

RMOL

1.00.0

Generated by Doxygen 1.8.1.1

Thu Jan 3 2013 21:29:15

Contents

1	RMOL Documentation	1
1.1	Getting Started	1
1.2	RMOL at SourceForge	1
1.3	RMOL Development	1
1.4	External Libraries	1
1.5	Support RMOL	2
1.6	About RMOL	2
2	People	2
2.1	Project Admins	2
2.2	Developers	2
2.3	Retired Developers	2
2.4	Contributors	2
2.5	Distribution Maintainers	3
3	Coding Rules	3
3.1	Default Naming Rules for Variables	3
3.2	Default Naming Rules for Functions	3
3.3	Default Naming Rules for Classes and Structures	3
3.4	Default Naming Rules for Files	3
3.5	Default Functionality of Classes	3
4	Copyright and License	4
4.1	GNU LESSER GENERAL PUBLIC LICENSE	4
4.1.1	Version 2.1, February 1999	4
4.2	Preamble	4
4.3	TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION	5
4.3.1	NO WARRANTY	9
4.3.2	END OF TERMS AND CONDITIONS	9
4.4	How to Apply These Terms to Your New Programs	9
5	Documentation Rules	10
5.1	General Rules	10
5.2	File Header	11
5.3	Grouping Various Parts	11
6	Main features	12
6.1	Optimisation features	12
6.2	Unconstraining	12
6.3	Forecasting features	12

6.4	Overbooking features	12
6.5	Other features	12
7	Make a Difference	12
8	Make a new release	13
8.1	Introduction	13
8.2	Initialisation	13
8.3	Release branch maintenance	13
8.4	Commit and publish the release branch	14
8.5	Create source packages (tar-balls)	14
8.6	Upload the HTML documentation to SourceForge	14
8.7	Generate the RPM packages	15
8.8	Update distributed change log	15
8.9	Create the binary package, including the documentation	15
8.10	Upload the files to SourceForge	15
8.11	Make a new post	15
8.12	Send an email on the announcement mailing-list	15
9	Installation	16
9.1	Table of Contents	16
9.2	Fedora/RedHat Linux distributions	16
9.3	RMOL Requirements	16
9.4	Basic Installation	17
9.5	Compilers and Options	18
9.6	Compiling For Multiple Architectures	18
9.7	Installation Names	18
9.8	Optional Features	19
9.9	Particular systems	19
9.10	Specifying the System Type	20
9.11	Sharing Defaults	20
9.12	Defining Variables	21
9.13	'cmake' Invocation	21
10	Linking with RMOL	25
10.1	Table of Contents	25
10.2	Introduction	25
10.3	Using the pkg-config command	25
10.4	Using the rmol-config script	25
10.5	M4 macro for the GNU Autotools	26
10.6	Using RMOL with dynamic linking	26

11 Test Rules	26
11.1 The Test File	26
11.2 The Reference File	26
11.3 Testing IT++ Library	26
12 Users Guide	27
12.1 Table of Contents	27
12.2 Introduction	27
12.3 Get Started	27
12.3.1 Get the RMOL library	27
12.3.2 Build the RMOL project	27
12.3.3 Build and Run the Tests	27
12.3.4 Install the RMOL Project (Binaries, Documentation)	27
12.4 Exploring the Predefined BOM Tree	27
12.4.1 Forecaster BOM Tree	27
12.4.2 Optimiser BOM Tree	28
12.5 Extending the BOM Tree	28
13 Supported Systems	28
13.1 Table of Contents	28
13.2 Introduction	28
13.3 RMOL 0.23.x	29
13.3.1 Linux Systems	29
13.3.2 Windows Systems	32
13.3.3 Unix Systems	35
14 RMOL Supported Systems (Previous Releases)	35
14.1 RMOL 3.9.1	35
14.2 RMOL 3.9.0	35
14.3 RMOL 3.8.1	35
15 Tutorials	35
15.1 Table of Contents	35
15.2 Introduction	36
15.2.1 Preparing the StdAir Project for Development	36
15.3 Build a Predefined BOM Tree	36
15.3.1 Instantiate the BOM Root Object	36
15.3.2 Instantiate the (Airline) Inventory Object	36
15.3.3 Link the Inventory Object with the BOM Root	36
15.3.4 Build Another Airline Inventory	37
15.3.5 Dump The BOM Tree Content	37

15.3.6 Result of the Tutorial Program	37
15.4 Extend the Pre-Defined BOM Tree	38
15.4.1 Extend an Airline Inventory Object	38
15.4.2 Build the Specific BOM Objects	38
15.4.3 Result of the Tutorial Program	39
16 Command-Line Test to Demonstrate How To Test the RMOL Project	39
17 Command-Line Test to Demonstrate How To Test the RMOL Project	43
18 Command-Line Test to Demonstrate How To Test the RMOL Project	43
19 Command-Line Test to Demonstrate How To Test the RMOL Project	46
20 Namespace Index	47
20.1 Namespace List	47
21 Class Index	47
21.1 Class Hierarchy	47
22 Class Index	49
22.1 Class List	49
23 File Index	51
23.1 File List	52
24 Namespace Documentation	54
24.1 RMOL Namespace Reference	54
24.1.1 Typedef Documentation	56
24.1.2 Variable Documentation	56
24.2 stdair Namespace Reference	57
24.2.1 Detailed Description	57
25 Class Documentation	57
25.1 RMOL::BasedForecasting Class Reference	57
25.1.1 Detailed Description	57
25.1.2 Member Function Documentation	57
25.2 CmdAbstract Class Reference	58
25.3 RMOL::ConvexHullException Class Reference	59
25.3.1 Detailed Description	59
25.3.2 Constructor & Destructor Documentation	59
25.4 RMOL::DemandGeneratorList Class Reference	59
25.4.1 Detailed Description	60
25.4.2 Member Typedef Documentation	60

25.4.3	Constructor & Destructor Documentation	60
25.4.4	Member Function Documentation	60
25.5	RMOL::DemandInputPreparation Class Reference	60
25.5.1	Detailed Description	61
25.5.2	Member Function Documentation	61
25.6	RMOL::Detruncator Class Reference	61
25.6.1	Detailed Description	61
25.6.2	Member Function Documentation	61
25.7	RMOL::DPOptimiser Class Reference	62
25.7.1	Detailed Description	62
25.7.2	Member Function Documentation	62
25.8	RMOL::EMDetruncator Class Reference	62
25.8.1	Detailed Description	62
25.8.2	Member Function Documentation	62
25.9	RMOL::EmptyBookingClassListException Class Reference	63
25.9.1	Detailed Description	63
25.9.2	Constructor & Destructor Documentation	63
25.10	RMOL::EmptyConvexHullException Class Reference	63
25.10.1	Detailed Description	64
25.10.2	Constructor & Destructor Documentation	64
25.11	RMOL::EmptyNestingStructException Class Reference	64
25.11.1	Detailed Description	65
25.11.2	Constructor & Destructor Documentation	65
25.12	RMOL::Emsr Class Reference	65
25.12.1	Detailed Description	65
25.12.2	Member Function Documentation	65
25.13	RMOL::EmsrUtils Class Reference	66
25.13.1	Detailed Description	66
25.13.2	Member Function Documentation	66
25.14	RMOL::FacRmolServiceContext Class Reference	67
25.14.1	Detailed Description	67
25.14.2	Constructor & Destructor Documentation	67
25.14.3	Member Function Documentation	68
25.15	FacServiceAbstract Class Reference	68
25.16	RMOL::FareAdjustment Class Reference	68
25.16.1	Detailed Description	69
25.16.2	Member Function Documentation	69
25.17	RMOL::FareFamilyDemandVectorSizeException Class Reference	69
25.17.1	Detailed Description	69
25.17.2	Constructor & Destructor Documentation	69

25.18RMOL::FareFamilyException Class Reference	70
25.18.1 Detailed Description	70
25.18.2 Constructor & Destructor Documentation	70
25.19RMOL::FirstPolicyNotNullException Class Reference	70
25.19.1 Detailed Description	71
25.19.2 Constructor & Destructor Documentation	71
25.20RMOL::Forecaster Class Reference	71
25.20.1 Detailed Description	71
25.20.2 Member Function Documentation	71
25.21ForecasterTestSuite Class Reference	71
25.21.1 Detailed Description	72
25.21.2 Constructor & Destructor Documentation	72
25.21.3 Member Function Documentation	72
25.21.4 Member Data Documentation	72
25.22RMOL::HistoricalBooking Struct Reference	72
25.22.1 Detailed Description	73
25.22.2 Constructor & Destructor Documentation	73
25.22.3 Member Function Documentation	73
25.23RMOL::HistoricalBookingHolder Struct Reference	75
25.23.1 Detailed Description	75
25.23.2 Constructor & Destructor Documentation	75
25.23.3 Member Function Documentation	76
25.24RMOL::HybridForecasting Class Reference	78
25.24.1 Detailed Description	78
25.24.2 Member Function Documentation	79
25.25RMOL::InventoryParser Class Reference	79
25.25.1 Detailed Description	80
25.25.2 Member Function Documentation	80
25.26RMOL::MarginalRevenueTransformation Class Reference	80
25.26.1 Detailed Description	80
25.26.2 Member Function Documentation	81
25.27RMOL::MCOptimiser Class Reference	81
25.27.1 Detailed Description	81
25.27.2 Member Function Documentation	81
25.28RMOL::MissingBookingClassInFareFamilyException Class Reference	82
25.28.1 Detailed Description	82
25.28.2 Constructor & Destructor Documentation	82
25.29RMOL::MissingDCPException Class Reference	82
25.29.1 Detailed Description	83
25.29.2 Constructor & Destructor Documentation	83

25.30RMOL::NewQFF Class Reference	83
25.30.1 Detailed Description	83
25.30.2 Member Function Documentation	83
25.31RMOL::OldQFF Class Reference	84
25.31.1 Detailed Description	84
25.31.2 Member Function Documentation	84
25.32RMOL::OptimisationException Class Reference	85
25.32.1 Detailed Description	85
25.32.2 Constructor & Destructor Documentation	85
25.33RMOL::Optimiser Class Reference	85
25.33.1 Detailed Description	86
25.33.2 Member Function Documentation	86
25.34OptimiseTestSuite Class Reference	87
25.34.1 Detailed Description	87
25.34.2 Constructor & Destructor Documentation	87
25.34.3 Member Function Documentation	87
25.34.4 Member Data Documentation	88
25.35RMOL::OverbookingException Class Reference	88
25.35.1 Detailed Description	88
25.35.2 Constructor & Destructor Documentation	88
25.36RMOL::PolicyException Class Reference	89
25.36.1 Detailed Description	89
25.36.2 Constructor & Destructor Documentation	89
25.37RMOL::PolicyHelper Class Reference	89
25.37.1 Detailed Description	89
25.37.2 Member Function Documentation	90
25.38RMOL::PreOptimiser Class Reference	90
25.38.1 Detailed Description	90
25.38.2 Member Function Documentation	90
25.39RMOL::QForecasting Class Reference	91
25.39.1 Detailed Description	91
25.39.2 Member Function Documentation	91
25.40RMOL::RMOL_Service Class Reference	92
25.40.1 Detailed Description	93
25.40.2 Constructor & Destructor Documentation	93
25.40.3 Member Function Documentation	94
25.41RMOL::RMOL_ServiceContext Class Reference	98
25.41.1 Detailed Description	99
25.41.2 Friends And Related Function Documentation	99
25.42RootException Class Reference	99

25.43RMOL::SegmentSnapshotTableHelper Class Reference	99
25.43.1 Detailed Description	100
25.43.2 Member Function Documentation	100
25.44ServiceAbstract Class Reference	100
25.45StructAbstract Class Reference	100
25.46TestFixture Class Reference	101
25.47UnconstrainerTestSuite Class Reference	101
25.47.1 Detailed Description	101
25.47.2 Constructor & Destructor Documentation	101
25.47.3 Member Function Documentation	102
25.47.4 Member Data Documentation	102
25.48RMOL::UnconstrainingException Class Reference	102
25.48.1 Detailed Description	102
25.48.2 Constructor & Destructor Documentation	102
25.49RMOL::Utilities Class Reference	102
25.49.1 Detailed Description	103
25.49.2 Member Function Documentation	103
25.50RMOL::YieldConvexHullException Class Reference	104
25.50.1 Detailed Description	105
25.50.2 Constructor & Destructor Documentation	105
26 File Documentation	105
26.1 doc/local/authors.doc File Reference	105
26.2 doc/local/codingrules.doc File Reference	105
26.3 doc/local/copyright.doc File Reference	105
26.4 doc/local/documentation.doc File Reference	105
26.5 doc/local/features.doc File Reference	105
26.6 doc/local/help_wanted.doc File Reference	105
26.7 doc/local/howto_release.doc File Reference	105
26.8 doc/local/index.doc File Reference	105
26.9 doc/local/installation.doc File Reference	105
26.10doc/local/linking.doc File Reference	105
26.11doc/local/test.doc File Reference	105
26.12doc/local/users_guide.doc File Reference	105
26.13doc/local/verification.doc File Reference	105
26.14doc/tutorial/tutorial.doc File Reference	105
26.15rmol/basic/BasConst.cpp File Reference	105
26.16BasConst.cpp	106
26.17rmol/basic/BasConst_General.hpp File Reference	106
26.18BasConst_General.hpp	106

26.19rmol/basic/BasConst_RMOL_Service.hpp File Reference	107
26.20BasConst_RMOL_Service.hpp	107
26.21rmol/batches/rmol.cpp File Reference	107
26.21.1 Function Documentation	108
26.21.2 Variable Documentation	109
26.22rmol.cpp	109
26.23rmol/bom/BucketHolderTypes.hpp File Reference	113
26.24BucketHolderTypes.hpp	113
26.25rmol/bom/DistributionParameterList.hpp File Reference	113
26.26DistributionParameterList.hpp	114
26.27rmol/bom/DPOptimiser.cpp File Reference	114
26.28DPOptimiser.cpp	114
26.29rmol/bom/DPOptimiser.hpp File Reference	117
26.30DPOptimiser.hpp	117
26.31rmol/bom/EMDetruncator.cpp File Reference	117
26.32EMDetruncator.cpp	118
26.33rmol/bom/EMDetruncator.hpp File Reference	119
26.34EMDetruncator.hpp	119
26.35rmol/bom/Emsr.cpp File Reference	119
26.36Emsr.cpp	120
26.37rmol/bom/Emsr.hpp File Reference	122
26.38Emsr.hpp	122
26.39rmol/bom/EmsrUtils.cpp File Reference	122
26.40EmsrUtils.cpp	123
26.41rmol/bom/EmsrUtils.hpp File Reference	124
26.42EmsrUtils.hpp	124
26.43rmol/bom/HistoricalBooking.cpp File Reference	125
26.44HistoricalBooking.cpp	125
26.45rmol/bom/HistoricalBooking.hpp File Reference	126
26.46HistoricalBooking.hpp	126
26.47rmol/bom/HistoricalBookingHolder.cpp File Reference	127
26.48HistoricalBookingHolder.cpp	127
26.49rmol/bom/HistoricalBookingHolder.hpp File Reference	131
26.50HistoricalBookingHolder.hpp	131
26.51rmol/bom/MCOptimiser.cpp File Reference	132
26.52MCOptimiser.cpp	133
26.53rmol/bom/MCOptimiser.hpp File Reference	136
26.54MCOptimiser.hpp	136
26.55rmol/bom/old/DemandGeneratorList.cpp File Reference	137
26.56DemandGeneratorList.cpp	137

26.57rmol/bom/old/DemandGeneratorList.hpp File Reference	138
26.58DemandGeneratorList.hpp	138
26.59rmol/bom/PolicyHelper.cpp File Reference	139
26.60PolicyHelper.cpp	139
26.61rmol/bom/PolicyHelper.hpp File Reference	143
26.62PolicyHelper.hpp	143
26.63rmol/bom/SegmentSnapshotTableHelper.cpp File Reference	144
26.64SegmentSnapshotTableHelper.cpp	144
26.65rmol/bom/SegmentSnapshotTableHelper.hpp File Reference	145
26.66SegmentSnapshotTableHelper.hpp	145
26.67rmol/bom/Utilities.cpp File Reference	146
26.68Utilities.cpp	146
26.69rmol/bom/Utilities.hpp File Reference	150
26.70Utilities.hpp	150
26.71rmol/command/BasedForecasting.cpp File Reference	151
26.72BasedForecasting.cpp	151
26.73rmol/command/BasedForecasting.hpp File Reference	154
26.74BasedForecasting.hpp	154
26.75rmol/command/DemandInputPreparation.cpp File Reference	154
26.76DemandInputPreparation.cpp	155
26.77rmol/command/DemandInputPreparation.hpp File Reference	156
26.78DemandInputPreparation.hpp	156
26.79rmol/command/Detruncator.cpp File Reference	156
26.80Detruncator.cpp	156
26.81rmol/command/Detruncator.hpp File Reference	157
26.82Detruncator.hpp	157
26.83rmol/command/FareAdjustment.cpp File Reference	158
26.84FareAdjustment.cpp	158
26.85rmol/command/FareAdjustment.hpp File Reference	158
26.86FareAdjustment.hpp	159
26.87rmol/command/Forecaster.cpp File Reference	159
26.88Forecaster.cpp	160
26.89rmol/command/Forecaster.hpp File Reference	162
26.90Forecaster.hpp	162
26.91rmol/command/HybridForecasting.cpp File Reference	163
26.92HybridForecasting.cpp	163
26.93rmol/command/HybridForecasting.hpp File Reference	166
26.94HybridForecasting.hpp	166
26.95rmol/command/InventoryParser.cpp File Reference	166
26.96InventoryParser.cpp	167

26.97	rmol/command/InventoryParser.hpp File Reference	169
26.98	InventoryParser.hpp	169
26.99	rmol/command/MarginalRevenueTransformation.cpp File Reference	169
26.100	MarginalRevenueTransformation.cpp	170
26.101	rmol/command/MarginalRevenueTransformation.hpp File Reference	173
26.102	MarginalRevenueTransformation.hpp	174
26.103	rmol/command/NewQFF.cpp File Reference	174
26.104	NewQFF.cpp	175
26.105	rmol/command/NewQFF.hpp File Reference	178
26.106	NewQFF.hpp	179
26.107	rmol/command/OldQFF.cpp File Reference	179
26.108	OldQFF.cpp	180
26.109	rmol/command/OldQFF.hpp File Reference	184
26.110	OldQFF.hpp	184
26.111	rmol/command/Optimiser.cpp File Reference	185
26.112	Optimiser.cpp	185
26.113	rmol/command/Optimiser.hpp File Reference	189
26.114	Optimiser.hpp	189
26.115	rmol/command/PreOptimiser.cpp File Reference	190
26.116	PreOptimiser.cpp	191
26.117	rmol/command/PreOptimiser.hpp File Reference	192
26.118	PreOptimiser.hpp	192
26.119	rmol/command/QForecasting.cpp File Reference	193
26.120	QForecasting.cpp	193
26.121	rmol/command/QForecasting.hpp File Reference	196
26.122	QForecasting.hpp	196
26.123	rmol/config/rmol-paths.hpp File Reference	196
26.123.1	Macro Definition Documentation	197
26.124	rmol-paths.hpp	198
26.125	rmol/factory/FacRmolServiceContext.cpp File Reference	199
26.126	FacRmolServiceContext.cpp	199
26.127	rmol/factory/FacRmolServiceContext.hpp File Reference	200
26.128	FacRmolServiceContext.hpp	200
26.129	rmol/RMOL_Service.hpp File Reference	201
26.130	RMOL_Service.hpp	201
26.131	rmol/RMOL_Types.hpp File Reference	204
26.132	RMOL_Types.hpp	205
26.133	rmol/service/RMOL_Service.cpp File Reference	207
26.134	RMOL_Service.cpp	207
26.135	rmol/service/RMOL_ServiceContext.cpp File Reference	233

26.136	RMOL_ServiceContext.cpp	233
26.137	rmol/service/RMOL_ServiceContext.hpp File Reference	234
26.138	RMOL_ServiceContext.hpp	234
26.139	test/rmol/bomsforforecaster.cpp File Reference	235
26.140	bomsforforecaster.cpp	235
26.141	test/rmol/ForecasterTestSuite.cpp File Reference	238
26.142	ForecasterTestSuite.cpp	238
26.143	test/rmol/ForecasterTestSuite.hpp File Reference	239
26.143	Function Documentation	239
26.144	ForecasterTestSuite.hpp	240
26.145	test/rmol/OptimiseTestSuite.cpp File Reference	240
26.146	OptimiseTestSuite.cpp	240
26.147	test/rmol/OptimiseTestSuite.hpp File Reference	243
26.147	Function Documentation	243
26.148	OptimiseTestSuite.hpp	243
26.149	test/rmol/UnconstrainerTestSuite.cpp File Reference	244
26.150	UnconstrainerTestSuite.cpp	244
26.151	test/rmol/UnconstrainerTestSuite.hpp File Reference	245
26.151	Function Documentation	245
26.152	UnconstrainerTestSuite.hpp	245

1 RMOL Documentation

1.1 Getting Started

- [Main features](#)
- [Installation](#)
- [Linking with RMOL](#)
- [Users Guide](#)
- [Tutorials](#)
- [Copyright and License](#)
- [Make a Difference](#)
- [Make a new release](#)
- [People](#)

1.2 RMOL at SourceForge

- [Project page](#)
- [Download RMOL](#)
- [Open a ticket for a bug or feature](#)

- [Mailing lists](#)
- [Forums](#)
 - [Discuss about Development issues](#)
 - [Ask for Help](#)
 - [Discuss RMOL](#)

1.3 RMOL Development

- [Git Repository](#) (Subversion is deprecated)
- [Coding Rules](#)
- [Documentation Rules](#)
- [Test Rules](#)

1.4 External Libraries

- [Boost](#) (C++ STL extensions)
- [Python](#)
- [MySQL client](#)
- [SOI](#) (C++ DB API)

1.5 Support RMOL

1.6 About RMOL

[RMOL](#) is a C++ library of revenue management and optimisation classes and functions. [RMOL](#) mainly targets simulation purposes. [N](#)

[RMOL](#) makes an extensive use of existing open-source libraries for increased functionality, speed and accuracy. In particular [GSL](#) (*GNU Scientific Library*) and [Boost](#) (*C++ Standard Extensions*) libraries are used.

The [RMOL](#) library originates from the department of Operational Research and Innovation at [Amadeus](#), Sophia Antipolis, France. [RMOL](#) is released under the terms of the [GNU Lesser General Public License](#) (LGPLv2.1) for you to enjoy.

[RMOL](#) should work on [GNU/Linux](#), [Sun Solaris](#), Microsoft Windows (with [Cygwin](#), [MinGW/MSYS](#), or [Microsoft Visual C++ .NET](#)) and [Mac OS X](#) operating systems.

Note

(N) - The [RMOL](#) library is **NOT** intended, in any way, to be used by airlines for production systems. If you want to report issue, bug or feature request, or if you just want to give feedback, have a look on the right-hand side of this page for the preferred reporting methods. In any case, please do not contact Amadeus directly for any matter related to [RMOL](#).

2 People

2.1 Project Admins

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2.5 Distribution Maintainers

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Note

(N) - **Amadeus** employees.

3 Coding Rules

In the following sections we describe the naming conventions which are used for files, classes, structures, local variables, and global variables.

3.1 Default Naming Rules for Variables

Variables names follow Java naming conventions. Examples:

- `lNumberOfPassengers`
- `lSeatAvailability`

3.2 Default Naming Rules for Functions

Function names follow Java naming conventions. Example:

- `int myFunctionName (const int& a, int b)`

3.3 Default Naming Rules for Classes and Structures

Each new word in a class or structure name should always start with a capital letter and the words should be separated with an under-score. Abbreviations are written with capital letters. Examples:

- MyClassName
- MyStructName

3.4 Default Naming Rules for Files

Files are named after the C++ class names.

Source files are named using `.cpp` suffix, whereas header files end with `.hpp` extension. Examples:

- FlightDate.hpp
- SegmentDate.cpp

3.5 Default Functionality of Classes

All classes that are configured by input parameters should include:

- default empty constructor
- one or more additional constructor(s) that takes input parameters and initializes the class instance
- setup function, preferably named `'setup'` or `'set_parameters'`

Explicit destructor functions are not required, unless they are needed. It shall not be possible to use any of the other member functions unless the class has been properly initiated with the input parameters.

4 Copyright and License

4.1 GNU LESSER GENERAL PUBLIC LICENSE

4.1.1 Version 2.1, February 1999

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of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts
as the successor of the GNU Library Public License, version 2, hence
the version number 2.1.]

4.2 Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages—typically libraries—of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

4.3 TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

1. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

1. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

1. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

1. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

1. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application

to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

1. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

1. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

1. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

1. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

1. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise)

that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

1. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
1. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

1. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

4.3.1 NO WARRANTY

1. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
1. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

4.3.2 END OF TERMS AND CONDITIONS

4.4 How to Apply These Terms to Your New Programs

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or
modify it under the terms of the GNU Lesser General Public
License as published by the Free Software Foundation; either
version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public
License along with this library; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
```

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice
```

That's all there is to it!

Source

5 Documentation Rules

5.1 General Rules

All classes in [RMOL](#) should be properly documented with Doxygen comments in include (.hpp) files. Source (.cpp) files should be documented according to a normal standard for well documented C++ code.

An example of how the interface of a class shall be documented in [RMOL](#) is shown here:

```
/*!
 * \brief Brief description of MyClass here
 *
 * Detailed description of MyClass here. With example code if needed.
 */
class MyClass {
public:
    //! Default constructor
    MyClass(void) { setup_done = false; }

    /*!

```

```

    * \brief Constructor that initializes the class with parameters
    *
    * Detailed description of the constructor here if needed
    *
    * \param[in] param1 Description of \a param1 here
    * \param[in] param2 Description of \a param2 here
    */
    MyClass(TYPE1 param1, TYPE2 param2) { setup(param1, param2); }

    /*!
    * \brief Setup function for MyClass
    *
    * Detailed description of the setup function here if needed
    *
    * \param[in] param1 Description of \a param1 here
    * \param[in] param2 Description of \a param2 here
    */
    void setup(TYPE1 param1, TYPE2 param2);

    /*!
    * \brief Brief description of memberFunction1
    *
    * Detailed description of memberFunction1 here if needed
    *
    * \param[in]      param1 Description of \a param1 here
    * \param[in]      param2 Description of \a param2 here
    * \param[in,out] param3 Description of \a param3 here
    * \return Description of the return value here
    */
    TYPE4 memberFunction1(TYPE1 param1, TYPE2 param2, TYPE3 &param3);

private:

    bool _setUpDone;          /*!< Variable that checks if the class is properly
                               initialized with parameters */
    TYPE1 _privateVariable1; /*!< Short description of _privateVariable1 here
    TYPE2 _privateVariable2; /*!< Short description of _privateVariable2 here
};

```

5.2 File Header

All files should start with the following header, which include Doxygen's `\file`, `\brief` and `\author` tags, `$Date$` and `$Revisions$` CVS tags, and a common copyright note:

```

/*!
 * \file
 * \brief Brief description of the file here
 * \author Names of the authors who contributed to this code
 * \date Date
 *
 * Detailed description of the file here if needed.
 *
 * -----
 *
 * RMOL - C++ Revenue Management Object Library
 *
 * Copyright (C) 2007-2010 (\see authors file for a list of contributors)
 *
 * \see copyright file for license information
 *
 * -----
 */

```

5.3 Grouping Various Parts

All functions must be added to a Doxygen group in order to appear in the documentation. The following code example defines the group `'my_group'`:

```

/*!
 * \defgroup my_group Brief description of the group here
 *
 * Detailed description of the group here
 */

```

The following example shows how to document the function `myFunction` and how to add it to the group `my_group`:

```

/*!
 * \brief Brief description of myFunction here
 * \ingroup my_group
 *
 * Detailed description of myFunction here
 *
 * \param[in] param1 Description of \a param1 here
 * \param[in] param2 Description of \a param2 here
 * \return Description of the return value here
 */
TYPE3 myFunction(TYPE1 param1, TYPE2 &param2);

```

6 Main features

A short list of the main features of [RMOL](#) is given below sorted in different categories. Many more features and functions exist and for these we refer to the reference documentation.

6.1 Optimisation features

- [Dynamic Programming \(DP\)](#)
- [EMSRa](#) and [EMSRb](#)
- Network optimisation with [Linear Programming \(LP\)](#)

6.2 Unconstraining

- Inventory censorflag and guillotine
- E-M (Expectation Maximisation)

6.3 Forecasting features

- [Exponential Smoothing](#)
- [Moving Average](#)

6.4 Overbooking features

- Cancellations and No-Shows
- Cost-based optimisation
- Service-based optimisation

6.5 Other features

- CSV input file parsing

7 Make a Difference

Do not ask what [RMOL](#) can do for you. Ask what you can do for [RMOL](#).

You can help us to develop the [RMOL](#) library. There are always a lot of things you can do:

- Start using [RMOL](#)
- Tell your friends about [RMOL](#) and help them to get started using it
- If you find a bug, report it to us. Without your help we can never hope to produce a bug free code.
- Help us to improve the documentation by providing information about documentation bugs
- Answer support requests in the [RMOL](#) discussion forums on SourceForge. If you know the answer to a question, help others to overcome their [RMOL](#) problems.
- Help us to improve our algorithms. If you know of a better way (e.g. that is faster or requires less memory) to implement some of our algorithms, then let us know.
- Help us to port [RMOL](#) to new platforms. If you manage to compile [RMOL](#) on a new platform, then tell us how you did it.
- Send us your code. If you have a good [RMOL](#) compatible code, which you can release under the LGPL, and you think it should be included in [RMOL](#), then send it to us.
- Become an [RMOL](#) developer. Send us an e-mail and tell what you can do for [RMOL](#).

8 Make a new release

8.1 Introduction

This document describes briefly the recommended procedure of releasing a new version of [RMOL](#) using a Linux development machine and the SourceForge project site.

The following steps are required to make a release of the distribution package.

- [Initialisation](#)
- [Release branch maintenance](#)
- [Commit and publish the release branch](#)
- [Create source packages \(tar-balls\)](#)
- [Upload the HTML documentation to SourceForge](#)
- [Generate the RPM packages](#)
- [Update distributed change log](#)
- [Create the binary package, including the documentation](#)
- [Upload the files to SourceForge](#)
- [Make a new post](#)
- [Send an email on the announcement mailing-list](#)

8.2 Initialisation

Clone locally the full [Git project](#):

```
cd ~
mkdir -p dev/sim
cd ~/dev/sim
git clone git://rmol.git.sourceforge.net/gitroot/rmol/rmol rmolgit
cd rmolgit
git checkout trunk
```

8.3 Release branch maintenance

Switch to the release branch, on your local clone, and merge the latest updates from the trunk. Decide about the new version to be released.

```
cd ~/dev/sim/rmolgit
git checkout releases
git merge trunk
```

Update the version in the various build system files, replacing the old version numbers by the correct ones:

```
vi CMakeLists.txt
vi autogen.sh
vi README
```

Update the version, add some news in the NEWS file, add a change-log in the ChangeLog file and in the RPM specification files:

```
vi NEWS
vi ChangeLog
vi rmol.spec
```

8.4 Commit and publish the release branch

Commit the new release:

```
cd ~/dev/sim/rmolgit
git add -A
git commit -m "[Release 0.5.0] Release of the 0.5.0 version of RMOL."
git push
```

8.5 Create source packages (tar-balls)

Create the distribution packages using the following command:

```
cd ~/dev/sim/rmolgit
git checkout releases
rm -rf build && mkdir -p build
cd build
export INSTALL_BASEDIR=/home/user/dev/deliveries
export LIBSUFFIX_4_CMAKE="-DLIB_SUFFIX=64"
cmake -DCMAKE_INSTALL_PREFIX=${INSTALL_BASEDIR}/rmol-0.5.0 \
  -DWITH_STDAIR_PREFIX=${INSTALL_BASEDIR}/stdair-stable \
  -DWITH_AIRRAC_PREFIX=${INSTALL_BASEDIR}/airsched-stable \
  -DWITH_AIRRAC_PREFIX=${INSTALL_BASEDIR}/airrac-stable \
  -DWITH_RMOL_PREFIX=${INSTALL_BASEDIR}/rmol-stable \
  -DWITH_RMOL_PREFIX=${INSTALL_BASEDIR}/airinv-stable \
  -DWITH_RMOL_PREFIX=${INSTALL_BASEDIR}/simfgt-stable \
  -DCMAKE_BUILD_TYPE:STRING=Debug -DINSTALL_DOC:BOOL=ON \
  ${LIBSUFFIX_4_CMAKE} ..
make check && make dist
make install
```

This will configure, compile and check the package. The output packages will be named, for instance, `rmol-0.5.0.tar.gz` and `rmol-0.5.0.tar.bz2`.

8.6 Upload the HTML documentation to SourceForge

In order to update the Web site files, either:

- **synchronise them with rsync and SSH:** Upload the just generated HTML (and PDF) documentation onto the **SourceForge Web site**.

```
cd ~/dev/sim/rmolgit/build
git checkout releases
rsync -aiv ${INSTALL_BASEDIR}/rmol-0.5.0/share/doc/rmol-0.5.0/html/ \
  your_sf_user,rmol@web.sourceforge.net:htdocs/
```

where `-aiv` options mean:

- `-a`: archive/mirror mode; equals `-rlptgoD` (no `-H`, `-A`, `-X`)
- `-v`: increase verbosity
- `-i`: output a change-summary for all updates
- Note the trailing slashes (/) at the end of both the source and target directories. It means that the content of the source directory (`doc/html`), rather than the directory itself, has to be copied into the content of the target directory.

- or use the **SourceForge Shell service**.

8.7 Generate the RPM packages

Optionally, generate the RPM package (for instance, for **Fedora/RedHat**):

```
cd ~/dev/sim/rmolgit/build
git checkout releases
make dist
```

To perform this step, `rpm-build`, `rpmlint` and `rpmdevtools` have to be available on the system.

```
cp ../rmol.spec ~/dev/packages/SPECS \
  && cp rmol-0.5.0.tar.bz2 ~/dev/packages/SOURCES
cd ~/dev/packages/SPECS
rpmbuild -ba rmol.spec
cd ~/dev/packages
rpmlint -i SPECS/rmol.spec SRPMS/rmol-0.5.0-1.fc16.src.rpm \
  RPMS/noarch/rmol-* RPMS/i686/rmol-*
```

8.8 Update distributed change log

Update the `NEWS` and `ChangeLog` files with appropriate information, including what has changed since the previous release. Then commit and push the changes into the **RMOL's Git repository**.

8.9 Create the binary package, including the documentation

Create the binary package, which includes HTML and PDF documentation, using the following command:

```
cd ~/dev/sim/rmolgit/build
git checkout releases
make package
```

The output binary package will be named, for instance, `rmol-0.5.0-Linux.tar.bz2`. That package contains both the HTML and PDF documentation. The binary package contains also the executables and shared libraries, as well as C++ header files, but all of those do not interest us for now.

8.10 Upload the files to SourceForge

Upload the distribution and documentation packages to the SourceForge server. Check [SourceForge help page on uploading software](#).

8.11 Make a new post

- submit a new entry in the [SourceForge project-related news feed](#)
- make a new post on the [SourceForge hosted WordPress blog](#)
- and update, if necessary, [Trac tickets](#).

8.12 Send an email on the announcement mailing-list

Finally, you should send an announcement to rmol-announce@lists.sourceforge.net (see <https://lists.sourceforge.net/lists/listinfo/rmol-announce> for the archives)

9 Installation

9.1 Table of Contents

- [Fedora/RedHat Linux distributions](#)
- [RMOL Requirements](#)
- [Basic Installation](#)
- [Compilers and Options](#)
- [Compiling For Multiple Architectures](#)
- [Installation Names](#)
- [Optional Features](#)
- [Particular systems](#)
- [Specifying the System Type](#)
- [Sharing Defaults](#)
- [Defining Variables](#)
- [‘cmake’ Invocation](#)

9.2 Fedora/RedHat Linux distributions

Note that on [Fedora/RedHat](#) Linux distributions, RPM packages are available and can be installed with your usual package manager. For instance:

```
yum -y install rmol-devel rmol-doc
```

RPM packages can also be available on the [SourceForge download site](#).

9.3 RMOL Requirements

RMOL should compile without errors or warnings on most GNU/Linux systems, on UNIX systems like Solaris SunOS, and on POSIX based environments for Microsoft Windows like Cygwin or MinGW with MSYS. It can be also built on Microsoft Windows NT/2000/XP/Vista/7 using Microsoft's Visual C++ .NET, but our support for this compiler is limited. For GNU/Linux, SunOS, Cygwin and MinGW we assume that you have at least the following GNU software installed on your computer:

- GNU Autotools:
 - `autoconf`,
 - `automake`,
 - `libtool`,
 - `make`, version 3.72.1 or later (check version with `'make --version'`)
- `GCC` - GNU C++ Compiler (g++), version 4.3.x or later (check version with `'gcc --version'`)
- `Boost` - C++ STL extensions, version 1.35 or later (check version with `'grep "define BOOST_LIB_VERSION" /usr/include/boost/version.hpp'`)
- `MySQL` - Database client libraries, version 5.0 or later (check version with `'mysql --version'`)
- `SOCI` - C++ database client library wrapper, version 3.0.0 or later (check version with `'soci-config --version'`)

Optionally, you might need a few additional programs: `Doxygen`, `LaTeX`, `Dvips` and `Ghostscript`, to generate the HTML and PDF documentation.

We strongly recommend that you use recent stable releases of the GCC, if possible. We do not actively work on supporting older versions of the GCC, and they may therefore (without prior notice) become unsupported in future releases of RMOL.

9.4 Basic Installation

Briefly, the shell commands `./cmake .. && make install` should configure, build and install this package. The following more-detailed instructions are generic; see the `'README'` file for instructions specific to this package. Some packages provide this `'INSTALL'` file but do not implement all of the features documented below. The lack of an optional feature in a given package is not necessarily a bug. More recommendations for GNU packages can be found in the info page corresponding to "Makefile Conventions: (standards)Makefile Conventions".

The `'cmake'` shell script attempts to guess correct values for various system-dependent variables used during compilation. It uses those values to create a `'Makefile'` in each directory of the package. It may also create one or more `'h'` files containing system-dependent definitions. Finally, it creates a `'CMakeCache.txt'` cache file that you can refer to in the future to recreate the current configuration, and files `'CMakeFiles'` containing compiler output (useful mainly for debugging `'cmake'`).

It can also use an optional file (typically called `'config.cache'` and enabled with `'-cache-file=config.cache'` or simply `'-C'`) that saves the results of its tests to speed up reconfiguring. Caching is disabled by default to prevent problems with accidental use of stale cache files.

If you need to do unusual things to compile the package, please try to figure out how `'configure'` could check whether to do them, and mail diffs or instructions to the address given in the `'README'` so they can be considered for the next release. If you are using the cache, and at some point `'config.cache'` contains results you don't want to keep, you may remove or edit it.

The file `'CMakeLists.txt'` is used to create the `'Makefile'` files.

The simplest way to compile this package is:

1. `'cd'` to the directory containing the package's source code and type `./cmake ..` to configure the package for your system. Running `'cmake'` is generally fast. While running, it prints some messages telling which features it is checking for.

2. Type `'make'` to compile the package.
3. Optionally, type `'make check'` to run any self-tests that come with the package, generally using the just-built uninstalled binaries.
4. Type `'make install'` to install the programs and any data files and documentation. When installing into a prefix owned by root, it is recommended that the package be configured and built as a regular user, and only the `'make install'` phase executed with root privileges.
5. You can remove the program binaries and object files from the source code directory by typing `'make clean'`. To also remove the files that `'configure'` created (so you can compile the package for a different kind of computer), type `'make distclean'`. There is also a `'make maintainer-clean'` target, but that is intended mainly for the package's developers. If you use it, you may have to get all sorts of other programs in order to regenerate files that came with the distribution.
6. Often, you can also type `'make uninstall'` to remove the installed files again. In practice, not all packages have tested that uninstallation works correctly, even though it is required by the GNU Coding Standards.

9.5 Compilers and Options

Some systems require unusual options for compilation or linking that the `'cmake'` script does not know about. Run `'./cmake -help'` for details on some of the pertinent environment variables.

You can give `'cmake'` initial values for configuration parameters by setting variables in the command line or in the environment. Here is an example:

```
./cmake CC=c99 CFLAGS=-g LIBS=-lposix
```

See also

[Defining Variables](#) for more details.

9.6 Compiling For Multiple Architectures

You can compile the package for more than one kind of computer at the same time, by placing the object files for each architecture in their own directory. To do this, you can use GNU `'make'`. `'cd'` to the directory where you want the object files and executables to go and run the `'configure'` script. `'configure'` automatically checks for the source code in the directory that `'configure'` is in and in `'..'`. This is known as a "VPATH" build.

With a non-GNU `'make'`, it is safer to compile the package for one architecture at a time in the source code directory. After you have installed the package for one architecture, use `'make distclean'` before reconfiguring for another architecture.

On MacOS X 10.5 and later systems, you can create libraries and executables that work on multiple system types-known as "fat" or "universal" binaries-by specifying multiple `'-arch'` options to the compiler but only a single `'-arch'` option to the preprocessor. Like this:

```
./configure CC="gcc -arch i386 -arch x86_64 -arch ppc -arch ppc64" \
           CXX="g++ -arch i386 -arch x86_64 -arch ppc -arch ppc64" \
           CPP="gcc -E" CXXCPP="g++ -E"
```

This is not guaranteed to produce working output in all cases, you may have to build one architecture at a time and combine the results using the 'lipo' tool if you have problems.

9.7 Installation Names

By default, 'make install' installs the package's commands under '/usr/local/bin', include files under '/usr/local/include', etc. You can specify an installation prefix other than '/usr/local' by giving 'configure' the option '-prefix=PREFIX', where PREFIX must be an absolute file name.

You can specify separate installation prefixes for architecture-specific files and architecture-independent files. If you pass the option '-exec-prefix=PREFIX' to 'configure', the package uses PREFIX as the prefix for installing programs and libraries. Documentation and other data files still use the regular prefix.

In addition, if you use an unusual directory layout you can give options like '-bindir=DIR' to specify different values for particular kinds of files. Run 'configure -help' for a list of the directories you can set and what kinds of files go in them. In general, the default for these options is expressed in terms of '\${prefix}', so that specifying just '-prefix' will affect all of the other directory specifications that were not explicitly provided.

The most portable way to affect installation locations is to pass the correct locations to 'configure'; however, many packages provide one or both of the following shortcuts of passing variable assignments to the 'make install' command line to change installation locations without having to reconfigure or recompile.

The first method involves providing an override variable for each affected directory. For example, 'make install prefix=/alternate/directory' will choose an alternate location for all directory configuration variables that were expressed in terms of '\${prefix}'. Any directories that were specified during 'configure', but not in terms of '\${prefix}', must each be overridden at install time for the entire installation to be relocated. The approach of makefile variable overrides for each directory variable is required by the GNU Coding Standards, and ideally causes no recompilation. However, some platforms have known limitations with the semantics of shared libraries that end up requiring recompilation when using this method, particularly noticeable in packages that use GNU Libtool.

The second method involves providing the 'DESTDIR' variable. For example, 'make install DESTDIR=/alternate/directory' will prepend '/alternate/directory' before all installation names. The approach of 'DESTDIR' overrides is not required by the GNU Coding Standards, and does not work on platforms that have drive letters. On the other hand, it does better at avoiding recompilation issues, and works well even when some directory options were not specified in terms of '\${prefix}' at 'configure' time.

9.8 Optional Features

If the package supports it, you can cause programs to be installed with an extra prefix or suffix on their names by giving 'cmake' the option '-program-prefix=PREFIX' or '-program-suffix=SUFFIX'.

Some packages pay attention to '-enable-FEATURE' options to 'configure', where FEATURE indicates an optional part of the package. They may also pay attention to '-with-PACKAGE' options, where PACKAGE is something like

'gnu-as' or 'x' (for the X Window System). The 'README' should mention any '-enable-' and '-with-' options that the package recognizes.

For packages that use the X Window System, 'configure' can usually find the X include and library files automatically, but if it doesn't, you can use the 'configure' options '-x-includes=DIR' and '-x-libraries=DIR' to specify their locations.

Some packages offer the ability to configure how verbose the execution of 'make' will be. For these packages, running './configure --enable-silent-rules' sets the default to minimal output, which can be overridden with 'make V=1'; while running './configure --disable-silent-rules' sets the default to verbose, which can be overridden with 'make V=0'.

9.9 Particular systems

On HP-UX, the default C compiler is not ANSI C compatible. If GNU CC is not installed, it is recommended to use the following options in order to use an ANSI C compiler:

```
./configure CC="cc -Ae -D_XOPEN_SOURCE=500"
```

and if that doesn't work, install pre-built binaries of GCC for HP-UX.

On OSF/1 a.k.a. Tru64, some versions of the default C compiler cannot parse its '<wchar.h>' header file. The option '-nodtk' can be used as a workaround. If GNU CC is not installed, it is therefore recommended to try

```
./configure CC="cc"
```

and if that doesn't work, try

```
./configure CC="cc -nodtk"
```

On Solaris, don't put '/usr/ucb' early in your 'PATH'. This directory contains several dysfunctional programs; working variants of these programs are available in '/usr/bin'. So, if you need '/usr/ucb' in your 'PATH', put it *after* '/usr/bin'.

On Haiku, software installed for all users goes in '/boot/common', not '/usr/local'. It is recommended to use the following options:

```
./cmake -DCMAKE_INSTALL_PREFIX=/boot/common
```

9.10 Specifying the System Type

There may be some features 'configure' cannot figure out automatically, but needs to determine by the type of machine the package will run on. Usually, assuming the package is built to be run on the *same* architectures, 'configure' can figure that out, but if it prints a message saying it cannot guess the machine type, give it the '--build=TYPE' option. TYPE can either be a short name for the system type, such as 'sun4', or a canonical name which has the form CPU-COMPANY-SYSTEM

where SYSTEM can have one of these forms:

- OS

- KERNEL-OS

See the file `'config.sub'` for the possible values of each field. If `'config.sub'` isn't included in this package, then this package doesn't need to know the machine type.

If you are *building* compiler tools for cross-compiling, you should use the option `'-target=TYPE'` to select the type of system they will produce code for.

If you want to use a cross compiler, that generates code for a platform different from the build platform, you should specify the "host" platform (i.e., that on which the generated programs will eventually be run) with `'-host=TYPE'`.

9.11 Sharing Defaults

If you want to set default values for `'configure'` scripts to share, you can create a site shell script called `'config.site'` that gives default values for variables like `'CC'`, `'cache_file'`, and `'prefix'`. `'configure'` looks for `'PREFIX/share/config.site'` if it exists, then `'PREFIX/etc/config.site'` if it exists. Or, you can set the `'CONFIG_SITE'` environment variable to the location of the site script. A warning: not all `'configure'` scripts look for a site script.

9.12 Defining Variables

Variables not defined in a site shell script can be set in the environment passed to `'configure'`. However, some packages may run `configure` again during the build, and the customized values of these variables may be lost. In order to avoid this problem, you should set them in the `'configure'` command line, using `'VAR=value'`. For example:

```
./configure CC=/usr/local2/bin/gcc
```

causes the specified `'gcc'` to be used as the C compiler (unless it is overridden in the site shell script).

Unfortunately, this technique does not work for `'CONFIG_SHELL'` due to an Autoconf bug. Until the bug is fixed you can use this workaround:

```
CONFIG_SHELL=/bin/bash /bin/bash ./configure CONFIG_SHELL=/bin/bash
```

9.13 'cmake' Invocation

`'cmake'` recognizes the following options to control how it operates.

- `'-help'`, `'-h'` print a summary of all of the options to `'configure'`, and exit.
- `'-help=short'`, `'-help=recursive'` print a summary of the options unique to this package's `'configure'`, and exit. The `'short'` variant lists options used only in the top level, while the `'recursive'` variant lists options also present in any nested packages.
- `'-version'`, `'-V'` print the version of Autoconf used to generate the `'configure'` script, and exit.
- `'-cache-file=FILE'` enable the cache: use and save the results of the tests in `FILE`, traditionally `'config.cache'`. `FILE` defaults to `'/dev/null'` to disable caching.

- '-config-cache', '-C' alias for '-cache-file=config.cache'.
- '-quiet', '-silent', '-q' do not print messages saying which checks are being made. To suppress all normal output, redirect it to '/dev/null' (any error messages will still be shown).
- '-srcdir=DIR' look for the package's source code in directory DIR. Usually 'configure' can determine that directory automatically.
- '-prefix=DIR' use DIR as the installation prefix.

See also

[Installation Names](#) for more details, including other options available for fine-tuning the installation locations.

- '-no-create', '-n' run the configure checks, but stop before creating any output files.

'cmake' also accepts some other, not widely useful, options. Run 'cmake -help' for more details.

The 'cmake' script produces an output like this:

```
cmake -DCMAKE_INSTALL_PREFIX=/home/user/dev/deliveries/rmol-99.99.99 -DLIB_SUFFIX=64 -DCMAKE_BUILD_TYPE:STRING
-- The C compiler identification is GNU
-- The CXX compiler identification is GNU
-- Check for working C compiler: /usr/lib64/ccache/gcc
-- Check for working C compiler: /usr/lib64/ccache/gcc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working CXX compiler: /usr/lib64/ccache/c++
-- Check for working CXX compiler: /usr/lib64/ccache/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Requires Git without specifying any version
-- Current Git revision name: 56c6c98cf2cfb4008a0acd35d08075cf5f79e693 trunk
-- Requires Boost-1.41
-- Boost version: 1.46.0
-- Found the following Boost libraries:
--   program_options
--   date_time
--   iostreams
--   serialization
--   filesystem
--   unit_test_framework
--   python
-- Found Boost version: 1.46.0
-- Found BoostWrapper: /usr/include (Required is at least version "1.41")
-- Requires MySQL without specifying any version
-- Using mysql-config: /usr/bin/mysql_config
-- Found MySQL: /usr/lib64/mysql/libmysqlclient.so
-- Found MySQL version: 5.5.14
-- Requires SOCI-3.0
-- Using soci-config: /usr/bin/soci-config
-- SOCI headers are buried
-- Found SOCI: /usr/lib64/libsoci_core.so (Required is at least version "3.0")
-- Found SOCIMySQL: /usr/lib64/libsoci_mysql.so (Required is at least version "3.0")
-- Found SOCI with MySQL back-end support version: 3.0.0
-- Requires StdAir-0.35
-- Found StdAir version: 0.37.1
-- Requires Doxygen without specifying any version
-- Found Doxygen: /usr/bin/doxygen
-- Found DoxygenWrapper: /usr/bin/doxygen
-- Found Doxygen version: 1.7.4
-- Had to set the linker language for 'airraclib' to CXX
-- Had to set the linker language for 'rmollib' to CXX
-- Test 'UnconstrainerTest' to be built with 'UnconstrainerTestSuite.cpp'
-- Test 'ForecasterTest' to be built with 'ForecasterTestSuite.cpp'
-- Test 'OptimiseTest' to be built with 'OptimiseTestSuite.cpp'
-- Test 'BOMsForForecasterTest' to be built with 'bomsforforecaster.cpp'
```

```

--
-- =====
-- -----
-- ---      Project Information      ---
-- -----
-- PROJECT_NAME ..... : rmol
-- PACKAGE_PRETTY_NAME ..... : RMOL
-- PACKAGE ..... : rmol
-- PACKAGE_NAME ..... : RMOL
-- PACKAGE_BRIEF ..... : C++ library of Revenue Management and Optimisation classes and functions
-- PACKAGE_VERSION ..... : 99.99.99
-- GENERIC_LIB_VERSION ..... : 99.99.99
-- GENERIC_LIB_SOVERSION ..... : 99.99
--
-- -----
-- ---      Build Configuration      ---
-- -----
-- Modules to build ..... : airrac;rmol
-- Libraries to build/install ..... : airraclib;rmolllib
-- Binaries to build/install ..... : airrac;rmol
-- Modules to test ..... : rmol
-- Binaries to test ..... : UnconstrainerTesttst;UnconstrainerTesttst;ForecasterTesttst;Unconstrained
--
-- * Module ..... : airrac
--   + Layers to build ..... : .;basic;bom;factory;command;service
--   + Dependencies on other layers :
--   + Libraries to build/install . : airraclib
--   + Executables to build/install : airrac
--   + Tests to perform ..... :
-- * Module ..... : rmol
--   + Layers to build ..... : .;basic;bom;factory;command;service
--   + Dependencies on other layers : airraclib
--   + Libraries to build/install . : rmolllib
--   + Executables to build/install : rmol
--   + Tests to perform ..... : UnconstrainerTesttst;UnconstrainerTesttst;ForecasterTesttst;Unconstrained
--
-- BUILD_SHARED_LIBS ..... : ON
-- CMAKE_BUILD_TYPE ..... : Debug
-- * CMAKE_C_FLAGS ..... :
-- * CMAKE_CXX_FLAGS ..... : -Wall -Werror
-- * BUILD_FLAGS ..... :
-- * COMPILE_FLAGS ..... :
-- CMAKE_MODULE_PATH ..... : /home/user/dev/sim/rmol/rmolgithub/config/
-- CMAKE_INSTALL_PREFIX ..... : /home/user/dev/deliveries/rmol-99.99.99
--
-- * Doxygen:
--   - DOXYGEN_VERSION ..... : 1.7.4
--   - DOXYGEN_EXECUTABLE ..... : /usr/bin/doxygen
--   - DOXYGEN_DOT_EXECUTABLE ..... : /usr/bin/dot
--   - DOXYGEN_DOT_PATH ..... : /usr/bin
--
-- -----
-- ---      Installation Configuration      ---
-- -----
-- INSTALL_LIB_DIR ..... : /home/user/dev/deliveries/rmol-99.99.99/lib64
-- INSTALL_BIN_DIR ..... : /home/user/dev/deliveries/rmol-99.99.99/bin
-- INSTALL_INCLUDE_DIR ..... : /home/user/dev/deliveries/rmol-99.99.99/include
-- INSTALL_DATA_DIR ..... : /home/user/dev/deliveries/rmol-99.99.99/share
-- INSTALL_SAMPLE_DIR ..... : /home/user/dev/deliveries/rmol-99.99.99/share/rmol/samples
-- INSTALL_DOC ..... : ON
--
-- -----
-- ---      Packaging Configuration      ---
-- -----
-- CPACK_PACKAGE_CONTACT ..... : Denis Arnaud <denis_arnaud - at - users dot sourceforge dot net>
-- CPACK_PACKAGE_VENDOR ..... : Denis Arnaud
-- CPACK_PACKAGE_VERSION ..... : 99.99.99
-- CPACK_PACKAGE_DESCRIPTION_FILE . : /home/user/dev/sim/rmol/rmolgithub/README
-- CPACK_RESOURCE_FILE_LICENSE .... : /home/user/dev/sim/rmol/rmolgithub/COPYING
-- CPACK_GENERATOR ..... : TBZ2
-- CPACK_DEBIAN_PACKAGE_DEPENDS ... :
-- CPACK_SOURCE_GENERATOR ..... : TBZ2;TGZ
-- CPACK_SOURCE_PACKAGE_FILE_NAME . : rmol-99.99.99

```

```

--
-- -----
-- ---      External libraries      ---
-- -----
--
-- * Boost:
--   - Boost_VERSION ..... : 104600
--   - Boost_LIB_VERSION ..... : 1_46
--   - Boost_HUMAN_VERSION ..... : 1.46.0
--   - Boost_INCLUDE_DIRS ..... : /usr/include
--   - Boost required components .. : program_options;date_time;iostreams;serialization;filesystem;unit_test_f
--   - Boost required libraries ... : optimized;/usr/lib64/libboost_iostreams-mt.so;debug;/usr/lib64/libboost_
--
-- * MySQL:
--   - MYSQL_VERSION ..... : 5.5.14
--   - MYSQL_INCLUDE_DIR ..... : /usr/include/mysql
--   - MYSQL_LIBRARIES ..... : /usr/lib64/mysql/libmysqlclient.so
--
-- * SOCI:
--   - SOCI_VERSION ..... : 3.0.0
--   - SOCI_INCLUDE_DIR ..... : /usr/include/soci
--   - SOCI_MYSQL_INCLUDE_DIR ..... : /usr/include/soci
--   - SOCI_LIBRARIES ..... : /usr/lib64/libsoci_core.so
--   - SOCI_MYSQL_LIBRARIES ..... : /usr/lib64/libsoci_mysql.so
--
-- * StdAir:
--   - STDAIR_VERSION ..... : 0.37.1
--   - STDAIR_BINARY_DIRS ..... : /home/user/dev/deliveries/stdair-0.37.1/bin
--   - STDAIR_EXECUTABLES ..... : stdair
--   - STDAIR_LIBRARY_DIRS ..... : /home/user/dev/deliveries/stdair-0.37.1/lib64
--   - STDAIR_LIBRARIES ..... : stdairlib;stdairuiclib
--   - STDAIR_INCLUDE_DIRS ..... : /home/user/dev/deliveries/stdair-0.37.1/include
--   - STDAIR_SAMPLE_DIR ..... : /home/user/dev/deliveries/stdair-0.37.1/share/stdair/samples
--
-- Change a value with: cmake -D<Variable>=<Value>
-- =====
--
-- Configuring done
-- Generating done
-- Build files have been written to: /home/user/dev/sim/rmol/rmolgithub/build

```

It is recommended that you check if your library has been compiled and linked properly and works as expected. To do so, you should execute the testing process 'make check'. As a result, you should obtain a similar report:

```

[ 0%] Built target hdr_cfg_rmol
[ 0%] Built target hdr_cfg_airrac
[ 30%] Built target airraclib
[ 86%] Built target rmolib
[ 90%] Built target BOMsForForecasterTesttst
[ 93%] Built target UnconstrainerTesttst
[ 96%] Built target ForecasterTesttst
[100%] Built target OptimiseTesttst
Scanning dependencies of target check_rmoltst
Test project /home/user/dev/sim/rmol/rmolgithub/build/test/rmol
  Start 1: UnconstrainerTesttst
1/4 Test #1: UnconstrainerTesttst ..... Passed    0.04 sec
  Start 2: ForecasterTesttst
2/4 Test #2: ForecasterTesttst ..... Passed    0.04 sec
  Start 3: OptimiseTesttst
3/4 Test #3: OptimiseTesttst ..... Passed    0.44 sec
  Start 4: BOMsForForecasterTesttst
4/4 Test #4: BOMsForForecasterTesttst ..... Passed    0.02 sec

100% tests passed, 0 tests failed out of 4

Total Test time (real) = 0.78 sec
[100%] Built target check_rmoltst
Scanning dependencies of target check
[100%] Built target check

```

Check if all the executed tests PASSED. If not, please contact us by filling a [bug-report](#).

Finally, you should install the compiled and linked library, include files and (optionally) HTML and PDF documentation by typing:

```
make install
```

Depending on the PREFIX settings during configuration, you might need the root (administrator) access to perform this step.

Eventually, you might invoke the following command

```
make clean
```

to remove all files created during compilation process, or even

```
cd ~/dev/sim/rmolgit
rm -rf build && mkdir build
cd build
```

to remove everything.

10 Linking with RMOL

10.1 Table of Contents

- [Introduction](#)
- [Using the pkg-config command](#)
- [Using the rmol-config script](#)
- [M4 macro for the GNU Autotools](#)
- [Using RMOL with dynamic linking](#)

10.2 Introduction

There are two convenient methods of linking your programs with the [RMOL](#) library. The first one employs the `'pkg-config'` command (see <http://pkgconfig.freedesktop.org/>), whereas the second one uses `'rmol-config'` script. These methods are shortly described below.

10.3 Using the pkg-config command

`'pkg-config'` is a helper tool used when compiling applications and libraries. It helps you insert the correct compiler and linker options. The syntax of the `'pkg-config'` is as follows:

```
pkg-config <options> <library_name>
```

For instance, assuming that you need to compile an [RMOL](#) based program `'my_prog.cpp'`, you should use the following command:

```
g++ `pkg-config --cflags rmol` -o my_prog my_prog.cpp `pkg-config --libs rmol`
```

For more information see the `'pkg-config'` man pages.

10.4 Using the rmol-config script

RMOL provides a shell script called `rmol-config`, which is installed by default in ``$prefix/bin'` (``/usr/local/bin'`) directory. It can be used to simplify compilation and linking of **RMOL** based programs. The usage of this script is quite similar to the usage of the ``pkg-config'` command.

Assuming that you need to compile the program ``my_prog.cpp'` you can now do that with the following command:

```
g++ `rmol-config --cflags` -o my_prog_opt my_prog.cpp `rmol-config --libs`
```

A list of ``rmol-config'` options can be obtained by typing:

```
rmol-config --help
```

If the ``rmol-config'` command is not found by your shell, you should add its location ``$prefix/bin'` to the `PATH` environment variable, e.g.:

```
export PATH=/usr/local/bin:$PATH
```

10.5 M4 macro for the GNU Autotools

A M4 macro file is delivered with **RMOL**, namely ``rmol.m4'`, which can be found in, e.g., ``/usr/share/aclocal'`. When used by a ``configure'` script, thanks to the ``AM_PATH_RMOL'` macro (specified in the M4 macro file), the following Makefile variables are then defined:

- ``RMOL_VERSION'` (e.g., defined to 0.23.0)
- ``RMOL_CFLAGS'` (e.g., defined to ``-I${prefix}/include'`)
- ``RMOL_LIBS'` (e.g., defined to ``-L${prefix}/lib -lrmol'`)

10.6 Using RMOL with dynamic linking

When using static linking some of the library routines in **RMOL** are copied into your executable program. This can lead to unnecessary large executables. To avoid having too large executable files you may use dynamic linking instead. Dynamic linking means that the actual linking is performed when the program is executed. This requires that the system is able to locate the shared **RMOL** library file during your program execution. If you install the **RMOL** library using a non-standard prefix, the ``LD_LIBRARY_PATH'` environment variable might be used to inform the linker of the dynamic library location, e.g.:

```
export LD_LIBRARY_PATH=<RMOL installation prefix>/lib:$LD_LIBRARY_PATH
```

11 Test Rules

This section describes rules how the functionality of the IT++ library should be verified. In the ``tests'` subdirectory test files are provided. All functionality should be tested using these test files.

11.1 The Test File

Each new IT++ module/class should be accompanied with a test file. The test file is an implementation in C++ that tests the functionality of a function/class or a group of functions/classes called modules. The test file should test relevant parameter settings and input/output relations to guarantee correct functionality of the corresponding classes/functions. The test files should be maintained using version control and updated whenever new functionality is added to the IT++ library.

The test file should print relevant data to a standard output that can be used to verify the functionality. All relevant parameter settings should be tested.

The test file should be placed in the ``tests'` subdirectory and should have a name ending with ``_test.cpp'`.

11.2 The Reference File

Consider a test file named `'module_test.cpp'`. A reference file named `'module_test.ref'` should accompany the test file. The reference file contains a reference printout of the standard output generated when running the test program. The reference file should be maintained using version control and updated according to the test file.

11.3 Testing IT++ Library

One can compile and execute all test programs from `'tests'` subdirectory by typing

```
% make check
```

after successful compilation of the IT++ library.

12 Users Guide

12.1 Table of Contents

- [Introduction](#)
- [Get Started](#)
 - [Get the RMOL library](#)
 - [Build the RMOL project](#)
 - [Build and Run the Tests](#)
 - [Install the RMOL Project \(Binaries, Documentation\)](#)
- [Exploring the Predefined BOM Tree](#)
 - [Forecaster BOM Tree](#)
 - [Optimiser BOM Tree](#)
- [Extending the BOM Tree](#)

12.2 Introduction

The [RMOL](#) library contains classes for revenue management. This document does not cover all the aspects of the [RMOL](#) library. It does however explain the most important things you need to know in order to start using [RMOL](#).

12.3 Get Started

12.3.1 Get the RMOL library

12.3.2 Build the RMOL project

To run the configuration script the first time, go to the top directory (where the [RMOL](#) package has been un-packed), and issue the following command:

- `mkdir -p build && cd build && cmake ..`
- `make`

Note

The [RMOL](#) project can either be cloned from the [Git Repository](#) or downloaded as a tar-ball package from the [Sourceforge Web site](#).

12.3.3 Build and Run the Tests

12.3.4 Install the RMOL Project (Binaries, Documentation)

12.4 Exploring the Predefined BOM Tree

[RMOL](#) predefines a BOM (Business Object Model) tree specific to the airline IT arena.

12.4.1 Forecaster BOM Tree

- [RMOL::EMDetruncator](#)
- [RMOL::Detruncator](#)
- [RMOL::Forecaster](#)

12.4.2 Optimiser BOM Tree

- [RMOL::DPOptimiser](#)
- [RMOL::MCOptimiser](#)
- [RMOL::Optimiser](#)

12.5 Extending the BOM Tree

13 Supported Systems

13.1 Table of Contents

- [Introduction](#)
- [RMOL 0.23.x](#)
 - [Linux Systems](#)
 - * [Fedora Core 4 with ATLAS](#)
 - * [Gentoo Linux with ACML](#)
 - * [Gentoo Linux with ATLAS](#)
 - * [Gentoo Linux with MKL](#)
 - * [Gentoo Linux with NetLib's BLAS and LAPACK](#)
 - * [Red Hat Enterprise Linux with RMOL External](#)
 - * [SUSE Linux 10.0 with NetLib's BLAS and LAPACK](#)
 - * [SUSE Linux 10.0 with MKL](#)
 - [Windows Systems](#)
 - * [Microsoft Windows XP with Cygwin](#)
 - * [Microsoft Windows XP with Cygwin and ATLAS](#)
 - * [Microsoft Windows XP with Cygwin and ACML](#)
 - * [Microsoft Windows XP with MinGW, MSYS and ACML](#)
 - * [Microsoft Windows XP with MinGW, MSYS and RMOL External](#)
 - * [Microsoft Windows XP with MS Visual C++ and Intel MKL](#)
 - [Unix Systems](#)
 - * [SunOS 5.9 with RMOL External](#)
- [RMOL 3.9.1](#)

- [RMOL 3.9.0](#)
- [RMOL 3.8.1](#)

13.2 Introduction

This page is intended to provide a list of [RMOL](#) supported systems, i.e. the systems on which configuration, installation and testing process of the [RMOL](#) library has been successful. Results are grouped based on minor release number. Therefore, only the latest tests for bug-fix releases are included. Besides, the information on this page is divided into sections dependent on the operating system.

Where necessary, some extra information is given for each tested configuration, e.g. external libraries installed, configuration commands used, etc.

If you manage to compile, install and test the [RMOL](#) library on a system not mentioned below, please let us know, so we could update this database.

13.3 RMOL 0.23.x

13.3.1 Linux Systems

13.3.1.1 Fedora Core 4 with ATLAS

- **Platform:** Intel Pentium 4
- **Operating System:** Fedora Core 4 (x86)
- **Compiler:** g++ (GCC) 4.0.2 20051125
- **RMOL release:** 0.23.0
- **External Libraries:** From FC4 distribution:
 - `fftw3.i386-3.0.1-3`
 - `fftw3-devel.i386-3.0.1-3`
 - `atlas-sse2.i386-3.6.0-8.fc4`
 - `atlas-sse2-devel.i386-3.6.0-8.fc4`
 - `blas.i386-3.0-35.fc4`
 - `lapack.i386-3.0-35.fc4`
- **Tests Status:** All tests PASSED
- **Comments:** [RMOL](#) configured with:

```
% CXXFLAGS="-O3 -pipe -march=pentium4" ./configure
```
- **Date:** March 7, 2006
- **Tester:** Tony Ottosson

13.3.1.2 Gentoo Linux with ACML

- **Platform:** AMD Sempron 3000+
- **Operating System:** Gentoo Linux 2006.0 (x86 arch)
- **Compiler(s):** g++ (GCC) 3.4.5
- **RMOL release:** 0.23.1
- **External Libraries:** Compiled and installed from portage tree:

```
- sci-libs/acml-3.0.0
```

- **Tests Status:** All tests PASSED
- **Comments:** BLAS and LAPACK libs set by using the following system commands:

```
% eselect blas set ACML
% eselect lapack set ACML
```

RMOL configured with:

```
% export CPPFLAGS="-I/usr/include/acml"
% ./configure --with-blas="-lblas"
```

- **Date:** March 31, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.1.3 Gentoo Linux with ATLAS

- **Platform:** Intel Pentium M Centrino
- **Operating System:** Gentoo Linux 2006.0 (x86)
- **Compiler:** g++ (GCC) 3.4.5
- **RMOL release:** 0.23.1
- **External Libraries:** Compiled and installed from portage tree:

```
- sci-libs/fftw-3.1
- sci-libs/blas-atlas-3.6.0-r1
- sci-libs/lapack-atlas-3.6.0
```

- **Tests Status:** All tests PASSED
- **Comments:** BLAS and LAPACK libs set by using the following system commands:

```
% eselect blas set ATLAS
% eselect lapack set ATLAS
```

RMOL configured with:

```
% ./configure --with-blas="-lblas"
```

- **Date:** March 31, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.1.4 Gentoo Linux with MKL

- **Platform:** Intel Pentium M Centrino
- **Operating System:** Gentoo Linux 2006.0 (x86 arch)
- **Compiler:** g++ (GCC) 3.4.5
- **RMOL release:** 0.23.0
- **External Libraries:** Intel Math Kernel Library (MKL) 8.0.1 installed manually in the following directory:
/opt/intel/mkl/8.0.1

- **Tests Status:** All tests PASSED
- **Comments:** RMOL configured using the following commands:

```
% export LDFLAGS="-L/opt/intel/mkl/8.0.1/lib/32"
% export CPPFLAGS="-I/opt/intel/mkl/8.0.1/include"
% ./configure
```

- **Date:** February 28, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.1.5 Gentoo Linux with NetLib's BLAS and LAPACK

- **Platform:** Intel Pentium M Centrino
- **Operating System:** Gentoo Linux 2006.0 (x86)
- **Compiler:** g++ (GCC) 3.4.5
- **RMOL release:** 0.23.1
- **External Libraries:** Compiled and installed from portage tree:
 - sci-libs/fftw-3.1
 - sci-libs/blas-reference-19940131-r2
 - sci-libs/cblas-reference-20030223
 - sci-libs/lapack-reference-3.0-r2
- **Tests Status:** All tests PASSED
- **Comments:** BLAS and LAPACK libs set by using the following system commands:

```
% blas-config reference
% lapack-config reference
```

RMOL configured with:

```
% ./configure --with-blas="-lblas"
```

- **Date:** March 31, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.1.6 Red Hat Enterprise Linux with RMOL External

- **Platform:** Intel Pentium 4
- **Operating System:** Red Hat Enterprise Linux AS release 4 (Nahant Update 2)
- **Compiler:** g++ (GCC) 3.4.4 20050721 (Red Hat 3.4.4-2)
- **RMOL release:** 0.23.0
- **External Libraries:** BLAS, CBLAS, LAPACK and FFTW libraries from [RMOL External 2.1.1](#) package
- **Tests Status:** All tests PASSED
- **Date:** March 7, 2006
- **Tester:** Erik G. Larsson

13.3.1.7 SUSE Linux 10.0 with NetLib's BLAS and LAPACK

- **Platform:** Intel Pentium 4 CPU 3.20GHz (64-bit)
- **Operating System:** SUSE Linux 10.0 (x86_64)
- **Compiler(s):** g++ (GCC) 4.0.2
- **RMOL release:** 0.23.0
- **External Libraries:** BLAS, LAPACK and FFTW libraries installed from OpenSuse 10.0 RPM repository:
 - blas-3.0-926
 - lapack-3.0-926
 - fftw3-3.0.1-114

- fftw3-threads-3.0.1-114
- fftw3-devel-3.0.1-114

- **Tests Status:** All tests PASSED

- **Comments:** [RMOL](#) configured with:

```
% export CXXFLAGS="-m64 -march=nocona -O3 -pipe"
% ./configure --with-lapack="/usr/lib64/liblapack.so.3"
```

- **Date:** March 1, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.1.8 SUSE Linux 10.0 with MKL

- **Platform:** Intel Pentium 4 CPU 3.20GHz (64-bit)
- **Operating System:** SUSE Linux 10.0 (x86_64)
- **Compiler(s):** g++ (GCC) 4.0.2
- **[RMOL](#) release:** 0.23.0
- **External Libraries:** Intel Math Kernel Library (MKL) 8.0.1 installed manually in the following directory:
/opt/intel/mkl/8.0.1
- **Tests Status:** All tests PASSED
- **Comments:** [RMOL](#) configured with:

```
% export CXXFLAGS="-m64 -march=nocona -O3 -pipe"
% export LDFLAGS="-L/opt/intel/mkl/8.0.1/lib/em64t"
% export CPPFLAGS="-I/opt/intel/mkl/8.0.1/include"
% ./configure
```

- **Date:** March 1, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2 Windows Systems

13.3.2.1 Microsoft Windows XP with Cygwin

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2, Cygwin 1.5.19-4
- **Compiler(s):** g++ (GCC) 3.4.4 (cygming special)
- **[RMOL](#) release:** 0.23.1
- **External Libraries:** Installed from Cygwin's repository:

- fftw-3.0.1-2
- fftw-dev-3.0.1-1
- lapack-3.0-4

- **Tests Status:** All tests PASSED
- **Comments:** Only static library can be built. [RMOL](#) configured with:

```
% ./configure
```

- **Date:** March 31, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2.2 Microsoft Windows XP with Cygwin and ATLAS

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2, Cygwin 1.5.19-4
- **Compiler(s):** g++ (GCC) 3.4.4 (cygming special)
- **RMOL release:** 0.23.1
- **External Libraries:** Installed from Cygwin's repository:
 - fftw-3.0.1-2
 - fftw-dev-3.0.1-1

ATLAS BLAS and LAPACK libraries from [RMOL](#) External 2.1.1 package configured using:

```
% ./configure --enable-atlas --disable-fftw
```

- **Tests Status:** All tests PASSED
- **Comments:** Only static library can be built. [RMOL](#) configured with:

```
% export LDFLAGS="-L/usr/local/lib"
% ./configure
```

- **Date:** March 31, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2.3 Microsoft Windows XP with Cygwin and ACML

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2, Cygwin 1.5.19-4
- **Compiler(s):** g++ (GCC) 3.4.4 (cygming special)
- **RMOL release:** 0.23.2
- **External Libraries:** ACML version 3.1.0 (acml3.1.0-32-win32-g77.exe) installed into a default directory, i.e. "c:\Program Files\AMD\acml3.1.0"
- **Tests Status:** All tests PASSED
- **Comments:** Only static library can be built. [RMOL](#) configured with:

```
% export LDFLAGS="-L/cygdrive/c/Progra~1/AMD/acml3.1.0/gnu32/lib"
% export CPPFLAGS="-I/cygdrive/c/Progra~1/AMD/acml3.1.0/gnu32/include"
% ./configure --enable-debug
```

- **Date:** May 15, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2.4 Microsoft Windows XP with MinGW, MSYS and ACML

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2, MinGW 5.0.2, MSYS 1.0.10
- **Compiler(s):** g++ (GCC) 3.4.4 (mingw special)
- **RMOL release:** 0.23.2
- **External Libraries:** ACML version 3.1.0 (acml3.1.0-32-win32-g77.exe) installed into a default directory, i.e. "c:\Program Files\AMD\acml3.1.0"
- **Tests Status:** All tests PASSED
- **Comments:** Only static library can be built. [RMOL](#) configured with:

```
% export LDFLAGS="-L/c/Program Files/AMD/acml3.1.0/gnu32/lib"
% export CPPFLAGS="-I/c/Program Files/AMD/acml3.1.0/gnu32/include"
% ./configure --enable-debug
```

- **Date:** May 15, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2.5 Microsoft Windows XP with MinGW, MSYS and RMOL External

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2, MinGW 5.0.2, MSYS 1.0.10
- **Compiler(s):** g++ (GCC) 3.4.4 (mingw special)
- **RMOL release:** 0.23.5
- **External Libraries:** BLAS, CBLAS, LAPACK and FFTW libraries from [RMOL External 2.2.0](#) package
- **Tests Status:** All tests PASSED
- **Comments:** Only static library can be built. [RMOL](#) configured with:

```
% export LDFLAGS="-L/usr/local/lib"
% export CPPFLAGS="-I/usr/local/include"
% export CXXFLAGS="-Wall -O3 -march=athlon-tbird -pipe"
% ./configure --disable-html-doc
```

- **Date:** August 11, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.2.6 Microsoft Windows XP with MS Visual C++ and Intel MKL

- **Platform:** AMD Sempron 3000+
- **Operating System:** Microsoft Windows XP SP2
- **Compiler(s):** Microsoft Visual C++ 2005 .NET
- **RMOL release:** 0.23.5
- **External Libraries:** Intel Math Kernel Library (MKL) 8.1 installed manually in the following directory: "C:\Program Files\Intel\MKL\8.1"
- **Tests Status:** Not fully tested. Some [RMOL](#) based programs compiled and run with success.
- **Comments:** Only static library can be built. [RMOL](#) built by opening the "win32\rmol.vcproj" project file in MSVC++ and executing "Build -> Build Solution" command from menu.
- **Date:** August 11, 2006
- **Tester:** Adam Piatyszek (ediap)

13.3.3 Unix Systems

13.3.3.1 SunOS 5.9 with RMOL External

- **Platform:** SUNW, Sun-Blade-100 (SPARC)
- **Operating System:** SunOS 5.9 Generic_112233-10
- **Compiler(s):** g++ (GCC) 3.4.5
- **RMOL release:** 0.23.2
- **External Libraries:** BLAS, CBLAS, LAPACK and FFTW libraries from [RMOL](#) External 2.1.1 package. The following configuration command has been used:

```
% export CFLAGS="-mcpu=ultrasparc -O2 -pipe -funroll-all-loops"
% ./configure
```

- **Tests Status:** All tests PASSED
- **Comments:** [RMOL](#) configured with:

```
% export LDFLAGS="-L/usr/local/lib"
% export CPPFLAGS="-I/usr/local/include"
% export CXXFLAGS="-mcpu=ultrasparc -O2 -pipe"
% ./configure --enable-debug
```

- **Date:** May 15, 2006
- **Tester:** Adam Piatyszek (ediap)

14 RMOL Supported Systems (Previous Releases)

14.1 RMOL 3.9.1

14.2 RMOL 3.9.0

14.3 RMOL 3.8.1

15 Tutorials

15.1 Table of Contents

- [Introduction](#)
 - [Preparing the StdAir Project for Development](#)
- [Build a Predefined BOM Tree](#)
 - [Instantiate the BOM Root Object](#)
 - [Instantiate the \(Airline\) Inventory Object](#)
 - [Link the Inventory Object with the BOM Root](#)
 - [Build Another Airline Inventory](#)
 - [Dump The BOM Tree Content](#)
 - [Result of the Tutorial Program](#)
- [Extend the Pre-Defined BOM Tree](#)
 - [Extend an Airline Inventory Object](#)
 - [Build the Specific BOM Objects](#)
 - [Result of the Tutorial Program](#)

15.2 Introduction

This page contains some tutorial examples that will help you getting started using StdAir. Most examples show how to construct some simple business objects, i.e., instances of the so-named Business Object Model (BOM).

15.2.1 Preparing the StdAir Project for Development

The source code for these examples can be found in the `batches` and `test/stdair` directories. They are compiled along with the rest of the `StdAir` project. See the User Guide ([Users Guide](#)) for more details on how to build the `StdAir` project.

15.3 Build a Predefined BOM Tree

A few steps:

- [Instantiate the BOM Root Object](#)
- [Instantiate the \(Airline\) Inventory Object](#)
- [Link the Inventory Object with the BOM Root](#)

15.3.1 Instantiate the BOM Root Object

First, a BOM root object (i.e., a root for all the classes in the project) is instantiated by the `stdair::STD-AIR_ServiceContext` context object, when the `stdair::STDAIR_Service` is itself instantiated. The corresponding `StdAir` type (class) is `stdair::BomRoot`.

In the following sample, that object is named `ioBomRoot`, and is given as input/output parameter of the `stdair::CmdBomManager::buildSampleBom()` method:

15.3.2 Instantiate the (Airline) Inventory Object

An airline inventory object can then be instantiated. Let us give it the "BA" airline code (corresponding to [British Airways](#)) as the object key. That is, an object (let us name it `lBAKey`) of type (class) `stdair::InventoryKey` has first to be instantiated.

Thanks to that key, an airline inventory object, i.e. of type (class) `stdair::Inventory`, can be instantiated. Let us name that airline inventory object `lBAInv`.

15.3.3 Link the Inventory Object with the BOM Root

Then, both objects have to be linked: the airline inventory object (`stdair::Inventory`) has to be linked with the root of the BOM tree (`stdair::BomRoot`). That operation is as simple as using the `stdair::FacBomManager::addToListAndMap()` method:

15.3.4 Build Another Airline Inventory

Another airline inventory object, corresponding to the Air France (**Air France**) company, is instantiated the same way:

See the corresponding full program (cmd_bom_manager_cpp) for more details.

15.3.5 Dump The BOM Tree Content

From the BomRoot (of type stdair : : BomRoot) object instance, the list of airline inventories (of type stdair : : Inventory) can then be retrieved...

... and browsed:

See the corresponding full program (bom_display_cpp) for more details.

15.3.6 Result of the Tutorial Program

When the stdair.cpp program is run (with the -b option), the output should look like:

```
[D]../batches/stdair.cpp:243: Welcome to stdair
[D]../batches/stdair/command/CmdBomManager.cpp:41: StdAir will build the BOM tree
    from built-in specifications.
[D]../batches/stdair.cpp:286:
=====
BomRoot:  -- ROOT  --
=====
+++++
Inventory: BA
+++++
*****
FlightDate: BA9, 2011-Jun-10
*****
*****
Leg-Dates:
-----
Flight, Leg, BoardDate, BoardTime, OffDate, OffTime, Date Offset, Time Offset,
    Elapsed, Distance, Capacity,
BA9 2011-Jun-10, LHR-BKK, 2011-Jun-10, 21:45:00, 2011-Jun-11, 15:40:00, 11:05:
    00, 1, 06:50:00, 9900, 0,
BA9 2011-Jun-10, BKK-SYD, 2011-Jun-11, 17:05:00, 2011-Jun-12, 15:40:00, 09:05:
    00, 1, 13:30:00, 8100, 0,
*****
*****
LegCabins:
-----
Flight, Leg, Cabin, OffedCAP, PhycAP, RgdADJ, AU, UPR, SS, Staff, WL, Group,
    CommSpace, AvPool, Av1, NAV, GAV, ACP, ETB, BidPrice,
BA9 2011-Jun-10, LHR-BKK 2011-Jun-10, Y, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 9, 0,
    0, 3.52965e-319, 0, 0,
BA9 2011-Jun-10, BKK-SYD 2011-Jun-11, Y, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 9, 0,
    0, 0, 0, 0,
*****
*****
Buckets:
-----
Flight, Leg, Cabin, Yield, AU/SI, SS, AV,
*****
*****
SegmentCabins:
-----
Flight, Segment, Cabin, FF, Bkgs, MIN, UPR, CommSpace, AvPool, BP,
BA9 2011-Jun-10, LHR-SYD 2011-Jun-10, Y, EcoSaver, 0, 0, 0, 0, 9, 0,
BA9 2011-Jun-10, LHR-BKK 2011-Jun-10, Y, EcoSaver, 0, 0, 0, 0, 9, 0,
BA9 2011-Jun-10, BKK-SYD 2011-Jun-11, Y, EcoSaver, 0, 0, 0, 0, 9, 0,
```

```

*****
*****
Subclasses:
-----
Flight, Segment, Cabin, FF, Subclass, MIN/AU (Prot), Nego, NS%, OB%, Bkgs,
    GrpBks (pdg), StfBkgs, WLBkgs, ETB, ClassAvl, RevAvl, SegAvl,
BA9 2011-Jun-10, LHR-SYD 2011-Jun-10, Y, EcoSaver, Q, 0 (0), 0, 0, 0, 0, 0 (0),
    0, 0, 0, 0, 0, 0,
+++++
Inventory: AF
+++++
*****
FlightDate: AF84, 2011-Mar-20
*****
*****
Leg-Dates:
-----
Flight, Leg, BoardDate, BoardTime, OffDate, OffTime, Date Offset, Time Offset,
    Elapsed, Distance, Capacity,
AF84 2011-Mar-20, CDG-SFO, 2011-Mar-20, 10:40:00, 2011-Mar-20, 12:50:00, 11:10:
    00, 0, -09:00:00, 9900, 0,
*****
*****
LegCabins:
-----
Flight, Leg, Cabin, OffedCAP, PhycAP, RgdADJ, AU, UPR, SS, Staff, WL, Group,
    CommSpace, AvPool, Avl, NAV, GAV, ACP, ETB, BidPrice,
AF84 2011-Mar-20, CDG-SFO 2011-Mar-20, Y, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 9, 9, 0
    , 0, 0, 0, 0,
*****
*****
Buckets:
-----
Flight, Leg, Cabin, Yield, AU/SI, SS, AV,
*****
*****
SegmentCabins:
-----
Flight, Segment, Cabin, FF, Bkgs, MIN, UPR, CommSpace, AvPool, BP,
AF84 2011-Mar-20, CDG-SFO 2011-Mar-20, Y, EcoSaver, 0, 0, 0, 0, 9, 0,
*****
*****
Subclasses:
-----
Flight, Segment, Cabin, FF, Subclass, MIN/AU (Prot), Nego, NS%, OB%, Bkgs,
    GrpBks (pdg), StfBkgs, WLBkgs, ETB, ClassAvl, RevAvl, SegAvl,
AF84 2011-Mar-20, CDG-SFO 2011-Mar-20, Y, EcoSaver, Q, 0 (0), 0, 0, 0, 0, 0 (0)
    , 0, 0, 0, 0, 0, 0,

```

See the corresponding full program (batch_stdair_cpp) for more details.

15.4 Extend the Pre-Defined BOM Tree

Now that we master how to instantiate the pre-defined StdAir classes, let us see how to extend that BOM.

15.4.1 Extend an Airline Inventory Object

For instance, let us assume that some (IT) provider (e.g., you) would like to have a specific implementation of the `Inventory` object. The corresponding class has just to extend the `stdair::Inventory` class:

The STL containers have to be defined accordingly too:

See the full class definition (test_archi_inv_hpp) and implementation (test_archi_inv_cpp) for more details.

15.4.2 Build the Specific BOM Objects

The BOM root object (`stdair::BomRoot`) is instantiated the classical way:

Then, the specific implementation of the airline inventory object (`myprovider::Inventory`) can be instantiated the same way as a standard `Inventory` (`stdair::Inventory`) would be:

Then, the specific implementation of the airline inventory object (`myprovider::Inventory`) is linked to the root of the BOM tree (`stdair::BomRoot`) the same way as the standard `Inventory` (`stdair::Inventory`) would be:

Another specific airline inventory object is instantiated the same way:

From the `BomRoot` (of type `stdair::BomRoot`) object instance, the list of specific airline inventories (of type `stdair::Inventory`) can then be retrieved...

... and browsed:

15.4.3 Result of the Tutorial Program

When this program is run, the output should look like:

```
Inventory: BA
Inventory: AF
```

See the corresponding full program (`StandardAirlineITTestSuite.cpp`) for more details.

16 Command-Line Test to Demonstrate How To Test the RMOL Project

```
*/
// //////////////////////////////////////
// Import section
// //////////////////////////////////////
// STL
#include <cassert>
#include <limits>
#include <sstream>
#include <fstream>
#include <string>
// Boost Unit Test Framework (UTF)
#define BOOST_TEST_DYN_LINK
#define BOOST_TEST_MAIN
#define BOOST_TEST_MODULE OptimiseTestSuite
#include <boost/test/unit_test.hpp>
// StdAir
#include <stdair/basic/BasLogParams.hpp>
#include <stdair/basic/BasDBParams.hpp>
#include <stdair/service/Logger.hpp>
// RMOL
#include <rmol/RMOL_Service.hpp>
#include <rmol/config/rmol-paths.hpp>

namespace boost_utf = boost::unit_test;

// (Boost) Unit Test XML Report
std::ofstream utfReportStream ("bomsforforecaster_utfresults.xml");
```

```

struct UnitTestConfig {
    UnitTestConfig() {
        boost_utf::unit_test_log.set_stream (utfReportStream);
        boost_utf::unit_test_log.set_format (boost_utf::XML);
        boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
        //boost_utf::unit_test_log.set_threshold_level
        (boost_utf::log_successful_tests);
    }

    ~UnitTestConfig() {
    }
};

namespace RMOL {

    struct BookingClassData {

        // Attributes
        double _bookingCount;
        double _fare;
        double _sellupFactor;
        bool _censorshipFlag;

        // Constructor
        BookingClassData (const double iBookingCount, const double iFare,
                        const double iSellupFactor, const bool iCensorshipFlag)
            : _bookingCount(iBookingCount), _fare(iFare),
              _sellupFactor(iSellupFactor), _censorshipFlag(iCensorshipFlag) {
        }

        // Getters
        double getFare () const {
            return _fare;
        }

        bool getCensorshipFlag () const {
            return _censorshipFlag;
        }

        // Display
        std::string toString() const {
            std::ostringstream oStr;
            oStr << std::endl
                << "[Booking class data information]" << std::endl
                << "Booking counter: " << _bookingCount << std::endl
                << "Fare: " << _fare << std::endl
                << "Sell-up Factor: " << _sellupFactor << std::endl
                << "censorshipFlag: " << _censorshipFlag << std::endl;
            return oStr.str();
        }
    };

    struct BookingClassDataSet {

        typedef std::vector<BookingClassData*> BookingClassDataList_T;

        // Attributes
        int _numberOfClass;
        double _minimumFare;
        bool _censorshipFlag; // true if any of the classes is censored
        BookingClassDataList_T _bookingClassDataList;

        // Constructor
        BookingClassDataSet ()
            : _numberOfClass(0), _minimumFare(0),
              _censorshipFlag(false) {
        }

        // Add BookingClassData
        void addBookingClassData (BookingClassData& ioBookingClassData) {
            _bookingClassDataList.push_back (&ioBookingClassData);
        }

        // Getters
        std::size_t getNumberOfClass () const {
            return _bookingClassDataList.size();
        }

        double getMinimumFare () const {
            return _minimumFare;
        }

        bool getCensorshipFlag () const {
            return _censorshipFlag;
        }
    };
};

```

```

// Setters
void setMinimumFare (const double iMinFare) {
    _minimumFare = iMinFare;
}

void setCensorshipFlag (const bool iCensorshipFlag) {
    _censorshipFlag = iCensorshipFlag;
}

// compute minimum fare
void updateMinimumFare() {
    double minFare = std::numeric_limits<double>::max();
    BookingClassDataList_T::iterator itBookingClassDataList;
    for (itBookingClassDataList = _bookingClassDataList.begin();
        itBookingClassDataList != _bookingClassDataList.end();
        ++itBookingClassDataList) {
        BookingClassData* lBookingClassData = *itBookingClassDataList;
        assert (lBookingClassData != NULL);

        const double lFare = lBookingClassData->getFare();
        if (lFare < minFare) {
            minFare = lFare;
        }
    }
    //
    setMinimumFare(minFare);
}

// compute censorship flag for the data set
void updateCensorshipFlag () {
    bool censorshipFlag = false;
    BookingClassDataList_T::iterator itBookingClassDataList;
    for (itBookingClassDataList = _bookingClassDataList.begin();
        itBookingClassDataList != _bookingClassDataList.end();
        ++itBookingClassDataList) {
        BookingClassData* lBookingClassData = *itBookingClassDataList;
        assert (lBookingClassData != NULL);

        const bool lCensorshipFlagOfAClass =
            lBookingClassData->getCensorshipFlag();
        if (lCensorshipFlagOfAClass) {
            censorshipFlag = true;
            break;
        }
    }
    //
    setCensorshipFlag(censorshipFlag);
}

// Display
std::string toString() const {
    std::ostringstream oStr;
    oStr << std::endl
        << "[Booking class data set information]" << std::endl
        << "Number of classes: " << _numberOfClass << std::endl
        << "Minimum fare: " << _minimumFare << std::endl
        << "The data of the class set are sensed: " << _censorshipFlag
        << std::endl;
    return oStr.str();
}

};

// /**----- BOM : Q-Forecaster ----- */
// struct QForecaster {

//     // Function focused BOM

//     // 1. calculate sell up probability for Q-eq

//     // 2. calculate Q-Equivalent Booking
//     double calculateQEqBooking (BookingClassDataSet& iBookingClassDataSet) {
//         double lQEqBooking = 0.0;
//         double lMinFare = iBookingClassDataSet.getMinimumFare();

//         return lQEqBooking;
//     }

//     /* Calculate Q-equivalent demand
//     [<- performed by unconstrainer if necessary (Using ExpMax BOM)]
//     */

//     // 3. Partition to each class

//     //

```

```

    // };
}

// //////////// Main: Unit Test Suite ////////////

// Set the UTF configuration (re-direct the output to a specific file)
BOOST_GLOBAL_FIXTURE (UnitTestFixture);

BOOST_AUTO_TEST_SUITE (master_test_suite)

BOOST_AUTO_TEST_CASE (rmol_forecaster) {

    // Output log File
    std::string lLogFilename ("bomsforforecaster.log");
    std::ofstream logOutputFile;

    // Open and clean the log outputfile
    logOutputFile.open (lLogFilename.c_str());
    logOutputFile.clear();

    // Initialise the RMOL service
    const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);

    // Initialise the RMOL service
    RMOL::RMOL_Service rmolService (lLogParams);

    // Build a sample BOM tree
    rmolService.buildSampleBom();

    // Register BCDataSet
    RMOL::BookingClassDataSet lBookingClassDataSet;

    // Register BookingClassData
    RMOL::BookingClassData QClassData (10, 100, 1, false);
    RMOL::BookingClassData MClassData (5, 150, 0.8, true);
    RMOL::BookingClassData BClassData (0, 200, 0.6, false);
    RMOL::BookingClassData YClassData (0, 300, 0.3, false);

    // Display
    STDAIR_LOG_DEBUG (QClassData.toString());
    STDAIR_LOG_DEBUG (MClassData.toString());
    STDAIR_LOG_DEBUG (BClassData.toString());
    STDAIR_LOG_DEBUG (YClassData.toString());

    // Add BookingClassData into the BCDataSet
    lBookingClassDataSet.addBookingClassData (QClassData);
    lBookingClassDataSet.addBookingClassData (MClassData);
    lBookingClassDataSet.addBookingClassData (BClassData);
    lBookingClassDataSet.addBookingClassData (YClassData);

    // DEBUG
    STDAIR_LOG_DEBUG (lBookingClassDataSet.toString());

    // Number of classes
    const stdair::NbOfClasses_T lNbOfClass = lBookingClassDataSet.
        getNumberOfClass();

    // DEBUG
    STDAIR_LOG_DEBUG ("Number of Classes: " << lNbOfClass);

    // Minimum fare
    BOOST_CHECK_NO_THROW (lBookingClassDataSet.updateMinimumFare());
    const double lMinFare = lBookingClassDataSet.getMinimumFare();

    // DEBUG
    STDAIR_LOG_DEBUG ("Minimum fare: " << lMinFare);

    // Censorship flag
    BOOST_CHECK_NO_THROW (lBookingClassDataSet.updateCensorshipFlag());
    const bool lCensorshipFlag = lBookingClassDataSet.getCensorshipFlag();

    // DEBUG
    STDAIR_LOG_DEBUG ("Censorship Flag: " << lCensorshipFlag);

    // Close the log output file
    logOutputFile.close();
}

// End the test suite
BOOST_AUTO_TEST_SUITE_END()

/*!

```

17 Command-Line Test to Demonstrate How To Test the RMOL Project

```

*/
// //////////////////////////////////////
// Import section
// //////////////////////////////////////
// STL
#include <sstream>
#include <fstream>
#include <string>
#include <vector>
#include <cmath>
// Boost Unit Test Framework (UTF)
#define BOOST_TEST_DYN_LINK
#define BOOST_TEST_MAIN
#define BOOST_TEST_MODULE ForecasterTestSuite
#include <boost/test/unit_test.hpp>
// StdAir
#include <stdair/basic/BasLogParams.hpp>
#include <stdair/basic/BasDBParams.hpp>
#include <stdair/basic/BasFileMgr.hpp>
#include <stdair/service/Logger.hpp>
// RMOL
#include <rmol/RMOL_Service.hpp>

namespace boost_utf = boost::unit_test;

// (Boost) Unit Test XML Report
std::ofstream utfReportStream ("ForecasterTestSuite_utfresults.xml");

struct UnitTestConfig {
    UnitTestConfig() {
        boost_utf::unit_test_log.set_stream (utfReportStream);
        boost_utf::unit_test_log.set_format (boost_utf::XML);
        boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
        //boost_utf::unit_test_log.set_threshold_level
        (boost_utf::log_successful_tests);
    }

    ~UnitTestConfig() {
    }
};

// ////////////////////////////////// Main: Unit Test Suite //////////////////////////////////

// Set the UTF configuration (re-direct the output to a specific file)
BOOST_GLOBAL_FIXTURE (UnitTestConfig);

BOOST_AUTO_TEST_SUITE (master_test_suite)

BOOST_AUTO_TEST_CASE (rmol_forecaster_q_forecasting) {
    const bool lTestFlag = true; //testForecasterHelper(0);
    BOOST_CHECK_EQUAL (lTestFlag, true);
    BOOST_CHECK_MESSAGE (lTestFlag == true,
        "The test has failed. Please see the log file for "
        "<< \"more details\"");
}

// End the test suite
BOOST_AUTO_TEST_SUITE_END()

/*!

```

18 Command-Line Test to Demonstrate How To Test the RMOL Project

```

*/
// //////////////////////////////////////
// Import section
// //////////////////////////////////////
// STL
#include <sstream>
#include <fstream>
#include <string>
// Boost Unit Test Framework (UTF)
#define BOOST_TEST_DYN_LINK
#define BOOST_TEST_MAIN
#define BOOST_TEST_MODULE OptimiseTestSuite
#include <boost/test/unit_test.hpp>
// StdAir
#include <stdair/basic/BasLogParams.hpp>

```

```

#include <stdair/basic/BasDBParams.hpp>
#include <stdair/basic/BasFileMgr.hpp>
#include <stdair/service/Logger.hpp>
// RMOL
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/RMOL_Service.hpp>
#include <rmol/config/rmol-paths.hpp>

namespace boost_utf = boost::unit_test;

// (Boost) Unit Test XML Report
std::ofstream utfReportStream ("OptimiseTestSuite_utfresults.xml");

struct UnitTestConfig {
    UnitTestConfig() {
        boost_utf::unit_test_log.set_stream (utfReportStream);
        boost_utf::unit_test_log.set_format (boost_utf::XML);
        boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
        //boost_utf::unit_test_log.set_threshold_level
        (boost_utf::log_successful_tests);
    }

    ~UnitTestConfig() {
    }
};

// ////////////////////////////////////////
int testOptimiseHelper (const unsigned short optimisationMethodFlag,
                        const bool isBuiltin) {

    // Return value
    int oExpectedBookingLimit = 0;

    // Output log File
    std::ostringstream oStr;
    oStr << "OptimiseTestSuite_" << optimisationMethodFlag << "_" << isBuiltin <<
        ".log";
    const stdair::Filename_T lLogFilename (oStr.str());

    // Number of random draws to be generated (best if greater than 100)
    const int K = RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
        ;

    // Methods of optimisation (0 = Monte-Carlo, 1 = Dynamic Programming,
    // 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b, 5 = EMSR-a with sellup prob.)
    const unsigned short METHOD_FLAG = optimisationMethodFlag;

    // Cabin Capacity (it must be greater then 100 here)
    const double cabinCapacity = 100.0;

    // Set the log parameters
    std::ofstream logOutputFile;
    // Open and clean the log outputfile
    logOutputFile.open (lLogFilename.c_str());
    logOutputFile.clear();

    // Initialise the RMOL service
    const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
    RMOL::RMOL_Service rmolService (lLogParams);

    // Check whether or not a (CSV) input file should be read
    if (isBuiltin == true) {

        // Build the default sample BOM tree and build a dummy BOM tree.
        rmolService.buildSampleBom();

    } else {

        // Parse the optimisation data and build a dummy BOM tree
        const stdair::Filename_T lRMInputFileName (STDAIR_SAMPLE_DIR
            "/rm02.csv");
        rmolService.parseAndLoad (cabinCapacity, lRMInputFileName);
    }

    switch (METHOD_FLAG) {
    case 0: {
        // DEBUG
        STDAIR_LOG_DEBUG ("Optimisation by Monte-Carlo (MC)");

        // Calculate the optimal protections by the Monte Carlo
        // Integration approach
        rmolService.optimalOptimisationByMCIntegration (K);
        break;
    }

    case 1: {

```



```

// DEBUG
STDAIR_LOG_DEBUG ("Optimisation by Dynamic Programming (DP)");

// Calculate the optimal protections by DP.
rmolService.optimalOptimisationByDP ();
break;
}

case 2: {
// DEBUG
STDAIR_LOG_DEBUG ("Calculate the Bid-Price Vectors (BPV) by EMSR");

// Calculate the Bid-Price Vector by EMSR
rmolService.heuristicOptimisationByEmsr ();
break;
}

case 3: {
// DEBUG
STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRa");

// Calculate the protections by EMSR-a
// Test the EMSR-a algorithm implementation
rmolService.heuristicOptimisationByEmsrA ();

// Return a cumulated booking limit value to test
// oExpectedBookingLimit = static_cast<int> (lBookingLimitVector.at(2));
break;
}

case 4: {
// DEBUG
STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRb");

// Calculate the protections by EMSR-b
rmolService.heuristicOptimisationByEmsrB ();
break;
}

default: rmolService.optimalOptimisationByMCIntegration (K);
}

// Close the log file
logOutputFile.close();

return oExpectedBookingLimit;
}

// //////////// Main: Unit Test Suite ////////////

// Set the UTF configuration (re-direct the output to a specific file)
BOOST_GLOBAL_FIXTURE (UnitTestFixture);

// ////////////////////////////////////////
// Tests are based on the following input values
// price; mean; standard deviation;
// 1050; 17.3; 5.8;
// 567; 45.1; 15.0;
// 534; 39.6; 13.2;
// 520; 34.0; 11.3;
// ////////////////////////////////////////

BOOST_AUTO_TEST_SUITE (master_test_suite)

BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo) {

// State whether the BOM tree should be built-in or parsed from an input file
const bool isBuiltin = false;

BOOST_CHECK_NO_THROW (testOptimiseHelper(0, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming) {

// State whether the BOM tree should be built-in or parsed from an input file
const bool isBuiltin = false;

BOOST_CHECK_NO_THROW (testOptimiseHelper(1, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bpv) {

// State whether the BOM tree should be built-in or parsed from an input file
const bool isBuiltin = false;

```

```

    BOOST_CHECK_NO_THROW (testOptimiseHelper(2, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = false;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(3, isBuiltin));
    // const int lBookingLimit = testOptimiseHelper(3);
    // const int lExpectedBookingLimit = 61;
    // BOOST_CHECK_EQUAL (lBookingLimit, lExpectedBookingLimit);
    // BOOST_CHECK_MESSAGE (lBookingLimit == lExpectedBookingLimit,
    //                       "The booking limit is " << lBookingLimit
    //                       << ", but it is expected to be "
    //                       << lExpectedBookingLimit);
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = false;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(4, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo_built_in) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = true;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(0, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming_built_in) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = true;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(1, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bpv_built_in) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = true;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(2, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a_built_in) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = true;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(3, isBuiltin));
}

BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b_built_in) {

    // State whether the BOM tree should be built-in or parsed from an input file
    const bool isBuiltin = true;

    BOOST_CHECK_NO_THROW (testOptimiseHelper(4, isBuiltin));
}

// End the test suite
BOOST_AUTO_TEST_SUITE_END()

/*!

```

19 Command-Line Test to Demonstrate How To Test the RMOL Project

```

*/
// //////////////////////////////////////
// Import section
// //////////////////////////////////////
// STL
#include <sstream>
#include <fstream>
#include <string>
// Boost Unit Test Framework (UTF)
#define BOOST_TEST_DYN_LINK

```

```

#define BOOST_TEST_MAIN
#define BOOST_TEST_MODULE UnconstrainerTestSuite
#include <boost/test/unit_test.hpp>
// StdAir
#include <stdair/basic/BasLogParams.hpp>
#include <stdair/basic/BasDBParams.hpp>
#include <stdair/basic/BasFileMgr.hpp>
#include <stdair/service/Logger.hpp>
// RMOL
#include <rmol/RMOL_Service.hpp>

namespace boost_utf = boost::unit_test;

// (Boost) Unit Test XML Report
std::ofstream utfReportStream ("UnconstrainerTestSuite_utfresults.xml");

struct UnitTestConfig {
    UnitTestConfig() {
        boost_utf::unit_test_log.set_stream (utfReportStream);
        boost_utf::unit_test_log.set_format (boost_utf::XML);
        boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
        //boost_utf::unit_test_log.set_threshold_level
        (boost_utf::log_successful_tests);
    }

    ~UnitTestConfig() {
    }
};

// ////////////////////////////////// Main: Unit Test Suite //////////////////////////////////

// Set the UTF configuration (re-direct the output to a specific file)
BOOST_GLOBAL_FIXTURE (UnitTestConfig);

BOOST_AUTO_TEST_SUITE (master_test_suite)

BOOST_AUTO_TEST_CASE (rmol_unconstraining_em) {
    const bool lTestFlag = true; // testUnconstrainerHelper(0);
    BOOST_CHECK_EQUAL (lTestFlag, true);
    BOOST_CHECK_MESSAGE (lTestFlag == true,
        "The test has failed. Please see the log file for "
        "<< \"more details\"");
}

// End the test suite
BOOST_AUTO_TEST_SUITE_END ()

/*!

```

20 Namespace Index

20.1 Namespace List

Here is a list of all namespaces with brief descriptions:

RMOL	54
stdair	57

21 Class Index

21.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

RMOL::BasedForecasting	57
std::basic_fstream< char >	
std::basic_fstream< wchar_t >	
std::basic_ifstream< char >	

```

std::basic_ifstream< wchar_t >
std::basic_ios< char >
std::basic_ios< wchar_t >
std::basic_iostream< char >
std::basic_iostream< wchar_t >
std::basic_istream< char >
std::basic_istream< wchar_t >
std::basic_istreamstream< char >
std::basic_istreamstream< wchar_t >
std::basic_ofstream< char >
std::basic_ofstream< wchar_t >
std::basic_ostream< char >
std::basic_ostream< wchar_t >
std::basic_ostreamstream< char >
std::basic_ostreamstream< wchar_t >
std::basic_string< char >
std::basic_string< wchar_t >
std::basic_stringstream< char >
std::basic_stringstream< wchar_t >

```

CmdAbstract	58
RMOL::InventoryParser	79
RMOL::DemandGeneratorList	59
RMOL::DemandInputPreparation	60
RMOL::Detruncator	61
RMOL::DPOptimiser	62
RMOL::EMDetruncator	62
RMOL::Emsr	65
RMOL::EmsrUtils	66
FacServiceAbstract	68
RMOL::FacRmolServiceContext	67
RMOL::FareAdjustment	68
RMOL::Forecaster	71
RMOL::HybridForecasting	78
RMOL::MarginalRevenueTransformation	80
RMOL::MCOptimiser	81
RMOL::NewQFF	83
RMOL::OldQFF	84
RMOL::Optimiser	85
RMOL::PolicyHelper	89
RMOL::PreOptimiser	90

RMOL::QForecasting	91
RMOL::RMOL_Service	92
RootException	99
RMOL::FareFamilyException	70
RMOL::EmptyBookingClassListException	63
RMOL::FareFamilyDemandVectorSizeException	69
RMOL::MissingBookingClassInFareFamilyException	82
RMOL::OptimisationException	85
RMOL::OverbookingException	88
RMOL::PolicyException	89
RMOL::ConvexHullException	59
RMOL::EmptyConvexHullException	63
RMOL::FirstPolicyNotNullException	70
RMOL::YieldConvexHullException	104
RMOL::UnconstrainingException	102
RMOL::EmptyNestingStructException	64
RMOL::MissingDCPEException	82
RMOL::SegmentSnapshotTableHelper	99
ServiceAbstract	100
RMOL::RMOL_ServiceContext	98
StructAbstract	100
RMOL::HistoricalBooking	72
RMOL::HistoricalBookingHolder	75
TestFixture	101
ForecasterTestSuite	71
OptimiseTestSuite	87
UnconstrainerTestSuite	101
RMOL::Utilities	102

22 Class Index

22.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

RMOL::BasedForecasting	57
CmdAbstract	58
RMOL::ConvexHullException Convex Hull-related exception	59
RMOL::DemandGeneratorList	59
RMOL::DemandInputPreparation	60
RMOL::Detruncator	61
RMOL::DPOptimiser	62
RMOL::EMDetruncator	62
RMOL::EmptyBookingClassListException Empty Booking Class List of Fare Family exception	63
RMOL::EmptyConvexHullException Empty convex hull exception	63
RMOL::EmptyNestingStructException Empty nesting structure in unconstrainer exception	64
RMOL::Emsr	65
RMOL::EmsrUtils	66
RMOL::FacRmolServiceContext Factory for the service context	67
FacServiceAbstract	68
RMOL::FareAdjustment	68
RMOL::FareFamilyDemandVectorSizeException Fare Family demand exception	69
RMOL::FareFamilyException Fare Family-related exception	70
RMOL::FirstPolicyNotNullException Missing policy NULL in convex hull exception	70
RMOL::Forecaster	71
ForecasterTestSuite	71
RMOL::HistoricalBooking Structure keeping track, for a given class, of the number of historical bookings and of the censorship flag	72
RMOL::HistoricalBookingHolder	75
RMOL::HybridForecasting	78
RMOL::InventoryParser Class filling the virtual class list (representing a list of classes/buckets) from a given input inventory	79

RMOL::MarginalRevenueTransformation	80
RMOL::MCOptimiser	81
RMOL::MissingBookingClassInFareFamilyException Missing Booking Class in Fare Family exception	82
RMOL::MissingDCPException Missing a DCP in unconstrainer exception	82
RMOL::NewQFF	83
RMOL::OldQFF	84
RMOL::OptimisationException Optimisation-related exception	85
RMOL::Optimiser	85
OptimiseTestSuite	87
RMOL::OverbookingException Overbooking-related exception	88
RMOL::PolicyException Policy-related exception	89
RMOL::PolicyHelper	89
RMOL::PreOptimiser	90
RMOL::QForecasting	91
RMOL::RMOL_Service Interface for the RMOL Services	92
RMOL::RMOL_ServiceContext Inner class holding the context for the RMOL Service object	98
RootException	99
RMOL::SegmentSnapshotTableHelper	99
ServiceAbstract	100
StructAbstract	100
TestFixture	101
UnconstrainerTestSuite	101
RMOL::UnconstrainingException Unconstraining-related exception	102
RMOL::Utilities	102
RMOL::YieldConvexHullException Yield convex hull exception	104

23 File Index

23.1 File List

Here is a list of all files with brief descriptions:

rmol/RMOL_Service.hpp	201
rmol/RMOL_Types.hpp	205
rmol/basic/BasConst.cpp	106
rmol/basic/BasConst_General.hpp	106
rmol/basic/BasConst_RMOL_Service.hpp	107
rmol/batches/rmol.cpp	109
rmol/bom/BucketHolderTypes.hpp	113
rmol/bom/DistributionParameterList.hpp	114
rmol/bom/DPOptimiser.cpp	114
rmol/bom/DPOptimiser.hpp	117
rmol/bom/EMDetruncator.cpp	118
rmol/bom/EMDetruncator.hpp	119
rmol/bom/Emsr.cpp	120
rmol/bom/Emsr.hpp	122
rmol/bom/EmsrUtils.cpp	123
rmol/bom/EmsrUtils.hpp	124
rmol/bom/HistoricalBooking.cpp	125
rmol/bom/HistoricalBooking.hpp	126
rmol/bom/HistoricalBookingHolder.cpp	127
rmol/bom/HistoricalBookingHolder.hpp	131
rmol/bom/MCOptimiser.cpp	133
rmol/bom/MCOptimiser.hpp	136
rmol/bom/PolicyHelper.cpp	139
rmol/bom/PolicyHelper.hpp	143
rmol/bom/SegmentSnapshotTableHelper.cpp	144
rmol/bom/SegmentSnapshotTableHelper.hpp	145
rmol/bom/Utilities.cpp	146
rmol/bom/Utilities.hpp	150
rmol/bom/old/DemandGeneratorList.cpp	137
rmol/bom/old/DemandGeneratorList.hpp	138

rmol/command/BasedForecasting.cpp	151
rmol/command/BasedForecasting.hpp	154
rmol/command/DemandInputPreparation.cpp	155
rmol/command/DemandInputPreparation.hpp	156
rmol/command/Detruncator.cpp	156
rmol/command/Detruncator.hpp	157
rmol/command/FareAdjustment.cpp	158
rmol/command/FareAdjustment.hpp	159
rmol/command/Forecaster.cpp	160
rmol/command/Forecaster.hpp	162
rmol/command/HybridForecasting.cpp	163
rmol/command/HybridForecasting.hpp	166
rmol/command/InventoryParser.cpp	167
rmol/command/InventoryParser.hpp	169
rmol/command/MarginalRevenueTransformation.cpp	170
rmol/command/MarginalRevenueTransformation.hpp	174
rmol/command/NewQFF.cpp	175
rmol/command/NewQFF.hpp	179
rmol/command/OldQFF.cpp	180
rmol/command/OldQFF.hpp	184
rmol/command/Optimiser.cpp	185
rmol/command/Optimiser.hpp	189
rmol/command/PreOptimiser.cpp	191
rmol/command/PreOptimiser.hpp	192
rmol/command/QForecasting.cpp	193
rmol/command/QForecasting.hpp	196
rmol/config/rmol-paths.hpp	198
rmol/factory/FacRmolServiceContext.cpp	199
rmol/factory/FacRmolServiceContext.hpp	200
rmol/service/RMOL_Service.cpp	207
rmol/service/RMOL_ServiceContext.cpp	233
rmol/service/RMOL_ServiceContext.hpp	234

test/rmol/bomsforforecaster.cpp	235
test/rmol/ForecasterTestSuite.cpp	238
test/rmol/ForecasterTestSuite.hpp	240
test/rmol/OptimiseTestSuite.cpp	240
test/rmol/OptimiseTestSuite.hpp	243
test/rmol/UnconstrainerTestSuite.cpp	244
test/rmol/UnconstrainerTestSuite.hpp	245

24 Namespace Documentation

24.1 RMOL Namespace Reference

Classes

- class [DPOptimiser](#)
- class [EMDetruncator](#)
- class [Emsr](#)
- class [EmsrUtils](#)
- struct [HistoricalBooking](#)
 - Structure keeping track, for a given class, of the number of historical bookings and of the censorship flag.*
- struct [HistoricalBookingHolder](#)
- class [MCOptimiser](#)
- class [DemandGeneratorList](#)
- class [PolicyHelper](#)
- class [SegmentSnapshotTableHelper](#)
- class [Utilities](#)
- class [BasedForecasting](#)
- class [DemandInputPreparation](#)
- class [Detruncator](#)
- class [FareAdjustment](#)
- class [Forecaster](#)
- class [HybridForecasting](#)
- class [InventoryParser](#)
 - Class filling the virtual class list (representing a list of classes/buckets) from a given input inventory.*
- class [MarginalRevenueTransformation](#)
- class [NewQFF](#)
- class [OldQFF](#)
- class [Optimiser](#)
- class [PreOptimiser](#)
- class [QForecasting](#)
- class [FacRmolServiceContext](#)
 - Factory for the service context.*
- class [RMOL_Service](#)
 - Interface for the [RMOL](#) Services.*
- class [OverbookingException](#)
 - Overbooking-related exception.*
- class [UnconstrainingException](#)
 - Unconstraining-related exception.*

- class [EmptyNestingStructException](#)
Empty nesting structure in unconstrainer exception.
- class [MissingDCPException](#)
Missing a DCP in unconstrainer exception.
- class [OptimisationException](#)
Optimisation-related exception.
- class [PolicyException](#)
Policy-related exception.
- class [ConvexHullException](#)
Convex Hull-related exception.
- class [EmptyConvexHullException](#)
Empty convex hull exception.
- class [FirstPolicyNotNullException](#)
Missing policy NULL in convex hull exception.
- class [YieldConvexHullException](#)
Yield convex hull exception.
- class [FareFamilyException](#)
Fare Family-related exception.
- class [EmptyBookingClassListException](#)
Empty Booking Class List of Fare Family exception.
- class [MissingBookingClassInFareFamilyException](#)
Missing Booking Class in Fare Family exception.
- class [FareFamilyDemandVectorSizeException](#)
Fare Family demand exception.
- class [RMOL_ServiceContext](#)
Inner class holding the context for the [RMOL](#) Service object.

Typedefs

- typedef std::list< BucketHolder * > [BucketHolderList_T](#)
- typedef std::list
 < FldDistributionParameters > [DistributionParameterList_T](#)
- typedef std::vector
 < [HistoricalBooking](#) > [HistoricalBookingVector_T](#)
- typedef boost::shared_ptr
 < [RMOL_Service](#) > [RMOL_ServicePtr_T](#)
- typedef std::vector
 < stdair::Flag_T > [FlagVector_T](#)
- typedef std::map
 < stdair::BookingClass
 *, stdair::MeanStdDevPair_T > [BookingClassMeanStdDevPairMap_T](#)

Variables

- const stdair::AirlineCode_T [DEFAULT_RMOL_SERVICE_AIRLINE_CODE](#) = "BA"
- const double [DEFAULT_RMOL_SERVICE_CAPACITY](#) = 1.0
- const int [DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION](#) = 10000
- const int [DEFAULT_PRECISION](#) = 10
- const double [DEFAULT_EPSILON](#) = 0.0001
- const double [DEFAULT_STOPPING_CRITERION](#) = 0.01
- const double [DEFAULT_INITIALIZER_DOUBLE_NEGATIVE](#) = -10.0

24.1.1 Typedef Documentation

24.1.1.1 `typedef std::list<BucketHolder*> RMOL::BucketHolderList_T`

Define a vector (ordered list) of N bucket/classe holders.

Definition at line 16 of file [BucketHolderTypes.hpp](#).

24.1.1.2 `typedef std::list<FldDistributionParameters> RMOL::DistributionParameterList_T`

Define the set of parameters, each of one wrapping a pair of distribution parameters (i.e., mean and standard deviation).

Definition at line 16 of file [DistributionParameterList.hpp](#).

24.1.1.3 `typedef std::vector<HistoricalBooking> RMOL::HistoricalBookingVector_T`

Define a vector (ordered list) of N HistoricalBookings.

Definition at line 16 of file [HistoricalBookingHolder.hpp](#).

24.1.1.4 `typedef boost::shared_ptr<RMOL_Service> RMOL::RMOL_ServicePtr_T`

Pointer on the [RMOL](#) Service handler.

Definition at line 176 of file [RMOL_Types.hpp](#).

24.1.1.5 `typedef std::vector<stdair::Flag_T> RMOL::FlagVector_T`

Define the vector of censorship flags.

Definition at line 179 of file [RMOL_Types.hpp](#).

24.1.1.6 `typedef std::map<stdair::BookingClass*, stdair::MeanStdDevPair_T> RMOL::BookingClassMeanStdDevPair-Map_T`

Define the map between booking class and demand.

Definition at line 182 of file [RMOL_Types.hpp](#).

24.1.2 Variable Documentation

24.1.2.1 `const stdair::AirlineCode_T RMOL::DEFAULT_RMOL_SERVICE_AIRLINE_CODE = "BA"`

Default airline code for the [RMOL_Service](#).

Definition at line 10 of file [BasConst.cpp](#).

24.1.2.2 `const double RMOL::DEFAULT_RMOL_SERVICE_CAPACITY = 1.0`

Default capacity for the [RMOL_Service](#).

Definition at line 13 of file [BasConst.cpp](#).

24.1.2.3 `const int RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION = 10000`

Default value for the number of draws within the Monte-Carlo Integration algorithm.

Definition at line 17 of file [BasConst.cpp](#).

Referenced by [RMOL::MCOptimiser::optimisationByMCIntegration\(\)](#).

24.1.2.4 `const int RMOL::DEFAULT_PRECISION = 10`

Default value for the precision of the integral computation in the Dynamic Programming algorithm (100 means that the precision will be 0.01).

Default value for the precision of the integral computation in the Dynamic Programming algorithm.

Definition at line 22 of file [BasConst.cpp](#).

24.1.2.5 `const double RMOL::DEFAULT_EPSILON = 0.0001`

Default epsilon value to qualify a denominator

Definition at line 25 of file [BasConst.cpp](#).

24.1.2.6 `const double RMOL::DEFAULT_STOPPING_CRITERION = 0.01`

Default stopping value for an iterative algorithm.

Definition at line 28 of file [BasConst.cpp](#).

24.1.2.7 `const double RMOL::DEFAULT_INITIALIZER_DOUBLE_NEGATIVE = -10.0`

Default negative value used to initialize a double variable.

Definition at line 31 of file [BasConst.cpp](#).

24.2 stdair Namespace Reference

24.2.1 Detailed Description

Forward declarations.

25 Class Documentation

25.1 RMOL::BasedForecasting Class Reference

```
#include <rmol/command/BasedForecasting.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::SegmentCabin &, const stdair::Date_T &, const stdair::DTD_T &, const stdair::UnconstrainingMethod &, const stdair::NbOfSegments_T &)
- static void [prepareHistoricalBooking](#) (const stdair::SegmentCabin &, const stdair::BookingClass &, const stdair::SegmentSnapshotTable &, [HistoricalBookingHolder](#) &, const stdair::DCP_T &, const stdair::DCP_T &, const stdair::NbOfSegments_T &, const stdair::NbOfSegments_T &)

25.1.1 Detailed Description

Class wrapping the forecasting algorithms.

Definition at line 21 of file [BasedForecasting.hpp](#).

25.1.2 Member Function Documentation

25.1.2.1 `bool RMOL::BasedForecasting::forecast (stdair::SegmentCabin & ioSegmentCabin, const stdair::Date_T & iCurrentDate, const stdair::DTD_T & iCurrentDTD, const stdair::UnconstrainingMethod & iUnconstrainingMethod, const stdair::NbOfSegments_T & iNbOfDepartedSegments) [static]`

Forecast demand for a segment cabin. Compute for the current DTD the mean and the standard deviation of unconstrained bookings of similar flights.

Parameters

<i>stdair::SegmentCabin&</i>	Current Segment Cabin
<i>const</i>	<i>stdair::Date_T</i> & Current Date
<i>const</i>	<i>stdair::DTD_T</i> & Current DTD
<i>const</i>	<i>stdair::UnconstrainingMethod</i> & Method used for the unconstraining
<i>const</i>	<i>stdair::NbOfSegments_T</i> & Number of usable historical segments

Definition at line 31 of file [BasedForecasting.cpp](#).

References [RMOL::Utilities::computeDistributionParameters\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfFlights\(\)](#), [RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), [prepareHistoricalBooking\(\)](#), and [RMOL::Detruncator::unconstrain\(\)](#).

25.1.2.2 `void RMOL::BasedForecasting::prepareHistoricalBooking (const stdair::SegmentCabin & iSegmentCabin, const stdair::BookingClass & iBookingClass, const stdair::SegmentSnapshotTable & iSegmentSnapshotTable, HistoricalBookingHolder & ioHBHolder, const stdair::DCP_T & iDCPBegin, const stdair::DCP_T & iDCPEnd, const stdair::NbOfSegments_T & iSegmentBegin, const stdair::NbOfSegments_T & iSegmentEnd) [static]`

Prepare the historical booking figures for a given cabin

Parameters

<i>const</i>	<i>stdair::DCP_T</i> & DCP range start
<i>const</i>	<i>stdair::DCP_T</i> & DCP range end
<i>const</i>	<i>stdair::NbOfSegments_T</i> & Segment range start index
<i>const</i>	<i>stdair::NbOfSegments_T</i> & Segment range end index

Definition at line 121 of file [BasedForecasting.cpp](#).

References [RMOL::HistoricalBookingHolder::addHistoricalBooking\(\)](#).

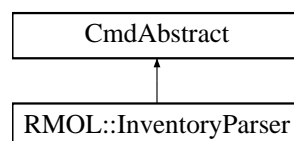
Referenced by [forecast\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/command/BasedForecasting.hpp](#)
- [rmol/command/BasedForecasting.cpp](#)

25.2 CmdAbstract Class Reference

Inheritance diagram for CmdAbstract:



The documentation for this class was generated from the following file:

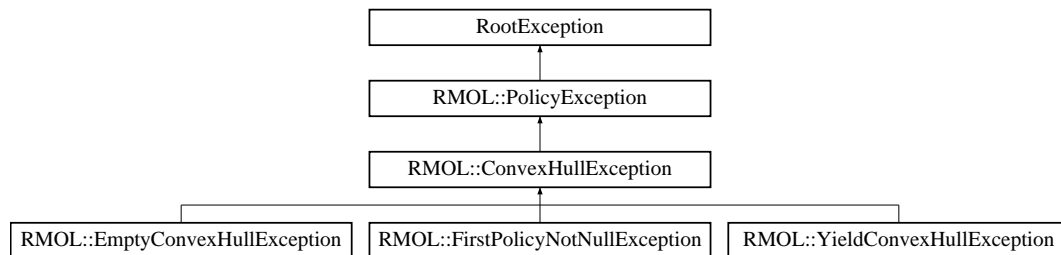
- [rmol/command/InventoryParser.hpp](#)

25.3 RMOL::ConvexHullException Class Reference

Convex Hull-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::ConvexHullException:



Public Member Functions

- [ConvexHullException](#) (const std::string &iWhat)

25.3.1 Detailed Description

Convex Hull-related exception.

Definition at line 93 of file [RMOL_Types.hpp](#).

25.3.2 Constructor & Destructor Documentation

25.3.2.1 RMOL::ConvexHullException::ConvexHullException (const std::string & iWhat) [inline]

Constructor.

Definition at line 96 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.4 RMOL::DemandGeneratorList Class Reference

```
#include <rmol/bom/old/DemandGeneratorList.hpp>
```

Public Member Functions

- [DemandGeneratorList](#) ()
- [DemandGeneratorList](#) (const [DemandGeneratorList](#) &)
- [DemandGeneratorList](#) (const [DistributionParameterList_T](#) &)
- virtual [~DemandGeneratorList](#) ()
- void [generateVariateList](#) ([VariateList_T](#) &) const

Protected Types

- typedef std::list< Gaussian > [DemandGeneratorList_T](#)

25.4.1 Detailed Description

Wrapper around a set of Gaussian Random Generators.

Definition at line 17 of file [DemandGeneratorList.hpp](#).

25.4.2 Member Typedef Documentation

25.4.2.1 typedef std::list<Gaussian> RMOL::DemandGeneratorList::DemandGeneratorList_T [protected]

Define a (ordered) set of Gaussian Random Generators.

Definition at line 20 of file [DemandGeneratorList.hpp](#).

25.4.3 Constructor & Destructor Documentation

25.4.3.1 RMOL::DemandGeneratorList::DemandGeneratorList ()

Constructors.

Definition at line 10 of file [DemandGeneratorList.cpp](#).

25.4.3.2 RMOL::DemandGeneratorList::DemandGeneratorList (const DemandGeneratorList & iDemandGeneratorList)

Definition at line 17 of file [DemandGeneratorList.cpp](#).

25.4.3.3 RMOL::DemandGeneratorList::DemandGeneratorList (const DistributionParameterList_T & iDistributionParameterList)

List of distribution parameters (mean, standard deviation).

Definition at line 25 of file [DemandGeneratorList.cpp](#).

25.4.3.4 RMOL::DemandGeneratorList::~DemandGeneratorList () [virtual]

Destructors.

Definition at line 30 of file [DemandGeneratorList.cpp](#).

25.4.4 Member Function Documentation

25.4.4.1 void RMOL::DemandGeneratorList::generateVariateList (VariateList_T & ioVariateList) const

Definition at line 50 of file [DemandGeneratorList.cpp](#).

The documentation for this class was generated from the following files:

- [rmol/bom/old/DemandGeneratorList.hpp](#)
- [rmol/bom/old/DemandGeneratorList.cpp](#)

25.5 RMOL::DemandInputPreparation Class Reference

```
#include <rmol/command/DemandInputPreparation.hpp>
```


Static Public Member Functions

- static bool [prepareDemandInput](#) (const stdair::SegmentCabin &)

25.5.1 Detailed Description

Class wrapping the pre-optimisation algorithms.

Definition at line 21 of file [DemandInputPreparation.hpp](#).

25.5.2 Member Function Documentation

25.5.2.1 bool RMOL::DemandInputPreparation::prepareDemandInput (const stdair::SegmentCabin & *iSegmentCabin*)
[static]

Prepare the demand input for the optimser.

Definition at line 23 of file [DemandInputPreparation.cpp](#).

The documentation for this class was generated from the following files:

- rmol/command/[DemandInputPreparation.hpp](#)
- rmol/command/[DemandInputPreparation.cpp](#)

25.6 RMOL::Detruncator Class Reference

```
#include <rmol/command/Detruncator.hpp>
```

Static Public Member Functions

- static void [unconstrain](#) ([HistoricalBookingHolder](#) &, const stdair::UnconstrainingMethod &)

25.6.1 Detailed Description

Class wrapping the principal unconstraining algorithms and some accessory algorithms.

Definition at line 20 of file [Detruncator.hpp](#).

25.6.2 Member Function Documentation

25.6.2.1 void RMOL::Detruncator::unconstrain ([HistoricalBookingHolder](#) & *ioHBHolder*, const
stdair::UnconstrainingMethod & *iMethod*) [static]

Unconstrain booking figures between two DCP's.

Definition at line 17 of file [Detruncator.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), [RMOL::HybridForecasting::forecast\(\)](#), [RMOL::OldQFF::forecast\(\)](#), and [RMOL::BasedForecasting::forecast\(\)](#).

The documentation for this class was generated from the following files:

- rmol/command/[Detruncator.hpp](#)
- rmol/command/[Detruncator.cpp](#)

25.7 RMOL::DPOptimiser Class Reference

```
#include <rmol/bom/DPOptimiser.hpp>
```

Static Public Member Functions

- static void [optimalOptimisationByDP](#) (stdair::LegCabin &)
- static double [cdfGaussianQ](#) (const double, const double)

25.7.1 Detailed Description

Utility methods for the Dynamic Programming algorithms.

Definition at line 17 of file [DPOptimiser.hpp](#).

25.7.2 Member Function Documentation

25.7.2.1 void RMOL::DPOptimiser::optimalOptimisationByDP (stdair::LegCabin & *ioLegCabin*) [static]

Dynamic Programming to compute the cumulative protection levels and booking limits (described in the book Revenue Management - Talluri & Van Ryzin, p.41-42).

Definition at line 22 of file [DPOptimiser.cpp](#).

25.7.2.2 static double RMOL::DPOptimiser::cdfGaussianQ (const double , const double) [static]

Compute the cdf_Q of a gaussian.

The documentation for this class was generated from the following files:

- [rmol/bom/DPOptimiser.hpp](#)
- [rmol/bom/DPOptimiser.cpp](#)

25.8 RMOL::EMDetruncator Class Reference

```
#include <rmol/bom/EMDetruncator.hpp>
```

Static Public Member Functions

- static void [unconstrain](#) (HistoricalBookingHolder &)

25.8.1 Detailed Description

Utility for the Expectation-Maximisation algorithm.

Definition at line 12 of file [EMDetruncator.hpp](#).

25.8.2 Member Function Documentation

25.8.2.1 void RMOL::EMDetruncator::unconstrain (HistoricalBookingHolder & *ioHistoricalBookingHolder*) [static]

Unconstrain the censored booking data using the Expectation-Maximisation algorithm.

Definition at line 20 of file [EMDetruncator.cpp](#).

References [RMOL::HistoricalBookingHolder::getDemandMean\(\)](#), [RMOL::HistoricalBookingHolder::getListOfToBeUnconstrainedFlags\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfFlights\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfUncensoredBookings\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfUncensoredData\(\)](#), [RMOL::HistoricalBookingHolder::getStandardDeviation\(\)](#), [RMOL::HistoricalBookingHolder::getUncensoredStandardDeviation\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), and [RMOL::HistoricalBookingHolder::setUnconstrainedDemand\(\)](#).

The documentation for this class was generated from the following files:

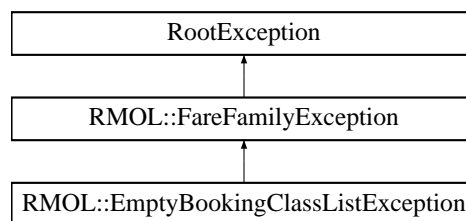
- [rmol/bom/EMDetruncator.hpp](#)
- [rmol/bom/EMDetruncator.cpp](#)

25.9 RMOL::EmptyBookingClassListException Class Reference

Empty Booking Class List of Fare Family exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::EmptyBookingClassListException:



Public Member Functions

- [EmptyBookingClassListException](#) (const std::string &iWhat)

25.9.1 Detailed Description

Empty Booking Class List of Fare Family exception.

Definition at line 144 of file [RMOL_Types.hpp](#).

25.9.2 Constructor & Destructor Documentation

25.9.2.1 RMOL::EmptyBookingClassListException::EmptyBookingClassListException (const std::string & iWhat) [inline]

Constructor.

Definition at line 147 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

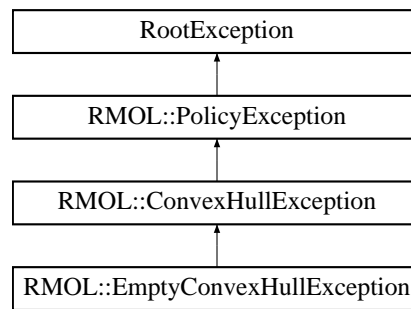
- [rmol/RMOL_Types.hpp](#)

25.10 RMOL::EmptyConvexHullException Class Reference

Empty convex hull exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::EmptyConvexHullException:



Public Member Functions

- [EmptyConvexHullException](#) (const std::string &iWhat)

25.10.1 Detailed Description

Empty convex hull exception.

Definition at line 103 of file [RMOL_Types.hpp](#).

25.10.2 Constructor & Destructor Documentation

25.10.2.1 RMOL::EmptyConvexHullException::EmptyConvexHullException (const std::string &*iWhat*) `[inline]`

Constructor.

Definition at line 106 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

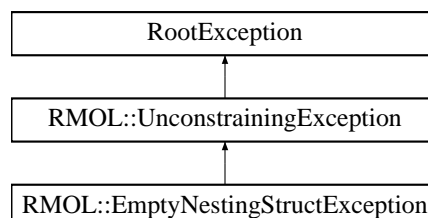
- [rmol/RMOL_Types.hpp](#)

25.11 RMOL::EmptyNestingStructException Class Reference

Empty nesting structure in unconstrainer exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::EmptyNestingStructException:



Public Member Functions

- [EmptyNestingStructException](#) (const std::string &iWhat)

25.11.1 Detailed Description

Empty nesting structure in unconstrainer exception.

Definition at line 52 of file [RMOL_Types.hpp](#).

25.11.2 Constructor & Destructor Documentation

25.11.2.1 RMOL::EmptyNestingStructException::EmptyNestingStructException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 55 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.12 RMOL::Emsr Class Reference

```
#include <rmol/bom/Emsr.hpp>
```

Static Public Member Functions

- static void [heuristicOptimisationByEmsr](#) (stdair::LegCabin &)
- static void [heuristicOptimisationByEmsrA](#) (stdair::LegCabin &)
- static void [heuristicOptimisationByEmsrB](#) (stdair::LegCabin &)

25.12.1 Detailed Description

Class Implementing the EMSR algorithm for Bid-Price Vector computing.

Definition at line 18 of file [Emsr.hpp](#).

25.12.2 Member Function Documentation

25.12.2.1 void RMOL::Emsr::heuristicOptimisationByEmsr (stdair::LegCabin & *ioLegCabin*) [static]

Compute the Bid-Price Vector using the EMSR algorithm. Then compute the protection levels and booking limits by using the BPV.

For each class/bucket j with yield p_j and demand D_j , compute $p_j * \Pr(D_j \geq x)$ with x the capacity index. This value is called the EMSR (Expected Marginal Seat Revenue) of the class/bucket j with the remaining capacity of x . Thus, we have for each class/bucket a list of EMSR values. We merge all these lists and sort the values from high to low in order to obtain the BPV.

Definition at line 108 of file [Emsr.cpp](#).

References [RMOL::EmsrUtils::computeEmsrValue\(\)](#).

25.12.2.2 void RMOL::Emsr::heuristicOptimisationByEmsrA (stdair::LegCabin & *ioLegCabin*) [static]

Calculate the optimal protections for the set of buckets/classes given in input, and update those buckets accordingly.

Definition at line 21 of file [Emsr.cpp](#).

References [RMOL::EmsrUtils::computeProtectionLevel\(\)](#).

25.12.2.3 void RMOL::Emsr::heuristicOptimisationByEmsrB (stdair::LegCabin & *ioLegCabin*) [static]

Compute the protection levels and booking limites by using the EMSR-b algorithm.

Definition at line 64 of file [Emsr.cpp](#).

References [RMOL::EmsrUtils::computeAggregatedVirtualClass\(\)](#), and [RMOL::EmsrUtils::computeProtectionLevel\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/bom/Emsr.hpp](#)
- [rmol/bom/Emsr.cpp](#)

25.13 RMOL::EmsrUtils Class Reference

```
#include <rmol/bom/EmsrUtils.hpp>
```

Static Public Member Functions

- static void [computeAggregatedVirtualClass](#) (stdair::VirtualClassStruct &, stdair::VirtualClassStruct &)
- static const stdair::ProtectionLevel_T [computeProtectionLevel](#) (stdair::VirtualClassStruct &, stdair::VirtualClassStruct &)
- static const double [computeEmsrValue](#) (double, stdair::VirtualClassStruct &)

25.13.1 Detailed Description

Forward declarations.

Definition at line 19 of file [EmsrUtils.hpp](#).

25.13.2 Member Function Documentation

25.13.2.1 void RMOL::EmsrUtils::computeAggregatedVirtualClass (stdair::VirtualClassStruct & *ioAggregatedVirtualClass*, stdair::VirtualClassStruct & *ioCurrentVirtualClass*) [static]

Compute the aggregated class/bucket of classes/buckets 1,...j for EMSR-b algorithm.

Definition at line 19 of file [EmsrUtils.cpp](#).

Referenced by [RMOL::Emsr::heuristicOptimisationByEmsrB\(\)](#).

25.13.2.2 const stdair::ProtectionLevel_T RMOL::EmsrUtils::computeProtectionLevel (stdair::VirtualClassStruct & *ioAggregatedVirtualClass*, stdair::VirtualClassStruct & *ioNextVirtualClass*) [static]

Compute the protection level using the Little-Wood formular.

Definition at line 53 of file [EmsrUtils.cpp](#).

Referenced by [RMOL::Emsr::heuristicOptimisationByEmsrA\(\)](#), and [RMOL::Emsr::heuristicOptimisationByEmsrB\(\)](#).

25.13.2.3 const double RMOL::EmsrUtils::computeEmsrValue (double *iCapacity*, stdair::VirtualClassStruct & *ioVirtualClass*) [static]

Compute the EMSR value of a class/bucket.

Definition at line 80 of file [EmsrUtils.cpp](#).

Referenced by [RMOL::Emsr::heuristicOptimisationByEmsr\(\)](#).

The documentation for this class was generated from the following files:

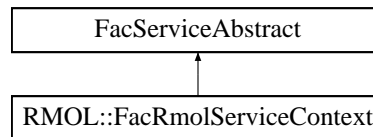
- [rmol/bom/EmsrUtils.hpp](#)
- [rmol/bom/EmsrUtils.cpp](#)

25.14 RMOL::FacRmolServiceContext Class Reference

Factory for the service context.

```
#include <rmol/factory/FacRmolServiceContext.hpp>
```

Inheritance diagram for RMOL::FacRmolServiceContext:



Public Member Functions

- [~FacRmolServiceContext\(\)](#)
- [RMOL_ServiceContext & create\(\)](#)

Static Public Member Functions

- static [FacRmolServiceContext & instance\(\)](#)

Protected Member Functions

- [FacRmolServiceContext\(\)](#)

25.14.1 Detailed Description

Factory for the service context.

Definition at line 22 of file [FacRmolServiceContext.hpp](#).

25.14.2 Constructor & Destructor Documentation

25.14.2.1 RMOL::FacRmolServiceContext::~~FacRmolServiceContext()

Destructor.

The Destruction put the `_instance` to NULL in order to be clean for the next `FacSimfqtServiceContext::instance()`.

Definition at line 17 of file [FacRmolServiceContext.cpp](#).

25.14.2.2 RMOL::FacRmolServiceContext::FacRmolServiceContext() [inline], [protected]

Default Constructor.

This constructor is protected in order to ensure the singleton pattern.

Definition at line 57 of file [FacRmolServiceContext.hpp](#).

Referenced by [instance\(\)](#).

25.14.3 Member Function Documentation

25.14.3.1 FacRmolServiceContext & RMOL::FacRmolServiceContext::instance () [static]

Provide the unique instance.

The singleton is instantiated when first used.

Returns

FacServiceContext&

Definition at line 22 of file [FacRmolServiceContext.cpp](#).

References [FacRmolServiceContext\(\)](#).

25.14.3.2 RMOL_ServiceContext & RMOL::FacRmolServiceContext::create ()

Create a new ServiceContext object.

This new object is added to the list of instantiated objects.

Returns

ServiceContext& The newly created object.

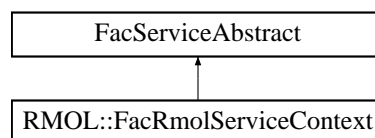
Definition at line 34 of file [FacRmolServiceContext.cpp](#).

The documentation for this class was generated from the following files:

- [rmol/factory/FacRmolServiceContext.hpp](#)
- [rmol/factory/FacRmolServiceContext.cpp](#)

25.15 FacServiceAbstract Class Reference

Inheritance diagram for FacServiceAbstract:



The documentation for this class was generated from the following file:

- [rmol/factory/FacRmolServiceContext.hpp](#)

25.16 RMOL::FareAdjustment Class Reference

```
#include <rmol/command/FareAdjustment.hpp>
```

Static Public Member Functions

- static bool [adjustYield](#) (const stdair::SegmentCabin &)

25.16.1 Detailed Description

Class wrapping the pre-optimisation algorithms.

Definition at line 21 of file [FareAdjustment.hpp](#).

25.16.2 Member Function Documentation

25.16.2.1 bool RMOL::FareAdjustment::adjustYield (const stdair::SegmentCabin & *iSegmentCabin*) [static]

Prepare the demand input for the optimiser.

Definition at line 23 of file [FareAdjustment.cpp](#).

The documentation for this class was generated from the following files:

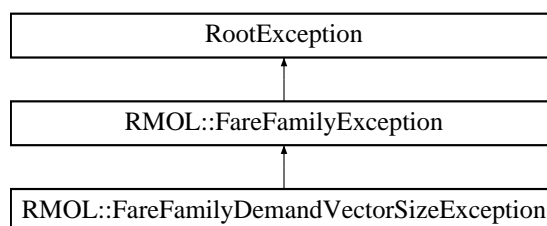
- [rmol/command/FareAdjustment.hpp](#)
- [rmol/command/FareAdjustment.cpp](#)

25.17 RMOL::FareFamilyDemandVectorSizeException Class Reference

Fare Family demand exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::FareFamilyDemandVectorSizeException:



Public Member Functions

- [FareFamilyDemandVectorSizeException](#) (const std::string &iWhat)

25.17.1 Detailed Description

Fare Family demand exception.

Definition at line 164 of file [RMOL_Types.hpp](#).

25.17.2 Constructor & Destructor Documentation

25.17.2.1 RMOL::FareFamilyDemandVectorSizeException::FareFamilyDemandVectorSizeException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 167 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

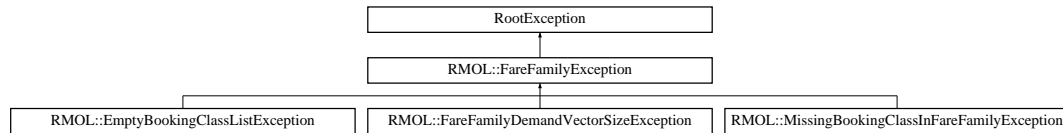
- [rmol/RMOL_Types.hpp](#)

25.18 RMOL::FareFamilyException Class Reference

Fare Family-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::FareFamilyException:



Public Member Functions

- [FareFamilyException](#) (const std::string &iWhat)

25.18.1 Detailed Description

Fare Family-related exception.

Definition at line 134 of file [RMOL_Types.hpp](#).

25.18.2 Constructor & Destructor Documentation

25.18.2.1 RMOL::FareFamilyException::FareFamilyException (const std::string &iWhat) [inline]

Constructor.

Definition at line 137 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

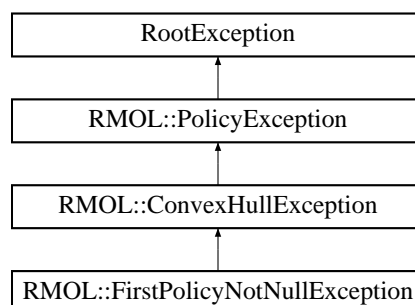
- [rmol/RMOL_Types.hpp](#)

25.19 RMOL::FirstPolicyNotNullException Class Reference

Missing policy NULL in convex hull exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::FirstPolicyNotNullException:



Public Member Functions

- [FirstPolicyNotNullException](#) (const std::string &iWhat)

25.19.1 Detailed Description

Missing policy NULL in convex hull exception.

Definition at line 113 of file [RMOL_Types.hpp](#).

25.19.2 Constructor & Destructor Documentation

25.19.2.1 RMOL::FirstPolicyNotNullException::FirstPolicyNotNullException (const std::string & *iWhat*) `[inline]`

Constructor.

Definition at line 116 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.20 RMOL::Forecaster Class Reference

```
#include <rmol/command/Forecaster.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::FlightDate &, const stdair::DateTime_T &, const stdair::UnconstrainingMethod &, const stdair::ForecastingMethod &)

25.20.1 Detailed Description

Class wrapping the forecasting algorithms.

Definition at line 22 of file [Forecaster.hpp](#).

25.20.2 Member Function Documentation

25.20.2.1 bool RMOL::Forecaster::forecast (stdair::FlightDate & *ioFlightDate*, const stdair::DateTime.T & *iEventTime*, const stdair::UnconstrainingMethod & *iUnconstrainingMethod*, const stdair::ForecastingMethod & *iForecastingMethod*) `[static]`

Forecast demand for a flight-date.

Definition at line 35 of file [Forecaster.cpp](#).

Referenced by [RMOL::RMOL_Service::optimise\(\)](#).

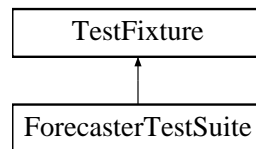
The documentation for this class was generated from the following files:

- [rmol/command/Forecaster.hpp](#)
- [rmol/command/Forecaster.cpp](#)

25.21 ForecasterTestSuite Class Reference

```
#include <test/rmol/ForecasterTestSuite.hpp>
```

Inheritance diagram for ForecasterTestSuite:



Public Member Functions

- void [testQForecaster](#) ()
- [ForecasterTestSuite](#) ()

Protected Attributes

- std::stringstream [_describeKey](#)

25.21.1 Detailed Description

Definition at line 6 of file [ForecasterTestSuite.hpp](#).

25.21.2 Constructor & Destructor Documentation

25.21.2.1 ForecasterTestSuite::ForecasterTestSuite ()

Constructor.

25.21.3 Member Function Documentation

25.21.3.1 void ForecasterTestSuite::testQForecaster ()

Test Q-forecaster.

25.21.4 Member Data Documentation

25.21.4.1 std::stringstream ForecasterTestSuite::_describeKey [protected]

Definition at line 19 of file [ForecasterTestSuite.hpp](#).

The documentation for this class was generated from the following file:

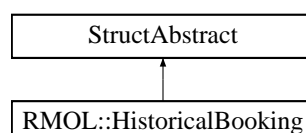
- test/rmol/[ForecasterTestSuite.hpp](#)

25.22 RMOL::HistoricalBooking Struct Reference

Structure keeping track, for a given class, of the number of historical bookings and of the censorship flag.

```
#include <rmol/bom/HistoricalBooking.hpp>
```

Inheritance diagram for RMOL::HistoricalBooking:



Public Member Functions

- const stdair::NbOfBookings_T & [getNbOfBookings](#) () const
- const stdair::NbOfBookings_T & [getUnconstrainedDemand](#) () const
- const stdair::Flag_T & [getFlag](#) () const
- void [setUnconstrainedDemand](#) (const stdair::NbOfBookings_T & iDemand)
- void [setParameters](#) (const stdair::NbOfBookings_T, const stdair::Flag_T)
- void [toStream](#) (std::ostream & ioOut) const
- const std::string [describe](#) () const
- void [display](#) () const
- [HistoricalBooking](#) (const stdair::NbOfBookings_T, const stdair::Flag_T)
- [HistoricalBooking](#) ()
- [HistoricalBooking](#) (const [HistoricalBooking](#) &)
- virtual [~HistoricalBooking](#) ()

25.22.1 Detailed Description

Structure keeping track, for a given class, of the number of historical bookings and of the censorship flag.

Definition at line 17 of file [HistoricalBooking.hpp](#).

25.22.2 Constructor & Destructor Documentation

25.22.2.1 RMOL::HistoricalBooking::HistoricalBooking (const stdair::NbOfBookings_T *iNbOfBookings*, const stdair::Flag_T *iFlag*)

Main constructor.

Definition at line 21 of file [HistoricalBooking.cpp](#).

25.22.2.2 RMOL::HistoricalBooking::HistoricalBooking ()

Default constructor.

Definition at line 15 of file [HistoricalBooking.cpp](#).

25.22.2.3 RMOL::HistoricalBooking::HistoricalBooking (const HistoricalBooking & *iHistoricalBooking*)

Copy constructor.

Definition at line 29 of file [HistoricalBooking.cpp](#).

25.22.2.4 RMOL::HistoricalBooking::~~HistoricalBooking () [virtual]

Destructor.

Definition at line 36 of file [HistoricalBooking.cpp](#).

25.22.3 Member Function Documentation

25.22.3.1 const stdair::NbOfBookings_T& RMOL::HistoricalBooking::getNbOfBookings () const [inline]

Getter for the booking.

Definition at line 22 of file [HistoricalBooking.hpp](#).

Referenced by [RMOL::HistoricalBookingHolder::calculateExpectedDemand\(\)](#), [RMOL::HistoricalBookingHolder::getHistoricalBooking\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfUncensoredBookings\(\)](#), [RMOL::HistoricalBookingHolder::getUncensoredStandardDeviation\(\)](#), [toStream\(\)](#), and [RMOL::HistoricalBookingHolder::toStream\(\)](#).

25.22.3.2 `const stdair::NbOfBookings_T& RMOL::HistoricalBooking::getUnconstrainedDemand () const` `[inline]`

Getter for the unconstrained bookings.

Definition at line 26 of file [HistoricalBooking.hpp](#).

Referenced by [RMOL::HistoricalBookingHolder::getDemandMean\(\)](#), [RMOL::HistoricalBookingHolder::getStandardDeviation\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), [toStream\(\)](#), and [RMOL::HistoricalBookingHolder::toStream\(\)](#).

25.22.3.3 `const stdair::Flag_T& RMOL::HistoricalBooking::getFlag () const` `[inline]`

Getter for the flag of censorship: "false" means that the bookings are not censored.

Definition at line 31 of file [HistoricalBooking.hpp](#).

Referenced by [RMOL::HistoricalBookingHolder::getCensorshipFlag\(\)](#), [RMOL::HistoricalBookingHolder::getListOfToBeUnconstrainedFlags\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfUncensoredBookings\(\)](#), [toStream\(\)](#), and [RMOL::HistoricalBookingHolder::toStream\(\)](#).

25.22.3.4 `void RMOL::HistoricalBooking::setUnconstrainedDemand (const stdair::NbOfBookings_T & iDemand)`
`[inline]`

Setter for the unconstraining demand.

Definition at line 38 of file [HistoricalBooking.hpp](#).

25.22.3.5 `void RMOL::HistoricalBooking::setParameters (const stdair::NbOfBookings_T iNbOfBookings, const stdair::Flag_T iFlag)`

Setter for all parameters.

Definition at line 41 of file [HistoricalBooking.cpp](#).

25.22.3.6 `void RMOL::HistoricalBooking::toStream (std::ostream & ioOut) const`

Dump a Business Object into an output stream.

Parameters

<i>ostream&</i>	the output stream
---------------------	-------------------

Returns

ostream& the output stream.

Definition at line 57 of file [HistoricalBooking.cpp](#).

References [getFlag\(\)](#), [getNbOfBookings\(\)](#), and [getUnconstrainedDemand\(\)](#).

Referenced by [display\(\)](#).

25.22.3.7 `const std::string RMOL::HistoricalBooking::describe () const`

Give a description of the structure (for display purposes).

Definition at line 48 of file [HistoricalBooking.cpp](#).

25.22.3.8 `void RMOL::HistoricalBooking::display () const`

Display on standard output.

Definition at line 66 of file [HistoricalBooking.cpp](#).

References [toStream\(\)](#).

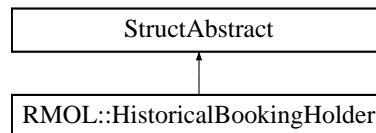
The documentation for this struct was generated from the following files:

- [rmol/bom/HistoricalBooking.hpp](#)
- [rmol/bom/HistoricalBooking.cpp](#)

25.23 RMOL::HistoricalBookingHolder Struct Reference

```
#include <rmol/bom/HistoricalBookingHolder.hpp>
```

Inheritance diagram for RMOL::HistoricalBookingHolder:



Public Member Functions

- const short [getNbOfFlights](#) () const
- const short [getNbOfUncensoredData](#) () const
- const stdair::NbOfBookings_T [getNbOfUncensoredBookings](#) () const
- const double [getUncensoredStandardDeviation](#) (const double &iMeanOfUncensoredBookings, const short iNbOfUncensoredData) const
- const double [getDemandMean](#) () const
- const double [getStandardDeviation](#) (const double) const
- const std::vector< bool > [getListOfToBeUnconstrainedFlags](#) () const
- const stdair::NbOfBookings_T & [getHistoricalBooking](#) (const short i) const
- const stdair::NbOfBookings_T & [getUnconstrainedDemand](#) (const short i) const
- const stdair::Flag_T & [getCensorshipFlag](#) (const short i) const
- const stdair::NbOfBookings_T & [getUnconstrainedDemandOnFirstElement](#) () const
- const stdair::NbOfBookings_T [calculateExpectedDemand](#) (const double, const double, const short, const stdair::NbOfBookings_T) const
- void [setUnconstrainedDemand](#) (const stdair::NbOfBookings_T &iExpectedDemand, const short i)
- void [addHistoricalBooking](#) (const [HistoricalBooking](#) &iHistoricalBooking)
- void [toStream](#) (std::ostream &ioOut) const
- const std::string [describe](#) () const
- void [display](#) () const
- virtual [~HistoricalBookingHolder](#) ()
- [HistoricalBookingHolder](#) ()

25.23.1 Detailed Description

Holder of a HistoricalBookingList object (for memory allocation and recollection purposes).

Definition at line 23 of file [HistoricalBookingHolder.hpp](#).

25.23.2 Constructor & Destructor Documentation

25.23.2.1 RMOL::HistoricalBookingHolder::~~HistoricalBookingHolder () [virtual]

Destructor.

Definition at line 23 of file [HistoricalBookingHolder.cpp](#).

25.23.2.2 RMOL::HistoricalBookingHolder::HistoricalBookingHolder ()

Constructor.

Protected to force the use of the Factory.

Definition at line 19 of file [HistoricalBookingHolder.cpp](#).

25.23.3 Member Function Documentation

25.23.3.1 const short RMOL::HistoricalBookingHolder::getNbOfFlights () const

Get number of flights.

Definition at line 28 of file [HistoricalBookingHolder.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), [RMOL::HybridForecasting::forecast\(\)](#), [RMOL::OldQFF::forecast\(\)](#), [RMOL::BasedForecasting::forecast\(\)](#), and [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.2 const short RMOL::HistoricalBookingHolder::getNbOfUncensoredData () const

Get number of uncensored booking data.

Definition at line 33 of file [HistoricalBookingHolder.cpp](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.3 const std::pair<NbOfBookings,T> RMOL::HistoricalBookingHolder::getNbOfUncensoredBookings () const

Get number of uncensored bookings.

Definition at line 49 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getFlag\(\)](#), and [RMOL::HistoricalBooking::getNbOfBookings\(\)](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.4 const double RMOL::HistoricalBookingHolder::getUncensoredStandardDeviation (const double & iMeanOfUncensoredBookings, const short iNbOfUncensoredData) const

Get standard deviation of uncensored bookings.

Definition at line 69 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getNbOfBookings\(\)](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.5 const double RMOL::HistoricalBookingHolder::getDemandMean () const

Get mean of historical demand.

Definition at line 95 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getUnconstrainedDemand\(\)](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.6 const double RMOL::HistoricalBookingHolder::getStandardDeviation (const double iDemandMean) const

Get standard deviation of demand.

Definition at line 116 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getUnconstrainedDemand\(\)](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.7 `const std::vector< bool > RMOL::HistoricalBookingHolder::getListOfToBeUnconstrainedFlags () const`

Get the list of flags of need to be unconstrained.

Definition at line 140 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getFlag\(\)](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.8 `const stdair::NbOfBookings_T & RMOL::HistoricalBookingHolder::getHistoricalBooking (const short i) const`

Get the historical booking of the (i+1)-th flight.

Definition at line 161 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getNbOfBookings\(\)](#).

25.23.3.9 `const stdair::NbOfBookings_T & RMOL::HistoricalBookingHolder::getUnconstrainedDemand (const short i) const`

Get the unconstraining demand of the (i+1)-th flight.

Definition at line 169 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getUnconstrainedDemand\(\)](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), [RMOL::HybridForecasting::forecast\(\)](#), [RMOL::OldQFF::forecast\(\)](#), [RMOL::BasedForecasting::forecast\(\)](#), [getUnconstrainedDemandOnFirstElement\(\)](#), and [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.10 `const stdair::Flag_T & RMOL::HistoricalBookingHolder::getCensorshipFlag (const short i) const`

Get the flag of the (i+1)-th flight.

Definition at line 177 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getFlag\(\)](#).

25.23.3.11 `const stdair::NbOfBookings_T& RMOL::HistoricalBookingHolder::getUnconstrainedDemandOnFirstElement ()
const [inline]`

Get the unconstraining demand of the first flight.

Definition at line 60 of file [HistoricalBookingHolder.hpp](#).

References [getUnconstrainedDemand\(\)](#).

25.23.3.12 `const stdair::NbOfBookings_T RMOL::HistoricalBookingHolder::calculateExpectedDemand (const double iMean,
const double iSD, const short i, const stdair::NbOfBookings_T iDemand) const`

Calculate the expected demand.

Definition at line 191 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getNbOfBookings\(\)](#).

25.23.3.13 `void RMOL::HistoricalBookingHolder::setUnconstrainedDemand (const stdair::NbOfBookings_T &
iExpectedDemand, const short i)`

Set the expected historical demand of the (i+1)-th flight.

Definition at line 185 of file [HistoricalBookingHolder.cpp](#).

Referenced by [RMOL::EMDetruncator::unconstrain\(\)](#).

25.23.3.14 `void RMOL::HistoricalBookingHolder::addHistoricalBooking (const HistoricalBooking & iHistoricalBooking)`

Add a [HistoricalBooking](#) object to the holder.

Definition at line 236 of file [HistoricalBookingHolder.cpp](#).

Referenced by [RMOL::BasedForecasting::prepareHistoricalBooking\(\)](#), [RMOL::QForecasting::preparePrice-OrientedHistoricalBooking\(\)](#), and [RMOL::HybridForecasting::prepareProductOrientedHistoricalBooking\(\)](#).

25.23.3.15 void RMOL::HistoricalBookingHolder::toStream (std::ostream & *ioOut*) const

Dump a Business Object into an output stream.

Parameters

<i>ostream&</i>	the output stream
---------------------	-------------------

Returns

ostream& the output stream.

Definition at line 241 of file [HistoricalBookingHolder.cpp](#).

References [RMOL::HistoricalBooking::getFlag\(\)](#), [RMOL::HistoricalBooking::getNbOfBookings\(\)](#), and [RMOL::HistoricalBooking::getUnconstrainedDemand\(\)](#).

Referenced by [display\(\)](#).

25.23.3.16 const std::string RMOL::HistoricalBookingHolder::describe () const

Give a description of the structure (for display purposes).

Definition at line 265 of file [HistoricalBookingHolder.cpp](#).

25.23.3.17 void RMOL::HistoricalBookingHolder::display () const

Display on standard output.

Definition at line 273 of file [HistoricalBookingHolder.cpp](#).

References [toStream\(\)](#).

The documentation for this struct was generated from the following files:

- [rmol/bom/HistoricalBookingHolder.hpp](#)
- [rmol/bom/HistoricalBookingHolder.cpp](#)

25.24 RMOL::HybridForecasting Class Reference

```
#include <rmol/command/HybridForecasting.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::SegmentCabin &, const stdair::Date_T &, const stdair::DTD_T &, const stdair::UnconstrainingMethod &, const stdair::NbOfSegments_T &)
- static void [prepareProductOrientedHistoricalBooking](#) (const stdair::SegmentCabin &, const stdair::Booking-Class &, const stdair::SegmentSnapshotTable &, [HistoricalBookingHolder](#) &, const stdair::DCP_T &, const stdair::DCP_T &, const stdair::NbOfSegments_T &, const stdair::NbOfSegments_T &)

25.24.1 Detailed Description

Class wrapping the forecasting algorithms.

Definition at line 21 of file [HybridForecasting.hpp](#).

25.24.2 Member Function Documentation

25.24.2.1 `bool RMOL::HybridForecasting::forecast (stdair::SegmentCabin & ioSegmentCabin, const stdair::Date_T & iCurrentDate, const stdair::DTD_T & iCurrentDTD, const stdair::UnconstrainingMethod & iUnconstrainingMethod, const stdair::NbOfSegments_T & iNbOfDepartedSegments) [static]`

Forecast demand for a segment cabin.

Parameters

<i>stdair::SegmentCabin&</i>	Current Segment Cabin
<i>const</i>	stdair::Date_T& Current Date
<i>const</i>	stdair::DTD_T& Current DTD
<i>const</i>	stdair::UnconstrainingMethod& Method used for the unconstraining
<i>const</i>	stdair::NbOfSegments_T& Number of usable historical segments

Definition at line 32 of file [HybridForecasting.cpp](#).

References [RMOL::Utilities::computeDistributionParameters\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfFlights\(\)](#), [RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), [prepareProductOrientedHistoricalBooking\(\)](#), and [RMOL::Detruncator::unconstrain\(\)](#).

25.24.2.2 `void RMOL::HybridForecasting::prepareProductOrientedHistoricalBooking (const stdair::SegmentCabin & iSegmentCabin, const stdair::BookingClass & iBookingClass, const stdair::SegmentSnapshotTable & iSegmentSnapshotTable, HistoricalBookingHolder & ioHBHolder, const stdair::DCP_T & iDCPBegin, const stdair::DCP_T & iDCPEnd, const stdair::NbOfSegments_T & iSegmentBegin, const stdair::NbOfSegments_T & iSegmentEnd) [static]`

Prepare the historical product-oriented booking figures for a given cabin

Parameters

<i>const</i>	stdair::DCP_T& DCP range start
<i>const</i>	stdair::DCP_T& DCP range end
<i>const</i>	stdair::NbOfSegments_T& Segment range start index
<i>const</i>	stdair::NbOfSegments_T& Segment range end index

Definition at line 125 of file [HybridForecasting.cpp](#).

References [RMOL::HistoricalBookingHolder::addHistoricalBooking\(\)](#).

Referenced by [forecast\(\)](#).

The documentation for this class was generated from the following files:

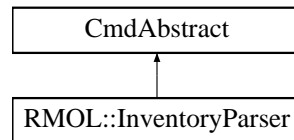
- [rmol/command/HybridForecasting.hpp](#)
- [rmol/command/HybridForecasting.cpp](#)

25.25 RMOL::InventoryParser Class Reference

Class filling the virtual class list (representing a list of classes/buckets) from a given input inventory.

```
#include <rmol/command/InventoryParser.hpp>
```

Inheritance diagram for RMOL::InventoryParser:



Static Public Member Functions

- static bool [parseInputFileAndBuildBom](#) (const std::string &iInputFileName, stdair::BomRoot &)

25.25.1 Detailed Description

Class filling the virtual class list (representing a list of classes/buckets) from a given input inventory.

Definition at line 25 of file [InventoryParser.hpp](#).

25.25.2 Member Function Documentation

25.25.2.1 bool RMOL::InventoryParser::parseInputFileAndBuildBom (const std::string & *iInputFileName*, stdair::BomRoot & *ioBomRoot*) [static]

Parse the input values from a CSV-formatted inventory file.

Parameters

<i>const</i>	std::string& iInputFileName Inventory file to be parsed.
<i>stdair::Bom-Root&</i>	The BOM tree.

Returns

bool Whether or not the parsing was successful.

Definition at line 36 of file [InventoryParser.cpp](#).

Referenced by [RMOL::RMOL_Service::parseAndLoad\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/command/InventoryParser.hpp](#)
- [rmol/command/InventoryParser.cpp](#)

25.26 RMOL::MarginalRevenueTransformation Class Reference

```
#include <rmol/command/MarginalRevenueTransformation.hpp>
```

Static Public Member Functions

- static bool [prepareDemandInput](#) (stdair::SegmentCabin &)

25.26.1 Detailed Description

Class wrapping the pre-optimisation algorithms.

Definition at line 21 of file [MarginalRevenueTransformation.hpp](#).

25.26.2 Member Function Documentation

25.26.2.1 bool RMOL::MarginalRevenueTransformation::prepareDemandInput (stdair::SegmentCabin & *ioSegmentCabin*)
[static]

Prepare the demand input for the optimiser.

Definition at line 28 of file [MarginalRevenueTransformation.cpp](#).

The documentation for this class was generated from the following files:

- [rmol/command/MarginalRevenueTransformation.hpp](#)
- [rmol/command/MarginalRevenueTransformation.cpp](#)

25.27 RMOL::MCOptimiser Class Reference

```
#include <rmol/bom/MCOptimiser.hpp>
```

Static Public Member Functions

- static void [optimalOptimisationByMCIntegration](#) (stdair::LegCabin &)
- static
stdair::GeneratedDemandVector_T [generateDemandVector](#) (const stdair::MeanValue_T &, const stdair::StdDevValue_T &, const stdair::NbOfSamples_T &)
- static void [optimisationByMCIntegration](#) (stdair::LegCabin &)

25.27.1 Detailed Description

Utility methods for the Monte-Carlo algorithms.

Definition at line 19 of file [MCOptimiser.hpp](#).

25.27.2 Member Function Documentation

25.27.2.1 void RMOL::MCOptimiser::optimalOptimisationByMCIntegration (stdair::LegCabin & *ioLegCabin*) [static]

Calculate the optimal protections for the set of buckets/classes given in input, and update those buckets accordingly.

The Monte Carlo Integration algorithm (see The Theory and Practice of Revenue Management, by Kalyan T. Talluri and Garret J. van Ryzin, Kluwer Academic Publishers, for the details) is used.

Definition at line 28 of file [MCOptimiser.cpp](#).

25.27.2.2 stdair::GeneratedDemandVector_T RMOL::MCOptimiser::generateDemandVector (const stdair::MeanValue_T & *iMean*, const stdair::StdDevValue_T & *iStdDev*, const stdair::NbOfSamples_T & *K*) [static]

Monte-Carlo

Definition at line 154 of file [MCOptimiser.cpp](#).

Referenced by [optimisationByMCIntegration\(\)](#).

25.27.2.3 void RMOL::MCOptimiser::optimisationByMCIntegration (stdair::LegCabin & *ioLegCabin*) [static]

Definition at line 175 of file [MCOptimiser.cpp](#).

References [RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION](#), and [generateDemandVector\(\)](#).

Referenced by [RMOL::Optimiser::optimiseUsingOnDForecast\(\)](#).

The documentation for this class was generated from the following files:

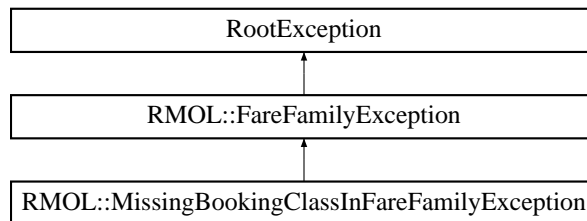
- [rmol/bom/MCOptimiser.hpp](#)
- [rmol/bom/MCOptimiser.cpp](#)

25.28 RMOL::MissingBookingClassInFareFamilyException Class Reference

Missing Booking Class in Fare Family exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::MissingBookingClassInFareFamilyException:



Public Member Functions

- [MissingBookingClassInFareFamilyException](#) (const std::string &iWhat)

25.28.1 Detailed Description

Missing Booking Class in Fare Family exception.

Definition at line 154 of file [RMOL_Types.hpp](#).

25.28.2 Constructor & Destructor Documentation

25.28.2.1 RMOL::MissingBookingClassInFareFamilyException::MissingBookingClassInFareFamilyException (const std::string &iWhat) [inline]

Constructor.

Definition at line 157 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

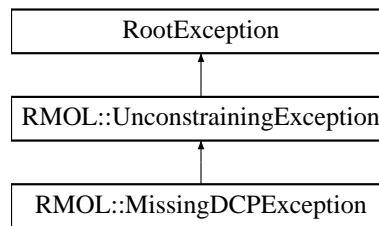
- [rmol/RMOL_Types.hpp](#)

25.29 RMOL::MissingDCPException Class Reference

Missing a DCP in unconstrainer exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::MissingDCPException:



Public Member Functions

- [MissingDCPException](#) (const std::string &iWhat)

25.29.1 Detailed Description

Missing a DCP in unconstrainer exception.

Definition at line 62 of file [RMOL_Types.hpp](#).

25.29.2 Constructor & Destructor Documentation

25.29.2.1 RMOL::MissingDCPException::MissingDCPException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 65 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.30 RMOL::NewQFF Class Reference

```
#include <rmol/command/NewQFF.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::SegmentCabin &, const stdair::Date_T &, const stdair::DTD_T &, const stdair::UnconstrainingMethod &, const stdair::NbOfSegments_T &)

25.30.1 Detailed Description

Class wrapping the forecasting algorithms.

Definition at line 23 of file [NewQFF.hpp](#).

25.30.2 Member Function Documentation

25.30.2.1 bool RMOL::NewQFF::forecast (stdair::SegmentCabin & *ioSegmentCabin*, const stdair::Date_T & *iCurrentDate*, const stdair::DTD_T & *iCurrentDTD*, const stdair::UnconstrainingMethod & *iUnconstrainingMethod*, const stdair::NbOfSegments_T & *iNbOfDepartedSegments*) [static]

Forecast demand for a segment cabin.

Parameters

<i>stdair::SegmentCabin&</i>	Current Segment Cabin
<i>const</i>	stdair::Date_T& Current Date
<i>const</i>	stdair::DTD_T& Current DTD
<i>const</i>	stdair::UnconstrainingMethod& Method used for the unconstraining
<i>const</i>	stdair::NbOfSegments_T& Number of usable historical segments

Definition at line 31 of file [NewQFF.cpp](#).

The documentation for this class was generated from the following files:

- [rmol/command/NewQFF.hpp](#)
- [rmol/command/NewQFF.cpp](#)

25.31 RMOL::OldQFF Class Reference

```
#include <rmol/command/OldQFF.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::SegmentCabin &, const stdair::Date_T &, const stdair::DTD_T &, const stdair::UnconstrainingMethod &, const stdair::NbOfSegments_T &)

25.31.1 Detailed Description

Class wrapping the forecasting algorithms.

Definition at line 23 of file [OldQFF.hpp](#).

25.31.2 Member Function Documentation

25.31.2.1 bool RMOL::OldQFF::forecast (stdair::SegmentCabin & *ioSegmentCabin*, const stdair::Date_T & *iCurrentDate*, const stdair::DTD_T & *iCurrentDTD*, const stdair::UnconstrainingMethod & *iUnconstrainingMethod*, const stdair::NbOfSegments_T & *iNbOfDepartedSegments*) [static]

Forecast demand for a segment cabin.

Parameters

<i>stdair::SegmentCabin&</i>	Current Segment Cabin
<i>const</i>	stdair::Date_T& Current Date
<i>const</i>	stdair::DTD_T& Current DTD
<i>const</i>	stdair::UnconstrainingMethod& Method used for the unconstraining
<i>const</i>	stdair::NbOfSegments_T& Number of usable historical segments

Definition at line 31 of file [OldQFF.cpp](#).

References [RMOL::Utilities::computeDistributionParameters\(\)](#), [RMOL::Utilities::computeSellUpFactorCurves\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfFlights\(\)](#), [RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), and [RMOL::Detruncator::unconstrain\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/command/OldQFF.hpp](#)

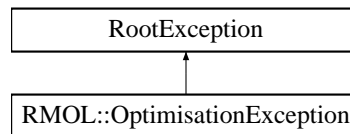
- [rmol/command/OldQFF.cpp](#)

25.32 RMOL::OptimisationException Class Reference

Optimisation-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::OptimisationException:



Public Member Functions

- [OptimisationException](#) (const std::string &iWhat)

25.32.1 Detailed Description

Optimisation-related exception.

Definition at line 72 of file [RMOL_Types.hpp](#).

25.32.2 Constructor & Destructor Documentation

25.32.2.1 RMOL::OptimisationException::OptimisationException (const std::string & iWhat) [inline]

Constructor.

Definition at line 75 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.33 RMOL::Optimiser Class Reference

```
#include <rmol/command/Optimiser.hpp>
```

Static Public Member Functions

- static void [optimalOptimisationByMCIntegration](#) (const stdair::NbOfSamples_T &, stdair::LegCabin &)
- static void [optimalOptimisationByDP](#) (stdair::LegCabin &)
- static void [heuristicOptimisationByEmsr](#) (stdair::LegCabin &)
- static void [heuristicOptimisationByEmsrA](#) (stdair::LegCabin &)
- static void [heuristicOptimisationByEmsrB](#) (stdair::LegCabin &)
- static bool [optimise](#) (stdair::FlightDate &, const stdair::OptimisationMethod &)
- static bool [buildVirtualClassListForLegBasedOptimisation](#) (stdair::LegCabin &)
- static double [optimiseUsingOnDForecast](#) (stdair::FlightDate &, const bool &iReduceFluctuations=false)

25.33.1 Detailed Description

Class wrapping the optimisation algorithms.

Definition at line 20 of file [Optimiser.hpp](#).

25.33.2 Member Function Documentation

25.33.2.1 `void RMOL::Optimiser::optimalOptimisationByMCIntegration (const stdair::NbOfSamples_T & K, stdair::LegCabin & ioLegCabin) [static]`

Monte Carlo Integration algorithm.

Calculate the optimal protections for the set of buckets/classes given in input, and update those buckets accordingly.

The Monte Carlo Integration algorithm (see The Theory and Practice of Revenue Management, by Kalyan T. Talluri and Garret J. van Ryzin, Kluwer Academic Publishers, for the details) is used. Hence, K is the number of random draws to perform. 100 is a minimum for K, as statistics must be drawn from those random generations.

Definition at line 30 of file [Optimiser.cpp](#).

25.33.2.2 `void RMOL::Optimiser::optimalOptimisationByDP (stdair::LegCabin & ioLegCabin) [static]`

Dynamic Programming.

Definition at line 64 of file [Optimiser.cpp](#).

25.33.2.3 `void RMOL::Optimiser::heuristicOptimisationByEmsr (stdair::LegCabin & ioLegCabin) [static]`

EMRS algorithm.

Definition at line 69 of file [Optimiser.cpp](#).

25.33.2.4 `void RMOL::Optimiser::heuristicOptimisationByEmsrA (stdair::LegCabin & ioLegCabin) [static]`

EMRS-a algorithm.

Definition at line 74 of file [Optimiser.cpp](#).

25.33.2.5 `void RMOL::Optimiser::heuristicOptimisationByEmsrB (stdair::LegCabin & ioLegCabin) [static]`

EMRS-b algorithm.

Definition at line 79 of file [Optimiser.cpp](#).

25.33.2.6 `bool RMOL::Optimiser::optimise (stdair::FlightDate & ioFlightDate, const stdair::OptimisationMethod & ioOptimisationMethod) [static]`

Optimise a flight-date using leg-based Monte Carlo Integration.

Definition at line 84 of file [Optimiser.cpp](#).

25.33.2.7 `bool RMOL::Optimiser::buildVirtualClassListForLegBasedOptimisation (stdair::LegCabin & ioLegCabin) [static]`

Build the virtual class list for the given leg-cabin.

Definition at line 164 of file [Optimiser.cpp](#).

25.33.2.8 `double RMOL::Optimiser::optimiseUsingOnDForecast (stdair::FlightDate & ioFlightDate, const bool & iReduceFluctuations = false) [static]`

[Optimiser](#)

Definition at line 247 of file [Optimiser.cpp](#).

References [RMOL::MCOptimiser::optimisationByMCIntegration\(\)](#).

Referenced by [RMOL::RMOL_Service::optimiseOnD\(\)](#), [RMOL::RMOL_Service::optimiseOnDUsingAdvancedRM-Cooperation\(\)](#), and [RMOL::RMOL_Service::optimiseOnDUsingRMCooperation\(\)](#).

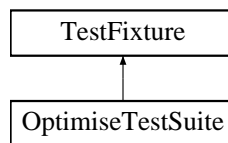
The documentation for this class was generated from the following files:

- [rmol/command/Optimiser.hpp](#)
- [rmol/command/Optimiser.cpp](#)

25.34 OptimiseTestSuite Class Reference

```
#include <test/rmol/OptimiseTestSuite.hpp>
```

Inheritance diagram for OptimiseTestSuite:



Public Member Functions

- void [testOptimiseMC](#) ()
- void [testOptimiseDP](#) ()
- void [testOptimiseEMSR](#) ()
- void [testOptimiseEMSRa](#) ()
- void [testOptimiseEMSRb](#) ()
- [OptimiseTestSuite](#) ()

Protected Attributes

- `std::stringstream` [_describeKey](#)

25.34.1 Detailed Description

Definition at line 6 of file [OptimiseTestSuite.hpp](#).

25.34.2 Constructor & Destructor Documentation

25.34.2.1 OptimiseTestSuite::OptimiseTestSuite ()

Test some error detection functionalities. Constructor.

25.34.3 Member Function Documentation

25.34.3.1 void OptimiseTestSuite::testOptimiseMC ()

Test the Monte-Carlo (MC) Optimisation functionality.

25.34.3.2 void OptimiseTestSuite::testOptimiseDP ()

Test the Dynamic Programming (DP) Optimisation functionality.

25.34.3.3 void OptimiseTestSuite::testOptimiseEMSR ()

Test the Expected Marginal Seat Revenue (EMSR) Optimisation functionality.

25.34.3.4 void OptimiseTestSuite::testOptimiseEMSRa ()

Test the Expected Marginal Seat Revenue, variant a (EMSR-a), Optimisation functionality.

25.34.3.5 void OptimiseTestSuite::testOptimiseEMSRb ()

Test the Expected Marginal Seat Revenue, variant b (EMSR-b), Optimisation functionality.

25.34.4 Member Data Documentation**25.34.4.1 std::stringstream OptimiseTestSuite::_describeKey [protected]**

Definition at line 43 of file [OptimiseTestSuite.hpp](#).

The documentation for this class was generated from the following file:

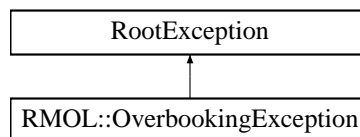
- [test/rmol/OptimiseTestSuite.hpp](#)

25.35 RMOL::OverbookingException Class Reference

Overbooking-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::OverbookingException:

**Public Member Functions**

- [OverbookingException](#) (const std::string &iWhat)

25.35.1 Detailed Description

Overbooking-related exception.

Definition at line 32 of file [RMOL_Types.hpp](#).

25.35.2 Constructor & Destructor Documentation**25.35.2.1 RMOL::OverbookingException::OverbookingException (const std::string & iWhat) [inline]**

Constructor.

Definition at line 35 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

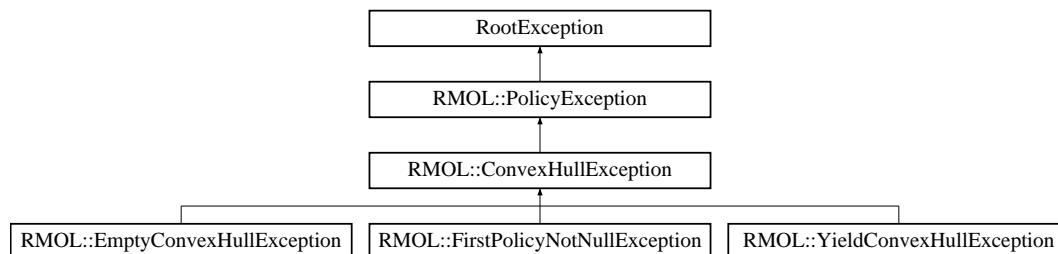
- [rmol/RMOL_Types.hpp](#)

25.36 RMOL::PolicyException Class Reference

Policy-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::PolicyException:



Public Member Functions

- [PolicyException](#) (const std::string &iWhat)

25.36.1 Detailed Description

Policy-related exception.

Definition at line 82 of file [RMOL_Types.hpp](#).

25.36.2 Constructor & Destructor Documentation

25.36.2.1 RMOL::PolicyException::PolicyException (const std::string & iWhat) [inline]

Constructor.

Definition at line 85 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.37 RMOL::PolicyHelper Class Reference

```
#include <rmol/bom/PolicyHelper.hpp>
```

Static Public Member Functions

- static void [diffBetweenTwoPolicies](#) (stdair::NestingNode &, const stdair::Policy &, const stdair::Policy &)
- static void [computeLastNode](#) (stdair::NestingNode &, const stdair::Policy &, const stdair::SegmentCabin &)
- static bool [isNested](#) (const stdair::Policy &, const stdair::Policy &)

25.37.1 Detailed Description

Class holding helper methods.

Definition at line 28 of file [PolicyHelper.hpp](#).

25.37.2 Member Function Documentation

25.37.2.1 void RMOL::PolicyHelper::diffBetweenTwoPolicies (stdair::NestingNode & *ioNode*, const stdair::Policy & *iFirstPolicy*, const stdair::Policy & *iSecondPolicy*) [static]

Find the booking class list representing the difference between two Policies (first minus second)

Definition at line 24 of file [PolicyHelper.cpp](#).

25.37.2.2 void RMOL::PolicyHelper::computeLastNode (stdair::NestingNode & *ioNode*, const stdair::Policy & *iPolicy*, const stdair::SegmentCabin & *iSegmentCabin*) [static]

Compute the list of the booking class which is not in the node.

Definition at line 164 of file [PolicyHelper.cpp](#).

25.37.2.3 bool RMOL::PolicyHelper::isNested (const stdair::Policy & *iFirstPolicy*, const stdair::Policy & *iSecondPolicy*) [static]

Check if the first policy is nested under the second policy.

Definition at line 220 of file [PolicyHelper.cpp](#).

The documentation for this class was generated from the following files:

- [rmol/bom/PolicyHelper.hpp](#)
- [rmol/bom/PolicyHelper.cpp](#)

25.38 RMOL::PreOptimiser Class Reference

```
#include <rmol/command/PreOptimiser.hpp>
```

Static Public Member Functions

- static bool [preOptimise](#) (stdair::FlightDate &, const stdair::PreOptimisationMethod &)

25.38.1 Detailed Description

Class wrapping the pre-optimisation algorithms.

Definition at line 22 of file [PreOptimiser.hpp](#).

25.38.2 Member Function Documentation

25.38.2.1 bool RMOL::PreOptimiser::preOptimise (stdair::FlightDate & *ioFlightDate*, const stdair::PreOptimisationMethod & *iPreOptimisationMethod*) [static]

Prepare the demand input for the optimiser.

Definition at line 30 of file [PreOptimiser.cpp](#).

Referenced by [RMOL::RMOL_Service::optimise\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/command/PreOptimiser.hpp](#)
- [rmol/command/PreOptimiser.cpp](#)

25.39 RMOL::QForecasting Class Reference

```
#include <rmol/command/QForecasting.hpp>
```

Static Public Member Functions

- static bool [forecast](#) (stdair::SegmentCabin &, const stdair::Date_T &, const stdair::DTD_T &, const stdair::UnconstrainingMethod &, const stdair::NbOfSegments_T &)
- static void [preparePriceOrientedHistoricalBooking](#) (const stdair::SegmentCabin &, const stdair::SegmentSnapshotTable &, [HistoricalBookingHolder](#) &, const stdair::DCP_T &, const stdair::DCP_T &, const stdair::NbOfSegments_T &, const stdair::NbOfSegments_T &, const stdair::BookingClassSellUpCurveMap_T &)

25.39.1 Detailed Description

Class wrapping the optimisation algorithms.

Definition at line 23 of file [QForecasting.hpp](#).

25.39.2 Member Function Documentation

25.39.2.1 bool RMOL::QForecasting::forecast (stdair::SegmentCabin & *ioSegmentCabin*, const stdair::Date.T & *iCurrentDate*, const stdair::DTD.T & *iCurrentDTD*, const stdair::UnconstrainingMethod & *iUnconstrainingMethod*, const stdair::NbOfSegments.T & *iNbOfDepartedSegments*) [static]

Forecast demand for a flight-date.

Parameters

<i>const</i>	stdair::Date_T& Current Date
<i>const</i>	stdair::NbOfSegments_T& Number of usable historical segments

Definition at line 31 of file [QForecasting.cpp](#).

References [RMOL::Utilities::computeDispatchingFactorCurves\(\)](#), [RMOL::Utilities::computeDistributionParameters\(\)](#), [RMOL::Utilities::computeSellUpFactorCurves\(\)](#), [RMOL::Utilities::dispatchDemandForecast\(\)](#), [RMOL::Utilities::dispatchDemandForecastForFA\(\)](#), [RMOL::HistoricalBookingHolder::getNbOfFlights\(\)](#), [RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD\(\)](#), [RMOL::HistoricalBookingHolder::getUnconstrainedDemand\(\)](#), [preparePriceOrientedHistoricalBooking\(\)](#), and [RMOL::Detruncator::unconstrain\(\)](#).

25.39.2.2 void RMOL::QForecasting::preparePriceOrientedHistoricalBooking (const stdair::SegmentCabin & *iSegmentCabin*, const stdair::SegmentSnapshotTable & *iSegmentSnapshotTable*, [HistoricalBookingHolder](#) & *ioHBHolder*, const stdair::DCP_T & *iDCPBegin*, const stdair::DCP_T & *iDCPEnd*, const stdair::NbOfSegments.T & *iSegmentBegin*, const stdair::NbOfSegments.T & *iSegmentEnd*, const stdair::BookingClassSellUpCurveMap_T & *iBCSellUpCurveMap*) [static]

Prepare the historical price-oriented booking figures for a given cabin

Parameters

<i>const</i>	stdair::DCP_T& DCP range start
<i>const</i>	stdair::DCP_T& DCP range end
<i>const</i>	stdair::NbOfSegments_T& Segment range start index
<i>const</i>	stdair::NbOfSegments_T& Segment range end index

Definition at line 136 of file [QForecasting.cpp](#).

References [RMOL::HistoricalBookingHolder::addHistoricalBooking\(\)](#).

Referenced by [forecast\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/command/QForecasting.hpp](#)
- [rmol/command/QForecasting.cpp](#)

25.40 RMOL::RMOL_Service Class Reference

Interface for the [RMOL](#) Services.

```
#include <rmol/RMOL_Service.hpp>
```

Public Member Functions

- [RMOL_Service](#) (const stdair::BasLogParams &, const stdair::BasDBParams &)
- [RMOL_Service](#) (const stdair::BasLogParams &)
- [RMOL_Service](#) (stdair::STDAIR_ServicePtr_T)
- void [parseAndLoad](#) (const stdair::CabinCapacity_T & iCabinCapacity, const stdair::Filename_T & iDemandAndClassDataFile)
- void [setUpStudyStatManager](#) ()
- [~RMOL_Service](#) ()
- void [buildSampleBom](#) ()
- void [clonePersistentBom](#) ()
- void [buildComplementaryLinks](#) (stdair::BomRoot &)
- void [optimalOptimisationByMCIntegration](#) (const int K)
- void [optimalOptimisationByDP](#) ()
- void [heuristicOptimisationByEmsr](#) ()
- void [heuristicOptimisationByEmsrA](#) ()
- void [heuristicOptimisationByEmsrB](#) ()
- void [heuristicOptimisationByMCIntegrationForQFF](#) ()
- void [heuristicOptimisationByEmsrBForQFF](#) ()
- void [MRTForNewQFF](#) ()
- const stdair::SegmentCabin & [retrieveDummySegmentCabin](#) (const bool isForFareFamilies=false)
- bool [optimise](#) (stdair::FlightDate &, const stdair::DateTime_T &, const stdair::UnconstrainingMethod &, const stdair::ForecastingMethod &, const stdair::PreOptimisationMethod &, const stdair::OptimisationMethod &, const stdair::PartnershipTechnique &)
- void [forecastOnD](#) (const stdair::DateTime_T &)
- stdair::YieldFeatures * [getYieldFeatures](#) (const stdair::OnDDate &, const stdair::CabinCode_T &, stdair::BomRoot &)
- void [forecastOnD](#) (const stdair::YieldFeatures &, stdair::OnDDate &, const stdair::CabinCode_T &, const stdair::DTD_T &, stdair::BomRoot &)
- void [setOnDForecast](#) (const stdair::AirlineClassList &, const stdair::MeanValue_T &, const stdair::StdDevValue_T &, stdair::OnDDate &, const stdair::CabinCode_T &, stdair::BomRoot &)
- void [setOnDForecast](#) (const stdair::AirlineCode_T &, const stdair::Date_T &, const stdair::AirportCode_T &, const stdair::AirportCode_T &, const stdair::CabinCode_T &, const stdair::ClassCode_T &, const stdair::MeanValue_T &, const stdair::StdDevValue_T &, const stdair::Yield_T &, stdair::BomRoot &)
- void [setOnDForecast](#) (const stdair::AirlineCodeList_T &, const stdair::AirlineCode_T &, const stdair::Date_T &, const stdair::AirportCode_T &, const stdair::AirportCode_T &, const stdair::CabinCode_T &, const stdair::ClassCodeList_T &, const stdair::MeanValue_T &, const stdair::StdDevValue_T &, const stdair::Yield_T &, stdair::BomRoot &)
- void [resetDemandInformation](#) (const stdair::DateTime_T &)
- void [resetDemandInformation](#) (const stdair::DateTime_T &, const stdair::Inventory &)
- void [projectAggregatedDemandOnLegCabins](#) (const stdair::DateTime_T &)
- void [projectOnDDemandOnLegCabinsUsingYP](#) (const stdair::DateTime_T &)
- void [projectOnDDemandOnLegCabinsUsingDA](#) (const stdair::DateTime_T &)
- void [projectOnDDemandOnLegCabinsUsingDYP](#) (const stdair::DateTime_T &)

- void [projectOnDDemandOnLegCabinsUsingDYP](#) (const stdair::DateTime_T &, const stdair::Inventory &)
- void [optimiseOnD](#) (const stdair::DateTime_T &)
- void [optimiseOnDUsingRMCooperation](#) (const stdair::DateTime_T &)
- void [optimiseOnDUsingAdvancedRMCooperation](#) (const stdair::DateTime_T &)
- void [updateBidPrice](#) (const stdair::DateTime_T &)
- void [updateBidPrice](#) (const stdair::FlightDate &, stdair::BomRoot &)
- std::string [jsonExport](#) (const stdair::AirlineCode_T &, const stdair::FlightNumber_T &, const stdair::Date_T & iDepartureDate) const
- std::string [csvDisplay](#) () const

25.40.1 Detailed Description

Interface for the [RMOL](#) Services.

Definition at line 43 of file [RMOL_Service.hpp](#).

25.40.2 Constructor & Destructor Documentation

25.40.2.1 RMOL::RMOL_Service::RMOL_Service (const stdair::BasLogParams & *iLogParams*, const stdair::BasDBParams & *iDBParams*)

Constructor.

The `initRmolService()` method is called; see the corresponding documentation for more details.

A reference on an output stream is given, so that log outputs can be directed onto that stream.

Moreover, database connection parameters are given, so that a session can be created on the corresponding database.

Parameters

<i>const</i>	stdair::BasLogParams& Parameters for the output log stream.
<i>const</i>	stdair::BasDBParams& Parameters for the database access.

Definition at line 85 of file [RMOL_Service.cpp](#).

25.40.2.2 RMOL::RMOL_Service::RMOL_Service (const stdair::BasLogParams & *iLogParams*)

Constructor.

The `initRmolService()` method is called; see the corresponding documentation for more details.

Moreover, a reference on an output stream is given, so that log outputs can be directed onto that stream.

Parameters

<i>const</i>	stdair::BasLogParams& Parameters for the output log stream.
--------------	---

Definition at line 64 of file [RMOL_Service.cpp](#).

25.40.2.3 RMOL::RMOL_Service::RMOL_Service (stdair::STDAIR_ServicePtr_T *ioSTDAIRServicePtr*)

Constructor.

The `initRmolService()` method is called; see the corresponding documentation for more details.

Moreover, as no reference on any output stream is given, it is assumed that the StdAir log service has already been initialised with the proper log output stream by some other methods in the calling chain (for instance, when the [RMOL_Service](#) is itself being initialised by another library service such as [AIRINV_Service](#)).

Parameters

<i>STDAIR_ServicePtr_T</i>	the shared pointer of stdair service.
----------------------------	---------------------------------------

Definition at line 107 of file [RMOL_Service.cpp](#).

25.40.2.4 RMOL::RMOL_Service::~~RMOL_Service ()

Destructor.

Definition at line 124 of file [RMOL_Service.cpp](#).

25.40.3 Member Function Documentation

25.40.3.1 void RMOL::RMOL_Service::parseAndLoad (const stdair::CabinCapacity_T & iCabinCapacity, const stdair::Filename_T & iDemandAndClassDataFile)

Parse the optimisation-related data and load them into memory.

First, the `STDAIR_Service::buildDummyInventory()` method is called, for [RMOL](#) and with the given cabin capacity, in order to build the minimum required flight-date structure in order to perform an optimisation on a leg-cabin.

The CSV input file describes the problem to be optimised, i.e.:

- the demand specifications for all the booking classes (mean and standard deviations for the demand distribution); the yields corresponding to those booking classes.

That CSV file is parsed and instantiated in memory accordingly. The leg-cabin capacity has been set at the initialisation of the ([RMOL](#)) service.

Parameters

<i>const</i>	stdair::CabinCapacity& Capacity of the leg-cabin to be optimised.
<i>const</i>	stdair::Filename_T& (CSV) input file.

Definition at line 201 of file [RMOL_Service.cpp](#).

References [buildComplementaryLinks\(\)](#), [clonePersistentBom\(\)](#), and [RMOL::InventoryParser::parseInputFileAndBuildBom\(\)](#).

Referenced by [main\(\)](#).

25.40.3.2 void RMOL::RMOL_Service::setUpStudyStatManager ()

Set up the StudyStatManager.

25.40.3.3 void RMOL::RMOL_Service::buildSampleBom ()

Build a sample BOM tree, and attach it to the BomRoot instance.

See also

`stdair::CmdBomManager::buildSampleBom()` for more details.

Definition at line 260 of file [RMOL_Service.cpp](#).

References [buildComplementaryLinks\(\)](#), and [clonePersistentBom\(\)](#).

Referenced by [main\(\)](#).

25.40.3.4 void RMOL::RMOL_Service::clonePersistentBom ()

Clone the persistent BOM object.

Definition at line 319 of file [RMOL_Service.cpp](#).

References [buildComplementaryLinks\(\)](#).

Referenced by [buildSampleBom\(\)](#), and [parseAndLoad\(\)](#).

25.40.3.5 void RMOL::RMOL_Service::buildComplementaryLinks (*stdair::BomRoot & ioBomRoot*)

Build all the complementary links in the given bom root object. Build the links between dummy leg cabin and dummy segment cabin.

Definition at line 357 of file [RMOL_Service.cpp](#).

Referenced by [buildSampleBom\(\)](#), [clonePersistentBom\(\)](#), and [parseAndLoad\(\)](#).

25.40.3.6 void RMOL::RMOL_Service::optimalOptimisationByMCIntegration (*const int K*)

Single resource optimization using the Monte Carlo algorithm.

Definition at line 382 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.7 void RMOL::RMOL_Service::optimalOptimisationByDP ()

Single resource optimization using dynamic programming.

Definition at line 426 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.8 void RMOL::RMOL_Service::heuristicOptimisationByEmsr ()

Single resource optimization using EMSR heuristic.

Definition at line 430 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.9 void RMOL::RMOL_Service::heuristicOptimisationByEmsrA ()

Single resource optimization using EMSR-a heuristic.

Definition at line 475 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.10 void RMOL::RMOL_Service::heuristicOptimisationByEmsrB ()

Single resource optimization using EMSR-b heuristic.

Definition at line 500 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.11 void RMOL::RMOL_Service::heuristicOptimisationByMCIntegrationForQFF ()

Single resource optimization using the Monte Carlo algorithm for QFF method.

25.40.3.12 void RMOL::RMOL_Service::heuristicOptimisationByEmsrBForQFF ()

Single resource optimization using EMSR-b heuristic for QFF method.

25.40.3.13 void RMOL::RMOL_Service::MRTForNewQFF ()

Single resource pre-optimization using Marginal Revenue Transformation for QFF method.

25.40.3.14 `const stdair::SegmentCabin & RMOL::RMOL_Service::retrieveDummySegmentCabin (const bool isForFareFamilies = false)`

Retrieve one sample segment-cabin of the dummy inventory of "XX".

Parameters

<i>const</i>	bool Boolean to choose the sample segment-cabin. True: the dummy segment-cabin with fare families. False: the dummy segment-cabin without fare families. By default the value is false.
--------------	---

Definition at line 525 of file [RMOL_Service.cpp](#).

25.40.3.15 `bool RMOL::RMOL_Service::optimise (stdair::FlightDate & ioFlightDate, const stdair::DateTime_T & iRMEventTime, const stdair::UnconstrainingMethod & iUnconstrainingMethod, const stdair::ForecastingMethod & iForecastingMethod, const stdair::PreOptimisationMethod & iPreOptimisationMethod, const stdair::OptimisationMethod & iOptimisationMethod, const stdair::PartnershipTechnique & iPartnershipTechnique)`

Optimise (revenue management) an flight-date/network-date

Definition at line 547 of file [RMOL_Service.cpp](#).

References [RMOL::Forecaster::forecast\(\)](#), [forecastOnD\(\)](#), [optimiseOnD\(\)](#), [optimiseOnDUsingAdvancedRM-Cooperation\(\)](#), [optimiseOnDUsingRMCooperation\(\)](#), [RMOL::PreOptimiser::preOptimise\(\)](#), [projectAggregated-DemandOnLegCabins\(\)](#), [projectOnDDemandOnLegCabinsUsingDYP\(\)](#), [projectOnDDemandOnLegCabinsUsingY-P\(\)](#), [resetDemandInformation\(\)](#), and [updateBidPrice\(\)](#).

25.40.3.16 `void RMOL::RMOL_Service::forecastOnD (const stdair::DateTime_T & iRMEventTime)`

Forecaster

Definition at line 648 of file [RMOL_Service.cpp](#).

References [getYieldFeatures\(\)](#).

Referenced by [optimise\(\)](#).

25.40.3.17 `stdair::YieldFeatures * RMOL::RMOL_Service::getYieldFeatures (const stdair::OnDDate & iOnDDate, const stdair::CabinCode_T & iCabinCode, stdair::BomRoot & iBomRoot)`

Definition at line 723 of file [RMOL_Service.cpp](#).

Referenced by [forecastOnD\(\)](#).

25.40.3.18 `void RMOL::RMOL_Service::forecastOnD (const stdair::YieldFeatures & iYieldFeatures, stdair::OnDDate & iOnDDate, const stdair::CabinCode_T & iCabinCode, const stdair::DTD_T & iDTD, stdair::BomRoot & iBomRoot)`

Definition at line 796 of file [RMOL_Service.cpp](#).

References [setOnDForecast\(\)](#).

25.40.3.19 `void RMOL::RMOL_Service::setOnDForecast (const stdair::AirlineClassList & iAirlineClassList, const stdair::MeanValue_T & iMeanValue, const stdair::StdDevValue_T & iStdDevValue, stdair::OnDDate & iOnDDate, const stdair::CabinCode_T & iCabinCode, stdair::BomRoot & iBomRoot)`

Definition at line 911 of file [RMOL_Service.cpp](#).

Referenced by [forecastOnD\(\)](#).

25.40.3.20 `void RMOL::RMOL_Service::setOnDForecast (const stdair::AirlineCode_T & iAirlineCode, const stdair::Date_T & iDepartureDate, const stdair::AirportCode_T & iOrigin, const stdair::AirportCode_T & iDestination, const stdair::CabinCode_T & iCabinCode, const stdair::ClassCode_T & iClassCode, const stdair::MeanValue_T & iMeanValue, const stdair::StdDevValue_T & iStdDevValue, const stdair::Yield_T & iYield, stdair::BomRoot & iBomRoot)`

Definition at line 970 of file [RMOL_Service.cpp](#).

25.40.3.21 void RMOL::RMOL_Service::setOnDForecast (const stdair::AirlineCodeList_T & *iAirlineCodeList*, const stdair::AirlineCode_T & *iAirlineCode*, const stdair::Date_T & *iDepartureDate*, const stdair::AirportCode_T & *iOrigin*, const stdair::AirportCode_T & *iDestination*, const stdair::CabinCode_T & *iCabinCode*, const stdair::ClassCodeList_T & *iClassCodeList*, const stdair::MeanValue_T & *iMeanValue*, const stdair::StdDevValue_T & *iStdDevValue*, const stdair::Yield_T & *iYield*, stdair::BomRoot & *iBomRoot*)

Definition at line 1034 of file [RMOL_Service.cpp](#).

25.40.3.22 void RMOL::RMOL_Service::resetDemandInformation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1151 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#), [optimiseOnDUsingAdvancedRMCooperation\(\)](#), and [optimiseOnDUsingRMCooperation\(\)](#).

25.40.3.23 void RMOL::RMOL_Service::resetDemandInformation (const stdair::DateTime_T & *iRMEventTime*, const stdair::Inventory & *iInventory*)

Definition at line 1177 of file [RMOL_Service.cpp](#).

25.40.3.24 void RMOL::RMOL_Service::projectAggregatedDemandOnLegCabins (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1227 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.25 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingYP (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1332 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#).

25.40.3.26 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDA (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1609 of file [RMOL_Service.cpp](#).

25.40.3.27 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1765 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#), [optimiseOnDUsingAdvancedRMCooperation\(\)](#), and [optimiseOnDUsingRMCooperation\(\)](#).

25.40.3.28 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP (const stdair::DateTime_T & *iRMEventTime*, const stdair::Inventory & *iInventory*)

Definition at line 1791 of file [RMOL_Service.cpp](#).

25.40.3.29 void RMOL::RMOL_Service::optimiseOnD (const stdair::DateTime_T & *iRMEventTime*)

[Optimiser](#)

Definition at line 1431 of file [RMOL_Service.cpp](#).

References [RMOL::Optimiser::optimiseUsingOnDForecast\(\)](#).

Referenced by [optimise\(\)](#).

25.40.3.30 void RMOL::RMOL_Service::optimiseOnDUsingRMCooperation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1907 of file [RMOL_Service.cpp](#).

References [RMOL::Optimiser::optimiseUsingOnDForecast\(\)](#), [projectOnDDemandOnLegCabinsUsingDYP\(\)](#), and [resetDemandInformation\(\)](#).

Referenced by [optimise\(\)](#).

25.40.3.31 void RMOL::RMOL_Service::optimiseOnDUsingAdvancedRMCooperation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1967 of file [RMOL_Service.cpp](#).

References [RMOL::Optimiser::optimiseUsingOnDForecast\(\)](#), [projectOnDDemandOnLegCabinsUsingDYP\(\)](#), [resetDemandInformation\(\)](#), and [updateBidPrice\(\)](#).

Referenced by [optimise\(\)](#).

25.40.3.32 void RMOL::RMOL_Service::updateBidPrice (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1480 of file [RMOL_Service.cpp](#).

Referenced by [optimise\(\)](#), and [optimiseOnDUsingAdvancedRMCooperation\(\)](#).

25.40.3.33 void RMOL::RMOL_Service::updateBidPrice (const stdair::FlightDate & *iFlightDate*, stdair::BomRoot & *iBomRoot*)

Definition at line 1528 of file [RMOL_Service.cpp](#).

25.40.3.34 std::string RMOL::RMOL_Service::jsonExport (const stdair::AirlineCode_T & , const stdair::FlightNumber_T & , const stdair::Date_T & *iDepartureDate*) const

Recursively dump, in the returned string and in JSON format, the flight-date corresponding to the parameters given as input.

Parameters

<i>const</i>	stdair::AirlineCode_T& Airline code of the flight to dump.
<i>const</i>	stdair::FlightNumber_T& Flight number of the flight to dump.
<i>const</i>	stdair::Date_T& Departure date of a flight to dump.

Returns

std::string Output string in which the BOM tree is JSON-ified.

25.40.3.35 std::string RMOL::RMOL_Service::csvDisplay () const

Recursively display (dump in the returned string) the objects of the BOM tree.

Returns

std::string Output string in which the BOM tree is logged/dumped.

The documentation for this class was generated from the following files:

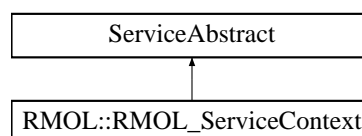
- [rmol/RMOL_Service.hpp](#)
- [rmol/service/RMOL_Service.cpp](#)

25.41 RMOL::RMOL_ServiceContext Class Reference

Inner class holding the context for the [RMOL](#) Service object.

```
#include <rmol/service/RMOL_ServiceContext.hpp>
```

Inheritance diagram for RMOL::RMOL_ServiceContext:



Friends

- class [RMOL_Service](#)
- class [FacRmolServiceContext](#)

25.41.1 Detailed Description

Inner class holding the context for the [RMOL](#) Service object.

Definition at line 29 of file [RMOL_ServiceContext.hpp](#).

25.41.2 Friends And Related Function Documentation

25.41.2.1 friend class [RMOL_Service](#) [friend]

The [RMOL_Service](#) class should be the sole class to get access to ServiceContext content: general users do not want to bother with a context interface.

Definition at line 35 of file [RMOL_ServiceContext.hpp](#).

25.41.2.2 friend class [FacRmolServiceContext](#) [friend]

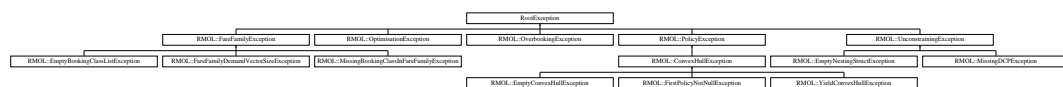
Definition at line 36 of file [RMOL_ServiceContext.hpp](#).

The documentation for this class was generated from the following files:

- [rmol/service/RMOL_ServiceContext.hpp](#)
- [rmol/service/RMOL_ServiceContext.cpp](#)

25.42 RootException Class Reference

Inheritance diagram for RootException:



The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

25.43 RMOL::SegmentSnapshotTableHelper Class Reference

```
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
```

Static Public Member Functions

- static stdair::NbOfSegments_T [getNbOfSegmentAlreadyPassedThisDTD](#) (const stdair::SegmentSnapshotTable &, const stdair::DTD_T &, const stdair::Date_T &)
- static bool [hasPassedThisDTD](#) (const stdair::SegmentCabin &, const stdair::DTD_T &, const stdair::Date_T &)

25.43.1 Detailed Description

Class representing the actual business functions for an airline guillotine block.

Definition at line 23 of file [SegmentSnapshotTableHelper.hpp](#).

25.43.2 Member Function Documentation

25.43.2.1 `stdair::NbOfSegments_T RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD (const stdair::SegmentSnapshotTable & iGB, const stdair::DTD_T & iDTD, const stdair::Date_T & iCurrentDate) [static]`

Retrieve the number of similar segments which already passed the given DTD.

Definition at line 20 of file [SegmentSnapshotTableHelper.cpp](#).

References [hasPassedThisDTD\(\)](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), [RMOL::HybridForecasting::forecast\(\)](#), [RMOL::OldQFF::forecast\(\)](#), [RMOL::BasedForecasting::forecast\(\)](#), and [RMOL::Utilities::getNbOfDepartedSimilarSegments\(\)](#).

25.43.2.2 `bool RMOL::SegmentSnapshotTableHelper::hasPassedThisDTD (const stdair::SegmentCabin & iSegmentCabin, const stdair::DTD_T & iDTD, const stdair::Date_T & iCurrentDate) [static]`

Check if the given segment has passed the given DTD.

Definition at line 42 of file [SegmentSnapshotTableHelper.cpp](#).

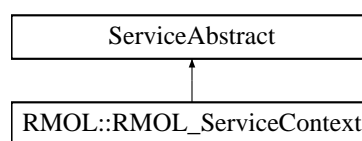
Referenced by [getNbOfSegmentAlreadyPassedThisDTD\(\)](#).

The documentation for this class was generated from the following files:

- [rmol/bom/SegmentSnapshotTableHelper.hpp](#)
- [rmol/bom/SegmentSnapshotTableHelper.cpp](#)

25.44 ServiceAbstract Class Reference

Inheritance diagram for ServiceAbstract:

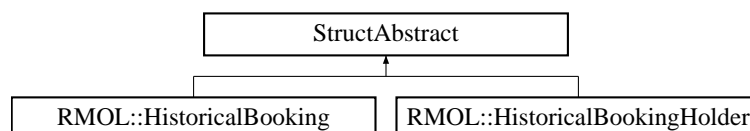


The documentation for this class was generated from the following file:

- [rmol/service/RMOL_ServiceContext.hpp](#)

25.45 StructAbstract Class Reference

Inheritance diagram for StructAbstract:

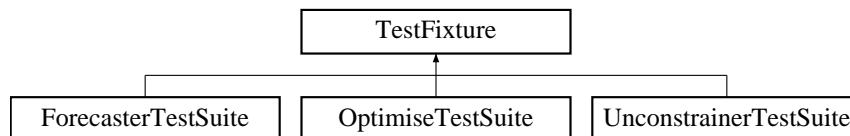


The documentation for this class was generated from the following file:

- [rmol/bom/HistoricalBooking.hpp](#)

25.46 TestFixture Class Reference

Inheritance diagram for TestFixture:



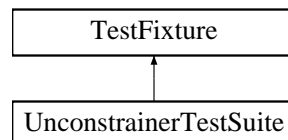
The documentation for this class was generated from the following file:

- [test/rmol/OptimiseTestSuite.hpp](#)

25.47 UnconstrainerTestSuite Class Reference

```
#include <test/rmol/UnconstrainerTestSuite.hpp>
```

Inheritance diagram for UnconstrainerTestSuite:



Public Member Functions

- `void testUnconstrainingByEM ()`
- `UnconstrainerTestSuite ()`

Protected Attributes

- `std::stringstream _describeKey`

25.47.1 Detailed Description

Definition at line 6 of file [UnconstrainerTestSuite.hpp](#).

25.47.2 Constructor & Destructor Documentation

25.47.2.1 UnconstrainerTestSuite::UnconstrainerTestSuite ()

Constructor.

25.47.3 Member Function Documentation

25.47.3.1 void UnconstrainerTestSuite::testUnconstrainingByEM ()

Test data unconstraining by Expectation Maximization.

25.47.4 Member Data Documentation

25.47.4.1 std::stringstream UnconstrainerTestSuite::describeKey [protected]

Definition at line 19 of file [UnconstrainerTestSuite.hpp](#).

The documentation for this class was generated from the following file:

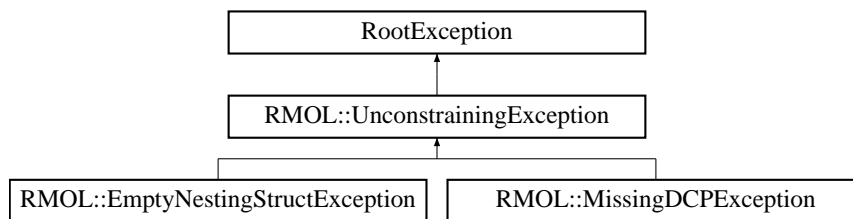
- test/rmol/[UnconstrainerTestSuite.hpp](#)

25.48 RMOL::UnconstrainingException Class Reference

Unconstraining-related exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::UnconstrainingException:



Public Member Functions

- [UnconstrainingException](#) (const std::string &iWhat)

25.48.1 Detailed Description

Unconstraining-related exception.

Definition at line 42 of file [RMOL_Types.hpp](#).

25.48.2 Constructor & Destructor Documentation

25.48.2.1 RMOL::UnconstrainingException::UnconstrainingException (const std::string &iWhat) [inline]

Constructor.

Definition at line 45 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- rmol/[RMOL_Types.hpp](#)

25.49 RMOL::Utilities Class Reference

```
#include <rmol/bom/Utilities.hpp>
```

Static Public Member Functions

- static void [computeDistributionParameters](#) (const stdair::UncDemVector_T &, stdair::MeanValue_T &, stdair::StdDevValue_T &)
- static stdair::DCPList_T [buildRemainingDCPList](#) (const stdair::DTD_T &)
- static stdair::DCPList_T [buildPastDCPList](#) (const stdair::DTD_T &)
- static stdair::NbOfSegments_T [getNbOfDepartedSimilarSegments](#) (const stdair::SegmentCabin &, const stdair::Date_T &)
- static stdair::BookingClassSellUpCurveMap_T [computeSellUpFactorCurves](#) (const stdair::FRAT5Curve_T &, const stdair::BookingClassList_T &)
- static stdair::BookingClassDispatchingCurveMap_T [computeDispatchingFactorCurves](#) (const stdair::FRAT5Curve_T &, const stdair::BookingClassList_T &)
- static void [dispatchDemandForecast](#) (const stdair::BookingClassDispatchingCurveMap_T &, const stdair::MeanValue_T &, const stdair::StdDevValue_T &, const stdair::DTD_T &)
- static void [dispatchDemandForecastForFA](#) (const stdair::BookingClassSellUpCurveMap_T &, const stdair::MeanValue_T &, const stdair::StdDevValue_T &, const stdair::DTD_T &)

25.49.1 Detailed Description

Class holding helper methods.

Definition at line 20 of file [Utilities.hpp](#).

25.49.2 Member Function Documentation

25.49.2.1 void RMOL::Utilities::computeDistributionParameters (const stdair::UncDemVector_T & *iVector*, stdair::MeanValue_T & *ioMean*, stdair::StdDevValue_T & *ioStdDev*) [static]

Compute the mean and the standard deviation from a set of samples.

Definition at line 27 of file [Utilities.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), [RMOL::HybridForecasting::forecast\(\)](#), [RMOL::OldQFF::forecast\(\)](#), and [RMOL::BasedForecasting::forecast\(\)](#).

25.49.2.2 stdair::DCPList_T RMOL::Utilities::buildRemainingDCPList (const stdair::DTD_T & *iDTD*) [static]

Build the list of remaining DCP's for the segment-date.

Definition at line 59 of file [Utilities.cpp](#).

25.49.2.3 stdair::DCPList_T RMOL::Utilities::buildPastDCPList (const stdair::DTD_T & *iDTD*) [static]

Build the list of past DCP's for the segment-date.

Definition at line 84 of file [Utilities.cpp](#).

25.49.2.4 stdair::NbOfSegments_T RMOL::Utilities::getNbOfDepartedSimilarSegments (const stdair::SegmentCabin & *iSegmentCabin*, const stdair::Date_T & *iEventDate*) [static]

Retrieve the number of departed similar segments.

Definition at line 104 of file [Utilities.cpp](#).

References [RMOL::SegmentSnapshotTableHelper::getNbOfSegmentAlreadyPassedThisDTD\(\)](#).

25.49.2.5 stdair::BookingClassSellUpCurveMap_T RMOL::Utilities::computeSellUpFactorCurves (const stdair::FRAT5Curve_T & *iFRAT5Curve*, const stdair::BookingClassList_T & *iBCList*) [static]

Precompute the sell-up factors for each class and each DCP.

Definition at line 116 of file [Utilities.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#), and [RMOL::OldQFF::forecast\(\)](#).

25.49.2.6 `stdair::BookingClassDispatchingCurveMap_T RMOL::Utilities::computeDispatchingFactorCurves (const stdair::FRAT5Curve_T & iFRAT5Curve, const stdair::BookingClassList_T & iBCList) [static]`

Precompute the dispatching factors for each class and each DCP.

Definition at line 177 of file [Utilities.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#).

25.49.2.7 `void RMOL::Utilities::dispatchDemandForecast (const stdair::BookingClassDispatchingCurveMap_T & iBCDispatchingCurveMap, const stdair::MeanValue_T & iMean, const stdair::StdDevValue_T & iStdDev, const stdair::DTD_T & iCurrentDCP) [static]`

Dispatching the demand forecast to all classes.

Definition at line 253 of file [Utilities.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#).

25.49.2.8 `void RMOL::Utilities::dispatchDemandForecastForFA (const stdair::BookingClassSellUpCurveMap_T & iBCSellUpCurveMap, const stdair::MeanValue_T & iMean, const stdair::StdDevValue_T & iStdDev, const stdair::DTD_T & iCurrentDCP) [static]`

Dispatching the demand forecast to all classes for FA.

Definition at line 286 of file [Utilities.cpp](#).

Referenced by [RMOL::QForecasting::forecast\(\)](#).

The documentation for this class was generated from the following files:

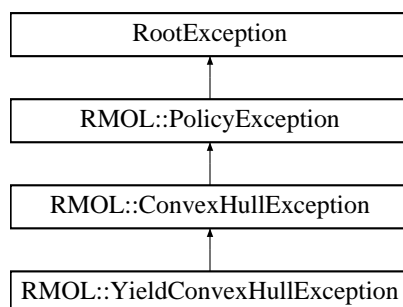
- [rmol/bom/Utilities.hpp](#)
- [rmol/bom/Utilities.cpp](#)

25.50 RMOL::YieldConvexHullException Class Reference

Yield convex hull exception.

```
#include <rmol/RMOL_Types.hpp>
```

Inheritance diagram for RMOL::YieldConvexHullException:



Public Member Functions

- [YieldConvexHullException](#) (const std::string &iWhat)

25.50.1 Detailed Description

Yield convex hull exception.

Definition at line 123 of file [RMOL_Types.hpp](#).

25.50.2 Constructor & Destructor Documentation

25.50.2.1 RMOL::YieldConvexHullException::YieldConvexHullException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 126 of file [RMOL_Types.hpp](#).

The documentation for this class was generated from the following file:

- [rmol/RMOL_Types.hpp](#)

26 File Documentation

26.1 doc/local/authors.doc File Reference

26.2 doc/local/codingrules.doc File Reference

26.3 doc/local/copyright.doc File Reference

26.4 doc/local/documentation.doc File Reference

26.5 doc/local/features.doc File Reference

26.6 doc/local/help_wanted.doc File Reference

26.7 doc/local/howto_release.doc File Reference

26.8 doc/local/index.doc File Reference

26.9 doc/local/installation.doc File Reference

26.10 doc/local/linking.doc File Reference

26.11 doc/local/test.doc File Reference

26.12 doc/local/users_guide.doc File Reference

26.13 doc/local/verification.doc File Reference

26.14 doc/tutorial/tutorial.doc File Reference

26.15 rmol/basic/BasConst.cpp File Reference

```
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/basic/BasConst_RMOL_Service.hpp>
```

Namespaces

- namespace [RMOL](#)

Variables

- const stdair::AirlineCode_T [RMOL::DEFAULT_RMOL_SERVICE_AIRLINE_CODE](#) = "BA"
- const double [RMOL::DEFAULT_RMOL_SERVICE_CAPACITY](#) = 1.0
- const int [RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION](#) = 10000
- const int [RMOL::DEFAULT_PRECISION](#) = 10
- const double [RMOL::DEFAULT_EPSILON](#) = 0.0001
- const double [RMOL::DEFAULT_STOPPING_CRITERION](#) = 0.01
- const double [RMOL::DEFAULT_INITIALIZER_DOUBLE_NEGATIVE](#) = -10.0

26.16 BasConst.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 #include <rmol/basic/BasConst_General.hpp>
00005 #include <rmol/basic/BasConst_RMOL_Service.hpp>
00006 >
00007 namespace RMOL {
00008     const stdair::AirlineCode_T DEFAULT_RMOL_SERVICE_AIRLINE_CODE
00009     = "BA";
00010
00011     const double DEFAULT_RMOL_SERVICE_CAPACITY = 1.0
00012     ;
00013
00014     const int DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
00015     = 10000;
00016
00017     const int DEFAULT_PRECISION = 10;
00018
00019     const double DEFAULT_EPSILON = 0.0001;
00020
00021     const double DEFAULT_STOPPING_CRITERION = 0.01;
00022
00023     const double DEFAULT_INITIALIZER_DOUBLE_NEGATIVE
00024     = -10.0;
00025 }

```

26.17 rmol/basic/BasConst_General.hpp File Reference

```
#include <stdair/stdair_types.hpp>
```

Namespaces

- namespace [RMOL](#)

26.18 BasConst_General.hpp

```

00001 #ifndef __RMOL_BAS_BASCONST_GENERAL_HPP
00002 #define __RMOL_BAS_BASCONST_GENERAL_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_types.hpp>
00009
00010 namespace RMOL {
00011
00012     extern const int DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION

```

```

;
00015
00018     extern const int  DEFAULT_PRECISION;
00019
00021     extern const double DEFAULT_EPSILON;
00022
00024     extern const double DEFAULT_STOPPING_CRITERION;
00025
00027     extern const double DEFAULT_INITIALIZER_DOUBLE_NEGATIVE
;
00028 }
00029 #endif // __RMOL_BAS_BASCONST_GENERAL_HPP

```

26.19 rmol/basic/BasConst_RMOL_Service.hpp File Reference

```

#include <vector>
#include <stdair/stdair_basic_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Namespaces

- namespace [RMOL](#)

26.20 BasConst_RMOL_Service.hpp

```

00001 #ifndef __RMOL_BAS_BASCONST_RMOL_SERVICE_HPP
00002 #define __RMOL_BAS_BASCONST_RMOL_SERVICE_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <vector>
00009 // StdAir
00010 #include <stdair/stdair_basic_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 namespace RMOL {
00015
00017     extern const stdair::AirlineCode_T DEFAULT_RMOL_SERVICE_AIRLINE_CODE
;
00018
00020     extern const double DEFAULT_RMOL_SERVICE_CAPACITY
;
00021
00022 }
00023 #endif // __RMOL_BAS_BASCONST_RMOL_SERVICE_HPP

```

26.21 rmol/batches/rmol.cpp File Reference

```

#include <cassert>
#include <iostream>
#include <sstream>
#include <fstream>
#include <string>
#include <boost/date_time/posix_time/posix_time.hpp>
#include <boost/date_time/gregorian/gregorian.hpp>
#include <boost/program_options.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/RMOL_Service.hpp>
#include <rmol/config/rmol-paths.hpp>

```

Functions

- `const std::string K_RMOL_DEFAULT_LOG_FILENAME ("rmol.log")`
- `const std::string K_RMOL_DEFAULT_INPUT_FILENAME (STDAIR_SAMPLE_DIR"/rm01.csv")`
- `template<class T > std::ostream & operator<< (std::ostream &os, const std::vector< T > &v)`
- `int readConfiguration (int argc, char *argv[], int &ioRandomDraws, double &ioCapacity, short &ioMethod, bool &iolsBuiltin, std::string &ioInputFilename, std::string &ioLogFilename)`
- `void optimise (RMOL::RMOL_Service &rmolService, const short &iMethod, const int &iRandomDraws)`
- `int main (int argc, char *argv[])`

Variables

- `const bool K_RMOL_DEFAULT_BUILT_IN_INPUT = false`
- `const int K_RMOL_DEFAULT_RANDOM_DRAWS = RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION`
- `const double K_RMOL_DEFAULT_CAPACITY = 500.0`
- `const short K_RMOL_DEFAULT_METHOD = 0`
- `const int K_RMOL_EARLY_RETURN_STATUS = 99`

26.21.1 Function Documentation

26.21.1.1 `const std::string K_RMOL_DEFAULT_LOG_FILENAME ("rmol.log")`

Default name and location for the log file.

Referenced by [readConfiguration\(\)](#).

26.21.1.2 `const std::string K_RMOL_DEFAULT_INPUT_FILENAME (STDAIR_SAMPLE_DIR"/rm01.csv")`

Default name and location for the (CSV) input file.

Referenced by [readConfiguration\(\)](#).

26.21.1.3 `template<class T > std::ostream& operator<< (std::ostream & os, const std::vector< T > & v)`

Definition at line 48 of file [rmol.cpp](#).

26.21.1.4 `int readConfiguration (int argc, char * argv[], int & ioRandomDraws, double & ioCapacity, short & ioMethod, bool & iolsBuiltin, std::string & ioInputFilename, std::string & ioLogFilename)`

Read and parse the command line options.

Definition at line 58 of file [rmol.cpp](#).

References [K_RMOL_DEFAULT_BUILT_IN_INPUT](#), [K_RMOL_DEFAULT_CAPACITY](#), [K_RMOL_DEFAULT_INPUT_FILENAME\(\)](#), [K_RMOL_DEFAULT_LOG_FILENAME\(\)](#), [K_RMOL_DEFAULT_METHOD](#), [K_RMOL_DEFAULT_RANDOM_DRAWS](#), [K_RMOL_EARLY_RETURN_STATUS](#), [PACKAGE_NAME](#), [PACKAGE_VERSION](#), and [PREFIXDIR](#).

Referenced by [main\(\)](#).

26.21.1.5 `void optimise (RMOL::RMOL_Service & rmolService, const short & iMethod, const int & iRandomDraws)`

Definition at line 168 of file [rmol.cpp](#).

References [RMOL::RMOL_Service::heuristicOptimisationByEmsr\(\)](#), [RMOL::RMOL_Service::heuristicOptimisationByEmsrA\(\)](#), [RMOL::RMOL_Service::heuristicOptimisationByEmsrB\(\)](#), [RMOL::RMOL_Service::optimalOptimisationByDP\(\)](#), and [RMOL::RMOL_Service::optimalOptimisationByMCIntegration\(\)](#).

Referenced by [main\(\)](#).

26.21.1.6 `int main (int argc, char * argv[])`

Definition at line 205 of file [rmol.cpp](#).

References [RMOL::RMOL_Service::buildSampleBom\(\)](#), [K_RMOL_EARLY_RETURN_STATUS](#), [optimise\(\)](#), [RMOL::RMOL_Service::parseAndLoad\(\)](#), and [readConfiguration\(\)](#).

26.21.2 Variable Documentation

26.21.2.1 `const bool K_RMOL_DEFAULT_BUILT_IN_INPUT = false`

Default for the input type. It can be either built-in or provided by an input file. That latter must then be given with the `-i/--input` option.

Definition at line 24 of file [rmol.cpp](#).

Referenced by [readConfiguration\(\)](#).

26.21.2.2 `const int K_RMOL_DEFAULT_RANDOM_DRAWS = RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION`

Default number of random draws to be generated (best if over 100).

Definition at line 30 of file [rmol.cpp](#).

Referenced by [readConfiguration\(\)](#).

26.21.2.3 `const double K_RMOL_DEFAULT_CAPACITY = 500.0`

Default value for the capacity of the resource (e.g., a flight cabin).

Definition at line 33 of file [rmol.cpp](#).

Referenced by [readConfiguration\(\)](#).

26.21.2.4 `const short K_RMOL_DEFAULT_METHOD = 0`

Default name and location for the Revenue Management method to be used.

- 0 = Monte-Carlo
- 1 = Dynamic Programming
- 2 = EMSR
- 3 = EMSR-a
- 4 = EMSR-b

Definition at line 44 of file [rmol.cpp](#).

Referenced by [readConfiguration\(\)](#).

26.21.2.5 `const int K_RMOL_EARLY_RETURN_STATUS = 99`

Early return status (so that it can be differentiated from an error).

Definition at line 55 of file [rmol.cpp](#).

Referenced by [main\(\)](#), and [readConfiguration\(\)](#).

26.22 rmol.cpp

```
00001 // STL
00002 #include <cassert>
```

```

00003 #include <iostream>
00004 #include <sstream>
00005 #include <fstream>
00006 #include <string>
00007 // Boost (Extended STL)
00008 #include <boost/date_time/posix_time/posix_time.hpp>
00009 #include <boost/date_time/gregorian/gregorian.hpp>
00010 #include <boost/program_options.hpp>
00011 // StdAir
00012 #include <stdair/service/Logger.hpp>
00013 // RMOL
00014 #include <rmol/basic/BasConst_General.hpp>
00015 #include <rmol/RMOL_Service.hpp>
00016 #include <rmol/config/rmol-paths.hpp>
00017
00018 // ////////// Constants //////////
00020 const std::string K_RMOL_DEFAULT_LOG_FILENAME ("
    rmol.log");
00021
00024 const bool K_RMOL_DEFAULT_BUILT_IN_INPUT = false;
00025
00027 const std::string K_RMOL_DEFAULT_INPUT_FILENAME (
    STDAIR_SAMPLE_DIR "/rmol.csv");
00028
00030 const int K_RMOL_DEFAULT_RANDOM_DRAWS =
    RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
    ;
00031
00033 const double K_RMOL_DEFAULT_CAPACITY = 500.0;
00034
00044 const short K_RMOL_DEFAULT_METHOD = 0;
00045
00046 // ////////// Parsing of Options & Configuration //////////
00047 // A helper function to simplify the main part.
00048 template<class T> std::ostream& operator<< (std::ostream& os,
00049     const std::vector<T>& v) {
00050     std::copy (v.begin(), v.end(), std::ostream_iterator<T> (std::cout, " "));
00051     return os;
00052 }
00053
00055 const int K_RMOL_EARLY_RETURN_STATUS = 99;
00056
00058 int readConfiguration(int argc, char* argv[],
    int& ioRandomDraws, double& ioCapacity,
    short& ioMethod, bool& ioIsBuiltin,
    std::string& ioInputFilename, std::string& ioLogFilename)
    {
00062
00063     // Default for the built-in input
00064     ioIsBuiltin = K_RMOL_DEFAULT_BUILT_IN_INPUT;
00065
00066     // Declare a group of options that will be allowed only on command line
00067     boost::program_options::options_description generic ("Generic options");
00068     generic.add_options()
00069         ("prefix", "print installation prefix")
00070         ("version,v", "print version string")
00071         ("help,h", "produce help message");
00072
00073     // Declare a group of options that will be allowed both on command
00074     // line and in config file
00075     boost::program_options::options_description config ("Configuration");
00076     config.add_options()
00077         ("draws,d",
00078             boost::program_options::value<int>(&ioRandomDraws)->default_value(
00079                 K_RMOL_DEFAULT_RANDOM_DRAWS),
00080             "Number of to-be-generated random draws")
00081         ("capacity,c",
00082             boost::program_options::value<double>(&ioCapacity)->default_value(
00083                 K_RMOL_DEFAULT_CAPACITY),
00084             "Resource capacity (e.g., for a flight leg)")
00085         ("method,m",
00086             boost::program_options::value<short>(&ioMethod)->default_value(
00087                 K_RMOL_DEFAULT_METHOD),
00088             "Revenue Management method to be used (0 = Monte-Carlo, 1 = Dynamic
    Programming, 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b)")
00089         ("builtin,b",
00090             "The cabin set up can be either built-in or parsed from an input file.
    That latter must then be given with the -i/--input option")
00091         ("input,i",
00092             boost::program_options::value< std::string >(&ioInputFilename)->
    default_value(K_RMOL_DEFAULT_INPUT_FILENAME),
00093             "(CSV) input file for the demand distribution parameters and resource
    (leg-cabin) capacities")
00094         ("log,l",
00095             boost::program_options::value< std::string >(&ioLogFilename)->
    default_value(K_RMOL_DEFAULT_LOG_FILENAME),
00096             "Filename for the logs")
    }

```

```

00094     ;
00095
00096     // Hidden options, will be allowed both on command line and
00097     // in config file, but will not be shown to the user.
00098     boost::program_options::options_description hidden ("Hidden options");
00099     hidden.add_options()
00100         ("copyright",
00101          boost::program_options::value< std::vector<std::string> >(),
00102          "Show the copyright (license)");
00103
00104     boost::program_options::options_description cmdline_options;
00105     cmdline_options.add(generic).add(config).add(hidden);
00106
00107     boost::program_options::options_description config_file_options;
00108     config_file_options.add(config).add(hidden);
00109
00110     boost::program_options::options_description visible ("Allowed options");
00111     visible.add(generic).add(config);
00112
00113     boost::program_options::positional_options_description p;
00114     p.add ("copyright", -1);
00115
00116     boost::program_options::variables_map vm;
00117     boost::program_options::
00118         store (boost::program_options::command_line_parser (argc, argv).
00119             options (cmdline_options).positional(p).run(), vm);
00120
00121     std::ifstream ifs ("rmol.cfg");
00122     boost::program_options::store (parse_config_file (ifs, config_file_options),
00123         vm);
00124     boost::program_options::notify (vm);
00125
00126     if (vm.count ("help")) {
00127         std::cout << visible << std::endl;
00128         return K_RMOL_EARLY_RETURN_STATUS;
00129     }
00130
00131     if (vm.count ("version")) {
00132         std::cout << PACKAGE_NAME << ", version " << PACKAGE_VERSION
00133         << std::endl;
00134         return K_RMOL_EARLY_RETURN_STATUS;
00135     }
00136
00137     if (vm.count ("prefix")) {
00138         std::cout << "Installation prefix: " << PREFIXDIR << std::endl;
00139         return K_RMOL_EARLY_RETURN_STATUS;
00140     }
00141
00142     if (vm.count ("builtin")) {
00143         ioIsBuiltin = true;
00144     }
00145     const std::string isBuiltinStr = (ioIsBuiltin == true)?"yes":"no";
00146     std::cout << "The BOM should be built-in? " << isBuiltinStr << std::endl;
00147
00148     if (ioIsBuiltin == false) {
00149         if (vm.count ("input")) {
00150             ioInputFilename = vm["input"].as< std::string >();
00151             std::cout << "Input filename is: " << ioInputFilename << std::endl;
00152         }
00153     }
00154
00155     if (vm.count ("log")) {
00156         ioLogFilename = vm["log"].as< std::string >();
00157         std::cout << "Log filename is: " << ioLogFilename << std::endl;
00158     }
00159
00160     std::cout << "The number of random draws is: " << ioRandomDraws << std::endl;
00161     std::cout << "The resource capacity is: " << ioCapacity << std::endl;
00162     std::cout << "The optimisation method is: " << ioMethod << std::endl;
00163     std::cout << std::endl;
00164     return 0;
00165 }
00166
00167 // //////////////////////////////////////
00168 void optimise (RMOL::RMOL_Service& rmolService,
00169     const short& iMethod, const int& iRandomDraws) {
00170
00171     switch (iMethod) {
00172     case 0: {
00173         // Calculate the optimal protections by the Monte Carlo
00174         // Integration approach
00175         rmolService.optimalOptimisationByMCIntegration
00176             (iRandomDraws);
00177         break;
00178     }
00179     case 1: {

```

```

00179     // Calculate the optimal protections by DP.
00180     rmolService.optimalOptimisationByDP ();
00181     break;
00182 }
00183 case 2: {
00184     // Calculate the Bid-Price Vector by EMSR
00185     rmolService.heuristicOptimisationByEmsr ();
00186     break;
00187 }
00188 case 3: {
00189     // Calculate the protections by EMSR-a
00190     rmolService.heuristicOptimisationByEmsrA ();
00191     break;
00192 }
00193 case 4: {
00194     // Calculate the protections by EMSR-b
00195     rmolService.heuristicOptimisationByEmsrB ();
00196     break;
00197 }
00198 default: {
00199     rmolService.optimalOptimisationByMCIntegration
00200     (iRandomDraws);
00201 }
00202 }
00203
00204 // ////////// M A I N //////////
00205 int main (int argc, char* argv[]) {
00206     // Number of random draws to be generated (best if greater than 100)
00207     int lRandomDraws = 0;
00208     // Cabin Capacity (it must be greater then 100 here)
00209     double lCapacity = 0.0;
00210     // Methods of optimisation (0 = Monte-Carlo, 1 = Dynamic Programming,
00211     // 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b)
00212     short lMethod = 0;
00213     // Built-in
00214     bool isBuiltin;
00215     // Input file name
00216     std::string lInputFilename;
00217     // Output log File
00218     std::string lLogFilename;
00219     // Call the command-line option parser
00220     const int lOptionParserStatus =
00221     readConfiguration (argc, argv, lRandomDraws, lCapacity,
00222     lMethod,
00223     isBuiltin, lInputFilename, lLogFilename);
00224     if (lOptionParserStatus == K_RMOL_EARLY_RETURN_STATUS
00225     ) {
00226         return 0;
00227     }
00228     // Set the log parameters
00229     std::ofstream logOutputFile;
00230     // Open and clean the log outputfile
00231     logOutputFile.open (lLogFilename.c_str());
00232     logOutputFile.clear();
00233     // Initialise the log stream
00234     const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
00235     // Initialise the RMOL service
00236     RMOL::RMOL_Service rmolService (lLogParams);
00237     if (isBuiltin == true) {
00238         // DEBUG
00239         STDAIR_LOG_DEBUG ("No input file has been given."
00240         "A sample BOM tree will therefore be built.");
00241         // Build a sample BOM tree
00242         rmolService.buildSampleBom();
00243     } else {
00244         // DEBUG
00245         STDAIR_LOG_DEBUG ("RMOL will parse " << lInputFilename
00246         << " and build the corresponding BOM tree.");
00247         //
00248         rmolService.parseAndLoad (lCapacity, lInputFilename);
00249     }
00250 }

```

```

00263
00264 // Launch the optimisation
00265 optimise (rmolService, lMethod, lRandomDraws);
00266
00267 //
00268 logOutputFile.close();
00269
00270 return 0;
00271 }

```

26.23 rmol/bom/BucketHolderTypes.hpp File Reference

```

#include <list>
#include <map>
#include <stdair/stdair_basic_types.hpp>

```

Namespaces

- namespace [RMOL](#)

Typedefs

- typedef std::list< BucketHolder * > [RMOL::BucketHolderList_T](#)

26.24 BucketHolderTypes.hpp

```

00001 #ifndef __RMOL_BUCKETHOLDERTYPES_HPP
00002 #define __RMOL_BUCKETHOLDERTYPES_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <list>
00009 #include <map>
00010 // STDAIR
00011 #include <stdair/stdair_basic_types.hpp>
00012
00013 namespace RMOL {
00014
00016     class BucketHolder;
00017
00019     typedef std::list<BucketHolder*> BucketHolderList_T;
00020
00023     typedef std::map<const stdair::MapKey_T, BucketHolder*>;
00024 }
00025 #endif // __RMOL_BUCKETHOLDERTYPES_HPP

```

26.25 rmol/bom/DistributionParameterList.hpp File Reference

```

#include <list>
#include <rmol/field/FldDistributionParameters.hpp>

```

Namespaces

- namespace [RMOL](#)

Typedefs

- typedef std::list
< FldDistributionParameters > [RMOL::DistributionParameterList_T](#)

26.26 DistributionParameterList.hpp

```

00001 #ifndef __RMOL_DISTRIBUTIONPARAMETERLIST_HPP
00002 #define __RMOL_DISTRIBUTIONPARAMETERLIST_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <list>
00009 // RMOL
00010 #include <rmol/field/FldDistributionParameters.hpp>
00011
00012 namespace RMOL {
00013
00016     typedef std::list<FldDistributionParameters> DistributionParameterList_T
    ;
00017
00018 }
00019 #endif // __RMOL_DISTRIBUTIONPARAMETERLIST_HPP

```

26.27 rmol/bom/DPOptimiser.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <vector>
#include <cmath>
#include <boost/math/distributions/normal.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/VirtualClassStruct.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/bom/DPOptimiser.hpp>

```

Namespaces

- namespace [RMOL](#)

26.28 DPOptimiser.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <vector>
00008 #include <cmath>
00009 // Boost Math
00010 #include <boost/math/distributions/normal.hpp>
00011 // StdAir
00012 #include <stdair/bom/LegCabin.hpp>
00013 #include <stdair/bom/VirtualClassStruct.hpp>
00014 #include <stdair/service/Logger.hpp>
00015 // RMOL
00016 #include <rmol/basic/BasConst_General.hpp>
00017 #include <rmol/bom/DPOptimiser.hpp>
00018
00019 namespace RMOL {
00020
00021 // //////////////////////////////////////
00022 void DPOptimiser::optimalOptimisationByDP
    (stdair::LegCabin& ioLegCabin) {
00023     // // Number of classes/buckets: n
00024     // const short nbOfClasses = ioBucketHolder.getSize();
00025
00026     // // Number of values of x to compute for each Vj(x).
00027     // const int maxValue = static_cast<int> (ioCabinCapacity *
        DEFAULT_PRECISION);
00028
00029     // // Vector of the Expected Maximal Revenue (Vj).

```

```

00030 // std::vector< std::vector<double> > MERVectorHolder;
00031
00032 // // Vector of V_0(x).
00033 // std::vector<double> initialMERVector (maxValue+1, 0.0);
00034 // MERVectorHolder.push_back (initialMERVector);
00035
00036 // // Current cumulative protection level (y_j * DEFAULT_PRECISION).
00037 // // Initialise with y_0 = 0.
00038 // int currentProtection = 0;
00039
00040 // int currentBucketIndex = 1;
00041 // ioBucketHolder.begin();
00042
00043 // while (currentProtection < maxValue && currentBucketIndex < nbOfClasses)
00044 {
00045 // //while (currentBucketIndex == 1) {
00046 // bool protectionChanged = false;
00047 // double nextProtection = 0.0;
00048 // std::vector<double> currentMERVector;
00049 // // double testGradient = 10000;
00050
00051 // Bucket& currentBucket = ioBucketHolder.getCurrentBucket();
00052 // const double meanDemand = currentBucket.getMean();
00053 // const double SDDemand = currentBucket.getStandardDeviation();
00054 // const double currentYield = currentBucket.getAverageYield();
00055 // const double errorFactor = 1.0;
00056
00057 // Bucket& nextBucket = ioBucketHolder.getNextBucket();
00058 // const double nextYield = nextBucket.getAverageYield();
00059
00060 // // For x <= currentProtection (y_(j-1)), V_j(x) = V_(j-1)(x).
00061 // for (int x = 0; x <= currentProtection; ++x) {
00062 //     const double MERValue =
MERVectorHolder.at(currentBucketIndex-1).at(x);
00063 //     currentMERVector.push_back (MERValue);
00064 // }
00065 // //
00066 // boost::math::normal lNormalDistribution (meanDemand, SDDemand);
00067
00068 // // Vector of gaussian pdf values.
00069 // std::vector<double> pdfVector;
00070 // for (int s = 0; s <= maxValue - currentProtection; ++s) {
00071 //     const double pdfValue =
00072 //         boost::math::pdf (lNormalDistribution, s/DEFAULT_PRECISION);
00073 //     pdfVector.push_back (pdfValue);
00074 // }
00075
00076 // // Vector of gaussian cdf values.
00077 // std::vector<double> cdfVector;
00078 // for (int s = 0; s <= maxValue - currentProtection; ++s) {
00079 //     const double cdfValue =
00080 //         boost::math::cdf (boost::math::complement (lNormalDistribution,
00081 //             s/DEFAULT_PRECISION));
00082 //     cdfVector.push_back (cdfValue);
00083 // }
00084
00085 // // Compute V_j(x) for x > currentProtection (y_(j-1)).
00086 // for (int x = currentProtection + 1; x <= maxValue; ++x) {
00087 //     const double lowerBound = static_cast<double> (x -
currentProtection);
00088
00089 //     // Compute the first integral in the V_j(x) formulation (see
00090 //     // the memo of Jerome Contant).
00091 //     const double power1 =
00092 //         - 0.5 * meanDemand * meanDemand / (SDDemand * SDDemand);
00093 //     const double e1 = std::exp (power1);
00094 //     const double power2 =
00095 //         - 0.5 * (lowerBound / DEFAULT_PRECISION - meanDemand)
00096 //         * (lowerBound / DEFAULT_PRECISION - meanDemand)
00097 //         / (SDDemand * SDDemand);
00098 //     const double e2 = std::exp (power2);
00099
00100 //     const double cdfValue0 =
00101 //         boost::math::cdf (boost::math::complement (lNormalDistribution,
00102 //             0.0));
00103 //     const double cdfValue1 =
00104 //         boost::math::cdf (boost::math::complement (lNormalDistribution,
00105 //             lowerBound/DEFAULT_PRECISION));
00106 //     const double integralResult1 = currentYield
00107 //         * ((e1 - e2) * SDDemand / sqrt (2 * 3.14159265)
00108 //             + meanDemand * (cdfValue0 - cdfValue1));
00109 //     double integralResult2 = 0.0;
00110 //     for (int s = 0; s < lowerBound; ++s) {

```

```

00113 //      const double partialResult =
00114 //          2 * MERVectorHolder.at(currentBucketIndex-1).at(x-s)
00115 //          * pdfVector.at(s);
00116
00117 //      integralResult2 += partialResult;
00118 //  }
00119 //  integralResult2 -= MERVectorHolder.at(currentBucketIndex-1).at(x) *
00120 //      pdfVector.at(0);
00121
00122 //  const int intLowerBound = static_cast<int>(lowerBound);
00123 //  integralResult2 +=
00124 //      MERVectorHolder.at(currentBucketIndex-1).at(x - intLowerBound) *
00125 //      pdfVector.at(intLowerBound);
00126
00127 //  integralResult2 /= 2 * DEFAULT_PRECISION;
00128 //  /*
00129 //  for (int s = 0; s < lowerBound; ++s) {
00130 //      const double partialResult =
00131 //          (MERVectorHolder.at(currentBucketIndex-1).at(x-s) +
00132 //           MERVectorHolder.at(currentBucketIndex-1).at(x-s-1)) *
00133 //          (cdfVector.at(s+1) - cdfVector.at(s)) / 2;
00134 //      integralResult2 += partialResult;
00135 //  }
00136 //  */
00137 //  const double firstElement = integralResult1 + integralResult2;
00138
00139 //  // Compute the second integral in the V_j(x) formulation (see
00140 //  // the memo of Jerome Contant).
00141 //  const double constCoefOfSecondElement =
00142 //      currentYield * lowerBound / DEFAULT_PRECISION
00143 //      + MERVectorHolder.at(currentBucketIndex-1).at(currentProtection);
00144
00145 //  const double secondElement = constCoefOfSecondElement
00146 //      * boost::math::cdf(boost::math::complement(lNormalDistribution,
00147 //          lowerBound/DEFAULT_PRECISION));
00148
00149 //  const double MERValue = (firstElement + secondElement) /
errorFactor;
00150
00151
00152 //  assert (currentMERVector.size() > 0);
00153 //  const double lastMERValue = currentMERVector.back();
00154
00155 //  const double currentGradient =
00156 //      (MERValue - lastMERValue) * DEFAULT_PRECISION;
00157
00158 //  //assert (currentGradient >= 0);
00159 //  if (currentGradient < -0) {
00160 //      std::ostringstream ostr;
00161 //      ostr << currentGradient << std::endl
00162 //          << "x = " << x << std::endl
00163 //          << "class: " << currentBucketIndex << std::endl;
00164 //      STDAIR_LOG_DEBUG (ostr.str());
00165 //  }
00166
00167 //  /*
00168 //  assert (currentGradient <= testGradient);
00169 //  testGradient = currentGradient;
00170 //  */
00171 //  if (protectionChanged == false && currentGradient <= nextYield) {
00172 //      nextProtection = x - 1;
00173 //      protectionChanged = true;
00174 //  }
00175
00176 //  if (protectionChanged == true && currentGradient > nextYield) {
00177 //      protectionChanged = false;
00178 //  }
00179
00180 //  if (protectionChanged == false && x == maxValue) {
00181 //      nextProtection = maxValue;
00182 //  }
00183
00184 //  currentMERVector.push_back (MERValue);
00185 //  }
00186
00187 //  // DEBUG
00188 //  STDAIR_LOG_DEBUG ("Vmaxindex = " << currentMERVector.back());
00189
00190 //  MERVectorHolder.push_back (currentMERVector);
00191
00192 //  const double realProtection = nextProtection / DEFAULT_PRECISION;
00193 //  const double bookingLimit = iCabinCapacity - realProtection;
00194
00195 //  currentBucket.setCumulatedProtection (realProtection);
00196 //  nextBucket.setCumulatedBookingLimit (bookingLimit);
00197

```



```

00198     //   currentProtection = static_cast<int> (std::floor (nextProtection));
00199
00200     //   ioBucketHolder.iterate();
00201     //   ++currentBucketIndex;
00202     // }
00203 }
00204
00205 }
```

26.29 rmol/bom/DPOptimiser.hpp File Reference

```
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::DPOptimiser](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.30 DPOptimiser.hpp

```

00001 #ifndef __RMOL_BOM_DPOPTIMISER_HPP
00002 #define __RMOL_BOM_DPOPTIMISER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // RMOL
00008 #include <rmol/RMOL_Types.hpp>
00009
00011 namespace stdair {
00012     class LegCabin;
00013 }
00014
00015 namespace RMOL {
00017     class DPOptimiser {
00018     public:
00019
00025         static void optimalOptimisationByDP (
00026             stdair::LegCabin&);
00026
00030         static double cdfGaussianQ (const double, const double);
00031     };
00032 }
00033 #endif // __RMOL_BOM_DPOPTIMISER_HPP
```

26.31 rmol/bom/EMDetruncator.cpp File Reference

```

#include <iostream>
#include <cmath>
#include <vector>
#include <cassert>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/EMDetruncator.hpp>
```

Namespaces

- namespace [RMOL](#)

26.32 EMDetruncator.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <iostream>
00006 #include <cmath>
00007 #include <vector>
00008 #include <cassert>
00009 // StdAir
00010 #include <stdair/stdair_basic_types.hpp>
00011 #include <stdair/service/Logger.hpp>
00012 // RMOL
00013 #include <rmol/bom/HistoricalBookingHolder.hpp>
00014 >
00015 #include <rmol/bom/EMDetruncator.hpp>
00016 namespace RMOL {
00017 // //////////////////////////////////////
00018 void EMDetruncator::unconstrain
00019 (HistoricalBookingHolder& ioHistoricalBookingHolder) {
00020     // Number of flights.
00021     const short lNbOfFlights =
00022         ioHistoricalBookingHolder.getNbOfFlights();
00023     // Number of uncensored booking data.
00024     const short lNbOfUncensoredData =
00025         ioHistoricalBookingHolder.getNbOfUncensoredData();
00026     if (lNbOfUncensoredData > 1) {
00027         // Number of uncensored bookings.
00028         const stdair::NbOfBookings_T lNbOfUncensoredBookings =
00029             ioHistoricalBookingHolder.getNbOfUncensoredBookings
00030         );
00031         const double lMeanOfUncensoredBookings =
00032             static_cast<double>(lNbOfUncensoredBookings/lNbOfUncensoredData);
00033         const double lStdDevOfUncensoredBookings =
00034             ioHistoricalBookingHolder.getUncensoredStandardDeviation
00035             (lMeanOfUncensoredBookings, lNbOfUncensoredData);
00036         std::vector<bool> toBeUnconstrained =
00037             ioHistoricalBookingHolder.getListOfToBeUnconstrainedFlags
00038         );
00039         double lDemandMean = lMeanOfUncensoredBookings;
00040         double lStdDev = lStdDevOfUncensoredBookings;
00041         // DEBUG
00042         // STDAIR_LOG_DEBUG ("mean: " << lDemandMean << ", std: " << lStdDev);
00043         if (lStdDev != 0) {
00044             bool stopUnconstraining = false;
00045             while (stopUnconstraining == false) {
00046                 stopUnconstraining = true;
00047                 for (short i = 0; i < lNbOfFlights; ++i) {
00048                     if (toBeUnconstrained.at(i) == true) {
00049                         // Get the unconstrained demand of the (i+1)-th flight.
00050                         const stdair::NbOfBookings_T demand =
00051                             ioHistoricalBookingHolder.getUnconstrainedDemand
00052                         (i);
00053                         //STDAIR_LOG_DEBUG ("demand: " << demand);
00054                         // Execute the Expectation step.
00055                         const stdair::NbOfBookings_T expectedDemand =
00056                             ioHistoricalBookingHolder.
00057                             calculateExpectedDemand (lDemandMean, lStdDev, i, demand);
00058                         //STDAIR_LOG_DEBUG ("expected: " << expectedDemand);
00059                         assert (expectedDemand >= 0 || expectedDemand < 0);
00060                         double absDiff =
00061                             static_cast<double>(expectedDemand - demand);
00062                         if (absDiff < 0) {

```

```

00074         absDiff = - absDiff;
00075     }
00076     if (absDiff < 0.001) {
00077         toBeUnconstrained.at (i) = false;
00078     }
00079     else {
00080         stopUnconstraining = false;
00081     }
00082
00083     ioHistoricalBookingHolder.setUnconstrainedDemand
00084     (expectedDemand,
00085
00086         i);
00087
00088     if (stopUnconstraining == false) {
00089         lDemandMean = ioHistoricalBookingHolder.getDemandMean(
00090
00091             lStdDev =
00092             ioHistoricalBookingHolder.getStandardDeviation
00093             (lDemandMean);
00094         }
00095     }
00096 }
00097 }
00098 }

```

26.33 rmol/bom/EMDetruncator.hpp File Reference

Classes

- class [RMOL::EMDetruncator](#)

Namespaces

- namespace [RMOL](#)

26.34 EMDetruncator.hpp

```

00001 #ifndef __RMOL_BOM_EMDETRUNCATOR_HPP
00002 #define __RMOL_BOM_EMDETRUNCATOR_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 namespace RMOL {
00008     // Forward declarations.
00009     struct HistoricalBookingHolder;
00010
00011     class EMDetruncator {
00012     public:
00013         static void unconstrain (HistoricalBookingHolder
00014             &);
00015     };
00016 }
00017
00018 #endif // __RMOL_BOM_EMDETRUNCATOR_HPP

```

26.35 rmol/bom/Emsr.cpp File Reference

```
#include <assert.h>
```

```

#include <iostream>
#include <cmath>
#include <list>
#include <algorithm>
#include <stdair/stdair_rm_types.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/VirtualClassStruct.hpp>
#include <rmol/bom/Emsr.hpp>
#include <rmol/bom/EmsrUtils.hpp>

```

Namespaces

- namespace [RMOL](#)

26.36 Emsr.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // C
00005 #include <assert.h>
00006 // STL
00007 #include <iostream>
00008 #include <cmath>
00009 #include <list>
00010 #include <algorithm>
00011 // StdAir
00012 #include <stdair/stdair_rm_types.hpp>
00013 #include <stdair/bom/LegCabin.hpp>
00014 #include <stdair/bom/VirtualClassStruct.hpp>
00015 // RMOL
00016 #include <rmol/bom/Emsr.hpp>
00017 #include <rmol/bom/EmsrUtils.hpp>
00018
00019 namespace RMOL {
00020 // //////////////////////////////////////
00021 void Emsr::heuristicOptimisationByEmsrA (
    stdair::LegCabin& ioLegCabin) {
00022     stdair::VirtualClassList_T& lVirtualClassList =
00023         ioLegCabin.getVirtualClassList ();
00024     const stdair::CabinCapacity_T& lCabinCapacity =
00025         ioLegCabin.getOfferedCapacity();
00026
00027     stdair::VirtualClassList_T::iterator itVC = lVirtualClassList.begin();
00028     assert (itVC != lVirtualClassList.end());
00029
00030     stdair::VirtualClassStruct& lFirstVC = *itVC;
00031     lFirstVC.setCumulatedBookingLimit (lCabinCapacity);
00032     ++itVC;
00033     for (; itVC != lVirtualClassList.end(); ++itVC) {
00034         stdair::VirtualClassStruct& lNextVC = *itVC;
00035
00036         // Initialise the protection for class/bucket j.
00037         stdair::ProtectionLevel_T lProtectionLevel = 0.0;
00038
00039         for(stdair::VirtualClassList_T::iterator itHigherVC =
00040             lVirtualClassList.begin(); itHigherVC != itVC; ++itHigherVC) {
00041             stdair::VirtualClassStruct& lHigherVC = *itHigherVC;
00042             const double lPartialProtectionLevel =
00043                 EmsrUtils::computeProtectionLevel (
00044                     lHigherVC, lNextVC);
00045             lProtectionLevel += lPartialProtectionLevel;
00046         }
00047         stdair::VirtualClassList_T::iterator itCurrentVC = itVC; --itCurrentVC;
00048         stdair::VirtualClassStruct& lCurrentVC = *itCurrentVC;
00049         lCurrentVC.setCumulatedProtection (lProtectionLevel);
00050
00051         // Compute the booking limit for the class/bucket j+1 (can be negative).
00052         const double lBookingLimit = lCabinCapacity - lProtectionLevel;
00053
00054         // Set the booking limit for class/bucket j+1.
00055         lNextVC.setCumulatedBookingLimit (lBookingLimit);
00056     }
00057 }
00058
00059 // //////////////////////////////////////

```

```

00064 void Emsr::heuristicOptimisationByEmsrB (
stdair::LegCabin& ioLegCabin) {
00065     stdair::VirtualClassList_T& lVirtualClassList =
00066         ioLegCabin.getVirtualClassList ();
00067     const stdair::CabinCapacity_T& lCabinCapacity =
00068         ioLegCabin.getOfferedCapacity();
00069
00075     stdair::VirtualClassList_T::iterator itVC = lVirtualClassList.begin();
00076     assert (itVC != lVirtualClassList.end());
00077
00078     stdair::VirtualClassStruct& lFirstVC = *itVC;
00079     lFirstVC.setCumulatedBookingLimit (lCabinCapacity);
00080     ++itVC;
00081     stdair::VirtualClassStruct lAggregatedVC = lFirstVC;
00082     for (; itVC != lVirtualClassList.end(); ++itVC) {
00083         stdair::VirtualClassStruct& lNextVC = *itVC;
00084
00085         // Compute the protection level for the aggregated class/bucket
00086         // using the Little-Wood formular.
00087         const stdair::ProtectionLevel_T lProtectionLevel =
00088             EmsrUtils::computeProtectionLevel (
lAggregatedVC, lNextVC);
00089
00090         // Set the protection level for class/bucket j.
00091         stdair::VirtualClassList_T::iterator itCurrentVC = itVC; --itCurrentVC;
00092         stdair::VirtualClassStruct& lCurrentVC = *itCurrentVC;
00093         lCurrentVC.setCumulatedProtection (lProtectionLevel);
00094
00095         // Compute the booking limit for class/bucket j+1 (can be negative).
00096         const double lBookingLimit = lCabinCapacity - lProtectionLevel;
00097
00098         // Set the booking limit for class/bucket j+1.
00099         lNextVC.setCumulatedBookingLimit (lBookingLimit);
00100
00101         // Compute the aggregated class/bucket of classes/buckets 1,...,j.
00102         EmsrUtils::computeAggregatedVirtualClass
(lAggregatedVC, lNextVC);
00103     }
00104 }
00105
00106 // //////////////////////////////////////
00107 void Emsr::heuristicOptimisationByEmsr (
stdair::LegCabin& ioLegCabin) {
00109     stdair::VirtualClassList_T& lVirtualClassList =
00110         ioLegCabin.getVirtualClassList ();
00111     const stdair::CabinCapacity_T& lCapacity = ioLegCabin.getOfferedCapacity();
00112     ioLegCabin.emptyBidPriceVector();
00113     stdair::BidPriceVector_T& lBidPriceVector =
00114         ioLegCabin.getBidPriceVector();
00115
00116     // Cabin capacity in integer.
00117     const int lCabinCapacity = static_cast<const int> (lCapacity);
00118
00119     // List of all EMSR values.
00120     stdair::EmsrValueList_T lEmsrValueList;
00121
00127     for (stdair::VirtualClassList_T::iterator itVC = lVirtualClassList.begin();
itVC != lVirtualClassList.end(); ++itVC) {
00128         stdair::VirtualClassStruct& lCurrentVC = *itVC;
00129         for (int k = 1; k <= lCabinCapacity; ++k) {
00130             const double emsrValue = EmsrUtils::computeEmsrValue
(k, lCurrentVC);
00131             lEmsrValueList.push_back(emsrValue);
00132         }
00133     }
00134
00135     // Sort the EMSR values from high to low.
00137     std::sort(lEmsrValueList.rbegin(), lEmsrValueList.rend());
00138
00139     // Sanity check
00140     const int lEmsrValueListSize = lEmsrValueList.size();
00141     assert (lEmsrValueListSize >= lCabinCapacity);
00142
00143     // Copy the EMSR sorted values to the BPV.
00144     stdair::EmsrValueList_T::const_iterator itCurrentValue =
lEmsrValueList.begin();
00145     for (int j = 0; j < lCabinCapacity; ++j, ++itCurrentValue) {
00146         const double lBidPrice = *itCurrentValue;
00147         lBidPriceVector.push_back (lBidPrice);
00148     }
00149     lEmsrValueList.clear();
00150
00151     // Build the protection levels and booking limits.
00153     if (lVirtualClassList.size() > 1) {
00154         int lCapacityIndex = 0;
00155         for (stdair::VirtualClassList_T::iterator itVC = lVirtualClassList.begin()

```

```

;
00156         itVC != lVirtualClassList.end()); {
00157     stdair::VirtualClassStruct& lCurrentVC = *itVC;
00158     if (itVC != lVirtualClassList.end()) {
00159         ++itVC;
00160     }
00161     stdair::VirtualClassStruct& lNextVC = *itVC;
00162     const stdair::Yield_T lNextYield = lNextVC.getYield();
00163     while ((lCapacityIndex < lCabinCapacity)
00164         && (lBidPriceVector.at(lCapacityIndex) > lNextYield)) {
00165         ++lCapacityIndex;
00166     }
00167     lCurrentVC.setCumulatedProtection (lCapacityIndex);
00168     lNextVC.setCumulatedBookingLimit (lCapacity - lCapacityIndex);
00169 }
00170 }
00171 }
00172
00173 }

```

26.37 rmol/bom/Emsr.hpp File Reference

```
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::Emsr](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.38 Emsr.hpp

```

00001 #ifndef __RMOL_EMSR_HPP
00002 #define __RMOL_EMSR_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // RMOL
00008 #include <rmol/RMOL_Types.hpp>
00009
00011 namespace stdair {
00012     class LegCabin;
00013 }
00014
00015 namespace RMOL {
00016
00018     class Emsr {
00019     public:
00031         static void heuristicOptimisationByEmsr (
00032             stdair::LegCabin&);
00037         static void heuristicOptimisationByEmsrA (
00038             stdair::LegCabin&);
00043         static void heuristicOptimisationByEmsrB (
00044             stdair::LegCabin&);
00045     };
00046 }
00047 #endif // __RMOL_EMSR_HPP

```

26.39 rmol/bom/EmsrUtils.cpp File Reference

```
#include <cassert>
```

```

#include <cmath>
#include <boost/math/distributions/normal.hpp>
#include <stdair/stdair_maths_types.hpp>
#include <stdair/bom/VirtualClassStruct.hpp>
#include <rmol/bom/EmsrUtils.hpp>
#include <rmol/basic/BasConst_General.hpp>

```

Namespaces

- namespace [RMOL](#)

26.40 EmsrUtils.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <cmath>
00007 // Boost Math
00008 #include <boost/math/distributions/normal.hpp>
00009 // StdAir
00010 #include <stdair/stdair_maths_types.hpp>
00011 #include <stdair/bom/VirtualClassStruct.hpp>
00012 // RMOL
00013 #include <rmol/bom/EmsrUtils.hpp>
00014 #include <rmol/basic/BasConst_General.hpp>
00015
00016 namespace RMOL {
00017 // //////////////////////////////////////
00018 void EmsrUtils::computeAggregatedVirtualClass
00019 (stdair::VirtualClassStruct& ioAggregatedVirtualClass,
00020  stdair::VirtualClassStruct& ioCurrentVirtualClass) {
00021     // Retrieve the demand mean, demand standard deviation and average
00022     // yield of the classes/buckets.
00023     const stdair::MeanValue_T lAggregatedMean =
00024         ioAggregatedVirtualClass.getMean();
00025     const stdair::MeanValue_T lCurrentMean = ioCurrentVirtualClass.getMean();
00026     const stdair::StdDevValue_T lAggregatedSD =
00027         ioAggregatedVirtualClass.getStdDev();
00028     const stdair::StdDevValue_T lCurrentSD = ioCurrentVirtualClass.getStdDev();
00029     const stdair::Yield_T lAggregatedYield =
00030         ioAggregatedVirtualClass.getYield();
00031     const stdair::Yield_T lCurrentYield = ioCurrentVirtualClass.getYield();
00032
00033     // Compute the new demand mean, new demand standard deviation and
00034     // new average yield for the new aggregated class/bucket.
00035     const stdair::MeanValue_T lNewMean = lAggregatedMean + lCurrentMean;
00036     const stdair::StdDevValue_T lNewSD =
00037         std::sqrt(lAggregatedSD*lAggregatedSD + lCurrentSD*lCurrentSD);
00038     stdair::Yield_T lNewYield = lCurrentYield;
00039     if (lNewMean > 0) {
00040         lNewYield = (lAggregatedYield*lAggregatedMean +
00041                     lCurrentYield*lCurrentMean) / lNewMean;
00042     }
00043     // Set the new yield range for the new aggregated class/bucket.
00044     ioAggregatedVirtualClass.setYield(lNewYield);
00045
00046     // Set the new demand for the new aggregated class/bucket.
00047     ioAggregatedVirtualClass.setMean(lNewMean);
00048     ioAggregatedVirtualClass.setStdDev(lNewSD);
00049 }
00050
00051 // //////////////////////////////////////
00052 const stdair::ProtectionLevel_T EmsrUtils::
00053 computeProtectionLevel (stdair::VirtualClassStruct&
00054 ioAggregatedVirtualClass,
00055                          stdair::VirtualClassStruct& ioNextVirtualClass) {
00056     // Retrieve the mean & standard deviation of the aggregated
00057     // class/bucket and the average yield of all the two
00058     // classes/buckets.
00059     const stdair::MeanValue_T lMean = ioAggregatedVirtualClass.getMean();
00060     const stdair::StdDevValue_T lSD = ioAggregatedVirtualClass.getStdDev();
00061     const stdair::Yield_T lAggregatedYield = ioAggregatedVirtualClass.getYield();
00062
00063     const stdair::Yield_T lNextYield = ioNextVirtualClass.getYield();
00064     assert (lAggregatedYield != 0);

```

```

00063
00064 // Compute the yield ratio between the higher bucket and the current one
00065 const double lYieldRatio = lNextYield / lAggregatedYield;
00066
00070 boost::math::normal lNormalDistribution (lMean, lSD);
00071 const stdair::ProtectionLevel_T lProtection =
00072     boost::math::quantile (boost::math::complement (lNormalDistribution,
00073                                                     lYieldRatio));
00074
00075     return lProtection;
00076 }
00077
00078 // //////////////////////////////////////
00079 const double EmsrUtils::
00080 computeEmsrValue (double iCapacity,
00081                  stdair::VirtualClassStruct& ioVirtualClass){
00082     // Retrieve the average yield, mean and standard deviation of the
00083     // demand of the class/bucket.
00084     const stdair::MeanValue_T lMean = ioVirtualClass.getMean();
00085     const stdair::StdDevValue_T lSD = ioVirtualClass.getStdDev();
00086     const stdair::Yield_T lYield = ioVirtualClass.getYield();
00087
00088     // Compute the EMSR value = lYield * Pr (demand >= iCapacity).
00089     boost::math::normal lNormalDistribution (lMean, lSD);
00090     const double emsrValue =
00091         lYield * boost::math::cdf (boost::math::complement (lNormalDistribution,
00092                                                             iCapacity));
00093
00094     return emsrValue;
00095 }
00096 }

```

26.41 rmol/bom/EmsrUtils.hpp File Reference

```
#include <stdair/stdair_inventory_types.hpp>
```

Classes

- class [RMOL::EmsrUtils](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.42 EmsrUtils.hpp

```

00001 #ifndef __RMOL_EMSRUTILS_HPP
00002 #define __RMOL_EMSRUTILS_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_inventory_types.hpp>
00009
00010 // Forward declarations.
00011 namespace stdair {
00012     struct VirtualClassStruct;
00013 }
00014
00015 namespace RMOL {
00016
00019     class EmsrUtils {
00020     public:
00023         static void computeAggregatedVirtualClass (
00024             stdair::VirtualClassStruct&,
00025                                                     stdair::VirtualClassStruct&);
00026
00027         static const stdair::ProtectionLevel_T computeProtectionLevel
00028             (stdair::VirtualClassStruct&, stdair::VirtualClassStruct&);
00029
00030         static const double computeEmsrValue (double,

```



```

        stdair::VirtualClassStruct&);
00031     };
00032 }
00033 #endif // __RMOL_EMSRUTILS_HPP

```

26.43 rmol/bom/HistoricalBooking.cpp File Reference

```

#include <sstream>
#include <cassert>
#include <iomanip>
#include <iostream>
#include <rmol/bom/HistoricalBooking.hpp>

```

Namespaces

- namespace [RMOL](#)

26.44 HistoricalBooking.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <sstream>
00006 #include <cassert>
00007 #include <iomanip>
00008 #include <iostream>
00009 // RMOL
00010 #include <rmol/bom/HistoricalBooking.hpp>
00011
00012 namespace RMOL {
00013
00014 // //////////////////////////////////////
00015 HistoricalBooking::HistoricalBooking () :
00016     _numberOfBookings (0.0), _unconstrainedDemand (0.0), _flag (false) {
00017 }
00018
00019 // //////////////////////////////////////
00020 HistoricalBooking::
00021 HistoricalBooking (const stdair::NbOfBookings_T
00022 iNbOfBookings,
00023                  const stdair::Flag_T iFlag)
00024 : _numberOfBookings (iNbOfBookings),
00025   _unconstrainedDemand (iNbOfBookings), _flag (iFlag) {
00026 }
00027
00028 // //////////////////////////////////////
00029 HistoricalBooking::HistoricalBooking
00030 (const HistoricalBooking& iHistoricalBooking) :
00031     _numberOfBookings (iHistoricalBooking.getNbOfBookings()),
00032     _unconstrainedDemand (iHistoricalBooking.getUnconstrainedDemand
00033 ()),
00034     _flag (iHistoricalBooking.getFlag()) {
00035 }
00036
00037 // //////////////////////////////////////
00038 HistoricalBooking::~HistoricalBooking()
00039 {
00040 }
00041
00042 // //////////////////////////////////////
00043 void HistoricalBooking::setParameters
00044 (const stdair::NbOfBookings_T iNbOfBookings, const stdair::Flag_T iFlag) {
00045     _numberOfBookings = iNbOfBookings;
00046     _unconstrainedDemand = iNbOfBookings;
00047     _flag = iFlag;
00048 }
00049
00050 // //////////////////////////////////////
00051 const std::string HistoricalBooking::describe()
00052 const {
00053     std::ostringstream ostr;
00054     ostr << "Struct of hitorical booking, unconstrained demand and flag of "

```

```

00051         << "censorship for a FlightDate/Class.";
00052
00053     return ostr.str();
00054 }
00055
00056 // //////////////////////////////////////
00057 void HistoricalBooking::toStream (std::ostream&
ioOut) const {
00058     const stdair::NbOfBookings_T bj = getNbOfBookings();
00059     const stdair::NbOfBookings_T uj = getUnconstrainedDemand
();
00060     const stdair::Flag_T fj = getFlag();
00061     ioOut << std::fixed << std::setprecision (2)
00062         << bj << " "; << uj << " "; << fj << std::endl;
00063 }
00064
00065 // //////////////////////////////////////
00066 void HistoricalBooking::display () const {
00067     toStream (std::cout);
00068 }
00069 }

```

26.45 rmol/bom/HistoricalBooking.hpp File Reference

```

#include <stdair/stdair_basic_types.hpp>
#include <stdair/basic/StructAbstract.hpp>

```

Classes

- struct [RMOL::HistoricalBooking](#)
Structure keeping track, for a given class, of the number of historical bookings and of the censorship flag.

Namespaces

- namespace [RMOL](#)

26.46 HistoricalBooking.hpp

```

00001 #ifndef __RMOL_BOM_HISTORICALBOOKING_HPP
00002 #define __RMOL_BOM_HISTORICALBOOKING_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_basic_types.hpp>
00009 #include <stdair/basic/StructAbstract.hpp>
00010
00011 namespace RMOL {
00012
00017     struct HistoricalBooking : public stdair::StructAbstract {
00018
00019     public:
00020         // ////////////////////////////////////// Getters //////////////////////////////////////
00022         const stdair::NbOfBookings_T& getNbOfBookings() const {
00023             return _numberOfBookings;
00024         }
00026         const stdair::NbOfBookings_T& getUnconstrainedDemand(
) const {
00027             return _unconstrainedDemand;
00028         }
00031         const stdair::Flag_T& getFlag() const {
00032             return _flag;
00033         }
00034
00035     public:
00036         // ////////////////////////////////////// Setters //////////////////////////////////////
00038         void setUnconstrainedDemand (const
stdair::NbOfBookings_T& iDemand) {
00039             _unconstrainedDemand = iDemand;
00040         }
00041

```

```

00043     void setParameters (const stdair::NbOfBookings_T, const
stdair::Flag_T);
00044
00045     public:
00046     // /////////// Display Methods ///////////
00052     void toStream (std::ostream& ioOut) const;
00053
00057     const std::string describe() const;
00058
00062     void display () const;
00063
00064     public:
00065     // /////////// Constructors and destructor. ///////////
00069     HistoricalBooking (const stdair::NbOfBookings_T, const
stdair::Flag_T);
00073     HistoricalBooking();
00077     HistoricalBooking (const HistoricalBooking
&);
00078
00082     virtual ~HistoricalBooking();
00083
00084     private:
00085     // /////////// Attributes ///////////
00089     stdair::NbOfBookings_T _numberOfBookings;
00090
00094     stdair::NbOfBookings_T _unconstrainedDemand;
00095
00099     stdair::Flag_T _flag;
00100 };
00101 }
00102 #endif // __RMOL_BOM_HISTORICALBOOKING_HPP

```

26.47 rmol/bom/HistoricalBookingHolder.cpp File Reference

```

#include <sstream>
#include <iostream>
#include <iomanip>
#include <cmath>
#include <cassert>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>

```

Namespaces

- namespace [RMOL](#)

26.48 HistoricalBookingHolder.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <sstream>
00006 #include <iostream>
00007 #include <iomanip>
00008 #include <cmath>
00009 #include <cassert>
00010 // StdAir
00011 #include <stdair/service/Logger.hpp>
00012 // RMOL
00013 #include <rmol/bom/HistoricalBooking.hpp>
00014 #include <rmol/bom/HistoricalBookingHolder.hpp>
00015 >
00016 namespace RMOL {
00017
00018     // //////////////////////////////////////
00019     HistoricalBookingHolder::HistoricalBookingHolder
00020     () {
00021     }
00022     // //////////////////////////////////////

```

```

00023 HistoricalBookingHolder::~HistoricalBookingHolder
00024 () {
00025     _historicalBookingVector.clear();
00026 }
00027 // //////////////////////////////////////
00028 const short HistoricalBookingHolder::getNbOfFlights
00029 () const {
00030     return _historicalBookingVector.size();
00031 }
00032 // //////////////////////////////////////
00033 const short HistoricalBookingHolder::getNbOfUncensoredData
00034 () const {
00035     short lResult = 0;
00036     const short lSize = _historicalBookingVector.size();
00037     for (short ite = 0; ite < lSize; ++ite) {
00038         const stdair::Flag_T lFlag = _historicalBookingVector.at(ite).getFlag ();
00039         if (lFlag == false) {
00040             ++ lResult;
00041         }
00042     }
00043     return lResult;
00044 }
00045 // //////////////////////////////////////
00046 const stdair::NbOfBookings_T HistoricalBookingHolder::
00047 getNbOfUncensoredBookings () const {
00048     stdair::NbOfBookings_T lResult = 0;
00049     const short lSize = _historicalBookingVector.size();
00050     for (short ite = 0; ite < lSize; ++ite) {
00051         const HistoricalBooking& lHistorialBooking =
00052             _historicalBookingVector.at (ite);
00053         const stdair::Flag_T lFlag = lHistorialBooking.getFlag ();
00054         if (lFlag == false) {
00055             const stdair::NbOfBookings_T& lBooking =
00056                 lHistorialBooking.getNbOfBookings ();
00057             lResult += lBooking;
00058         }
00059     }
00060     return lResult;
00061 }
00062 // //////////////////////////////////////
00063 const double HistoricalBookingHolder::
00064 getUncensoredStandardDeviation (const double&
00065 iMeanOfUncensoredBookings,
00066                                 const short iNbOfUncensoredData) const {
00067     double lResult = 0;
00068     const short lSize = _historicalBookingVector.size();
00069     for (short ite = 0; ite < lSize; ++ite) {
00070         const stdair::Flag_T lFlag = _historicalBookingVector.at(ite).getFlag ();
00071         if (lFlag == false) {
00072             const HistoricalBooking& lHistorialBooking =
00073                 _historicalBookingVector.at (ite);
00074             const stdair::NbOfBookings_T& lBooking =
00075                 lHistorialBooking.getNbOfBookings ();
00076             lResult += (lBooking - iMeanOfUncensoredBookings)
00077                 * (lBooking - iMeanOfUncensoredBookings);
00078         }
00079     }
00080     lResult /= (iNbOfUncensoredData - 1);
00081     lResult = std::sqrt (lResult);
00082     return lResult;
00083 }
00084 // //////////////////////////////////////
00085 const double HistoricalBookingHolder::getDemandMean
00086 () const {
00087     double lResult = 0;
00088     const short lSize = _historicalBookingVector.size();
00089     for (short ite = 0; ite < lSize; ++ite) {
00090         const HistoricalBooking& lHistorialBooking =
00091             _historicalBookingVector.at(ite);
00092         const stdair::NbOfBookings_T& lDemand =
00093             lHistorialBooking.getUnconstrainedDemand ();
00094     }

```

```

00105
00106     lResult += static_cast<double>(lDemand);
00107 }
00108
00109     lResult /= lSize;
00110
00111     return lResult;
00112 }
00113
00114 // //////////////////////////////////////
00115 const double HistoricalBookingHolder::getStandardDeviation
00116 (const double iDemandMean) const {
00117     double lResult = 0;
00118     const short lSize = _historicalBookingVector.size();
00119
00120     for (short ite = 0; ite < lSize; ++ite) {
00121         const HistoricalBooking& lHistorialBooking =
00122             _historicalBookingVector.at(ite);
00123
00124         const stdair::NbOfBookings_T& lDemand =
00125             lHistorialBooking.getUnconstrainedDemand ();
00126
00127         const double lDoubleDemand = static_cast<double> (lDemand);
00128         lResult += (lDoubleDemand - iDemandMean) * (lDoubleDemand - iDemandMean);
00129     }
00130
00131     lResult /= (lSize - 1);
00132
00133     lResult = std::sqrt (lResult);
00134
00135     return lResult;
00136 }
00137
00138 // //////////////////////////////////////
00139 const std::vector<bool> HistoricalBookingHolder::
00140 getListOfToBeUnconstrainedFlags () const {
00141     std::vector<bool> lResult;
00142     const short lSize = _historicalBookingVector.size();
00143
00144     for (short ite = 0; ite < lSize; ++ite) {
00145         const HistoricalBooking& lHistorialBooking =
00146             _historicalBookingVector.at(ite);
00147         const stdair::Flag_T lFlag = lHistorialBooking.getFlag ();
00148         if (lFlag == true) {
00149             lResult.push_back(true);
00150         }
00151         else {
00152             lResult.push_back(false);
00153         }
00154     }
00155
00156     return lResult;
00157 }
00158
00159 // //////////////////////////////////////
00160 const stdair::NbOfBookings_T& HistoricalBookingHolder::
00161 getHistoricalBooking (const short i) const {
00162     const HistoricalBooking& lHistorialBooking =
00163         _historicalBookingVector.at(i);
00164     return lHistorialBooking.getNbOfBookings();
00165 }
00166
00167 // //////////////////////////////////////
00168 const stdair::NbOfBookings_T& HistoricalBookingHolder::
00169 getUnconstrainedDemand (const short i) const {
00170     const HistoricalBooking& lHistorialBooking =
00171         _historicalBookingVector.at(i);
00172     return lHistorialBooking.getUnconstrainedDemand();
00173 }
00174
00175 // //////////////////////////////////////
00176 const stdair::Flag_T& HistoricalBookingHolder::
00177 getCensorshipFlag (const short i) const {
00178     const HistoricalBooking& lHistorialBooking =
00179         _historicalBookingVector.at(i);
00180     return lHistorialBooking.getFlag();
00181 }
00182
00183 // //////////////////////////////////////
00184 void HistoricalBookingHolder::setUnconstrainedDemand
00185 (const stdair::NbOfBookings_T& iExpectedDemand, const short i) {
00186     _historicalBookingVector.at(i).setUnconstrainedDemand(iExpectedDemand);
00187 }
00188
00189 // //////////////////////////////////////
00190 const stdair::NbOfBookings_T HistoricalBookingHolder::calculateExpectedDemand
00191 (const double iMean, const double iSD,

```

```

00192     const short i, const stdair::NbOfBookings_T iDemand) const {
00193
00194         const HistoricalBooking lHistorialBooking =
00195             _historicalBookingVector.at(i);
00196         const double lBooking =
00197             static_cast<double> (lHistorialBooking.getNbOfBookings())
;
00198         double e, d1, d2;
00199
00200         e = - (lBooking - iMean) * (lBooking - iMean) * 0.625 / (iSD * iSD);
00201         //STDAIR_LOG_DEBUG ("e: " << e);
00202         e = exp (e);
00203         //STDAIR_LOG_DEBUG ("e: " << e);
00204
00205         double s = std::sqrt (1 - e);
00206         //STDAIR_LOG_DEBUG ("s: " << s);
00207
00208         if (lBooking >= iMean) {
00209             if (e < 0.01) {
00210                 return iDemand;
00211             }
00212             d1 = 0.5 * (1 - s);
00213         }
00214         else {
00215             d1 = 0.5 * (1 + s);
00216         }
00217         //STDAIR_LOG_DEBUG ("d1: " << d1);
00218
00219         e = - (lBooking - iMean) * (lBooking - iMean) * 0.5 / (iSD * iSD);
00220         e = exp (e);
00221         d2 = e * iSD / std::sqrt(2 * 3.14159265);
00222         //STDAIR_LOG_DEBUG ("d2: " << d2);
00223
00224         if (d1 == 0) {
00225             return iDemand;
00226         }
00227
00228         const stdair::NbOfBookings_T lDemand =
00229             static_cast<stdair::NbOfBookings_T> (iMean + d2/d1);
00230
00231         return lDemand;
00232     }
00233
00234     // //////////////////////////////////////
00235     void HistoricalBookingHolder::addHistoricalBooking
00236     (const HistoricalBooking& iHistoricalBooking) {
00237         _historicalBookingVector.push_back(iHistoricalBooking);
00238     }
00239
00240     // //////////////////////////////////////
00241     void HistoricalBookingHolder::toStream (
std::ostream& ioOut) const {
00242         const short lSize = _historicalBookingVector.size();
00243
00244         ioOut << "Historical Booking; Unconstrained Demand; Flag" << std::endl;
00245
00246         for (short ite = 0; ite < lSize; ++ite) {
00247             const HistoricalBooking& lHistorialBooking =
00248                 _historicalBookingVector.at(ite);
00249
00250             const stdair::NbOfBookings_T& lBooking =
00251                 lHistorialBooking.getNbOfBookings();
00252
00253             const stdair::NbOfBookings_T& lDemand =
00254                 lHistorialBooking.getUnconstrainedDemand();
00255
00256             const stdair::Flag_T lFlag = lHistorialBooking.getFlag();
00257
00258             ioOut << lBooking << "      "
00259                 << lDemand << "      "
00260                 << lFlag << std::endl;
00261         }
00262     }
00263
00264     // //////////////////////////////////////
00265     const std::string HistoricalBookingHolder::describe
() const {
00266         std::ostringstream ostr;
00267         ostr << "Holder of HistoricalBooking structs.";
00268
00269         return ostr.str();
00270     }
00271
00272     // //////////////////////////////////////
00273     void HistoricalBookingHolder::display() const
{
00274         toStream (std::cout);

```

```
00275     }
00276 }
```

26.49 rmol/bom/HistoricalBookingHolder.hpp File Reference

```
#include <iostream>
#include <vector>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/basic/StructAbstract.hpp>
```

Classes

- struct [RMOL::HistoricalBookingHolder](#)

Namespaces

- namespace [RMOL](#)

Typedefs

- typedef std::vector
< HistoricalBooking > [RMOL::HistoricalBookingVector_T](#)

26.50 HistoricalBookingHolder.hpp

```
00001 #ifndef __RMOL_BOM_HISTORICALBOOKINGHOLDER_HPP
00002 #define __RMOL_BOM_HISTORICALBOOKINGHOLDER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <iostream>
00009 #include <vector>
00010 // StdAir
00011 #include <stdair/stdair_basic_types.hpp>
00012 #include <stdair/basic/StructAbstract.hpp>
00013
00014 namespace RMOL {
00016     struct HistoricalBooking;
00017
00019     typedef std::vector<HistoricalBooking> HistoricalBookingVector_T
00020 ;
00023     struct HistoricalBookingHolder : public
stdair::StructAbstract {
00024
00025     public:
00026         // //////////////////////////////////
00028         const short getNbOfFlights () const;
00029
00031         const short getNbOfUncensoredData () const;
00032
00034         const stdair::NbOfBookings_T getNbOfUncensoredBookings
() const;
00035
00037         const double getUncensoredStandardDeviation
(const double& iMeanOfUncensoredBookings,
00038         const short iNbOfUncensoredData) const;
00039
00042         const double getDemandMean () const;
00043
00045         const double getStandardDeviation (const double) const;
00046
00048         const std::vector<bool> getListOfToBeUnconstrainedFlags
() const;
00049
00051         const stdair::NbOfBookings_T& getHistoricalBooking (
```

```

    const short i) const;
00052
00054     const stdair::NbOfBookings_T& getUnconstrainedDemand
    (const short i) const;
00055
00057     const stdair::Flag_T& getCensorshipFlag (const short i)
    const;
00058
00060     const stdair::NbOfBookings_T& getUnconstrainedDemandOnFirstElement
    () const {
00061         return getUnconstrainedDemand (0);
00062     }
00063
00065     const stdair::NbOfBookings_T calculateExpectedDemand
    (const double,
00066                                     const double,
00067                                     const short,
00068                                     const stdair::NbOfBookings_T) const
    ;
00069
00071     void setUnconstrainedDemand (const
    stdair::NbOfBookings_T& iExpectedDemand,
00072                                     const short i);
00073
00075     void addHistoricalBooking (const HistoricalBooking
    & iHistoricalBooking);
00076
00080     void toStream (std::ostream& ioOut) const;
00081
00082     // ////////// Display Methods //////////
00084     const std::string describe() const;
00085
00087     void display () const;
00088
00090     virtual ~HistoricalBookingHolder();
00091
00092 public:
00095     HistoricalBookingHolder ();
00096
00097 private:
00099     HistoricalBookingVector_T _historicalBookingVector
    ;
00100
00101 protected:
00102 };
00103 }
00104 #endif // __RMOL_BOM_HISTORICALBOOKINGHOLDER_HPP
00105

```

26.51 rmol/bom/MCOptimiser.cpp File Reference

```

#include <cassert>
#include <string>
#include <sstream>
#include <algorithm>
#include <cmath>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/VirtualClassStruct.hpp>
#include <stdair/service/Logger.hpp>
#include <stdair/basic/RandomGeneration.hpp>
#include <stdair/basic/BasConst_General.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/bom/MCOptimiser.hpp>

```

Namespaces

- namespace [RMOL](#)

26.52 MCOptimiser.cpp

```

00001 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00002 // Import section
00003 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <string>
00007 #include <sstream>
00008 #include <algorithm>
00009 #include <cmath>
00010 // StdAir
00011 #include <stdair/stdair_basic_types.hpp>
00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/LegCabin.hpp>
00014 #include <stdair/bom/SegmentCabin.hpp>
00015 #include <stdair/bom/BookingClass.hpp>
00016 #include <stdair/bom/VirtualClassStruct.hpp>
00017 #include <stdair/service/Logger.hpp>
00018 #include <stdair/basic/RandomGeneration.hpp>
00019 #include <stdair/basic/BasConst_General.hpp>
00020 // RMOL
00021 #include <rmol/basic/BasConst_General.hpp>
00022 #include <rmol/bom/MCOptimiser.hpp>
00023
00024 namespace RMOL {
00025
00026 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00027 void MCOptimiser::
00028 optimalOptimisationByMCIntegration (
00029     stdair::LegCabin& ioLegCabin) {
00029     // Retrieve the segment-cabin
00030     const stdair::SegmentCabinList_T lSegmentCabinList =
00031         stdair::BomManager::getList<stdair::SegmentCabin> (ioLegCabin);
00032     stdair::SegmentCabinList_T::const_iterator itSC = lSegmentCabinList.begin();
00033
00034     assert (itSC != lSegmentCabinList.end());
00035     const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00036     assert (lSegmentCabin_ptr != NULL);
00037
00038     // Retrieve the class list.
00039     const stdair::BookingClassList_T lBookingClassList =
00040         stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00041
00042     // Retrieve the remaining cabin capacity.
00043     const stdair::Availability_T& lCap = ioLegCabin.getAvailabilityPool();
00044     const int lCapacity = static_cast<const int> (lCap);
00045     const stdair::UnsignedIndex_T lCapacityIndex =
00046         static_cast<const stdair::UnsignedIndex_T> ((lCapacity+abs(lCapacity))/2);
00047
00048     // Retrieve the virtual class list.
00049     stdair::VirtualClassList_T& lVCLList = ioLegCabin.getVirtualClassList();
00050
00051     // Parse the virtual class list and compute the protection levels.
00052     stdair::VirtualClassList_T::iterator itCurrentVC = lVCLList.begin();
00053     assert (itCurrentVC != lVCLList.end());
00054     stdair::VirtualClassList_T::iterator itNextVC = itCurrentVC; ++itNextVC;
00055
00056     // Initialise the partial sum holder with the demand sample of the first
00057     // virtual class.
00058     stdair::VirtualClassStruct& lFirstVC = *itCurrentVC;
00059     stdair::GeneratedDemandVector_T lPartialSumHolder =
00060         lFirstVC.getGeneratedDemandVector();
00061
00062     // Initialise the booking limit for the first class, which is equal to
00063     // the remaining capacity.
00064     lFirstVC.setCumulatedBookingLimit (lCap);
00065
00066     // Initialise bid price vector with the first element (index 0) equal to
00067     // the highest yield.
00068     ioLegCabin.emptyBidPriceVector();
00069     stdair::BidPriceVector_T& lBPV = ioLegCabin.getBidPriceVector();
00070     //const stdair::Yield_T& y1 = lFirstVC.getYield ();
00071     //lBPV.push_back (y1);
00072     stdair::UnsignedIndex_T idx = 1;
00073
00074     for (; itNextVC != lVCLList.end(); ++itCurrentVC, ++itNextVC) {
00075         // Get the yields of the two classes.
00076         stdair::VirtualClassStruct& lCurrentVC = *itCurrentVC;
00077         stdair::VirtualClassStruct& lNextVC = *itNextVC;
00078         const stdair::Yield_T& yj = lCurrentVC.getYield ();
00079         const stdair::Yield_T& yj1 = lNextVC.getYield ();
00080
00081         // Consistency check: the yield/price of a higher class/bucket
00082         // (with the j index lower) must be higher.
00083         assert (yj > yj1);

```

```

00083
00084 // Sort the partial sum holder.
00085 std::sort (lPartialSumHolder.begin(), lPartialSumHolder.end());
00086 const stdair::UnsignedIndex_T K = lPartialSumHolder.size ();
00087
00088 // Compute the optimal index lj = floor {[y(j)-y(j+1)]/y(j) . K}
00089 const double ljdoube = std::floor (K * (yj - yj1) / yj);
00090 stdair::UnsignedIndex_T lj =
00091     static_cast<stdair::UnsignedIndex_T> (ljdoube);
00092
00093 // Consistency check.
00094 assert (lj >= 1 && lj < K);
00095
00096 // The optimal protection: p(j) = 1/2 [S(j,lj) + S(j, lj+1)]
00097 const double sj1 = lPartialSumHolder.at (lj - 1);
00098 const double sjlp1 = lPartialSumHolder.at (lj + 1 - 1);
00099 const double pj = (sj1 + sjlp1) / 2;
00100
00101 // Set the cumulated protection level for the current class.
00102 lCurrentVC.setCumulatedProtection (pj);
00103 // Set the cumulated booking limit for the next class.
00104 lNextVC.setCumulatedBookingLimit (lCap - pj);
00105
00110 const stdair::UnsignedIndex_T pjint = static_cast<const int> (pj);
00111 stdair::GeneratedDemandVector_T::iterator itLowerBound =
00112     lPartialSumHolder.begin();
00113 for (; idx <= pjint && idx <= lCapacityIndex; ++idx) {
00114     itLowerBound =
00115         std::lower_bound (itLowerBound, lPartialSumHolder.end(), idx);
00116     const stdair::UnsignedIndex_T pos =
00117         itLowerBound - lPartialSumHolder.begin();
00118
00119     const stdair::BidPrice_T lBP = yj * (K - pos) / K;
00120     lBPV.push_back (lBP);
00121 }
00122
00123 // Update the partial sum holder.
00124 const stdair::GeneratedDemandVector_T& lNextPSH =
00125     lNextVC.getGeneratedDemandVector();
00126 assert (K <= lNextPSH.size());
00127 for (stdair::UnsignedIndex_T i = 0; i < K - lj; ++i) {
00128     lPartialSumHolder.at(i) = lPartialSumHolder.at(i + lj) + lNextPSH.at(i)
;
00129 }
00130 lPartialSumHolder.resize (K - lj);
00131 }
00132
00137 stdair::VirtualClassStruct& lLastVC = *itCurrentVC;
00138 const stdair::Yield_T& yn = lLastVC.getYield();
00139 stdair::GeneratedDemandVector_T::iterator itLowerBound =
00140     lPartialSumHolder.begin();
00141 for (; idx <= lCapacityIndex; ++idx) {
00142     itLowerBound =
00143         std::lower_bound (itLowerBound, lPartialSumHolder.end(), idx);
00144     const stdair::UnsignedIndex_T pos =
00145         itLowerBound - lPartialSumHolder.begin();
00146     const stdair::UnsignedIndex_T K = lPartialSumHolder.size();
00147     const stdair::BidPrice_T lBP = yn * (K - pos) / K;
00148     lBPV.push_back (lBP);
00149 }
00150 }
00151
00152 // //////////////////////////////////////
00153 stdair::GeneratedDemandVector_T MCOptimiser::
00154 generateDemandVector (const stdair::MeanValue_T& iMean,
00155                     const stdair::StdDevValue_T& iStdDev,
00156                     const stdair::NbOfSamples_T& K) {
00157     stdair::GeneratedDemandVector_T oDemandVector;
00158     if (iStdDev > 0) {
00159         stdair::RandomGeneration lGenerator (stdair::DEFAULT_RANDOM_SEED);
00160         for (unsigned int i = 0; i < K; ++i) {
00161             stdair::RealNumber_T lDemandSample =
00162                 lGenerator.generateNormal (iMean, iStdDev);
00163             oDemandVector.push_back (lDemandSample);
00164         }
00165     } else {
00166         for (unsigned int i = 0; i < K; ++i) {
00167             oDemandVector.push_back (iMean);
00168         }
00169     }
00170     return oDemandVector;
00171 }
00172
00173 // //////////////////////////////////////
00174 void MCOptimiser::
00175 optimisationByMCIntegration (stdair::LegCabin&
ioLegCabin) {

```

```

00176 // Number of MC samples
00177 stdair::NbOfSamples_T K = DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
;
00178
00179 const stdair::YieldLevelDemandMap_T& lYieldDemandMap =
00180     ioLegCabin.getYieldLevelDemandMap();
00181 assert (!lYieldDemandMap.empty());
00182
00183 std::ostringstream oStr;
00184 oStr << "Yield list ";
00185 for (stdair::YieldLevelDemandMap_T::const_iterator itYD =
00186     lYieldDemandMap.begin();
00187     itYD != lYieldDemandMap.end(); ++itYD) {
00188     const stdair::Yield_T& y = itYD->first;
00189     oStr << y << " ";
00190 }
00191
00192 STDAIR_LOG_DEBUG (oStr.str());
00193 ioLegCabin.emptyBidPriceVector();
00194 stdair::BidPriceVector_T& lBidPriceVector =
00195     ioLegCabin.getBidPriceVector();
00196 const stdair::Availability_T& lAvailabilityPool =
00197     ioLegCabin.getAvailabilityPool();
00198 // Initialise the minimal bid price to 1.0 (just to avoid problems
00199 // of division by zero).
00200 const stdair::BidPrice_T& lMinBP = 1.0;
00201
00202 stdair::YieldLevelDemandMap_T::const_reverse_iterator itCurrentYD =
00203     lYieldDemandMap.rbegin();
00204 stdair::YieldLevelDemandMap_T::const_reverse_iterator itNextYD =
itCurrentYD;
00205 ++itNextYD;
00206
00207 // Initialise the partial sum holder
00208 stdair::MeanStdDevPair_T lMeanStdDevPair = itCurrentYD->second;
00209 stdair::GeneratedDemandVector_T lPartialSumHolder =
00210     generateDemandVector(lMeanStdDevPair.first,
lMeanStdDevPair.second, K);
00211
00212 stdair::UnsignedIndex_T idx = 1;
00213 for (; itNextYD!=lYieldDemandMap.rend(); ++itCurrentYD, ++itNextYD) {
00214     const stdair::Yield_T& yj = itCurrentYD->first;
00215     const stdair::Yield_T& yj1 = itNextYD->first;
00216     // Consistency check: the yield/price of a higher class/bucket
00217     // (with the j index lower) must be higher.
00218     assert (yj > yj1);
00219     // Sort the partial sum holder.
00220     std::sort (lPartialSumHolder.begin(), lPartialSumHolder.end());
00221     // STDAIR_LOG_DEBUG ("Partial sums : max = " << lPartialSumHolder.back()
00222     // << " min = " << lPartialSumHolder.front());
00223     K = lPartialSumHolder.size ();
00224     // Compute the optimal index lj = floor {[y(j)-y(j+1)]/y(j) . K}
00225     const double ljdoube = std::floor (K * (yj - yj1) / yj);
00226     stdair::UnsignedIndex_T lj =
00227         static_cast<stdair::UnsignedIndex_T> (ljdoube);
00228     // Consistency check.
00229     assert (lj >= 1 && lj < K);
00230     // The optimal protection: p(j) = 1/2 [S(j,lj) + S(j, lj+1)]
00231     const double sjl = lPartialSumHolder.at (lj - 1);
00232     const double sjlp1 = lPartialSumHolder.at (lj + 1 - 1);
00233     const double pj = (sjl + sjlp1) / 2;
00234     const stdair::UnsignedIndex_T pjint = static_cast<const int> (pj);
00235     stdair::GeneratedDemandVector_T::iterator itLowerBound =
00236         lPartialSumHolder.begin();
00237     for (; idx <= pjint && idx <= lAvailabilityPool; ++idx) {
00238         itLowerBound =
00239             std::lower_bound (itLowerBound, lPartialSumHolder.end(), idx);
00240         const stdair::UnsignedIndex_T pos =
00241             itLowerBound - lPartialSumHolder.begin();
00242
00243         const stdair::BidPrice_T lBP = yj * (K - pos) / K;
00244         lBidPriceVector.push_back (lBP);
00245     }
00246     // Update the partial sum holder.
00247     lMeanStdDevPair = itNextYD->second;
00248     const stdair::GeneratedDemandVector_T& lNextDV =
00249         generateDemandVector (lMeanStdDevPair.first,
lMeanStdDevPair.second, K - lj);
00250     for (stdair::UnsignedIndex_T i = 0; i < K - lj; ++i) {
00251         lPartialSumHolder.at(i) = lPartialSumHolder.at(i + lj) + lNextDV.at(i);
00252     }
00253     lPartialSumHolder.resize (K - lj);
00254 }
00255 // STDAIR_LOG_DEBUG ("Partial sums : max = " << lPartialSumHolder.back()
00256 // << " min = " << lPartialSumHolder.front());
00257
00258 std::sort (lPartialSumHolder.begin(), lPartialSumHolder.end());

```

```

00272     const stdair::Yield_T& yn = itCurrentYD->first;
00273     stdair::GeneratedDemandVector_T::iterator itLowerBound =
00274         lPartialSumHolder.begin();
00275     K = lPartialSumHolder.size();
00276
00277     bool lMinBPReached = false;
00278     for (; idx <= lAvailabilityPool; ++idx) {
00279         itLowerBound =
00280             std::lower_bound (itLowerBound, lPartialSumHolder.end(), idx);
00281
00282         if (!lMinBPReached) {
00283             const stdair::UnsignedIndex_T pos =
00284                 itLowerBound - lPartialSumHolder.begin();
00285             stdair::BidPrice_T lBP = yn * (K - pos) / K;
00286
00287             if (lBP < lMinBP) {
00288                 lBP = lMinBP; lMinBPReached = true;
00289             }
00290
00291             lBidPriceVector.push_back (lBP);
00292
00293         } else {
00294             lBidPriceVector.push_back (lMinBP);
00295         }
00296     }
00297 }
00298
00299 // Updating the bid price values
00300 ioLegCabin.updatePreviousBidPrice();
00301 ioLegCabin.setCurrentBidPrice (lBidPriceVector.back());
00302
00303 // Compute and display the bid price variation after optimisation
00304 const stdair::BidPrice_T lPreviousBP = ioLegCabin.getPreviousBidPrice();
00305 stdair::BidPrice_T lNewBP = ioLegCabin.getCurrentBidPrice();
00306 // Check
00307 assert (lPreviousBP != 0);
00308 stdair::BidPrice_T lBidPriceDelta = lNewBP - lPreviousBP;
00309
00310 double lBidPriceVariation = 100*lBidPriceDelta/lPreviousBP;
00311
00312 STDAIR_LOG_DEBUG ("Bid price: previous value " << lPreviousBP
00313                  << ", new value " << lNewBP
00314                  << ", variation " << lBidPriceVariation << " %"
00315                  << ", BPV size " << lBidPriceVector.size());
00316 }
00317
00318 }

```

26.53 rmol/bom/MCOptimiser.hpp File Reference

```

#include <rmol/RMOL_Types.hpp>
#include <stdair/stdair_maths_types.hpp>
#include <stdair/stdair_rm_types.hpp>

```

Classes

- class [RMOL::MCOptimiser](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.54 MCOptimiser.hpp

```

00001 #ifndef __RMOL_BOM_MCUTILS_HPP
00002 #define __RMOL_BOM_MCUTILS_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // RMOL

```

```

00008 #include <rmol/RMOL_Types.hpp>
00009 #include <stdair/stdair_maths_types.hpp>
00010 #include <stdair/stdair_rm_types.hpp>
00011
00012 // Forward declarations.
00013 namespace stdair {
00014     class LegCabin;
00015 }
00016
00017 namespace RMOL {
00019     class MCOptimiser {
00020     public:
00021
00022         static void optimalOptimisationByMCIntegration
00030             (stdair::LegCabin&);
00031
00032         static stdair::GeneratedDemandVector_T
00033             generateDemandVector (const stdair::MeanValue_T&,
00034                                 const stdair::StdDevValue_T&,
00035                                 const stdair::NbOfSamples_T&);
00036
00037         static void optimisationByMCIntegration (
00038             stdair::LegCabin&);
00039
00040     };
00041 };
00042 #endif // __RMOL_BOM_MCUTILS_HPP

```

26.55 rmol/bom/old/DemandGeneratorList.cpp File Reference

```
#include <rmol/bom/DemandGeneratorList.hpp>
```

Namespaces

- namespace [RMOL](#)

26.56 DemandGeneratorList.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // RMOL
00005 #include <rmol/bom/DemandGeneratorList.hpp>
00006
00007 namespace RMOL {
00008
00009     // //////////////////////////////////////
00010     DemandGeneratorList::DemandGeneratorList
00011     () {
00012         const DistributionParameterList_T
00013             aDistributionParameterList;
00014         init (aDistributionParameterList);
00015     }
00016
00017     // //////////////////////////////////////
00018     DemandGeneratorList::
00019     DemandGeneratorList (const DemandGeneratorList
00020         & iDemandGeneratorList) {
00021         // TODO: copy the distribution parameters of the input generator list
00022         const DistributionParameterList_T
00023             aDistributionParameterList;
00024         init (aDistributionParameterList);
00025     }
00026
00027     // //////////////////////////////////////
00028     DemandGeneratorList::
00029     DemandGeneratorList (const DistributionParameterList_T
00030         & iDistributionParameterList) {
00031         init (iDistributionParameterList);
00032     }
00033
00034     // //////////////////////////////////////
00035     DemandGeneratorList::~DemandGeneratorList
00036     () {
00037     }
00038 }

```

```

00033 // //////////////////////////////////////
00034 void DemandGeneratorList::
00035   init (const DistributionParameterList_T&
iDistributionParameterList) {
00036
00037     DistributionParameterList_T::const_iterator itParams =
00038       iDistributionParameterList.begin();
00039     for ( ; itParams != iDistributionParameterList.end(); itParams++) {
00040       const FldDistributionParameters& aParams = *itParams;
00041
00042       const Gaussian gaussianGenerator (aParams);
00043
00044       _demandGeneratorList.push_back (gaussianGenerator);
00045     }
00046   }
00047
00048 // //////////////////////////////////////
00049 void DemandGeneratorList::
00050   generateVariateList (VariateList_T& ioVariateList) const
{
00051
00052   // Iterate on the (number of) classes/buckets, n
00053   DemandGeneratorList_T::const_iterator itGenerator =
00054     _demandGeneratorList.begin();
00055   for ( ; itGenerator != _demandGeneratorList.end(); itGenerator++) {
00056     const Gaussian& gaussianGenerator = *itGenerator;
00057
00058     // Generate a random variate following the Gaussian distribution
00059     const double generatedVariate = gaussianGenerator.generateVariate ();
00060     ioVariateList.push_back (generatedVariate);
00061   }
00062 }
00063
00064 }

```

26.57 rmol/bom/old/DemandGeneratorList.hpp File Reference

```

#include <list>
#include <rmol/bom/VariateList.hpp>
#include <rmol/bom/DistributionParameterList.hpp>
#include <rmol/bom/Gaussian.hpp>

```

Classes

- class [RMOL::DemandGeneratorList](#)

Namespaces

- namespace [RMOL](#)

26.58 DemandGeneratorList.hpp

```

00001 #ifndef __RMOL_DEMANDGENERATORLIST_HPP
00002 #define __RMOL_DEMANDGENERATORLIST_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <list>
00009 // RMOL
00010 #include <rmol/bom/VariateList.hpp>
00011 #include <rmol/bom/DistributionParameterList.hpp>
>
00012 #include <rmol/bom/Gaussian.hpp>
00013
00014 namespace RMOL {
00015
00017   class DemandGeneratorList {
00018   protected:
00020     typedef std::list<Gaussian> DemandGeneratorList_T;
00021

```

```

00022 public:
00024     DemandGeneratorList ();
00025     DemandGeneratorList (const DemandGeneratorList
&);
00027     DemandGeneratorList (const DistributionParameterList_T
&);
00028
00030     virtual ~DemandGeneratorList ();
00031
00033     void generateVariateList (VariateList_T&) const;
00034
00035 private:
00036     DemandGeneratorList_T _demandGeneratorList;
00037
00039     void init (const DistributionParameterList_T&);
00040
00041 };
00042 }
00043 #endif // __RMOL_DEMANDGENERATORLIST_HPP

```

26.59 rmol/bom/PolicyHelper.cpp File Reference

```

#include <cassert>
#include <cmath>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/basic/BasConst_Yield.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/Policy.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/NestingNode.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/factory/FacBomManager.hpp>
#include <rmol/bom/PolicyHelper.hpp>

```

Namespaces

- namespace [RMOL](#)

26.60 PolicyHelper.cpp

```

00001
00002 // //////////////////////////////////////
00003 // Import section
00004 // //////////////////////////////////////
00005 // STL
00006 #include <cassert>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_Inventory.hpp>
00010 #include <stdair/basic/BasConst_Yield.hpp>
00011 #include <stdair/bom/SegmentCabin.hpp>
00012 #include <stdair/bom/Policy.hpp>
00013 #include <stdair/bom/BookingClass.hpp>
00014 #include <stdair/bom/FareFamily.hpp>
00015 #include <stdair/bom/NestingNode.hpp>
00016 #include <stdair/bom/BomManager.hpp>
00017 #include <stdair/factory/FacBomManager.hpp>
00018 // RMOL
00019 #include <rmol/bom/PolicyHelper.hpp>
00020
00021 namespace RMOL {
00022 // //////////////////////////////////////
00023 void PolicyHelper::
00024 diffBetweenTwoPolicies (stdair::NestingNode& ioNode,
00025                         const stdair::Policy& iFirstPolicy,
00026                         const stdair::Policy& iSecondPolicy) {
00027
00028     // Retrieve the booking class list of the first policy
00029     const stdair::BookingClassList_T& lFirstBCList =
00030         stdair::BomManager::getList<stdair::BookingClass> (iFirstPolicy);

```

```

00031
00032 // Browse the booking class list
00033 for (stdair::BookingClassList_T::const_iterator itBC = lFirstBCList.begin()
;
00034      itBC != lFirstBCList.end(); ++itBC){
00035     const stdair::BookingClass* iFirstPolicyBC_ptr = *itBC;
00036     const stdair::BookingClassKey& lFirstPolicyBCKey =
00037     iFirstPolicyBC_ptr->getKey();
00038     const stdair::ClassCode_T& lFirstPolicyClassCode =
00039     lFirstPolicyBCKey.getClassCode();
00040     // Retrieve the fare family of the booking class and the list of booking
00041     // class of this fare family
00042     const stdair::FareFamily& lFareFamily =
00043     stdair::BomManager::getParent<stdair::FareFamily> (*iFirstPolicyBC_ptr)
;
00044
00045     // Retrieve the list of booking class between the both booking classes
00046     diffBetweenBookingClassAndPolicy (ioNode, lFareFamily,
00047     lFirstPolicyClassCode,
00048     iSecondPolicy);
00049 }
00050 }
00051
00052 // //////////////////////////////////////
00053 const bool PolicyHelper::
00054 intersectionBetweenPolicyAndBookingClassList (const
stdair::BookingClassList_T& iBCList,
00055 const stdair::Policy& iPolicy,
00056 stdair::ClassCode_T& oClassCode) {
00057     bool isInBookingClassList = false;
00058
00059     // Retrieve the booking classes of the policy
00060     const bool hasAListOfBC =
00061     stdair::BomManager::hasList<stdair::BookingClass> (iPolicy);
00062     if (hasAListOfBC == false) {
00063         return isInBookingClassList;
00064     }
00065     const stdair::BookingClassList_T& lPolicyBookingClassList =
00066     stdair::BomManager::getList<stdair::BookingClass> (iPolicy);
00067
00068     // Browse the booking class list of the fare family
00069     stdair::BookingClassList_T::const_iterator itFFBC = iBCList.begin();
00070     for (; itFFBC != iBCList.end(); ++itFFBC) {
00071         stdair::BookingClass* lFFBC_ptr = *itFFBC;
00072         const stdair::BookingClassKey& lFFBCKey = lFFBC_ptr->getKey();
00073         const stdair::ClassCode_T& lFFBCClassCode = lFFBCKey.getClassCode();
00074         // Compare the booking class with booking classes of policy
00075         stdair::BookingClassList_T::const_iterator itPolicyBC =
00076         lPolicyBookingClassList.begin();
00077         for (; itPolicyBC != lPolicyBookingClassList.end(); ++itPolicyBC){
00078             const stdair::BookingClass* lPolicyBC_ptr = *itPolicyBC;
00079             const stdair::BookingClassKey& lPolicyBCKey = lPolicyBC_ptr->getKey();
00080             const stdair::ClassCode_T& lPolicyClassCode =
00081             lPolicyBCKey.getClassCode();
00082             if (lPolicyClassCode == lFFBCClassCode) {
00083                 oClassCode = lPolicyClassCode;
00084                 isInBookingClassList = true;
00085                 return isInBookingClassList;
00086             }
00087         }
00088     }
00089     // If the policy has not any booking class in the fare family,
00090     // return false
00091     return isInBookingClassList;
00092 }
00093
00094 // //////////////////////////////////////
00095 void PolicyHelper::
00096 diffBetweenBookingClassAndPolicy (stdair::NestingNode& ioNode,
00097 const stdair::FareFamily& iFareFamily,
00098 const stdair::ClassCode_T&
iFirstPolicyClassCode,
00099 const stdair::Policy& iSecondPolicy) {
00100     const stdair::BookingClassList_T& lFFBCList =
00101     stdair::BomManager::getList<stdair::BookingClass> (iFareFamily);
00102     const bool isEmptyBookingClassList = lFFBCList.empty();
00103     if (isEmptyBookingClassList == true) {
00104         std::ostringstream ostr;
00105         ostr << "The booking class list of the fare family "
00106         << iFareFamily.describeKey() << " is empty.";
00107         STDAIR_LOG_DEBUG(ostr.str());
00108         throw EmptyBookingClassListException (ostr.str());
00109     }
00110
00111     // Retrieve the reverse iterator for the first booking class
00112     stdair::BookingClassList_T::const_reverse_iterator ritBC;
00113     for (ritBC = lFFBCList.rbegin(); ritBC != lFFBCList.rend(); ++ritBC) {

```



```

00114     const stdair::BookingClass* lBC_ptr = *ritBC;
00115     assert (lBC_ptr != NULL);
00116     const stdair::BookingClassKey& lBookingClassKey = lBC_ptr->getKey();
00117     const stdair::ClassCode_T& lClassCode = lBookingClassKey.getClassCode();
00118     if (iFirstPolicyClassCode == lClassCode) {
00119         break;
00120     }
00121 }
00122 if (ritBC == lFFBCList.rend()) {
00123     std::ostringstream ostr;
00124     ostr << "The booking class " << iFirstPolicyClassCode
00125         << "is not in the Fare Family " << iFareFamily.describeKey();
00126     STDAIR_LOG_DEBUG(ostr.str());
00127     throw MissingBookingClassInFareFamilyException (ostr.str());
00128 }
00129 assert(ritBC != lFFBCList.rend());
00130
00131 // Retrieve the booking class of the second policy in the same
00132 // fare family than the current booking class
00133 stdair::ClassCode_T lSecondPolicyClassCode;
00134 const bool hasABookingClassIn =
00135     intersectionBetweenPolicyAndBookingClassList (lFFBCList,
00136                                                    iSecondPolicy,
00137                                                    lSecondPolicyClassCode);
00138 // Add booking class between the first booking class and
00139 // the second booking class
00140
00141 if (hasABookingClassIn == false) {
00142     for (; ritBC != lFFBCList.rend(); ++ritBC) {
00143         stdair::BookingClass* lBC_ptr = *ritBC;
00144         stdair::FacBomManager::addToList (ioNode, *lBC_ptr);
00145     }
00146 } else {
00147     for (; ritBC != lFFBCList.rend(); ++ritBC) {
00148         stdair::BookingClass* lBC_ptr = *ritBC;
00149         assert (lBC_ptr != NULL);
00150         const stdair::BookingClassKey& lBookingClassKey = lBC_ptr->getKey();
00151         const stdair::ClassCode_T& lClassCode = lBookingClassKey.getClassCode()
00152 ;
00153         if (lSecondPolicyClassCode == lClassCode) {
00154             break;
00155         }
00156         stdair::FacBomManager::addToList (ioNode, *lBC_ptr);
00157     }
00158     assert(ritBC != lFFBCList.rend());
00159 }
00160 }
00161
00162 // //////////////////////////////////////
00163 void PolicyHelper::
00164 computeLastNode (stdair::NestingNode& ioNode,
00165                  const stdair::Policy& iPolicy,
00166                  const stdair::SegmentCabin& iSegmentCabin) {
00167     // Compare the number of booking classes in the policy and the number
00168     // of fare families of the segment-cabin.
00169     ioNode.setYield(stdair::DEFAULT_YIELD_VALUE);
00170     const stdair::BookingClassList_T& lBCList =
00171         stdair::BomManager::getList<stdair::BookingClass> (iPolicy);
00172     const stdair::NbOfClasses_T lNbOfClasses = lBCList.size();
00173     const stdair::FareFamilyList_T& lFFList =
00174         stdair::BomManager::getList<stdair::FareFamily> (iSegmentCabin);
00175     const stdair::NbOfFareFamilies_T lNbOfFFs = lFFList.size();
00176     assert (lNbOfFFs >= lNbOfClasses);
00177
00178     // Number of closed fare families in the policy.
00179     const stdair::NbOfFareFamilies_T lNbOfClosedFFs = lNbOfFFs - lNbOfClasses;
00180     stdair::FareFamilyList_T::const_reverse_iterator itFF = lFFList.rbegin();
00181     for (unsigned i=0; i<lNbOfClosedFFs; ++i, ++itFF) {
00182         const stdair::FareFamily* lFF_ptr = *itFF;
00183         assert (lFF_ptr != NULL);
00184         const stdair::BookingClassList_T& lCurrentBCList =
00185             stdair::BomManager::getList<stdair::BookingClass> (*lFF_ptr);
00186         for (stdair::BookingClassList_T::const_reverse_iterator itCurrentBC =
00187             lCurrentBCList.rbegin(); itCurrentBC != lCurrentBCList.rend();
00188             ++itCurrentBC) {
00189             stdair::BookingClass* lCurrentBC_ptr = *itCurrentBC;
00190             assert (lCurrentBC_ptr != NULL);
00191             stdair::FacBomManager::addToList (ioNode, *lCurrentBC_ptr);
00192         }
00193     }
00194
00195     //
00196     for (stdair::BookingClassList_T::const_reverse_iterator itBC =
00197         lBCList.rbegin(); itBC != lBCList.rend(); ++itBC) {
00198         const stdair::BookingClass* lBC_ptr = *itBC;
00199         assert (lBC_ptr != NULL);

```

```

00200     const stdair::FareFamily& lFF =
00201         stdair::BomManager::getParent<stdair::FareFamily> (*lBC_ptr);
00202
00203     const stdair::BookingClassList_T& lCurrentBCList =
00204         stdair::BomManager::getList<stdair::BookingClass> (lFF);
00205     for (stdair::BookingClassList_T::const_reverse_iterator itCurrentBC =
00206         lCurrentBCList.rbegin(); itCurrentBC != lCurrentBCList.rend();
00207         ++itCurrentBC) {
00208         stdair::BookingClass* lCurrentBC_ptr = *itCurrentBC;
00209         assert (lCurrentBC_ptr != NULL);
00210         if (lCurrentBC_ptr->describeKey() != lBC_ptr->describeKey()) {
00211             stdair::FacBomManager::addToList (ioNode, *lCurrentBC_ptr);
00212         } else {
00213             break;
00214         }
00215     }
00216 }
00217 }
00218
00219 // //////////////////////////////////////
00220 bool PolicyHelper::isNested (const stdair::Policy&
00221     iFirstPolicy,
00222                             const stdair::Policy& iSecondPolicy) {
00223     bool isNested = false;
00224     // The number of classes in the first policy should be smaller or equal
00225     // to the number of classes in the second one.
00226     const bool hasAListOfBCFirstPolicy =
00227         stdair::BomManager::hasList<stdair::BookingClass> (iFirstPolicy);
00228     // All policies are nested with the empty policy
00229     if (hasAListOfBCFirstPolicy == false) {
00230         isNested = true;
00231         return isNested;
00232     }
00233     const stdair::BookingClassList_T& lFirstBCList =
00234         stdair::BomManager::getList<stdair::BookingClass> (iFirstPolicy);
00235     const bool hasAListOfBCSecondPolicy =
00236         stdair::BomManager::hasList<stdair::BookingClass> (iSecondPolicy);
00237     // The empty policy is not nested
00238     if (hasAListOfBCSecondPolicy == false) {
00239         return isNested;
00240     }
00241     const stdair::BookingClassList_T& lSecondBCList =
00242         stdair::BomManager::getList<stdair::BookingClass> (iSecondPolicy);
00243     if (lFirstBCList.size() > lSecondBCList.size()) {
00244         return isNested;
00245     }
00246     // Browse the two lists of booking classes and verify if the pairs
00247     // of classes are in order.
00248     stdair::BookingClassList_T::const_iterator itFirstBC = lFirstBCList.begin()
;
00249     for (stdair::BookingClassList_T::const_iterator itSecondBC =
00250         lSecondBCList.begin(); itFirstBC != lFirstBCList.end();
00251         ++itFirstBC, ++itSecondBC) {
00252         const stdair::BookingClass* lFirstBC_ptr = *itFirstBC;
00253         assert (lFirstBC_ptr != NULL);
00254         const std::string lFirstKey = lFirstBC_ptr->describeKey();
00255         const stdair::BookingClass* lSecondBC_ptr = *itSecondBC;
00256         assert (lSecondBC_ptr != NULL);
00257         const std::string lSecondKey = lSecondBC_ptr->describeKey();
00258         if (lFirstKey == lSecondKey) {
00259             break;
00260         }
00261
00262         // Retrieve the parent FF and its booking class list.
00263         const stdair::FareFamily& lFF =
00264             stdair::BomManager::getParent<stdair::FareFamily> (*lFirstBC_ptr);
00265         const stdair::BookingClassList_T& lBCList =
00266             stdair::BomManager::getList<stdair::BookingClass> (lFF);
00267         for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00268             itBC != lBCList.end(); ++itBC) {
00269             const stdair::BookingClass* lBC_ptr = *itBC;
00270             assert (lBC_ptr != NULL);
00271             const std::string lKey = lBC_ptr->describeKey();
00272             if (lFirstKey == lKey) {
00273                 break;
00274             } else if (lSecondKey == lKey) {
00275                 return isNested;
00276             }
00277         }
00278     }
00279     isNested = true;
00280     return isNested;
00281 }
00282 }
00283 }

```

26.61 rmol/bom/PolicyHelper.hpp File Reference

```
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/bom/PolicyTypes.hpp>
#include <stdair/bom/BookingClassTypes.hpp>
#include <stdair/bom/FareFamilyTypes.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::PolicyHelper](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.62 PolicyHelper.hpp

```
00001 #ifndef __RMOL_BOM_POLICYHELPER_HPP
00002 #define __RMOL_BOM_POLICYHELPER_HPP
00003 // //////////////////////////////////////
00004 // Import section
00005 // //////////////////////////////////////
00006 // StdAir
00007 #include <stdair/stdair_inventory_types.hpp>
00008 #include <stdair/bom/PolicyTypes.hpp>
00009 #include <stdair/bom/BookingClassTypes.hpp>
00010 #include <stdair/bom/FareFamilyTypes.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class SegmentCabin;
00017     class Policy;
00018     class FareFamily;
00019     class BookingClass;
00020     class NestingNode;
00021 }
00022
00023 namespace RMOL {
00024
00028     class PolicyHelper {
00029     public:
00030
00035         static void
00036         diffBetweenTwoPolicies (stdair::NestingNode&, const
stdair::Policy&,
                                const stdair::Policy&);
00037
00038         static void
00042         computeLastNode (stdair::NestingNode&, const stdair::Policy&
                                const stdair::SegmentCabin&);
00043
00044         static bool isNested (const stdair::Policy&, const stdair::Policy&)
00045     ;
00050
00051     private:
00052
00053         static const bool
00058         intersectionBetweenPolicyAndBookingClassList (const
stdair::BookingClassList_T&,
                                const stdair::Policy&,
                                stdair::ClassCode_T&);
00059
00060         static void
00066         diffBetweenBookingClassAndPolicy (stdair::NestingNode&,
                                const stdair::FareFamily&,
                                const stdair::ClassCode_T&,
                                const stdair::Policy&);
00067
00068
00069
00070
```

```

00071
00072     };
00073
00074 }
00075
00076 #endif // __RMOL_BOM_POLICYHELPER_HPP

```

26.63 rmol/bom/SegmentSnapshotTableHelper.cpp File Reference

```

#include <cassert>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>

```

Namespaces

- namespace [RMOL](#)

26.64 SegmentSnapshotTableHelper.cpp

```

00001 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00002 // Import section
00003 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 // StdAir
00007 #include <stdair/basic/BasConst_Inventory.hpp>
00008 #include <stdair/bom/BomManager.hpp>
00009 #include <stdair/bom/SegmentDate.hpp>
00010 #include <stdair/bom/SegmentCabin.hpp>
00011 #include <stdair/bom/BookingClass.hpp>
00012 #include <stdair/bom/SegmentSnapshotTable.hpp>
00013 #include <stdair/service/Logger.hpp>
00014 // RMOL
00015 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00016
00017 namespace RMOL {
00018     //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00019     stdair::NbOfSegments_T SegmentSnapshotTableHelper::
00020     getNbOfSegmentAlreadyPassedThisDTD (const
00021     stdair::SegmentSnapshotTable& iGB,
00022     const stdair::DTD_T& iDTD,
00023     const stdair::Date_T& iCurrentDate) {
00024     stdair::NbOfSegments_T oNbOfSegments = 0;
00025     // Browse the list of segments and check if it has passed the given DTD.
00026     const stdair::SegmentCabinIndexMap_T& lSCMap=iGB.getSegmentCabinIndexMap();
00027     for (stdair::SegmentCabinIndexMap_T::const_iterator itSC = lSCMap.begin();
00028     itSC != lSCMap.end(); ++itSC) {
00029     const stdair::SegmentCabin* lSC_ptr = itSC->first;
00030     assert (lSC_ptr != NULL);
00031
00032     if (hasPassedThisDTD (*lSC_ptr, iDTD, iCurrentDate) ==
00033     true) {
00034         ++oNbOfSegments;
00035     }
00036     }
00037     return oNbOfSegments;
00038     }
00039
00040     //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00041     bool SegmentSnapshotTableHelper::
00042     hasPassedThisDTD (const stdair::SegmentCabin& iSegmentCabin
00043     ,
00044     const stdair::DTD_T& iDTD,

```

```

00044         const stdair::Date_T& iCurrentDate) {
00045     // Retrieve the boarding date.
00046     const stdair::SegmentDate& lSegmentDate =
00047         stdair::BomManager::getParent<stdair::SegmentDate> (iSegmentCabin);
00048     const stdair::Date_T& lBoardingDate = lSegmentDate.getBoardingDate();
00049
00050     // Compare the date offset between the boarding date and the current date
00051     // to the DTD.
00052     stdair::DateOffset_T lDateOffset = lBoardingDate - iCurrentDate;
00053     stdair::DTD_T lDateOffsetInDays = lDateOffset.days();
00054     if (iDTD > lDateOffsetInDays) {
00055         return true;
00056     } else {
00057         return false;
00058     }
00059 }
00060 }

```

26.65 rmol/bom/SegmentSnapshotTableHelper.hpp File Reference

```

#include <string>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_date_time_types.hpp>

```

Classes

- class [RMOL::SegmentSnapshotTableHelper](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.66 SegmentSnapshotTableHelper.hpp

```

00001 #ifndef __RMOL_BOM_SEGMENTSNAPOSHOTTABLEHELPER_HPP
00002 #define __RMOL_BOM_SEGMENTSNAPOSHOTTABLEHELPER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <string>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 #include <stdair/stdair_date_time_types.hpp>
00012
00013 // Forward declarations
00014 namespace stdair {
00015     class SegmentSnapshotTable;
00016     class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00020
00023     class SegmentSnapshotTableHelper {
00024     public:
00025         // ////////////////////////////////// Business Methods //////////////////////////////////
00030         static stdair::NbOfSegments_T getNbOfSegmentAlreadyPassedThisDTD
            (const stdair::SegmentSnapshotTable&, const stdair::DTD_T&, const
            stdair::Date_T&);
00031
00035         static bool hasPassedThisDTD (const stdair::SegmentCabin&,
00036                                     const stdair::DTD_T&, const stdair::Date_T&);
00037     };
00038
00039 }
00040 #endif // __RMOL_BOM_SEGMENTSNAPOSHOTTABLEHELPER_HPP

```

26.67 rmol/bom/Utilities.cpp File Reference

```
#include <cassert>
#include <string>
#include <numeric>
#include <algorithm>
#include <cmath>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/BookingClassTypes.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
```

Namespaces

- namespace [RMOL](#)

26.68 Utilities.cpp

```
00001
00002 // //////////////////////////////////////
00003 // Import section
00004 // //////////////////////////////////////
00005 // STL
00006 #include <cassert>
00007 #include <string>
00008 #include <numeric>
00009 #include <algorithm>
00010 #include <cmath>
00011 // StdAir
00012 #include <stdair/basic/BasConst_Inventory.hpp>
00013 #include <stdair/bom/BomManager.hpp>
00014 #include <stdair/bom/SegmentCabin.hpp>
00015 #include <stdair/bom/FareFamily.hpp>
00016 #include <stdair/bom/BookingClass.hpp>
00017 #include <stdair/bom/BookingClassTypes.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/basic/BasConst_General.hpp>
00021 #include <rmol/bom/Utilities.hpp>
00022 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00023 >
00024 namespace RMOL {
00025 // //////////////////////////////////////
00026 void Utilities::
00027 computeDistributionParameters (const
stdair::UncDemVector_T& iVector,
stdair::MeanValue_T& ioMean,
stdair::StdDevValue_T& ioStdDev) {
00028
00029     ioMean = 0.0; ioStdDev = 0.0;
00030     const stdair::NbOfSamples_T lNbOfSamples = iVector.size();
00031     assert (lNbOfSamples > 1);
00032
00033     // Compute the mean
00034     for (stdair::UncDemVector_T::const_iterator itSample = iVector.begin();
00035          itSample != iVector.end(); ++itSample) {
00036         //STDAIR_LOG_NOTIFICATION (*itSample);
00037         ioMean += *itSample;
00038     }
00039     ioMean /= lNbOfSamples;
00040
00041     // Compute the standard deviation
00042     for (stdair::UncDemVector_T::const_iterator itSample = iVector.begin();
00043          itSample != iVector.end(); ++itSample) {
00044         const stdair::MeanValue_T lSample = *itSample;
00045         ioStdDev += ((lSample - ioMean) * (lSample - ioMean));
00046     }
```

```

00047     }
00048     ioStdDev /= (lNbOfSamples - 1);
00049     ioStdDev = std::sqrt (ioStdDev);
00050
00051     // Sanity check
00052     if (ioStdDev == 0) {
00053         ioStdDev = 0.1;
00054     }
00055 }
00056
00057 // //////////////////////////////////////
00058 stdair::DCPList_T Utilities::
00059 buildRemainingDCPList (const stdair::DTD_T& iDTD) {
00060     stdair::DCPList_T oDCPList;
00061
00062     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00063     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00064     while (itDCP != lWholeDCPList.end()) {
00065         const stdair::DCP_T& lDCP = *itDCP;
00066         if (iDTD >= lDCP) {
00067             break;
00068         }
00069         ++itDCP;
00070     }
00071     assert (itDCP != lWholeDCPList.end());
00072
00073     oDCPList.push_back (iDTD);
00074     ++itDCP;
00075     for (; itDCP != lWholeDCPList.end(); ++itDCP) {
00076         oDCPList.push_back (*itDCP);
00077     }
00078
00079     return oDCPList;
00080 }
00081
00082 // //////////////////////////////////////
00083 stdair::DCPList_T Utilities::
00084 buildPastDCPList (const stdair::DTD_T& iDTD) {
00085     stdair::DCPList_T oDCPList;
00086
00087     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00088     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00089     while (itDCP != lWholeDCPList.end()) {
00090         const stdair::DCP_T& lDCP = *itDCP;
00091         if (iDTD <= lDCP) {
00092             oDCPList.push_back (lDCP);
00093             ++itDCP;
00094         } else {
00095             break;
00096         }
00097     }
00098
00099     return oDCPList;
00100 }
00101
00102 // //////////////////////////////////////
00103 stdair::NbOfSegments_T Utilities::
00104 getNbOfDepartedSimilarSegments (const
stdair::SegmentCabin& iSegmentCabin,
00105                                 const stdair::Date_T& iEventDate) {
00106     stdair::DTD_T lDTD = 0;
00107     // Retrieve the guillotine block.
00108     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00109         iSegmentCabin.getSegmentSnapshotTable();
00110     return SegmentSnapshotTableHelper::
00111         getNbOfSegmentAlreadyPassedThisDTD
00112         (lSegmentSnapshotTable, lDTD, iEventDate);
00113 }
00114
00115 // //////////////////////////////////////
00116 stdair::BookingClassSellUpCurveMap_T Utilities::
00117 computeSellUpFactorCurves (const
stdair::FRAT5Curve_T& iFRAT5Curve,
00118                             const stdair::BookingClassList_T& iBCList) {
00119     stdair::BookingClassSellUpCurveMap_T oBCSellUpFactorMap;
00120
00121     // Initialise a sell-up factor curve of 1.0 values
00122     stdair::SellUpCurve_T lBasedSellUpCurve;
00123     for (stdair::FRAT5Curve_T::const_iterator itFRAT5 = iFRAT5Curve.begin();
00124          itFRAT5 != iFRAT5Curve.end(); ++itFRAT5) {
00125         const stdair::DTD_T& lDTD = itFRAT5->first;
00126         lBasedSellUpCurve.insert(stdair::SellUpCurve_T::value_type(lDTD, 1.0));
00127     }
00128
00129     // Retrieve the classes from low to high and compute the distributions of
00130     // product-oriented and price-oriented demand.
00131     // Retrieve the lowest class.

```

```

00131     stdair::BookingClassList_T::const_reverse_iterator itCurrentClass =
00132         iBCList.rbegin();
00133     assert (itCurrentClass != iBCList.rend());
00134
00135     // If there is only one class in the cabin, all the sell-up factors
00136     // will be 1.
00137     stdair::BookingClass* lLowestBC_ptr = *itCurrentClass;
00138     assert (lLowestBC_ptr != NULL);
00139     const stdair::Yield_T& lLowestYield = lLowestBC_ptr->getYield();
00140     bool insert = oBCSellUpFactorMap.
00141         insert (stdair::BookingClassSellUpCurveMap_T::
00142             value_type(lLowestBC_ptr, lBasedSellUpCurve)).second;
00143     assert (insert == true);
00144     ++itCurrentClass;
00145
00146     // Compute the demand for higher class using the formula
00147     // Pro_sell_up_from_Q_to_F = e ^ ((y_F/y_Q - 1) * ln (0.5) / (FRAT5 - 1))
00148     for (; itCurrentClass != iBCList.rend(); ++itCurrentClass) {
00149         stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00150         assert (lCurrentBC_ptr != NULL);
00151         const stdair::Yield_T& lCurrentYield = lCurrentBC_ptr->getYield();
00152
00153         // Compute the sell-up factor curve for the current class.
00154         stdair::SellUpCurve_T lCurrentSellUpCurve;
00155         for (stdair::FRAT5Curve_T::const_iterator itFRAT5 = iFRAT5Curve.begin();
00156             itFRAT5 != iFRAT5Curve.end(); ++itFRAT5) {
00157             const stdair::DTD_T& lDTD = itFRAT5->first;
00158             const stdair::FRAT5_T& lFRAT5 = itFRAT5->second;
00159             const double lSellUpCoef = log(0.5)/(lFRAT5-1);
00160             const stdair::SellUpProbability_T lSellUpFactor =
00161                 exp ((lCurrentYield/lLowestYield - 1.0) * lSellUpCoef);
00162             const bool isInsertionSuccessful =
00163                 lCurrentSellUpCurve.insert (stdair::SellUpCurve_T::value_type(lDTD,
00164 lSellUpFactor)).second;
00165             assert (isInsertionSuccessful == true);
00166         }
00167         const bool isInsertionSuccessful = oBCSellUpFactorMap.
00168             insert (stdair::BookingClassSellUpCurveMap_T::
00169                 value_type(lCurrentBC_ptr, lCurrentSellUpCurve)).second;
00170         assert (isInsertionSuccessful == true);
00171     }
00172     return oBCSellUpFactorMap;
00173 }
00174
00175 // //////////////////////////////////////
00176 stdair::BookingClassDispatchingCurveMap_T Utilities::
00177 computeDispatchingFactorCurves (const
00178     stdair::FRAT5Curve_T& iFRAT5Curve,
00179     const stdair::BookingClassList_T& iBCList) {
00180     stdair::BookingClassDispatchingCurveMap_T oBCDispatchingFactorMap;
00181
00182     // Initialise a sell-up factor curve of 1.0 values
00183     stdair::DispatchingCurve_T lBasedDispatchingCurve;
00184     for (stdair::FRAT5Curve_T::const_iterator itFRAT5 = iFRAT5Curve.begin();
00185         itFRAT5 != iFRAT5Curve.end(); ++itFRAT5) {
00186         const stdair::DTD_T& lDTD = itFRAT5->first;
00187         lBasedDispatchingCurve.insert (stdair::DispatchingCurve_T::value_type(lDTD
00188 , 1.0));
00189     }
00190
00191     // Retrieve the classes from low to high and compute the distributions of
00192     // product-oriented and price-oriented demand.
00193     // Retrieve the lowest class.
00194     stdair::BookingClassList_T::const_reverse_iterator itCurrentClass =
00195         iBCList.rbegin();
00196     assert (itCurrentClass != iBCList.rend());
00197     stdair::BookingClassList_T::const_reverse_iterator itNextClass =
00198         itCurrentClass; ++itNextClass;
00199
00200     // If there is only one class in the cabin, all the sell-up factors
00201     // will be 1.
00202     stdair::BookingClass* lLowestBC_ptr = *itCurrentClass;
00203     assert (lLowestBC_ptr != NULL);
00204     const stdair::Yield_T& lLowestYield = lLowestBC_ptr->getYield();
00205     if (itNextClass == iBCList.rend()) {
00206         bool insert = oBCDispatchingFactorMap.
00207             insert (stdair::BookingClassDispatchingCurveMap_T::
00208                 value_type(lLowestBC_ptr, lBasedDispatchingCurve)).second;
00209         assert (insert == true);
00210     } else {
00211         // Compute the demand for higher class using the formula
00212         // Pro_sell_up_from_Q_to_F = e ^ ((y_F/y_Q - 1) * ln (0.5) / (FRAT5 - 1))
00213         for (; itNextClass != iBCList.rend(); ++itCurrentClass, ++itNextClass) {
00214             stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00215             stdair::BookingClass* lNextBC_ptr = *itNextClass;
00216             assert (lNextBC_ptr != NULL);

```



```

00215         const stdair::Yield_T& lNextYield = lNextBC_ptr->getYield();
00216
00217         // Compute the sell-up factor curve for the current class.
00218         stdair::DispatchingCurve_T lCurrentDispatchingCurve;
00219         for (stdair::FRAT5Curve_T::const_iterator itFRAT5 = iFRAT5Curve.begin();
00220
00221             itFRAT5 != iFRAT5Curve.end(); ++itFRAT5) {
00222             const stdair::DTD_T& lDTD = itFRAT5->first;
00223             const stdair::FRAT5_T& lFRAT5 = itFRAT5->second;
00224             const double lDispatchingCoef = log(0.5)/(lFRAT5-1);
00225             double lDispatchingFactor =
00226                 exp ((lNextYield/lLowestYield - 1.0) * lDispatchingCoef);
00227             stdair::DispatchingCurve_T::iterator itBasedDispatching =
00228                 lBasedDispatchingCurve.find (lDTD);
00229             assert (itBasedDispatching != lBasedDispatchingCurve.end());
00230             double& lBasedFactor = itBasedDispatching->second;
00231             bool insert = lCurrentDispatchingCurve.insert (
00232                 stdair::DispatchingCurve_T::value_type(lDTD, lBasedFactor - lDispatchingFactor)).second;
00233             assert (insert == true);
00234             lBasedFactor = lDispatchingFactor;
00235         }
00236         bool insert = oBCDispatchingFactorMap.
00237             insert (stdair::BookingClassDispatchingCurveMap_T::
00238                 value_type(lCurrentBC_ptr, lCurrentDispatchingCurve)).second;
00239         assert (insert == true);
00240     }
00241
00242     // Compute the sell-up factor curve for the highest class (which is the
00243     // "current class")
00244     stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00245     bool insert = oBCDispatchingFactorMap.
00246         insert (stdair::BookingClassDispatchingCurveMap_T::
00247             value_type(lCurrentBC_ptr, lBasedDispatchingCurve)).second;
00248     assert (insert == true);
00249 }
00250
00251 // //////////////////////////////////////
00252 void Utilities::dispatchDemandForecast
00253 (const stdair::BookingClassDispatchingCurveMap_T& iBCDispatchingCurveMap,
00254  const stdair::MeanValue_T& iMean,
00255  const stdair::StdDevValue_T& iStdDev,
00256  const stdair::DTD_T& iCurrentDCP) {
00257     for (stdair::BookingClassDispatchingCurveMap_T::const_iterator itBCDC =
00258         iBCDispatchingCurveMap.begin();
00259         itBCDC != iBCDispatchingCurveMap.end(); ++itBCDC) {
00260         stdair::BookingClass* lBC_ptr = itBCDC->first;
00261         assert (lBC_ptr != NULL);
00262         const stdair::DispatchingCurve_T& lDispatchingCurve = itBCDC->second;
00263         stdair::DispatchingCurve_T::const_iterator itDispatchingFactor =
00264             lDispatchingCurve.find (iCurrentDCP);
00265         assert (itDispatchingFactor != lDispatchingCurve.end());
00266         const double& lDF = itDispatchingFactor->second;
00267
00268         const stdair::MeanValue_T& lCurrentMean = lBC_ptr->getPriceDemMean();
00269         const stdair::StdDevValue_T& lCurrentStdDev = lBC_ptr->getPriceDemStdDev(
00270     );
00271
00272         const stdair::MeanValue_T lAdditionalMean = iMean * lDF;
00273         const stdair::StdDevValue_T lAdditionalStdDev = iStdDev * std::sqrt (lDF)
00274     );
00275
00276         const stdair::MeanValue_T lNewMean = lCurrentMean + lAdditionalMean;
00277         const stdair::StdDevValue_T lNewStdDev =
00278             std::sqrt (lCurrentStdDev * lCurrentStdDev
00279                 + lAdditionalStdDev * lAdditionalStdDev);
00280
00281         lBC_ptr->setPriceDemMean (lNewMean);
00282         lBC_ptr->setPriceDemStdDev (lNewStdDev);
00283     }
00284 }
00285
00286 // //////////////////////////////////////
00287 void Utilities::dispatchDemandForecastForFA
00288 (const stdair::BookingClassSellUpCurveMap_T& iBCSellUpCurveMap,
00289  const stdair::MeanValue_T& iMean,
00290  const stdair::StdDevValue_T& iStdDev,
00291  const stdair::DTD_T& iCurrentDCP) {
00292     for (stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSU =
00293         iBCSellUpCurveMap.begin();
00294         itBCSU != iBCSellUpCurveMap.end(); ++itBCSU) {
00295         stdair::BookingClass* lBC_ptr = itBCSU->first;
00296         assert (lBC_ptr != NULL);
00297         const stdair::SellUpCurve_T& lSellUpCurve = itBCSU->second;
00298         stdair::SellUpCurve_T::const_iterator itSellUpFactor =
00299             lSellUpCurve.find (iCurrentDCP);

```

```

00298     assert (itSellUpFactor != lSellUpCurve.end());
00299     const stdair::SellUpProbability_T& lSU = itSellUpFactor->second;
00300
00301     const stdair::MeanValue_T& lCurrentMean = lBC_ptr->getCumuPriceDemMean();
00302     const stdair::StdDevValue_T& lCurrentStdDev =
00303         lBC_ptr->getCumuPriceDemStdDev();
00304
00305     const stdair::MeanValue_T lAdditionalMean = iMean * lSU;
00306     const stdair::StdDevValue_T lAdditionalStdDev = iStdDev * std::sqrt (lSU)
;
00307
00308     const stdair::MeanValue_T lNewMean = lCurrentMean + lAdditionalMean;
00309     const stdair::StdDevValue_T lNewStdDev =
00310         std::sqrt (lCurrentStdDev * lCurrentStdDev
00311             + lAdditionalStdDev * lAdditionalStdDev);
00312
00313     lBC_ptr->setCumuPriceDemMean (lNewMean);
00314     lBC_ptr->setCumuPriceDemStdDev (lNewStdDev);
00315 }
00316 }
00317 }

```

26.69 rmol/bom/Utilities.hpp File Reference

```

#include <stdair/stdair_inventory_types.hpp>
#include <stdair/bom/FareFamilyTypes.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::Utilities](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.70 Utilities.hpp

```

00001 #ifndef __RMOL_BOM_UTILITIES_HPP
00002 #define __RMOL_BOM_UTILITIES_HPP
00003 // //////////////////////////////////////
00004 // Import section
00005 // //////////////////////////////////////
00006 // StdAir
00007 #include <stdair/stdair_inventory_types.hpp>
00008 #include <stdair/bom/FareFamilyTypes.hpp>
00009 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations
00013 namespace stdair {
00014     class SegmentCabin;
00015 }
00016
00017 namespace RMOL {
00018
00020     class Utilities {
00021     public:
00023         static void computeDistributionParameters (
00024             const stdair::UncDemVector_T&,
00025             stdair::MeanValue_T&,
00026             stdair::StdDevValue_T&);
00030         static stdair::DCPList_T buildRemainingDCPList (const
00031             stdair::DTD_T&);
00035         static stdair::DCPList_T buildPastDCPList (const
00036             stdair::DTD_T&);
00040         static stdair::NbOfSegments_T
00041             getNbOfDepartedSimilarSegments (const

```

```

stdair::SegmentCabin&,
00042                                     const stdair::Date_T&);
00043
00047     static stdair::BookingClassSellUpCurveMap_T
00048     computeSellUpFactorCurves (const
stdair::FRAT5Curve_T&,
00049                                     const stdair::BookingClassList_T&);
00050
00054     static stdair::BookingClassDispatchingCurveMap_T
00055     computeDispatchingFactorCurves (const
stdair::FRAT5Curve_T&,
00056                                     const stdair::BookingClassList_T&);
00057
00061     static void
00062     dispatchDemandForecast (const
stdair::BookingClassDispatchingCurveMap_T&,
00063                                     const stdair::MeanValue_T&,
00064                                     const stdair::StdDevValue_T&,
00065                                     const stdair::DTD_T&);
00066
00070     static void
00071     dispatchDemandForecastForFA (const
stdair::BookingClassSellUpCurveMap_T&,
00072                                     const stdair::MeanValue_T&,
00073                                     const stdair::StdDevValue_T&,
00074                                     const stdair::DTD_T&);
00075 };
00076
00077 }
00078
00079 #endif // __RMOL_BOM_UTILITIES_HPP

```

26.71 rmol/command/BasedForecasting.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/basic/RandomGeneration.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/command/BasedForecasting.hpp>
#include <rmol/command/Detruncator.hpp>

```

Namespaces

- namespace [RMOL](#)

26.72 BasedForecasting.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>

```

```

00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/basic/RandomGeneration.hpp>
00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/LegDate.hpp>
00014 #include <stdair/bom/SegmentDate.hpp>
00015 #include <stdair/bom/LegCabin.hpp>
00016 #include <stdair/bom/SegmentCabin.hpp>
00017 #include <stdair/bom/SegmentSnapshotTable.hpp>
00018 #include <stdair/bom/BookingClass.hpp>
00019 #include <stdair/service/Logger.hpp>
00020 // RMOL
00021 #include <rmol/bom/Utilities.hpp>
00022 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00023 #include <rmol/bom/HistoricalBookingHolder.hpp>
00024 #include <rmol/bom/HistoricalBooking.hpp>
00025 #include <rmol/command/BasedForecasting.hpp>
00026 #include <rmol/command/Detruncator.hpp>
00027
00028 namespace RMOL {
00029 // //////////////////////////////////////
00030 bool BasedForecasting::
00031 forecast (stdair::SegmentCabin& ioSegmentCabin,
00032          const stdair::Date_T& iCurrentDate,
00033          const stdair::DTD_T& iCurrentDTD,
00034          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00035          const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00036
00037     // Retrieve the snapshot table.
00038     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00039         ioSegmentCabin.getSegmentSnapshotTable();
00040
00041     // Retrieve the booking class list.
00042     const stdair::BookingClassList_T& lBCList =
00043         stdair::BomManager::getList<stdair::BookingClass>(ioSegmentCabin);
00044
00045     // Browse all remaining DCP's and do unconstraining and forecasting for
00046     // all demand.
00047     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00048     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00049     stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00050     for (; itNextDCP != lWholeDCPList.end(); ++itDCP, ++itNextDCP) {
00051         const stdair::DCP_T& lCurrentDCP = *itDCP;
00052         const stdair::DCP_T& lNextDCP = *itNextDCP;
00053
00054         // The end of the interval is after the current DTD.
00055         if (lNextDCP < iCurrentDTD) {
00056             // Get the number of similar segments which has already passed the
00057             // (lNextDCP+1)
00058             const stdair::NbOfSegments_T& lNbOfUsableSegments =
00059                 SegmentSnapshotTableHelper::
00060                     getNbOfSegmentAlreadyPassedThisDTD
00061                     (lSegmentSnapshotTable,
00062                      lNextDCP+1,
00063                      iCurrentDate);
00064             stdair::NbOfSegments_T lSegmentBegin = 0;
00065             const stdair::NbOfSegments_T lSegmentEnd = lNbOfUsableSegments-1;
00066             if (iNbOfDepartedSegments > 52) {
00067                 lSegmentBegin = iNbOfDepartedSegments - 52;
00068             }
00069
00070             // Browse the list of booking classes and forecast the product-oriented
00071             // demand for each class.
00072             for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00073                  itBC != lBCList.end(); ++itBC) {
00074                 stdair::BookingClass* lBC_ptr = *itBC;
00075                 assert (lBC_ptr != NULL);
00076
00077                 // Retrieve the historical product-oriented bookings for the
00078                 // given class.
00079                 HistoricalBookingHolder lHBHolder;
00080                 prepareHistoricalBooking (ioSegmentCabin, *
00081                 lBC_ptr,
00082                 lSegmentSnapshotTable,
00083                 lHBHolder,
00084                 lCurrentDCP, lNextDCP,
00085                 lSegmentBegin, lSegmentEnd);
00086
00087                 // Unconstrain the historical bookings.
00088                 Detruncator::unconstrain (lHBHolder,
00089                 iUnconstrainingMethod);
00090
00091                 // Retrieve the historical unconstrained demand and perform the

```

```

00089         // forecasting.
00090         stdair::UncDemVector_T lUncDemVector;
00091         const short lNbOfHistoricalFlights = lHBHolder.getNbOffFlights
    );
00092         for (short i = 0; i < lNbOfHistoricalFlights; ++i) {
00093             const stdair::NbOfBookings_T& lUncDemand =
00094                 lHBHolder.getUnconstrainedDemand (i);
00095             lUncDemVector.push_back (lUncDemand);
00096         }
00097         stdair::MeanValue_T lMean = 0.0;
00098         stdair::StdDevValue_T lStdDev = 0.0;
00099         Utilities::computeDistributionParameters
    (lUncDemVector,
00100                                     lMean, lStdDev);
00101
00102         // Add the demand forecast to the booking class.
00103         const stdair::MeanValue_T& lCurrentMean = lBC_ptr->getProductDemMean(
    );
00104         const stdair::StdDevValue_T& lCurrentStdDev =
00105             lBC_ptr->getProductDemStdDev();
00106
00107         const stdair::MeanValue_T lNewMean = lCurrentMean + lMean;
00108         const stdair::StdDevValue_T lNewStdDev =
00109             std::sqrt (lCurrentStdDev * lCurrentStdDev + lStdDev * lStdDev);
00110
00111         lBC_ptr->setProductDemMean (lNewMean);
00112         lBC_ptr->setProductDemStdDev (lNewStdDev);
00113     }
00114 }
00115 }
00116 return true;
00117 }
00118
00119 // //////////////////////////////////////
00120 void BasedForecasting::prepareHistoricalBooking
00121 (const stdair::SegmentCabin& iSegmentCabin,
00122  const stdair::BookingClass& iBookingClass,
00123  const stdair::SegmentSnapshotTable& iSegmentSnapshotTable,
00124  HistoricalBookingHolder& ioHBHolder,
00125  const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00126  const stdair::NbOfSegments_T& iSegmentBegin,
00127  const stdair::NbOfSegments_T& iSegmentEnd) {
00128
00129     // Retrieve the booking class index within the snapshot table
00130     const stdair::ClassIndex_T& lClassIdx =
00131         iSegmentSnapshotTable.getClassIndex (iBookingClass.describeKey());
00132
00133     // Retrieve the gross daily booking and availability snapshots.
00134     const stdair::ConstSegmentCabinDTDRangeSnapshotView_T lPriceBookingView =
00135         iSegmentSnapshotTable.
00136         getConstSegmentCabinDTDRangePriceOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00137     const stdair::ConstSegmentCabinDTDRangeSnapshotView_T lProductBookingView =
00138         iSegmentSnapshotTable.
00139         getConstSegmentCabinDTDRangeProductOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00140     const stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00141         iSegmentSnapshotTable.
00142         getConstSegmentCabinDTDRangeAvailabilitySnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00143
00144     // Browse the list of segments and build the historical booking holder.
00145     const stdair::ClassIndexMap_T& lVTIdxMap =
00146         iSegmentSnapshotTable.getClassIndexMap();
00147     const stdair::NbOfClasses_T lNbOfClasses = lVTIdxMap.size();
00148
00149     for (short i = 0; i <= iSegmentEnd-iSegmentBegin; ++i) {
00150         stdair::Flag_T lCensorshipFlag = false;
00151         const short lNbOfDTDs = iDCPEnd - iDCPBegin + 1;
00152         const stdair::UnsignedIndex_T lIdx = i*lNbOfClasses + lClassIdx;
00153
00154         // Parse the DTDs during the period and compute the censorship flag
00155         for (short j = 0; j < lNbOfDTDs; ++j) {
00156             // Check if the data has been censored during this day.
00157             // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfClasses: " << lNbOfClasses
00158             // << ", ClassIdx: " << iClassIdx << ", j: " << j);
00159             if (lAvlView[lIdx][j] < 1.0) {
00160                 lCensorshipFlag = true;
00161                 break;
00162             }
00163         }
00164
00165         // Retrieve the historical bookings
00166         stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00167         for (short j = 0; j < lNbOfDTDs; ++j) {
00168             lNbOfHistoricalBkgs +=
00169                 lPriceBookingView[lIdx][j] + lProductBookingView[lIdx][j];
00170         }
00171         HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs,
00172         lCensorshipFlag);

```

```

00169         ioHBHolder.addHistoricalBooking (lHistoricalBkg);
00170     }
00171 }
00172
00173 }
```

26.73 rmol/command/BasedForecasting.hpp File Reference

```

#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::BasedForecasting](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.74 BasedForecasting.hpp

```

00001 #ifndef __RMOL_COMMAND_BASEDFORECASTING_HPP
00002 #define __RMOL_COMMAND_BASEDFORECASTING_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_inventory_types.hpp>
00009 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations
00013 namespace stdair {
00014     class SegmentCabin;
00015     class BookingClass;
00016     class SegmentSnapshotTable;
00017 }
00018
00019 namespace RMOL {
00021     class BasedForecasting {
00022     public:
00034         static bool forecast (stdair::SegmentCabin&, const stdair::Date_T&,
00035                             const stdair::DTD_T&,
00036                             const stdair::UnconstrainingMethod&,
00037                             const stdair::NbOfSegments_T&);
00038
00047         static void prepareHistoricalBooking
00048             (const stdair::SegmentCabin&, const stdair::BookingClass&,
00049             const stdair::SegmentSnapshotTable&, HistoricalBookingHolder
00050             &,
00051             const stdair::DCP_T&, const stdair::DCP_T&,
00052             const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&);
00053     };
00054 #endif // __RMOL_COMMAND_BASEDFORECASTING_HPP
```

26.75 rmol/command/DemandInputPreparation.cpp File Reference

```

#include <cassert>
```

```

#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/command/DemandInputPreparation.hpp>

```

Namespaces

- namespace [RMOL](#)

26.76 DemandInputPreparation.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/SegmentCabin.hpp>
00013 #include <stdair/bom/BookingClass.hpp>
00014 #include <stdair/service/Logger.hpp>
00015 // RMOL
00016 #include <rmol/bom/Utilities.hpp>
00017 #include <rmol/command/DemandInputPreparation.hpp>
00018 >
00019 namespace RMOL {
00020
00021 // //////////////////////////////////////
00022 bool DemandInputPreparation::
00023 prepareDemandInput (const stdair::SegmentCabin&
iSegmentCabin) {
00024     bool isSucceeded = true;
00025
00026     // Browse the list of booking classes and sum the price-oriented
00027     // demand forecast and the product-oriented demand forecast.
00028     const stdair::BookingClassList_T& lBCList =
00029         stdair::BomManager::getList<stdair::BookingClass> (iSegmentCabin);
00030     for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00031          itBC != lBCList.end(); ++itBC) {
00032         stdair::BookingClass* lBC_ptr = *itBC;
00033         assert (lBC_ptr != NULL);
00034
00035         const stdair::MeanValue_T& lPriceDemMean = lBC_ptr->getPriceDemMean();
00036         const stdair::StdDevValue_T& lPriceStdDev = lBC_ptr->getPriceDemStdDev();
00037         const stdair::MeanValue_T& lProductDemMean = lBC_ptr->getProductDemMean();
00038
00039         const stdair::StdDevValue_T& lProductStdDev =
00040             lBC_ptr->getProductDemStdDev();
00041         const stdair::MeanValue_T lNewMeanValue = lPriceDemMean + lProductDemMean;
00042
00043         const stdair::StdDevValue_T lNewStdDev =
00044             std::sqrt (lPriceStdDev*lPriceStdDev + lProductStdDev*lProductStdDev);
00045         lBC_ptr->setMean (lNewMeanValue);
00046         lBC_ptr->setStdDev (lNewStdDev);
00047     }
00048     return isSucceeded;
00049 }
00050 }
00051
00052 }

```

26.77 rmol/command/DemandInputPreparation.hpp File Reference

```
#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::DemandInputPreparation](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.78 DemandInputPreparation.hpp

```
00001 #ifndef __RMOL_COMMAND_DEMANDINPUTPREPARATION_HPP
00002 #define __RMOL_COMMAND_DEMANDINPUTPREPARATION_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00021     class DemandInputPreparation {
00022     public:
00026         static bool prepareDemandInput (const
stdair::SegmentCabin&);
00027     };
00028 }
00029 #endif // __RMOL_COMMAND_DEMANDINPUTPREPARATION_HPP
```

26.79 rmol/command/Detruncator.cpp File Reference

```
#include <cassert>
#include <stdair/basic/UnconstrainingMethod.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/EMDetruncator.hpp>
#include <rmol/command/Detruncator.hpp>
```

Namespaces

- namespace [RMOL](#)

26.80 Detruncator.cpp

```
00001 // //////////////////////////////////////
00002 // Import section
```



```

00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 // StdAir
00007 #include <stdair/basic/UnconstrainingMethod.hpp>
00008 #include <stdair/service/Logger.hpp>
00009 // RMOL
00010 #include <rmol/bom/HistoricalBookingHolder.hpp>
00011 #include <rmol/bom/EMDetruncator.hpp>
00012 #include <rmol/command/Detruncator.hpp>
00013
00014 namespace RMOL {
00015     // //////////////////////////////////////
00016     void Detruncator::
00017     unconstrain (HistoricalBookingHolder&
00018     ioHBHolder,
00019                 const stdair::UnconstrainingMethod& iMethod) {
00020         const stdair::UnconstrainingMethod::EN_UnconstrainingMethod&
00021         lUnconstrainingMethod =
00022             iMethod.getMethod();
00023         switch (lUnconstrainingMethod) {
00024             case stdair::UnconstrainingMethod::EM: {
00025                 EMDetruncator::unconstrain (ioHBHolder);
00026                 break;
00027             }
00028             default: {
00029                 assert (false);
00030                 break;
00031             }
00032         }
00033     }

```

26.81 rmol/command/Detruncator.hpp File Reference

```

#include <stdair/stdair_inventory_types.hpp>
#include <stdair/basic/UnconstrainingMethod.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::Detruncator](#)

Namespaces

- namespace [RMOL](#)

26.82 Detruncator.hpp

```

00001 #ifndef __RMOL_COMMAND_DETRUNCATOR_HPP
00002 #define __RMOL_COMMAND_DETRUNCATOR_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_inventory_types.hpp>
00009 #include <stdair/basic/UnconstrainingMethod.hpp>
00010 // RMOL
00011 #include <rmol/RMOL_Types.hpp>
00012
00013 namespace RMOL {
00014     // Forward declarations.
00015     struct HistoricalBookingHolder;
00016
00017     class Detruncator {
00018     public:
00019         static void unconstrain (HistoricalBookingHolder
00020                                 &,

```

```

00026             const stdair::UnconstrainingMethod&);
00027
00028     };
00029 }
00030 #endif // __RMOL_COMMAND_DETRUNCATOR_HPP
00031
00032

```

26.83 rmol/command/FareAdjustment.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/command/FareAdjustment.hpp>

```

Namespaces

- namespace [RMOL](#)

26.84 FareAdjustment.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/SegmentCabin.hpp>
00013 #include <stdair/bom/BookingClass.hpp>
00014 #include <stdair/service/Logger.hpp>
00015 // RMOL
00016 #include <rmol/bom/Utilities.hpp>
00017 #include <rmol/command/FareAdjustment.hpp>
00018
00019 namespace RMOL {
00020
00021 // //////////////////////////////////////
00022 bool FareAdjustment::
00023 adjustYield (const stdair::SegmentCabin& iSegmentCabin) {
00024     return false;
00025 }
00026
00027 }

```

26.85 rmol/command/FareAdjustment.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::FareAdjustment](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.86 FareAdjustment.hpp

```

00001 #ifndef __RMOL_COMMAND_FAREADJUSTMENT_HPP
00002 #define __RMOL_COMMAND_FAREADJUSTMENT_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00021     class FareAdjustment {
00022     public:
00026         static bool adjustYield (const stdair::SegmentCabin&);
00027     };
00028 }
00029 #endif // __RMOL_COMMAND_FAREADJUSTMENT_HPP

```

26.87 rmol/command/Forecaster.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/command/BasedForecasting.hpp>
#include <rmol/command/Forecaster.hpp>
#include <rmol/command/QForecasting.hpp>
#include <rmol/command/HybridForecasting.hpp>
#include <rmol/command/OldQFF.hpp>
#include <rmol/command/NewQFF.hpp>

```

Namespaces

- namespace [RMOL](#)

26.88 Forecaster.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/FlightDate.hpp>
00013 #include <stdair/bom/SegmentDate.hpp>
00014 #include <stdair/bom/SegmentCabin.hpp>
00015 #include <stdair/bom/SegmentSnapshotTable.hpp>
00016 #include <stdair/bom/FareFamily.hpp>
00017 #include <stdair/bom/BookingClass.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/bom/Utilities.hpp>
00021 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00022 >
00023 #include <rmol/bom/HistoricalBookingHolder.hpp>
00024 >
00025 #include <rmol/bom/HistoricalBooking.hpp>
00026 #include <rmol/command/BasedForecasting.hpp>
00027 #include <rmol/command/Forecaster.hpp>
00028 #include <rmol/command/QForecasting.hpp>
00029 #include <rmol/command/HybridForecasting.hpp>
00030 #include <rmol/command/OldQFF.hpp>
00031 #include <rmol/command/NewQFF.hpp>
00032
00033 namespace RMOL {
00034
00035 // //////////////////////////////////////
00036 bool Forecaster::
00037 forecast (stdair::FlightDate& ioFlightDate,
00038          const stdair::DateTime_T& iEventTime,
00039          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00040          const stdair::ForecastingMethod& iForecastingMethod) {
00041     // Build the offset dates.
00042     const stdair::Date_T& lEventDate = iEventTime.date();
00043
00044     //
00045     bool isSucceeded = true;
00046     const stdair::SegmentDateList_T& lSDList =
00047         stdair::BomManager::getList<stdair::SegmentDate> (ioFlightDate);
00048     for (stdair::SegmentDateList_T::const_iterator itSD = lSDList.begin();
00049          itSD != lSDList.end(); ++itSD) {
00050         stdair::SegmentDate* lSD_ptr = *itSD;
00051         assert (lSD_ptr != NULL);
00052
00053         // TODO: Take into account the case where the segment departure date
00054         // is not the same as the flight departure date.
00055         // const stdair::Date_T& lBoardingDate = lSD_ptr->getBoardingDate();
00056         // const stdair::DateOffset_T lSegmentDateOffset =
00057         //     lBoardingDate - lEventDate;
00058         // const stdair::DTD_T lSegmentDTD = lSegmentDateOffset.days();
00059
00060         //
00061         const stdair::SegmentCabinList_T& lSCList =
00062             stdair::BomManager::getList<stdair::SegmentCabin> (*lSD_ptr);
00063         for (stdair::SegmentCabinList_T::const_iterator itSC = lSCList.begin();
00064              itSC != lSCList.end(); ++itSC) {
00065             stdair::SegmentCabin* lSC_ptr = *itSC;
00066             assert (lSC_ptr != NULL);
00067
00068             //
00069             // STDAIR_LOG_NOTIFICATION (ioFlightDate.getDepartureDate()
00070             //                             << " " << lSegmentDTD);
00071             bool isForecasted = forecast (*lSC_ptr, lEventDate,
00072                                         iUnconstrainingMethod,
00073                                         iForecastingMethod);
00074             if (isForecasted == false) {
00075                 isSucceeded = false;
00076             }
00077         }
00078     }
00079 }

```

```

00076     }
00077
00078     return isSucceeded;
00079 }
00080
00081 // //////////////////////////////////////
00082 bool Forecaster::
00083 forecast (stdair::SegmentCabin& ioSegmentCabin,
00084          const stdair::Date_T& iEventDate,
00085          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00086          const stdair::ForecastingMethod& iForecastingMethod) {
00087     // Retrieve the number of departed similar segments.
00088     stdair::NbOfSegments_T lNbOfDepartedSegments =
00089         Utilities::getNbOfDepartedSimilarSegments
00090         (ioSegmentCabin, iEventDate);
00091
00092     // DEBUG
00093     // STDAIR_LOG_DEBUG ("Nb of similar departed segments: "
00094     //                   << lNbOfDepartedSegments);
00095
00096     // If the number of departed segments are less than two, there
00097     // will be no forecast, and thus no optimisation.
00098     if (lNbOfDepartedSegments < 2) {
00099         return false;
00100     } else {
00101         setDemandForecastsToZero (ioSegmentCabin);
00102         const stdair::SegmentDate& lSegmentDate =
00103             stdair::BomManager::getParent<stdair::SegmentDate> (ioSegmentCabin);
00104         const stdair::Date_T& lBoardingDate = lSegmentDate.getBoardingDate();
00105         const stdair::DateOffset_T lDateOffset = lBoardingDate - iEventDate;
00106         const stdair::DTD_T& lDaysBeforeDeparture = lDateOffset.days();
00107
00108         // If the forecasting method is QFF (old or new), but there are
00109         // not more than two fare families in the cabin, hybrid
00110         // forecasting will be used.
00111         const stdair::ForecastingMethod::EN_ForecastingMethod lForecastingMethod
00112             =
00113             iForecastingMethod.getMethod();
00114         switch (lForecastingMethod) {
00115             case stdair::ForecastingMethod::Q_FORECASTING: {
00116                 return QForecasting::forecast (ioSegmentCabin,
00117                     iEventDate,
00118                     lDaysBeforeDeparture,
00119                     iUnconstrainingMethod,
00120                     lNbOfDepartedSegments);
00121             }
00122             case stdair::ForecastingMethod::HYBRID_FORECASTING: {
00123                 return HybridForecasting::forecast (
00124                     ioSegmentCabin, iEventDate,
00125                     lDaysBeforeDeparture,
00126                     iUnconstrainingMethod,
00127                     lNbOfDepartedSegments);
00128             }
00129             case stdair::ForecastingMethod::NEW_QFF: {
00130                 if (ioSegmentCabin.getFareFamilyStatus() == false) {
00131                     return HybridForecasting::forecast (
00132                         ioSegmentCabin, iEventDate,
00133                         lDaysBeforeDeparture,
00134                         iUnconstrainingMethod,
00135                         lNbOfDepartedSegments);
00136                 } else {
00137                     return NewQFF::forecast (ioSegmentCabin, iEventDate,
00138                         lDaysBeforeDeparture, iUnconstrainingMethod,
00139                         lNbOfDepartedSegments);
00140                 }
00141             }
00142             case stdair::ForecastingMethod::OLD_QFF: {
00143                 if (ioSegmentCabin.getFareFamilyStatus() == false) {
00144                     return HybridForecasting::forecast (
00145                         ioSegmentCabin, iEventDate,
00146                         lDaysBeforeDeparture,
00147                         iUnconstrainingMethod,
00148                         lNbOfDepartedSegments);
00149                 } else {
00150                     return OldQFF::forecast (ioSegmentCabin, iEventDate,
00151                         lDaysBeforeDeparture, iUnconstrainingMethod,
00152                         lNbOfDepartedSegments);
00153                 }
00154             }
00155             case stdair::ForecastingMethod::BASED_FORECASTING: {
00156                 return BasedForecasting::forecast (
00157                     ioSegmentCabin, iEventDate,
00158                     lDaysBeforeDeparture,
00159                     iUnconstrainingMethod,
00160                     lNbOfDepartedSegments);
00161             }
00162         }
00163     }

```

```

00156     }
00157     default:{
00158         assert (false);
00159         break;
00160     }
00161 }
00162 return false;
00163 }
00164 }
00165
00166 // //////////////////////////////////////
00167 void Forecaster::
00168 setDemandForecastsToZero(const stdair::SegmentCabin& iSegmentCabin) {
00169     // Set the demand forecast for all classes and fare families to zero.
00170     const stdair::FareFamilyList_T& lFFList =
00171         stdair::BomManager::getList<stdair::FareFamily> (iSegmentCabin);
00172     for (stdair::FareFamilyList_T::const_iterator itFF = lFFList.begin();
00173          itFF != lFFList.end(); ++itFF) {
00174         stdair::FareFamily* lFF_ptr = *itFF;
00175         assert (lFF_ptr != NULL);
00176         lFF_ptr->setMean (0.0);
00177         lFF_ptr->setStdDev (0.0);
00178
00179         const stdair::BookingClassList_T& lBCList =
00180             stdair::BomManager::getList<stdair::BookingClass> (*lFF_ptr);
00181         for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00182              itBC != lBCList.end(); ++itBC) {
00183             stdair::BookingClass* lBC_ptr = *itBC;
00184             assert (lBC_ptr != NULL);
00185             lBC_ptr->setMean (0.0);
00186             lBC_ptr->setStdDev (0.0);
00187             lBC_ptr->setPriceDemMean (0.0);
00188             lBC_ptr->setPriceDemStdDev (0.0);
00189             lBC_ptr->setProductDemMean (0.0);
00190             lBC_ptr->setProductDemStdDev (0.0);
00191             lBC_ptr->setCumuPriceDemMean (0.0);
00192             lBC_ptr->setCumuPriceDemStdDev (0.0);
00193         }
00194     }
00195 }
00196 }

```

26.89 rmol/command/Forecaster.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::Forecaster](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.90 Forecaster.hpp

```

00001 #ifndef __RMOL_COMMAND_FORECASTER_HPP
00002 #define __RMOL_COMMAND_FORECASTER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013

```

```

00014 // Forward declarations
00015 namespace stdair {
00016     class FlightDate;
00017     class SegmentCabin;
00018 }
00019
00020 namespace RMOL {
00022     class Forecaster {
00023     public:
00027         static bool forecast (stdair::FlightDate&, const stdair::DateTime_T
&,
00028                               const stdair::UnconstrainingMethod&,
00029                               const stdair::ForecastingMethod&);
00030
00031     private:
00035         static bool forecast (stdair::SegmentCabin&, const stdair::Date_T&,
00036                               const stdair::UnconstrainingMethod&,
00037                               const stdair::ForecastingMethod&);
00038
00042         static void setDemandForecastsToZero (const stdair::SegmentCabin&);
00043
00044     };
00045 }
00046 #endif // __RMOL_COMMAND_FORECASTER_HPP

```

26.91 rmol/command/HybridForecasting.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/basic/RandomGeneration.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/command/QForecasting.hpp>
#include <rmol/command/HybridForecasting.hpp>
#include <rmol/command/Detruncator.hpp>

```

Namespaces

- namespace [RMOL](#)

26.92 HybridForecasting.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/basic/RandomGeneration.hpp>

```

```

00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/LegDate.hpp>
00014 #include <stdair/bom/SegmentDate.hpp>
00015 #include <stdair/bom/LegCabin.hpp>
00016 #include <stdair/bom/SegmentCabin.hpp>
00017 #include <stdair/bom/SegmentSnapshotTable.hpp>
00018 #include <stdair/bom/BookingClass.hpp>
00019 #include <stdair/service/Logger.hpp>
00020 // RMOL
00021 #include <rmol/bom/Utilities.hpp>
00022 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00023 #include <rmol/bom/HistoricalBookingHolder.hpp>
00024 #include <rmol/bom/HistoricalBooking.hpp>
00025 #include <rmol/command/QForecasting.hpp>
00026 #include <rmol/command/HybridForecasting.hpp>
00027 #include <rmol/command/Detruncator.hpp>
00028
00029 namespace RMOL {
00030 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00031 bool HybridForecasting::
00032 forecast (stdair::SegmentCabin& ioSegmentCabin,
00033          const stdair::Date_T& iCurrentDate,
00034          const stdair::DTD_T& iCurrentDTD,
00035          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00036          const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00037     // Call QForecasting to treat the price-oriented demand.
00038     QForecasting::forecast (ioSegmentCabin, iCurrentDate,
00039                             iCurrentDTD,
00040                             iUnconstrainingMethod, iNbOfDepartedSegments);
00041
00042     // Retrieve the snapshot table.
00043     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00044         ioSegmentCabin.getSegmentSnapshotTable();
00045
00046     // Retrieve the booking class list.
00047     const stdair::BookingClassList_T& lBCList =
00048         stdair::BomManager::getList<stdair::BookingClass>(ioSegmentCabin);
00049
00050     // Browse all remaining DCP's and do unconstraining, forecasting for
00051     // all product-oriented demand.
00052     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00053     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00054     stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00055     for (; itNextDCP != lWholeDCPList.end(); ++itDCP, ++itNextDCP) {
00056         const stdair::DCP_T& lCurrentDCP = *itDCP;
00057         const stdair::DCP_T& lNextDCP = *itNextDCP;
00058
00059         // The end of the interval is after the current DTD.
00060         if (lNextDCP < iCurrentDTD) {
00061             // Get the number of similar segments which has already passed the
00062             // (lNextDCP+1)
00063             const stdair::NbOfSegments_T& lNbOfUsableSegments =
00064                 SegmentSnapshotTableHelper::
00065                     getNbOfSegmentAlreadyPassedThisDTD
00066                     (lSegmentSnapshotTable,
00067                     lNextDCP+1,
00068                     iCurrentDate);
00069             stdair::NbOfSegments_T lSegmentBegin = 0;
00070             const stdair::NbOfSegments_T lSegmentEnd = lNbOfUsableSegments-1;
00071             if (iNbOfDepartedSegments > 52) {
00072                 lSegmentBegin = iNbOfDepartedSegments - 52;
00073             }
00074
00075             // Browse the list of booking classes and forecast the product-oriented
00076             // demand for each class.
00077             for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00078                  itBC != lBCList.end(); ++itBC) {
00079                 stdair::BookingClass* lBC_ptr = *itBC;
00080                 assert (lBC_ptr != NULL);
00081
00082                 // Retrieve the historical product-oriented bookings for the
00083                 // given class.
00084                 HistoricalBookingHolder lHBHolder;
00085                 prepareProductOrientedHistoricalBooking
00086                 (ioSegmentCabin, *lBC_ptr,
00087                  lSegmentSnapshotTable,
00088                  lHBHolder,
00089                  lCurrentDCP, lNextDCP,
00090                  lSegmentBegin, lSegmentEnd);
00091
00092                 // Unconstrain the historical bookings.
00093                 Detruncator::unconstrain (lHBHolder,
00094                 iUnconstrainingMethod);
00095
00096                 // Retrieve the historical unconstrained demand and perform the

```



```

00093         // forecasting.
00094         stdair::UncDemVector_T lUncDemVector;
00095         const short lNbOfHistoricalFlights = lHBHolder.getNbOffFlights
    );
00096         for (short i = 0; i < lNbOfHistoricalFlights; ++i) {
00097             const stdair::NbOfBookings_T& lUncDemand =
00098                 lHBHolder.getUnconstrainedDemand (i);
00099             lUncDemVector.push_back (lUncDemand);
00100         }
00101         stdair::MeanValue_T lMean = 0.0;
00102         stdair::StdDevValue_T lStdDev = 0.0;
00103         Utilities::computeDistributionParameters
    (lUncDemVector,
00104                                     lMean, lStdDev);
00105
00106         // Add the demand forecast to the booking class.
00107         const stdair::MeanValue_T& lCurrentMean = lBC_ptr->getProductDemMean(
    );
00108         const stdair::StdDevValue_T& lCurrentStdDev =
00109             lBC_ptr->getProductDemStdDev();
00110
00111         const stdair::MeanValue_T lNewMean = lCurrentMean + lMean;
00112         const stdair::StdDevValue_T lNewStdDev =
00113             std::sqrt (lCurrentStdDev * lCurrentStdDev + lStdDev * lStdDev);
00114
00115         lBC_ptr->setProductDemMean (lNewMean);
00116         lBC_ptr->setProductDemStdDev (lNewStdDev);
00117     }
00118 }
00119 }
00120 return true;
00121 }
00122
00123 // //////////////////////////////////////
00124 void HybridForecasting::prepareProductOrientedHistoricalBooking
00125 (const stdair::SegmentCabin& iSegmentCabin,
00126  const stdair::BookingClass& iBookingClass,
00127  const stdair::SegmentSnapshotTable& iSegmentSnapshotTable,
00128  HistoricalBookingHolder& ioHBHolder,
00129  const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00130  const stdair::NbOfSegments_T& iSegmentBegin,
00131  const stdair::NbOfSegments_T& iSegmentEnd) {
00132
00133     // Retrieve the booking class index within the snapshot table
00134     const stdair::ClassIndex_T& lClassIdx =
00135         iSegmentSnapshotTable.getClassIndex (iBookingClass.describeKey());
00136
00137     // Retrieve the gross daily booking and availability snapshots.
00138     const stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00139         iSegmentSnapshotTable.
00140         getConstSegmentCabinDTDRangeProductOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00141     const stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00142         iSegmentSnapshotTable.
00143         getConstSegmentCabinDTDRangeAvailabilitySnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00144
00145     // Browse the list of segments and build the historical booking holder.
00146     const stdair::ClassIndexMap_T& lVTIdxMap =
00147         iSegmentSnapshotTable.getClassIndexMap();
00148     const stdair::NbOfClasses_T lNbOfClasses = lVTIdxMap.size();
00149
00150     for (short i = 0; i <= iSegmentEnd-iSegmentBegin; ++i) {
00151         stdair::Flag_T lCensorshipFlag = false;
00152         const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00153         const stdair::UnsignedIndex_T lIdx = i*lNbOfClasses + lClassIdx;
00154
00155         // Parse the DTDs during the period and compute the censorship flag
00156         for (short j = 0; j < lNbOfDTDs; ++j) {
00157             // Check if the data has been censored during this day.
00158             // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfClasses: " << lNbOfClasses
00159             // << ", ClassIdx: " << iClassIdx << ", j: " << j);
00160             if (lAvlView[lIdx][j] < 1.0) {
00161                 lCensorshipFlag = true;
00162                 break;
00163             }
00164         }
00165
00166         // Retrieve the historical product-oriented bookings
00167         stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00168         for (short j = 0; j < lNbOfDTDs; ++j) {
00169             lNbOfHistoricalBkgs += lBookingView[lIdx][j];
00170         }
00171         HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs,
00172         lCensorshipFlag);
00173         ioHBHolder.addHistoricalBooking (lHistoricalBkg);
00174     }
00175 }
00176 }
00177

```

```
00174 }
```

26.93 rmol/command/HybridForecasting.hpp File Reference

```
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::HybridForecasting](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.94 HybridForecasting.hpp

```
00001 #ifndef __RMOL_COMMAND_HYBRIDFORECASTING_HPP
00002 #define __RMOL_COMMAND_HYBRIDFORECASTING_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_inventory_types.hpp>
00009 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations
00013 namespace stdair {
00014     class SegmentCabin;
00015     class BookingClass;
00016     class SegmentSnapshotTable;
00017 }
00018
00019 namespace RMOL {
00021     class HybridForecasting {
00022     public:
00032         static bool forecast (stdair::SegmentCabin&, const stdair::Date_T&,
00033                             const stdair::DTD_T&,
00034                             const stdair::UnconstrainingMethod&,
00035                             const stdair::NbOfSegments_T&);
00036
00045         static void prepareProductOrientedHistoricalBooking
00046         (const stdair::SegmentCabin&, const stdair::BookingClass&,
00047          const stdair::SegmentSnapshotTable&, HistoricalBookingHolder
00048          &,
00048          const stdair::DCP_T&, const stdair::DCP_T&,
00049          const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&);
00050     };
00051 }
00052 #endif // __RMOL_COMMAND_HYBRIDFORECASTING_HPP
```

26.95 rmol/command/InventoryParser.cpp File Reference

```
#include <sstream>
```

```

#include <fstream>
#include <cassert>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_maths_types.hpp>
#include <stdair/stdair_exceptions.hpp>
#include <stdair/basic/BasConst_DefaultObject.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/basic/BasFileMgr.hpp>
#include <stdair/bom/BomRetriever.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/BomRoot.hpp>
#include <stdair/bom/Inventory.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/VirtualClassStruct.hpp>
#include <stdair/factory/FacBom.hpp>
#include <stdair/factory/FacBomManager.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/command/InventoryParser.hpp>

```

Namespaces

- namespace [RMOL](#)

26.96 InventoryParser.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <sstream>
00006 #include <fstream>
00007 #include <cassert>
00008 // StdAir
00009 #include <stdair/stdair_inventory_types.hpp>
00010 #include <stdair/stdair_maths_types.hpp>
00011 #include <stdair/stdair_exceptions.hpp>
00012 #include <stdair/basic/BasConst_DefaultObject.hpp>
00013 #include <stdair/basic/BasConst_Inventory.hpp>
00014 #include <stdair/basic/BasFileMgr.hpp>
00015 #include <stdair/bom/BomRetriever.hpp>
00016 #include <stdair/bom/BomManager.hpp>
00017 #include <stdair/bom/BomRoot.hpp>
00018 #include <stdair/bom/Inventory.hpp>
00019 #include <stdair/bom/FlightDate.hpp>
00020 #include <stdair/bom/SegmentDate.hpp>
00021 #include <stdair/bom/SegmentCabin.hpp>
00022 #include <stdair/bom/LegDate.hpp>
00023 #include <stdair/bom/LegCabin.hpp>
00024 #include <stdair/bom/BookingClass.hpp>
00025 #include <stdair/bom/VirtualClassStruct.hpp>
00026 #include <stdair/factory/FacBom.hpp>
00027 #include <stdair/factory/FacBomManager.hpp>
00028 #include <stdair/service/Logger.hpp>
00029 // RMOL
00030 #include <rmol/command/InventoryParser.hpp>
00031
00032 namespace RMOL {
00033
00034 // //////////////////////////////////////
00035 bool InventoryParser::
00036 parseInputFileAndBuildBom (const std::string&
00037                             iInputFileName,
00038                             stdair::BomRoot& ioBomRoot) {
00039     bool hasReadBeenSuccessful = false;

```

```

00039
00040 // Check that the file path given as input corresponds to an actual file
00041 const bool doesExistAndIsReadable =
00042     stdair::BasFileMgr::doesExistAndIsReadable (iInputFileName);
00043 if (doesExistAndIsReadable == false) {
00044     std::ostringstream oMessage;
00045     oMessage << "The input file, '" << iInputFileName
00046         << "', can not be retrieved on the file-system";
00047     throw stdair::FileNotFoundException (oMessage.str());
00048 }
00049
00050 // Retrieve the (sample) leg-cabin
00051 stdair::LegCabin& lLegCabin =
00052     stdair::BomRetriever::retrieveDummyLegCabin (ioBomRoot);
00053
00054 // Retrieve the (sample) segment-cabin
00055 stdair::SegmentCabin& lSegmentCabin =
00056     stdair::BomRetriever::retrieveDummySegmentCabin (ioBomRoot);
00057
00058 // Open the input file
00059 std::ifstream inputFile (iInputFileName.c_str());
00060 if (! inputFile) {
00061     STDAIR_LOG_ERROR ("Can not open input file '" << iInputFileName << "'");
00062     throw new stdair::FileNotFoundException ("Can not open input file '"
00063         + iInputFileName + "'");
00064 }
00065
00066 char buffer[80];
00067 double dval;
00068 short i = 1;
00069 bool hasAllPArms = true;
00070 stdair::Yield_T lYield;
00071 stdair::MeanValue_T lMean;
00072 stdair::StdDevValue_T lStdDev;
00073 stdair::BookingClassKey lBCKKey (stdair::DEFAULT_CLASS_CODE);
00074
00075 while (inputFile.getline (buffer, sizeof (buffer), ';')) {
00076     std::istringstream iStringStr (buffer);
00077
00078     if (i == 1) {
00079         hasAllPArms = true;
00080     }
00081
00082     if (iStringStr >> dval) {
00083         if (i == 1) {
00084             lYield = dval;
00085             // std::cout << "Yield[" << i << "] = '" << dval << "'" << std::endl;
00086         } else if (i == 2) {
00087             lMean = dval;
00088             // std::cout << "Mean[" << i << "] = '" << dval << "'" << std::endl;
00089         } else if (i == 3) {
00090             lStdDev = dval;
00091             //std::cout << "stdDev[" << i << "] = '" << dval << "'" << std::endl;
00092             i = 0;
00093         }
00094         i++;
00095     } else {
00096         hasAllPArms = false;
00097     }
00098
00099     if (hasAllPArms && i == 1) {
00100         stdair::BookingClass& lBookingClass =
00101             stdair::FacBom<stdair::BookingClass>::instance().create (lBCKKey);
00102         stdair::FacBomManager::addToList (lSegmentCabin, lBookingClass);
00103         lBookingClass.setYield (lYield);
00104         lBookingClass.setMean (lMean);
00105         lBookingClass.setStdDev (lStdDev);
00106         stdair::BookingClassList_T lBookingClassList;
00107         lBookingClassList.push_back (&lBookingClass);
00108         stdair::VirtualClassStruct lVirtualClass (lBookingClassList);
00109         lVirtualClass.setYield (lYield);
00110         lVirtualClass.setMean (lMean);
00111         lVirtualClass.setStdDev (lStdDev);
00112         lLegCabin.addVirtualClass (lVirtualClass);
00113     }
00114 }
00115
00116 //
00117 if (!inputFile.eof()) {
00118     STDAIR_LOG_ERROR ("Problem when reading input file '" << iInputFileName
00119         << "'");
00120     return hasReadBeenSuccessful;
00121 }
00122
00123
00124
00125

```

```

00126     //
00127     hasReadBeenSuccessful = true;
00128     return hasReadBeenSuccessful;
00129 }
00130
00131 }
```

26.97 rmol/command/InventoryParser.hpp File Reference

```

#include <string>
#include <stdair/command/CmdAbstract.hpp>
```

Classes

- class [RMOL::InventoryParser](#)
Class filling the virtual class list (representing a list of classes/buckets) from a given input inventory.

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.98 InventoryParser.hpp

```

00001 #ifndef __RMOL_CMD_INVENTORYPARSER_HPP
00002 #define __RMOL_CMD_INVENTORYPARSER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <string>
00009 // StdAir
00010 #include <stdair/command/CmdAbstract.hpp>
00011
00013 namespace stdair {
00014     class BomRoot;
00015     class LegCabin;
00016     class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00020
00025     class InventoryParser : public stdair::CmdAbstract {
00026     public:
00027
00035         static bool parseInputFileAndBuildBom (const
std::string& iInputFileName,
stdair::BomRoot&);
00036     };
00037 };
00038 }
00039 #endif // __RMOL_CMD_INVENTORYPARSER_HPP
```

26.99 rmol/command/MarginalRevenueTransformation.cpp File Reference

```

#include <cassert>
```

```

#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/SimpleNestingStructure.hpp>
#include <stdair/bom/NestingNode.hpp>
#include <stdair/bom/Policy.hpp>
#include <stdair/factory/FacBomManager.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/PolicyHelper.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/command/MarginalRevenueTransformation.hpp>

```

Namespaces

- namespace [RMOL](#)

26.100 MarginalRevenueTransformation.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/SegmentCabin.hpp>
00013 #include <stdair/bom/BookingClass.hpp>
00014 #include <stdair/bom/SimpleNestingStructure.hpp>
00015 #include <stdair/bom/NestingNode.hpp>
00016 #include <stdair/bom/Policy.hpp>
00017 #include <stdair/factory/FacBomManager.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/bom/PolicyHelper.hpp>
00021 #include <rmol/bom/Utilities.hpp>
00022 #include <rmol/command/MarginalRevenueTransformation.hpp>
00023 >
00024 namespace RMOL {
00025
00026 // //////////////////////////////////////
00027 bool MarginalRevenueTransformation::
00028 prepareDemandInput (stdair::SegmentCabin& ioSegmentCabin)
00029 {
00030     // Build the convex hull, then adjust the yield and demand of all
00031     // classes based on the hull.
00032
00033     buildNestedConvexHull (ioSegmentCabin);
00034     bool isSucceeded = adjustYieldAndDemand (ioSegmentCabin);
00035
00036     return isSucceeded;
00037 }
00038 // //////////////////////////////////////
00039 void MarginalRevenueTransformation::
00040 buildConvexHull (stdair::SegmentCabin& ioSegmentCabin) {
00041     // Reset the convex hull of the segment.
00042     ioSegmentCabin.resetConvexHull();
00043
00044     // The first (from the left side) point of the convex hull is the "empty"
00045     // policy, i.e. the one with all fare families closed.
00046     const stdair::PolicyList_T& lPolicyList =
00047         stdair::BomManager::getList<stdair::Policy> (ioSegmentCabin);
00048
00049     // By construction, the empty policy is the first one on the list of

```

```

00050 // eligible policies.
00051 stdair::PolicyList_T::const_iterator itPolicy=lPolicyList.begin();
00052 stdair::Policy* lEmptyPolicy_ptr = *itPolicy;
00053 assert (lEmptyPolicy_ptr != NULL);
00054 ioSegmentCabin.addPolicy (*lEmptyPolicy_ptr);
00055
00056 // Pointer on the current policy of the convex hull.
00057 stdair::Policy* lCurrentPolicy_ptr = lEmptyPolicy_ptr;
00058 bool lEndOfHull = false;
00059
00060 // The end of hull is reached when from the current policy, we cannot
00061 // find an other one with greater demand and total revenue.
00062 while (lEndOfHull == false) {
00063     // Demand and total revenue of the current policy.
00064     const double& lCurrentDem = lCurrentPolicy_ptr->getDemand();
00065     const double lCurrentTR = lCurrentPolicy_ptr->getTotalRevenue();
00066
00067     // Search for the next policy.
00068     double lGradient = 0.0;
00069     stdair::Policy* lNextPolicy_ptr = NULL;
00070     for (stdair::PolicyList_T::const_iterator itPol = lPolicyList.begin();
00071          itPol != lPolicyList.end(); ++itPol) {
00072         stdair::Policy* lPolicy_ptr = *itPol;
00073         assert (lPolicy_ptr != NULL);
00074
00075         const double& lDem = lPolicy_ptr->getDemand();
00076         const double lTR = lPolicy_ptr->getTotalRevenue();
00077         if (lDem > lCurrentDem && lTR > lCurrentTR) {
00078             const double lNewGradient = (lTR-lCurrentTR)/(lDem-lCurrentDem);
00079             if (lNewGradient > lGradient) {
00080                 lGradient = lNewGradient;
00081                 lNextPolicy_ptr = lPolicy_ptr;
00082             }
00083         }
00084     }
00085
00086     // Check if we have found the next policy
00087     if (lNextPolicy_ptr == NULL) {
00088         lEndOfHull = true;
00089     } else {
00090         ioSegmentCabin.addPolicy (*lNextPolicy_ptr);
00091         lCurrentPolicy_ptr = lNextPolicy_ptr;
00092     }
00093 }
00094 }
00095
00096 // //////////////////////////////////////
00097 void MarginalRevenueTransformation::
00098 buildNestedConvexHull (stdair::SegmentCabin& ioSegmentCabin) {
00099     // Reset the convex hull of the segment.
00100     ioSegmentCabin.resetConvexHull();
00101
00102     // The first (from the left side) point of the convex hull is the "empty"
00103     // policy, i.e. the one with all fare families closed.
00104     const stdair::PolicyList_T& lPolicyList =
00105         stdair::BomManager::getList<stdair::Policy> (ioSegmentCabin);
00106
00107     // By construction, the empty policy is the first one on the list of
00108     // eligible policies.
00109     stdair::PolicyList_T::const_iterator itPolicy=lPolicyList.begin();
00110     stdair::Policy* lEmptyPolicy_ptr = *itPolicy;
00111     assert (lEmptyPolicy_ptr != NULL);
00112     ioSegmentCabin.addPolicy (*lEmptyPolicy_ptr);
00113
00114     // Pointer on the current policy of the convex hull.
00115     stdair::Policy* lCurrentPolicy_ptr = lEmptyPolicy_ptr;
00116     bool lEndOfHull = false;
00117
00118     // The end of hull is reached when from the current policy, we cannot
00119     // find an other one with greater demand and total revenue.
00120     while (lEndOfHull == false) {
00121         // Demand and total revenue of the current policy.
00122         const double& lCurrentDem = lCurrentPolicy_ptr->getDemand();
00123         const double lCurrentTR = lCurrentPolicy_ptr->getTotalRevenue();
00124
00125         // Search for the next policy.
00126         double lGradient = 0.0;
00127         stdair::Policy* lNextPolicy_ptr = NULL;
00128         for (stdair::PolicyList_T::const_iterator itPol = lPolicyList.begin();
00129              itPol != lPolicyList.end(); ++itPol) {
00130             stdair::Policy* lPolicy_ptr = *itPol;
00131             assert (lPolicy_ptr != NULL);
00132
00133             const double& lDem = lPolicy_ptr->getDemand();
00134             const double lTR = lPolicy_ptr->getTotalRevenue();
00135             if (lDem > lCurrentDem && lTR > lCurrentTR
00136                 && PolicyHelper::isNested (*

```

```

lCurrentPolicy_ptr, *lPolicy_ptr)) {
00137     const double lNewGradient = (lTR-lCurrentTR)/(lDem-lCurrentDem);
00138     if (lNewGradient > lGradient) {
00139         lGradient = lNewGradient;
00140         lNextPolicy_ptr = lPolicy_ptr;
00141     }
00142 }
00143 }
00144
00145 // Check if we have found the next policy
00146 if (lNextPolicy_ptr == NULL) {
00147     lEndOfHull = true;
00148 } else {
00149     ioSegmentCabin.addPolicy (*lNextPolicy_ptr);
00150     lCurrentPolicy_ptr = lNextPolicy_ptr;
00151 }
00152 }
00153 }
00154
00155 // //////////////////////////////////////
00156 bool MarginalRevenueTransformation::
00157 adjustYieldAndDemand (stdair::SegmentCabin& ioSegmentCabin) {
00158     bool isSucceeded = false;
00159     stdair::NbOfClasses_T lBookingClassCounter = 0;
00160     // Browse the list of policies on the convex hull, compute the differences
00161     // between pairs of consecutive policies.
00162     const stdair::PolicyList_T& lConvexHull = ioSegmentCabin.getConvexHull();
00163     stdair::PolicyList_T::const_iterator itCurrentPolicy = lConvexHull.begin();
00164     assert (itCurrentPolicy != lConvexHull.end());
00165     stdair::PolicyList_T::const_iterator itNextPolicy = itCurrentPolicy;
00166     ++itNextPolicy;
00167     // If the nesting has only one element (the empty policy),
00168     // there is no optimisation and no pre-optimisation.
00169     if (itNextPolicy == lConvexHull.end()) {
00170         return isSucceeded;
00171     }
00172
00173     // Reset the yield-based nesting structure
00174     stdair::FacBomManager::resetYieldBasedNestingStructure (ioSegmentCabin);
00175
00176     // Retrieve the yield-based nesting structure.
00177     stdair::SimpleNestingStructure& lYieldBasedNS =
00178     stdair::BomManager::getObject<stdair::SimpleNestingStructure> (
ioSegmentCabin, stdair::YIELD_BASED_NESTING_STRUCTURE_CODE);
00179     const stdair::NestingNodeList_T& lNodeList =
00180     stdair::BomManager::getList<stdair::NestingNode> (lYieldBasedNS);
00181     stdair::NestingNodeList_T::const_iterator itNode = lNodeList.begin();
00182
00183     for (; itNextPolicy != lConvexHull.end();
00184         ++itCurrentPolicy, ++itNextPolicy, ++itNode){
00185         const stdair::Policy* lCurrentPolicy_ptr = *itCurrentPolicy;
00186         assert (lCurrentPolicy_ptr != NULL);
00187         const stdair::Policy* lNextPolicy_ptr = *itNextPolicy;
00188         assert (lNextPolicy_ptr != NULL);
00189
00190         // Retrieve the node. If there isn't any node left, create new one.
00191         stdair::NestingNode* lNode_ptr = NULL;
00192         if (itNode == lNodeList.end()) {
00193             // Create a nesting node
00194             stdair::NestingNodeCode_T lNodeCode ("XXX");
00195             stdair::NestingNodeKey lNodeKey (lNodeCode);
00196             stdair::NestingNode& lNestingNode =
00197             stdair::FacBom<stdair::NestingNode>::instance().create (lNodeKey);
00198             stdair::FacBomManager::addToList (lYieldBasedNS, lNestingNode);
00199             stdair::FacBomManager::linkWithParent (lYieldBasedNS, lNestingNode);
00200             lNode_ptr = &lNestingNode;
00201         } else {
00202             lNode_ptr = *itNode;
00203         }
00204         assert (lNode_ptr != NULL);
00205         PolicyHelper::diffBetweenTwoPolicies
00206         (*lNode_ptr, *lNextPolicy_ptr,
00207             *lCurrentPolicy_ptr);
00208
00209         // Compute the adjusted yield, demand mean and demand standard deviation.
00210         // Note: because of the nature of the convex hull, in the adjusted
00211         // standard deviation computation, we can take the difference between
00212         // the squares of the standard deviations of the two policies instead of
00213         // the sum of the squares.
00214         const stdair::MeanValue_T lAdjustedDemMean =
00215         lNextPolicy_ptr->getDemand()-lCurrentPolicy_ptr->getDemand();
00216         assert (lAdjustedDemMean > 0.0);
00217         const stdair::StdDevValue_T& lCurrentStdDev =
00218         lCurrentPolicy_ptr->getStdDev();
00219         const stdair::StdDevValue_T& lNextStdDev = lNextPolicy_ptr->getStdDev();
00220         assert (lNextStdDev > lCurrentStdDev);
00221         const stdair::StdDevValue_T lAdjustedDemStdDev =

```



```

00221         std::sqrt (lNextStdDev*lNextStdDev - lCurrentStdDev*lCurrentStdDev);
00222         const stdair::Yield_T lAdjustedYield =
00223         (lNextPolicy_ptr->getTotalRevenue()-lCurrentPolicy_ptr->getTotalRevenue
00224         ())/(lAdjustedDemMean);
00225         assert (lAdjustedYield > 0.0);
00226         lNode_ptr->setYield (lAdjustedYield);
00227         // Browse the list of booking classes in the node. Set the adjusted yield
00228         // for each class. However, the adjusted demand forecast will be
00229         // distributed only to the first class of the list.
00230         const stdair::BookingClassList_T lBCList =
00231         stdair::BomManager::getList<stdair::BookingClass> (*lNode_ptr);
00232         stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00233         assert (itBC != lBCList.end());
00234         stdair::BookingClass* lFirstClass = *itBC;
00235         assert (lFirstClass != NULL);
00236         lFirstClass->setMean (lAdjustedDemMean);
00237         lFirstClass->setStdDev (lAdjustedDemStdDev);
00238         for (; itBC != lBCList.end(); ++itBC) {
00239             stdair::BookingClass* lClass = *itBC;
00240             assert (lClass != NULL);
00241             lClass->setAdjustedYield (lAdjustedYield);
00242             ++lBookingClassCounter;
00243         }
00244     }
00245
00246     const stdair::BookingClassList_T& lSCBookingClassList =
00247     stdair::BomManager::getList<stdair::BookingClass> (ioSegmentCabin);
00248     const stdair::NbOfClasses_T lNbOfBookingClass = lSCBookingClassList.size();
00249     assert (lNbOfBookingClass >= lBookingClassCounter);
00250     if (lBookingClassCounter < lNbOfBookingClass) {
00251         // At the last node. All the classes which haven't been added to the
00252         // nesting structure will be added to the next nesting structure, with
00253         // an adjusted yield of zero.
00254         // Retrieve the node. If there isn't any node left, create new one.
00255         stdair::NestingNode* lLastNode_ptr = NULL;
00256         if (itNode == lNodeList.end()) {
00257             // Create a nesting node
00258             stdair::NestingNodeCode_T lNodeCode ("XXX");
00259             stdair::NestingNodeKey lNodeKey (lNodeCode);
00260             stdair::NestingNode& lNestingNode =
00261             stdair::FacBom<stdair::NestingNode>::instance().create (lNodeKey);
00262             stdair::FacBomManager::addToList (lYieldBasedNS, lNestingNode);
00263             stdair::FacBomManager::linkWithParent (lYieldBasedNS, lNestingNode);
00264             lLastNode_ptr =
00265             stdair::BomManager::getObjectPtr<stdair::NestingNode> (lYieldBasedNS,
00266             lNodeKey.toString());
00267         } else {
00268             lLastNode_ptr = *itNode;
00269         }
00270         assert (lLastNode_ptr != NULL);
00271         const stdair::Policy* lLastPolicy_ptr = *itCurrentPolicy;
00272         assert (lLastPolicy_ptr != NULL);
00273         PolicyHelper::computeLastNode (*
00274         lLastNode_ptr, *lLastPolicy_ptr,
00275         ioSegmentCabin);
00276     }
00277     isSucceeded = true;
00278     return isSucceeded;
00279 }
00280
00281 }

```

26.101 rmol/command/MarginalRevenueTransformation.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::MarginalRevenueTransformation](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.102 MarginalRevenueTransformation.hpp

```

00001 #ifndef __RMOL_COMMAND_MARGINALREVENUETRANSFORMATION_HPP
00002 #define __RMOL_COMMAND_MARGINALREVENUETRANSFORMATION_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00021     class MarginalRevenueTransformation {
00022     public:
00026         static bool prepareDemandInput (stdair::SegmentCabin&);
00027
00028     private:
00032         static void buildNestedConvexHull (stdair::SegmentCabin&);
00033
00037         static void buildConvexHull (stdair::SegmentCabin&);
00038
00042         static bool adjustYieldAndDemand (stdair::SegmentCabin&);
00043     };
00044 }
00045 #endif // __RMOL_COMMAND_MARGINALREVENUETRANSFORMATION_HPP

```

26.103 rmol/command/NewQFF.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/Policy.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/bom/EMDetruncator.hpp>
#include <rmol/command/NewQFF.hpp>
#include <rmol/command/Detruncator.hpp>

```

Namespaces

- namespace [RMOL](#)

26.104 NewQFF.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/SegmentDate.hpp>
00013 #include <stdair/bom/SegmentCabin.hpp>
00014 #include <stdair/bom/SegmentSnapshotTable.hpp>
00015 #include <stdair/bom/FareFamily.hpp>
00016 #include <stdair/bom/BookingClass.hpp>
00017 #include <stdair/bom/Policy.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/bom/Utilities.hpp>
00021 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00022 #include <rmol/bom/HistoricalBookingHolder.hpp>
00023 #include <rmol/bom/HistoricalBooking.hpp>
00024 #include <rmol/bom/EMDetruncator.hpp>
00025 #include <rmol/command/NewQFF.hpp>
00026 #include <rmol/command/Detruncator.hpp>
00027
00028 namespace RMOL {
00029 // //////////////////////////////////////
00030 bool NewQFF::
00031 forecast (stdair::SegmentCabin& ioSegmentCabin,
00032          const stdair::Date_T& iCurrentDate,
00033          const stdair::DTD_T& iCurrentDTD,
00034          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00035          const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00036     // Retrieve the snapshot table.
00037     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00038         ioSegmentCabin.getSegmentSnapshotTable();
00039
00040     // Browse the list of fare families and execute "Q-forecasting" within
00041     // each fare family.
00042     const stdair::FareFamilyList_T& lFFList =
00043         stdair::BomManager::getList<stdair::FareFamily>(ioSegmentCabin);
00044     for (stdair::FareFamilyList_T::const_iterator itFF = lFFList.begin();
00045          itFF != lFFList.end(); ++itFF) {
00046         stdair::FareFamily* lFF_ptr = *itFF;
00047         assert (lFF_ptr != NULL);
00048
00049         forecast (*lFF_ptr,
00050                 iCurrentDate,
00051                 iCurrentDTD,
00052                 iUnconstrainingMethod,
00053                 iNbOfDepartedSegments,
00054                 lSegmentSnapshotTable);
00055     }
00056
00057     // Dispatch the demand forecast to the policies.
00058     dispatchDemandForecastToPolicies (ioSegmentCabin);
00059
00060     return true;
00061 }
00062
00063 // //////////////////////////////////////
00064 void NewQFF::
00065 forecast (stdair::FareFamily& ioFareFamily,
00066          const stdair::Date_T& iCurrentDate,
00067          const stdair::DTD_T& iCurrentDTD,
00068          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00069          const stdair::NbOfSegments_T& iNbOfDepartedSegments,
00070          const stdair::SegmentSnapshotTable& iSegmentSnapshotTable) {
00071     // Retrieve the FRAT5Curve.
00072     const stdair::FRAT5Curve_T& lFRAT5Curve = ioFareFamily.getFrat5Curve();
00073
00074     // Retrieve the booking class list and compute the sell up curves
00075     // and the dispatching curves.
00076     const stdair::BookingClassList_T& lBCLList =
00077         stdair::BomManager::getList<stdair::BookingClass>(ioFareFamily);
00078     const stdair::BookingClassSellUpCurveMap_T lBCSellUpCurveMap =
00079         Utilities::computeSellUpFactorCurves
00080         (lFRAT5Curve, lBCLList);
00081     const stdair::BookingClassDispatchingCurveMap_T lBCDispatchingCurveMap =
00082         Utilities::computeDispatchingFactorCurves
00083         (lFRAT5Curve, lBCLList);

```

```

00082
00083 // Browse all remaining DCP's and do unconstraining, forecasting
00084 // and dispatching.
00085 const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00086 stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00087 stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00088 for (; itNextDCP != lWholeDCPList.end(); ++itDCP, ++itNextDCP) {
00089     const stdair::DCP_T& lCurrentDCP = *itDCP;
00090     const stdair::DCP_T& lNextDCP = *itNextDCP;
00091
00092     // The end of the interval is after the current DTD.
00093     if (lNextDCP < iCurrentDTD) {
00094         // Get the number of similar segments which has already passed the
00095         // (lNextDCP+1)
00096         const stdair::NbOfSegments_T& lNbOfUsableSegments =
00097             SegmentSnapshotTableHelper::
00098                 getNbOfSegmentAlreadyPassedThisDTD
00099                 (iSegmentSnapshotTable,
00100                  lNextDCP+1,
00101                  iCurrentDate);
00102         stdair::NbOfSegments_T lSegmentBegin = 0;
00103         const stdair::NbOfSegments_T lSegmentEnd = lNbOfUsableSegments-1;
00104         if (iNbOfDepartedSegments > 52) {
00105             lSegmentBegin = iNbOfDepartedSegments - 52;
00106         }
00107         // Retrieve the historical bookings and convert them to
00108         // Q-equivalent bookings.
00109         HistoricalBookingHolder lHBHolder;
00110         preparePriceOrientedHistoricalBooking (ioFareFamily,
00111                                                iSegmentSnapshotTable,
00112                                                lHBHolder,
00113                                                lCurrentDCP, lNextDCP,
00114                                                lSegmentBegin, lSegmentEnd,
00115                                                lBCSellUpCurveMap);
00116
00117         // Unconstrain the historical bookings.
00118         Detruncator::unconstrain (lHBHolder,
00119                                   iUnconstrainingMethod);
00120
00121         // Retrieve the historical unconstrained demand and perform the
00122         // forecasting.
00123         stdair::UncDemVector_T lUncDemVector;
00124         // Be careful, the getter returns the vector size,
00125         // so there is no reference.
00126         const short lNbOfHistoricalFlights = lHBHolder.getNbOfFlights();
00127         for (short i = 0; i < lNbOfHistoricalFlights; ++i) {
00128             const stdair::NbOfBookings_T& lUncDemand =
00129                 lHBHolder.getUnconstrainedDemand (i);
00130             lUncDemVector.push_back (lUncDemand);
00131         }
00132         stdair::MeanValue_T lMean = 0.0;
00133         stdair::StdDevValue_T lStdDev = 0.0;
00134         Utilities::computeDistributionParameters
00135             (lUncDemVector,
00136              lMean, lStdDev);
00137
00138         // Dispatch the forecast to all the classes.
00139         Utilities::dispatchDemandForecast (
00140             lBCDispatchingCurveMap,
00141             lMean, lStdDev, lCurrentDCP);
00142
00143         // Dispatch the forecast to all classes for Fare Adjustment or MRT.
00144         // The sell-up probability will be used in this case.
00145         Utilities::dispatchDemandForecastForFA
00146             (lBCSellUpCurveMap,
00147              lMean, lStdDev, lCurrentDCP);
00148
00149         // Add the demand forecast to the fare family.
00150         const stdair::MeanValue_T& lCurrentMean = ioFareFamily.getMean();
00151         const stdair::StdDevValue_T& lCurrentStdDev = ioFareFamily.getStdDev();
00152         const stdair::MeanValue_T lNewMean = lCurrentMean + lMean;
00153         const stdair::StdDevValue_T lNewStdDev =
00154             std::sqrt (lCurrentStdDev * lCurrentStdDev + lStdDev * lStdDev);
00155         ioFareFamily.setMean (lNewMean);
00156         ioFareFamily.setStdDev (lNewStdDev);
00157     }
00158 }
00159
00160 // //////////////////////////////////////
00161 void NewQFF::preparePriceOrientedHistoricalBooking
00162     (const stdair::FareFamily& iFareFamily,
00163      const stdair::SegmentSnapshotTable& iSegmentSnapshotTable,

```

```

00164     HistoricalBookingHolder& ioHBHolder,
00165     const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00166     const stdair::NbOfSegments_T& iSegmentBegin,
00167     const stdair::NbOfSegments_T& iSegmentEnd,
00168     const stdair::BookingClassSellUpCurveMap_T& iBCSellUpCurveMap) {
00169
00170     // Retrieve the gross daily booking and availability snapshots.
00171     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lPriceBookingView =
00172         iSegmentSnapshotTable.
00173         getConstSegmentCabinDTRangePriceOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00174     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lProductBookingView =
00175         iSegmentSnapshotTable.
00176         getConstSegmentCabinDTRangeProductOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00177     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lAvlView =
00178         iSegmentSnapshotTable.
00179         getConstSegmentCabinDTRangeAvailabilitySnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00180
00181     // Browse the list of segments and build the historical booking holder.
00182     const stdair::ClassIndexMap_T& lVTIdxMap =
00183         iSegmentSnapshotTable.getClassIndexMap();
00184     const stdair::NbOfClasses_T lNbOfClasses = lVTIdxMap.size();
00185
00186     for (short i = 0; i <= iSegmentEnd-iSegmentBegin; ++i) {
00187         stdair::Flag_T lCensorshipFlag = false;
00188         const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00189
00190         // Parse the DTDs during the period and compute the censorship flag
00191         for (short j = 0; j < lNbOfDTDs; ++j) {
00192             // Check if the data has been censored during this day.
00193             // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfClasses: " << lNbOfClasses
00194             //                  << ", ClassIdx: " << iClassIdx << ", j: " << j);
00195             bool tempCensorship = true;
00196             for (stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSUC =
00197                 iBCSellUpCurveMap.begin();
00198                 itBCSUC != iBCSellUpCurveMap.end(); ++itBCSUC) {
00199                 const stdair::BookingClass* lBookingClass_ptr = itBCSUC->first;
00200                 assert (lBookingClass_ptr != NULL);
00201                 const stdair::ClassIndex_T& lClassIdx =
00202                     iSegmentSnapshotTable.getClassIndex(lBookingClass_ptr->describeKey()
00203             ));
00204             const stdair::UnsignedIndex_T lAvlIdx = i*lNbOfClasses + lClassIdx;
00205             if (lAvlView[lAvlIdx][j] >= 1.0) {
00206                 tempCensorship = false;
00207                 break;
00208             }
00209         }
00210         if (tempCensorship == true) {
00211             lCensorshipFlag = true;
00212             break;
00213         }
00214     }
00215
00216     // Compute the Q-equivalent bookings
00217     stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00218     for (stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSUC =
00219         iBCSellUpCurveMap.begin();
00220         itBCSUC != iBCSellUpCurveMap.end(); ++itBCSUC) {
00221         const stdair::BookingClass* lBookingClass_ptr = itBCSUC->first;
00222         assert (lBookingClass_ptr != NULL);
00223         const stdair::SellUpCurve_T& lSellUpCurve = itBCSUC->second;
00224         stdair::SellUpCurve_T::const_iterator itSellUp =
00225             lSellUpCurve.find (iDCPBegin);
00226         assert (itSellUp != lSellUpCurve.end());
00227         const stdair::SellUpProbability_T& lSellUp = itSellUp->second;
00228         assert (lSellUp != 0);
00229
00230         // Retrieve the number of bookings
00231         const stdair::ClassIndex_T& lClassIdx =
00232             iSegmentSnapshotTable.getClassIndex(lBookingClass_ptr->describeKey())
00233     ;
00234     const stdair::UnsignedIndex_T lIdx = i*lNbOfClasses + lClassIdx;
00235
00236     stdair::NbOfBookings_T lNbOfBookings = 0.0;
00237     for (short j = 0; j < lNbOfDTDs; ++j) {
00238         lNbOfBookings +=
00239             lPriceBookingView[lIdx][j] + lProductBookingView[lIdx][j];
00240     }
00241     const stdair::NbOfBookings_T lNbOfQEquivalentBkgs=lNbOfBookings/lSellUp
00242 ;
00243     lNbOfHistoricalBkgs += lNbOfQEquivalentBkgs;
00244 }
00245
00246 HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs, lCensorshipFlag);
00247 ioHBHolder.addHistoricalBooking (lHistoricalBkg);
00248 }
00249 }

```

```

00245
00246 ///////////////////////////////////////////////////////////////////
00247 void NewQFF::
00248 dispatchDemandForecastToPolicies (const stdair::SegmentCabin& iSegmentCabin){
00249     // Retrieve the list of policies.
00250     const stdair::PolicyList_T& lPolicyList =
00251         stdair::BomManager::getList<stdair::Policy> (iSegmentCabin);
00252
00253     for (stdair::PolicyList_T::const_iterator itPolicy = lPolicyList.begin();
00254          itPolicy != lPolicyList.end(); ++itPolicy) {
00255         stdair::Policy* lPolicy_ptr = *itPolicy;
00256         assert (lPolicy_ptr != NULL);
00257         dispatchDemandForecastToPolicy (*lPolicy_ptr);
00258     }
00259 }
00260
00261 ///////////////////////////////////////////////////////////////////
00262 void NewQFF::
00263 dispatchDemandForecastToPolicy (stdair::Policy& ioPolicy){
00264     // Reset the demand forecast of the policy
00265     ioPolicy.resetDemandForecast();
00266
00267     const stdair::MeanValue_T& lPolicyDemand = ioPolicy.getDemand();
00268     const stdair::StdDevValue_T& lPolicyStdDev = ioPolicy.getStdDev();
00269     stdair::MeanValue_T lNewPolicyDemand = lPolicyDemand;
00270     stdair::MeanValue_T lNewPolicyStdDev = lPolicyStdDev;
00271
00272     // Browse the list of booking classes of the policy and use the
00273     // cumulative price-oriented demand forecast of each class.
00274     const bool hasAListOfBC =
00275         stdair::BomManager::hasList<stdair::BookingClass> (ioPolicy);
00276     if (hasAListOfBC == true) {
00277         const stdair::BookingClassList_T& lBCList =
00278             stdair::BomManager::getList<stdair::BookingClass> (ioPolicy);
00279         for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00280              itBC != lBCList.end(); ++itBC) {
00281             const stdair::BookingClass* lBC_ptr = *itBC;
00282             assert (lBC_ptr != NULL);
00283             const stdair::Yield_T& lYield = lBC_ptr->getYield();
00284             const stdair::MeanValue_T& lDemand = lBC_ptr->getCumuPriceDemMean();
00285             const stdair::StdDevValue_T& lStdDev =
00286                 lBC_ptr->getCumuPriceDemStdDev();
00287
00288             ioPolicy.addYieldDemand (lYield, lDemand);
00289             lNewPolicyDemand += lDemand;
00290             const stdair::StdDevValue_T lSquareNewPolicyStdDev =
00291                 lNewPolicyStdDev*lNewPolicyStdDev + lStdDev*lStdDev;
00292             lNewPolicyStdDev =
00293                 std::sqrt (lSquareNewPolicyStdDev);
00294         }
00295         ioPolicy.setDemand(lNewPolicyDemand);
00296         ioPolicy.setStdDev(lNewPolicyStdDev);
00297     }
00298 }
00299 }

```

26.105 rmol/command/NewQFF.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::NewQFF](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.106 NewQFF.hpp

```

00001 #ifndef __RMOL_COMMAND_NEWQFF_HPP
00002 #define __RMOL_COMMAND_NEWQFF_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class SegmentCabin;
00017     class FareFamily;
00018     class SegmentSnapshotTable;
00019 }
00020
00021 namespace RMOL {
00023     class NewQFF {
00024     public:
00034         static bool forecast (stdair::SegmentCabin&, const stdair::Date_T&,
00035                             const stdair::DTD_T&,
00036                             const stdair::UnconstrainingMethod&,
00037                             const stdair::NbOfSegments_T&);
00038
00039     private:
00043         static void forecast (stdair::FareFamily&,
00044                             const stdair::Date_T&,
00045                             const stdair::DTD_T&,
00046                             const stdair::UnconstrainingMethod&,
00047                             const stdair::NbOfSegments_T&,
00048                             const stdair::SegmentSnapshotTable&);
00049
00058         static void preparePriceOrientedHistoricalBooking
00059         (const stdair::FareFamily&, const stdair::SegmentSnapshotTable&,
00060          HistoricalBookingHolder&, const stdair::DCP_T&,
00061          const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&,
00062          const stdair::BookingClassSellUpCurveMap_T&);
00063
00067         static void dispatchDemandForecastToPolicies (const stdair::SegmentCabin&);
00068
00072         static void dispatchDemandForecastToPolicy (stdair::Policy&);
00073     };
00074 }
00075 #endif // __RMOL_COMMAND_NEWQFF_HPP

```

26.107 rmol/command/OldQFF.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/Policy.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/bom/EMDetruncator.hpp>
#include <rmol/command/OldQFF.hpp>
#include <rmol/command/Detruncator.hpp>

```

Namespaces

- namespace [RMOL](#)

26.108 OldQFF.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/SegmentDate.hpp>
00013 #include <stdair/bom/SegmentCabin.hpp>
00014 #include <stdair/bom/SegmentSnapshotTable.hpp>
00015 #include <stdair/bom/FareFamily.hpp>
00016 #include <stdair/bom/BookingClass.hpp>
00017 #include <stdair/bom/Policy.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/bom/Utilities.hpp>
00021 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00022 #include <rmol/bom/HistoricalBookingHolder.hpp>
00023 #include <rmol/bom/HistoricalBooking.hpp>
00024 #include <rmol/bom/EMDetruncator.hpp>
00025 #include <rmol/command/OldQFF.hpp>
00026 #include <rmol/command/Detruncator.hpp>
00027
00028 namespace RMOL {
00029 // //////////////////////////////////////
00030 bool OldQFF::
00031 forecast (stdair::SegmentCabin& ioSegmentCabin,
00032          const stdair::Date_T& iCurrentDate,
00033          const stdair::DTD_T& iCurrentDTD,
00034          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00035          const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00036     // Retrieve the snapshot table.
00037     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00038         ioSegmentCabin.getSegmentSnapshotTable();
00039
00040     // Retrieve the FRAT5Curve.
00041     const stdair::FareFamilyList_T& lFFList =
00042         stdair::BomManager::getList<stdair::FareFamily>(ioSegmentCabin);
00043     stdair::FareFamilyList_T::const_reverse_iterator itFF = lFFList.rbegin();
00044     assert (itFF != lFFList.rend());
00045     stdair::FareFamily* lFF_ptr = *itFF;
00046     assert (lFF_ptr != NULL);
00047     const stdair::FRAT5Curve_T lFRAT5Curve = lFF_ptr->getFrat5Curve();
00048
00049     // Retrieve the booking class list and compute the sell up curves
00050     // and the dispatching curves.
00051     const stdair::BookingClassList_T& lBCList =
00052         stdair::BomManager::getList<stdair::BookingClass>(ioSegmentCabin);
00053     const stdair::BookingClassSellUpCurveMap_T lBCSellUpCurveMap =
00054         Utilities::computeSellUpFactorCurves
00055         (lFRAT5Curve, lBCList);
00056
00057     // Retrieve the list of all policies and reset the demand forecast
00058     // for each one.
00059     const stdair::PolicyList_T& lPolicyList =
00060         stdair::BomManager::getList<stdair::Policy>(ioSegmentCabin);
00061     for (stdair::PolicyList_T::const_iterator itPolicy = lPolicyList.begin();
00062          itPolicy != lPolicyList.end(); ++itPolicy) {
00063         stdair::Policy* lPolicy_ptr = *itPolicy;
00064         assert (lPolicy_ptr != NULL);
00065         lPolicy_ptr->resetDemandForecast();
00066     }
00067
00068     // Browse all remaining DCP's and do unconstraining, forecasting
00069     // and dispatching.
00070     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00071     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();

```



```

00071     stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00072     for (; itNextDCP != lWholeDCPList.end(); ++itDCP, ++itNextDCP) {
00073         const stdair::DCP_T& lCurrentDCP = *itDCP;
00074         const stdair::DCP_T& lNextDCP = *itNextDCP;
00075
00076         // The end of the interval is after the current DTD.
00077         if (lNextDCP < iCurrentDTD) {
00078             // Get the number of similar segments which has already passed the
00079             // (lNextDCP+1)
00080             const stdair::NbOfSegments_T& lNbOfUsableSegments =
00081                 SegmentSnapshotTableHelper::
00082                     getNbOfSegmentAlreadyPassedThisDTD
00083                     (lSegmentSnapshotTable,
00084                     lNextDCP+1,
00085                     iCurrentDate);
00086             stdair::NbOfSegments_T lSegmentBegin = 0;
00087             const stdair::NbOfSegments_T lSegmentEnd = lNbOfUsableSegments-1;
00088             if (iNbOfDepartedSegments > 52) {
00089                 lSegmentBegin = iNbOfDepartedSegments - 52;
00090             }
00091
00092             // Retrieve the historical bookings and convert them to
00093             // Q-equivalent bookings.
00094             HistoricalBookingHolder lHBHolder;
00095             prepareHistoricalBooking (ioSegmentCabin, lSegmentSnapshotTable,
00096                                     lHBHolder, lCurrentDCP, lNextDCP,
00097                                     lSegmentBegin, lSegmentEnd,
00098                                     lBCSellUpCurveMap);
00099
00100             // Unconstrain the historical bookings.
00101             Detruncator::unconstrain (lHBHolder,
00102                                     iUnconstrainingMethod);
00103
00104             // Retrieve the historical unconstrained demand and perform the
00105             // forecasting.
00106             stdair::UncDemVector_T lUncDemVector;
00107             const short lNbOfHistoricalFlights = lHBHolder.getNbOfFlights
00108             ();
00109             for (short i = 0; i < lNbOfHistoricalFlights; ++i) {
00110                 const stdair::NbOfBookings_T& lUncDemand =
00111                     lHBHolder.getUnconstrainedDemand (i);
00112                 lUncDemVector.push_back (lUncDemand);
00113             }
00114             stdair::MeanValue_T lMean = 0.0;
00115             stdair::StdDevValue_T lStdDev = 0.0;
00116             Utilities::computeDistributionParameters
00117             (lUncDemVector,
00118             lMean, lStdDev);
00119
00120             // Add the demand forecast to the fare family.
00121             const stdair::MeanValue_T& lCurrentMean = lFF_ptr->getMean();
00122             const stdair::StdDevValue_T& lCurrentStdDev = lFF_ptr->getStdDev();
00123
00124             const stdair::MeanValue_T lNewMean = lCurrentMean + lMean;
00125             const stdair::StdDevValue_T lNewStdDev =
00126                 std::sqrt (lCurrentStdDev * lCurrentStdDev + lStdDev * lStdDev);
00127             lFF_ptr->setMean (lNewMean);
00128             lFF_ptr->setStdDev (lNewStdDev);
00129
00130             // Dispatch the demand forecast to the policies.
00131             dispatchDemandForecastToPolicies (lPolicyList, lCurrentDCP, lMean,
00132                                             lStdDev, lBCSellUpCurveMap);
00133         }
00134     }
00135     return true;
00136 }
00137
00138 ///////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00139 void OldQFF::prepareHistoricalBooking
00140 (const stdair::SegmentCabin& iSegmentCabin,
00141  const stdair::SegmentSnapshotTable& iSegmentSnapshotTable,
00142  HistoricalBookingHolder& ioHBHolder,
00143  const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00144  const stdair::NbOfSegments_T& iSegmentBegin,
00145  const stdair::NbOfSegments_T& iSegmentEnd,
00146  const stdair::BookingClassSellUpCurveMap_T& iBCSellUpCurveMap) {
00147
00148     // Retrieve the segment-cabin index within the snapshot table
00149     std::ostringstream lSCMapKey;
00150     lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00151                 << iSegmentCabin.describeKey();
00152     const stdair::ClassIndex_T& lCabinIdx =
00153         iSegmentSnapshotTable.getClassIndex (lSCMapKey.str());
00154
00155     // Retrieve the gross daily booking and availability snapshots.

```

```

00154     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lPriceBookingView =
00155         iSegmentSnapshotTable.
getConstSegmentCabinDTRangePriceOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00156     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lProductBookingView =
00157         iSegmentSnapshotTable.
getConstSegmentCabinDTRangeProductOrientedGrossBookingSnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00158     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lAvlView =
00159         iSegmentSnapshotTable.
getConstSegmentCabinDTRangeAvailabilitySnapshotView (iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);

00160
00161     // Browse the list of segments and build the historical booking holder.
00162     const stdair::ClassIndexMap_T& lVTIdxMap =
00163         iSegmentSnapshotTable.getClassIndexMap();
00164     const stdair::NbOfClasses_T lNbOfClasses = lVTIdxMap.size();
00165
00166     for (short i = 0; i <= iSegmentEnd-iSegmentBegin; ++i) {
00167         stdair::Flag_T lCensorshipFlag = false;
00168         const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00169         const stdair::UnsignedIndex_T lAvlIdx = i*lNbOfClasses + lCabinIdx;
00170
00171         // Parse the DTDs during the period and compute the censorship flag
00172         for (short j = 0; j < lNbOfDTDs; ++j) {
00173             // Check if the data has been censored during this day.
00174             // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfClasses: " << lNbOfClasses
00175             //                  << ", ClassIdx: " << iClassIdx << ", j: " << j);
00176             if (lAvlView[lAvlIdx][j] < 1.0) {
00177                 lCensorshipFlag = true;
00178                 break;
00179             }
00180         }
00181
00182         // Compute the Q-equivalent bookings
00183         stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00184         const stdair::BookingClassList_T& lBCList =
00185             stdair::BomManager::getList<stdair::BookingClass> (iSegmentCabin);
00186         for (short j = 0; j < lNbOfDTDs; ++j) {
00187             stdair::BookingClass* lLowestBC_ptr = NULL;
00188             stdair::NbOfBookings_T lNbOfBksOfTheDay = 0.0;
00189             for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00190                  itBC != lBCList.end(); ++itBC) {
00191                 stdair::BookingClass* lBC_ptr = *itBC;
00192                 assert (lBC_ptr != NULL);
00193
00194                 // Retrieve the number of bookings
00195                 const stdair::ClassIndex_T& lClassIdx =
00196                     iSegmentSnapshotTable.getClassIndex(lBC_ptr->describeKey());
00197                 const stdair::UnsignedIndex_T lIdx = i*lNbOfClasses + lClassIdx;
00198                 const stdair::NbOfBookings_T lNbOfBookings =
00199                     lPriceBookingView[lIdx][j] + lProductBookingView[lIdx][j];
00200                 lNbOfBksOfTheDay += lNbOfBookings;
00201
00202                 if (lAvlView[lIdx][j] >= 1.0) {
00203                     lLowestBC_ptr = lBC_ptr;
00204                 }
00205             }
00206
00207             // Convert the number of bookings of the day to Q-equivalent
00208             // bookings using the sell-up probability of the lowest class
00209             // available of the day.
00210             if (lLowestBC_ptr != NULL) {
00211                 stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSUC =
00212                     iBCSellUpCurveMap.find (lLowestBC_ptr);
00213                 assert (itBCSUC != iBCSellUpCurveMap.end());
00214                 const stdair::SellUpCurve_T& lSellUpCurve = itBCSUC->second;
00215                 stdair::SellUpCurve_T::const_iterator itSellUp =
00216                     lSellUpCurve.find (iDCPBegin);
00217                 assert (itSellUp != lSellUpCurve.end());
00218                 const stdair::SellUpProbability_T& lSellUp = itSellUp->second;
00219                 assert (lSellUp != 0);
00220
00221                 lNbOfHistoricalBkgs += lNbOfBksOfTheDay/lSellUp;
00222             }
00223         }
00224
00225         HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs, lCensorshipFlag);
00226         ioHBHolder.addHistoricalBooking (lHistoricalBkg);
00227     }
00228 }
00229
00230 // //////////////////////////////////////
00231 void OldQFF::
00232 dispatchDemandForecastToPolicies (const stdair::PolicyList_T& iPolicyList,
00233                                   const stdair::DCP_T& iCurrentDCP,
00234                                   const stdair::MeanValue_T& iMean,
00235                                   const stdair::StdDevValue_T& iStdDev,
00236                                   const stdair::BookingClassSellUpCurveMap_T&
iBCSellUpCurveMap) {

```

```

00237     for (stdair::PolicyList_T::const_iterator itPolicy = iPolicyList.begin();
00238          itPolicy != iPolicyList.end(); ++itPolicy) {
00239         stdair::Policy* lPolicy_ptr = *itPolicy;
00240         assert (lPolicy_ptr != NULL);
00241         dispatchDemandForecastToPolicy (*lPolicy_ptr,
00242                                         iCurrentDCP,
00243                                         iMean,
00244                                         iStdDev,
00245                                         iBCSellUpCurveMap);
00246     }
00247 }
00248
00249 // //////////////////////////////////////
00250 void OldQFF::
00251 dispatchDemandForecastToPolicy (stdair::Policy& ioPolicy,
00252                                 const stdair::DCP_T& iCurrentDCP,
00253                                 const stdair::MeanValue_T& iMean,
00254                                 const stdair::StdDevValue_T& iStdDev,
00255                                 const stdair::BookingClassSellUpCurveMap_T&
iBCSellUpCurveMap) {
00256     const stdair::MeanValue_T& lPolicyDemand = ioPolicy.getDemand();
00257     const stdair::StdDevValue_T& lPolicyStdDev = ioPolicy.getStdDev();
00258
00259     // Browse the list of booking classes of the policy and use the
00260     // cumulative price-oriented demand forecast of each class.
00261     const bool hasAListOfBC =
00262         stdair::BomManager::hasList<stdair::BookingClass> (ioPolicy);
00263     if (hasAListOfBC == true) {
00264         const stdair::BookingClassList_T& lBCList =
00265             stdair::BomManager::getList<stdair::BookingClass> (ioPolicy);
00266         stdair::BookingClassList_T::const_reverse_iterator itCurrentBC =
00267             lBCList.rbegin();
00268         assert(itCurrentBC != lBCList.rend());
00269         stdair::BookingClass* lLowestBC_ptr = *itCurrentBC;
00270         assert (lLowestBC_ptr != NULL);
00271         const stdair::Yield_T& lLowestBCYield = lLowestBC_ptr->getYield();
00272         // Retrieve the sell-up factor for the lowest class.
00273         stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSU =
00274             iBCSellUpCurveMap.find (lLowestBC_ptr);
00275         assert (itBCSU != iBCSellUpCurveMap.end());
00276         const stdair::SellUpCurve_T& lSellUpCurve = itBCSU->second;
00277         stdair::SellUpCurve_T::const_iterator itSellUpFactor =
00278             lSellUpCurve.find (iCurrentDCP);
00279         assert (itSellUpFactor != lSellUpCurve.end());
00280         const stdair::SellUpProbability_T& lSUToLowestClass = itSellUpFactor->
second;
00281
00282         const stdair::MeanValue_T lAdditinalPolicyDemandMean =
00283             iMean * lSUToLowestClass;
00284         const stdair::StdDevValue_T lAdditinalPolicyDemandStdDev =
00285             iStdDev * std::sqrt (lSUToLowestClass);
00286
00287         const stdair::MeanValue_T lNewPolicyDemandMean =
00288             lPolicyDemand + lAdditinalPolicyDemandMean;
00289         const stdair::StdDevValue_T lNewPolicyDemandStdDev =
00290             std::sqrt (lPolicyStdDev*lPolicyStdDev
00291                       + lAdditinalPolicyDemandStdDev * lAdditinalPolicyDemandStdDev);
00292         //
00293         ioPolicy.setDemand (lNewPolicyDemandMean);
00294         ioPolicy.setStdDev (lNewPolicyDemandStdDev);
00295
00296         ioPolicy.addYieldDemand (lLowestBCYield,
00297                                 lAdditinalPolicyDemandMean);
00298
00299         // Iterate other classes.
00300         stdair::BookingClassList_T::const_reverse_iterator itNextBC=itCurrentBC;
00301         ++itNextBC;
00302         for (; itNextBC != lBCList.rend(); ++itNextBC, ++itCurrentBC) {
00303             stdair::BookingClass* lCurrentBC_ptr = *itCurrentBC;
00304             assert (lCurrentBC_ptr != NULL);
00305             stdair::BookingClass* lNextBC_ptr = *itNextBC;
00306             assert (lNextBC_ptr != NULL);
00307
00308             // Retrieve the disutility for the current policy to the next one.
00309             const stdair::FareFamily& lCurrentFF =
00310                 stdair::BomManager::getParent<stdair::FareFamily> (*lCurrentBC_ptr);
00311             const stdair::FFDisutilityCurve_T& lDisutilityCurve =
00312                 lCurrentFF.getDisutilityCurve();
00313             stdair::FFDisutilityCurve_T::const_iterator itDU =
00314                 lDisutilityCurve.find (iCurrentDCP);
00315             assert (itDU != lDisutilityCurve.end());
00316             const double& lDU = itDU->second;
00317
00318             // Retrieve the sell-up factor for the next class.
00319             stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSUN =
00320                 iBCSellUpCurveMap.find (lNextBC_ptr);
00321             assert (itBCSUN != iBCSellUpCurveMap.end());

```

```

00322         const stdair::SellUpCurve_T& lSellUpCurveN = itBCSUN->second;
00323         stdair::SellUpCurve_T::const_iterator itSellUpFactorN =
00324             lSellUpCurveN.find (iCurrentDCP);
00325         assert (itSellUpFactorN != lSellUpCurveN.end());
00326         const stdair::SellUpProbability_T& lSUToNextClass = itSellUpFactorN->
second;
00327         assert (lSUToNextClass > 0.0);
00328         assert (lSUToNextClass < lSUToLowestClass);
00329
00330         // Retrieve the yields of the two classes
00331         const stdair::Yield_T& lCurrentYield = lCurrentBC_ptr->getYield();
00332         const stdair::Yield_T& lNextYield = lNextBC_ptr->getYield();
00333         const double lBuyUpFactor = exp ((lCurrentYield-lNextYield)*lDU);
00334
00335         // Withdraw an amount demand forecast from the current class. This
00336         // amount of forecast will be added to the next class.
00337         const stdair::MeanValue_T lDemandForNextClass =
00338             iMean * lSUToNextClass * lBuyUpFactor;
00339         ioPolicy.addYieldDemand (lNextYield, lDemandForNextClass);
00340         ioPolicy.addYieldDemand (lCurrentYield, -lDemandForNextClass);
00341     }
00342 }
00343 }
00344 }

```

26.109 rmol/command/OldQFF.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/bom/PolicyTypes.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::OldQFF](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.110 OldQFF.hpp

```

00001 #ifndef __RMOL_COMMAND_OLDQFF_HPP
00002 #define __RMOL_COMMAND_OLDQFF_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 #include <stdair/bom/PolicyTypes.hpp>
00012 // RMOL
00013 #include <rmol/RMOL_Types.hpp>
00014
00015 // Forward declarations
00016 namespace stdair {
00017     class SegmentCabin;
00018     class SegmentSnapshotTable;
00019 }
00020
00021 namespace RMOL {
00022     class OldQFF {
00023     public:
00024         static bool forecast (stdair::SegmentCabin&, const stdair::Date_T&,
00025                             const stdair::DTD_T&,
00026                             const stdair::UnconstrainingMethod&,
00027                             const stdair::NbOfSegments_T&);
00028     };
00029 }

```

```

00039 private:
00048     static void prepareHistoricalBooking (const stdair::SegmentCabin&,
00049                                           const stdair::SegmentSnapshotTable&,
00050                                           HistoricalBookingHolder
00051                                           &,
00052                                           const stdair::DCP_T&,
00053                                           const stdair::DCP_T&,
00054                                           const stdair::NbOfSegments_T&,
00055                                           const stdair::NbOfSegments_T&,
00056                                           const
stdair::BookingClassSellUpCurveMap_T&);
00060     static void
00061     dispatchDemandForecastToPolicies (const stdair::PolicyList_T&,
00062                                       const stdair::DCP_T&,
00063                                       const stdair::MeanValue_T&,
00064                                       const stdair::StdDevValue_T&,
00065                                       const
stdair::BookingClassSellUpCurveMap_T&);
00066     static void
00070     dispatchDemandForecastToPolicy (stdair::Policy&,
00071                                    const stdair::DCP_T&,
00072                                    const stdair::MeanValue_T&,
00073                                    const stdair::StdDevValue_T&,
00074                                    const stdair::BookingClassSellUpCurveMap_T&
00075                                    );
00076 };
00077 }
00078 #endif // __RMOL_COMMAND_OLDQFF_HPP

```

26.111 rmol/command/Optimiser.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/RandomGeneration.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/bom/MCOptimiser.hpp>
#include <rmol/bom/Emsr.hpp>
#include <rmol/bom/DPOptimiser.hpp>
#include <rmol/command/Optimiser.hpp>

```

Namespaces

- namespace [RMOL](#)

26.112 Optimiser.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 // StdAir
00008 #include <stdair/basic/BasConst_General.hpp>
00009 #include <stdair/basic/RandomGeneration.hpp>
00010 #include <stdair/bom/BomManager.hpp>

```

```

00011 #include <stdair/bom/FlightDate.hpp>
00012 #include <stdair/bom/LegDate.hpp>
00013 #include <stdair/bom/SegmentDate.hpp>
00014 #include <stdair/bom/LegCabin.hpp>
00015 #include <stdair/bom/SegmentCabin.hpp>
00016 #include <stdair/bom/FareFamily.hpp>
00017 #include <stdair/bom/BookingClass.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/basic/BasConst_General.hpp>
00021 #include <rmol/bom/MCOptimiser.hpp>
00022 #include <rmol/bom/Emsr.hpp>
00023 #include <rmol/bom/DPOptimiser.hpp>
00024 #include <rmol/command/Optimiser.hpp>
00025
00026 namespace RMOL {
00027
00028     // //////////////////////////////////////
00029     void Optimiser::
00030     optimalOptimisationByMCIntegration (const
00031     stdair::NbOfSamples_T& K,
00032                                     stdair::LegCabin& ioLegCabin) {
00033         // Retrieve the segment-cabin
00034         const stdair::SegmentCabinList_T lSegmentCabinList =
00035             stdair::BomManager::getList<stdair::SegmentCabin> (ioLegCabin);
00036         stdair::SegmentCabinList_T::const_iterator itSC = lSegmentCabinList.begin()
00037     ;
00038         assert (itSC != lSegmentCabinList.end());
00039         const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00040         assert (lSegmentCabin_ptr != NULL);
00041
00042         // Retrieve the class list.
00043         const stdair::BookingClassList_T lBookingClassList =
00044             stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00045         stdair::RandomGeneration lSeedGenerator (stdair::DEFAULT_RANDOM_SEED);
00046
00047         // Generate the demand samples for the booking classes.
00048         for (stdair::BookingClassList_T::const_iterator itBC =
00049             lBookingClassList.begin(); itBC != lBookingClassList.end(); ++itBC)
00050         {
00051             stdair::RandomSeed_T lRandomSeed =
00052                 lSeedGenerator.generateUniform01 () * 1e9;
00053             stdair::BookingClass* lBookingClass_ptr = *itBC;
00054             assert (lBookingClass_ptr != NULL);
00055             lBookingClass_ptr->generateDemandSamples (K, lRandomSeed);
00056
00057             // DEBUG
00058             //STDAIR_LOG_DEBUG ("Generating " << K << " demand samples for the class
00059             "
00060             //
00061             // << lBookingClass_ptr->describeKey());
00062         }
00063         // Call the class performing the actual algorithm
00064         MCOptimiser::optimalOptimisationByMCIntegration
00065         (ioLegCabin);
00066     }
00067
00068     // //////////////////////////////////////
00069     void Optimiser::optimalOptimisationByDP (
00070     stdair::LegCabin& ioLegCabin) {
00071         DPOptimiser::optimalOptimisationByDP (
00072         ioLegCabin);
00073     }
00074
00075     // //////////////////////////////////////
00076     void Optimiser::heuristicOptimisationByEmsr
00077     (stdair::LegCabin& ioLegCabin) {
00078         Emsr::heuristicOptimisationByEmsr (
00079         ioLegCabin);
00080     }
00081
00082     // //////////////////////////////////////
00083     void Optimiser::heuristicOptimisationByEmsrA
00084     (stdair::LegCabin& ioLegCabin) {
00085         Emsr::heuristicOptimisationByEmsrA (
00086         ioLegCabin);
00087     }
00088
00089     // //////////////////////////////////////
00090     void Optimiser::heuristicOptimisationByEmsrB
00091     (stdair::LegCabin& ioLegCabin) {
00092         Emsr::heuristicOptimisationByEmsrB (
00093         ioLegCabin);
00094     }
00095
00096     // //////////////////////////////////////
00097     bool Optimiser::optimise (stdair::FlightDate& ioFlightDate

```

```

00085         const stdair::OptimisationMethod&
iOptimisationMethod) {
00086     bool optimiseSucceeded = false;
00087     // Browse the leg-cabin list and build the virtual class list for
00088     // each cabin.
00089     const stdair::LegDateList_T& lLDList =
00090         stdair::BomManager::getList<stdair::LegDate> (ioFlightDate);
00091     for (stdair::LegDateList_T::const_iterator itLD = lLDList.begin();
00092          itLD != lLDList.end(); ++itLD) {
00093         stdair::LegDate* lLD_ptr = *itLD;
00094         assert (lLD_ptr != NULL);
00095         const bool isSucceeded = optimise(*lLD_ptr, iOptimisationMethod);
00096         // If at least one leg date is optimised, the optimisation is succeeded.
00097         if (isSucceeded == true) {
00098             optimiseSucceeded = true;
00099             // Do not return now because all leg dates need to be optimised.
00100         }
00101     }
00102     return optimiseSucceeded;
00103 }
00104
00105 // //////////////////////////////////////
00106 bool Optimiser::
00107 optimise (stdair::LegDate& ioLegDate,
00108          const stdair::OptimisationMethod& iOptimisationMethod) {
00109     bool optimiseSucceeded = false;
00110     // Browse the leg-cabin list
00111     const stdair::LegCabinList_T& lLCLList =
00112         stdair::BomManager::getList<stdair::LegCabin> (ioLegDate);
00113     for (stdair::LegCabinList_T::const_iterator itLC = lLCLList.begin();
00114          itLC != lLCLList.end(); ++itLC) {
00115         stdair::LegCabin* lLC_ptr = *itLC;
00116         assert (lLC_ptr != NULL);
00117         const bool isSucceeded = optimise(*lLC_ptr, iOptimisationMethod);
00118         // If at least one leg cabin is optimised, the optimisation is succeeded.
00119         if (isSucceeded == true) {
00120             optimiseSucceeded = true;
00121             // Do not return now because all leg cabins need to be optimised.
00122         }
00123     }
00124     return optimiseSucceeded;
00125 }
00126
00127 // //////////////////////////////////////
00128 bool Optimiser::
00129 optimise (stdair::LegCabin& ioLegCabin,
00130          const stdair::OptimisationMethod& iOptimisationMethod) {
00131     bool optimiseSucceeded = false;
00132     //
00133     // Build the virtual class list.
00134     bool hasVirtualClass =
00135         buildVirtualClassListForLegBasedOptimisation
00136         (ioLegCabin);
00137     if (hasVirtualClass == true) {
00138         switch (iOptimisationMethod.getMethod()) {
00139             case stdair::OptimisationMethod::LEG_BASED_MC: {
00140                 // Number of samples generated for the Monte Carlo integration.
00141                 // It is important that number is greater than 100 (=10000 here).
00142                 const stdair::NbOfSamples_T lNbOfSamples =
00143                     DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
00144                 ;
00145                 optimalOptimisationByMCIntegration (
00146                     lNbOfSamples, ioLegCabin);
00147                 optimiseSucceeded = true;
00148                 break;
00149             }
00150             case stdair::OptimisationMethod::LEG_BASED_EMSR_B: {
00151                 heuristicOptimisationByEmsrB (ioLegCabin);
00152                 optimiseSucceeded = true;
00153                 break;
00154             }
00155             default: {
00156                 assert (false);
00157                 break;
00158             }
00159         }
00160     }
00161     return optimiseSucceeded;
00162 }
00163
00164 // //////////////////////////////////////
00165 bool Optimiser::
00166 buildVirtualClassListForLegBasedOptimisation
00167 (stdair::LegCabin& ioLegCabin) {
00168     // The map holding all virtual classes to be created.

```

```

00166     stdair::VirtualClassMap_T lVirtualClassMap;
00167     bool isEmpty = false;
00168
00169     // Retrieve the segment-cabin
00170     const stdair::SegmentCabinList_T& lSegmentCabinList =
00171         stdair::BomManager::getList<stdair::SegmentCabin> (ioLegCabin);
00172     stdair::SegmentCabinList_T::const_iterator itSC = lSegmentCabinList.begin()
;
00173     assert (itSC != lSegmentCabinList.end());
00174     const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00175     assert (lSegmentCabin_ptr != NULL);
00176
00177     // Retrieve the class list.
00178     const stdair::BookingClassList_T lBookingClassList =
00179         stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00180
00181     // Generate the demand samples for the booking classes.
00182     for (stdair::BookingClassList_T::const_iterator itBC =
00183         lBookingClassList.begin(); itBC != lBookingClassList.end(); ++itBC)
{
00184         stdair::BookingClass* lBookingClass_ptr = *itBC;
00185         assert (lBookingClass_ptr != NULL);
00186
00187         // If the demand forecast of the class is zero, there no need to create
00188         // a virtual class.
00189         // TODO: use float utils
00190         const stdair::NbOfRequests_T& lMean = lBookingClass_ptr->getMean();
00191         const stdair::StdDevValue_T& lStdDev = lBookingClass_ptr->getStdDev();
00192         if (lMean > 0.0) {
00193             const stdair::Yield_T& lYield = lBookingClass_ptr->getAdjustedYield();
00194             // TODO: use float utils
00195             assert (lYield >= 0.0);
00196             const stdair::Yield_T lRoundedYieldDouble = std::floor(lYield + 0.5);
00197             const stdair::YieldLevel_T lRoundedYieldLevel =
00198                 static_cast<stdair::YieldLevel_T>(lRoundedYieldDouble);
00199             if (lRoundedYieldLevel > 0) {
00200                 // If there is already a virtual class with this yield, add the
current
00201                 // booking class to its list and sum the two demand distributions.
00202                 // Otherwise, create a new virtual class.
00203                 stdair::VirtualClassMap_T::iterator itVCM =
00204                     lVirtualClassMap.find(lRoundedYieldLevel);
00205                 if (itVCM == lVirtualClassMap.end()) {
00206                     stdair::BookingClassList_T lBookingClassList;
00207                     lBookingClassList.push_back(lBookingClass_ptr);
00208                     stdair::VirtualClassStruct lVirtualClass (lBookingClassList);
00209                     lVirtualClass.setYield (lRoundedYieldLevel);
00210                     lVirtualClass.setMean (lMean);
00211                     lVirtualClass.setStdDev (lStdDev);
00212
00213                     lVirtualClassMap.insert (stdair::VirtualClassMap_T::
00214                         value_type (lRoundedYieldLevel, lVirtualClass
));
00215                 } else {
00216                     stdair::VirtualClassStruct& lVirtualClass = itVCM->second;
00217                     const stdair::MeanValue_T& lVCMean = lVirtualClass.getMean();
00218                     const stdair::StdDevValue_T& lVCStdDev = lVirtualClass.getStdDev();
00219                     const stdair::MeanValue_T lNewMean = lVCMean + lMean;
00220                     const stdair::StdDevValue_T lNewStdDev =
00221                         std::sqrt (lVCStdDev * lVCStdDev + lStdDev * lStdDev);
00222                     lVirtualClass.setMean (lNewMean);
00223                     lVirtualClass.setStdDev (lNewStdDev);
00224
00225                     lVirtualClass.addBookingClass (*lBookingClass_ptr);
00226                 }
00227             }
00228         }
00229     }
00230
00231     // Browse the virtual class map from high to low yield.
00232     ioLegCabin.emptyVirtualClassList();
00233     for (stdair::VirtualClassMap_T::reverse_iterator itVC =
00234         lVirtualClassMap.rbegin(); itVC != lVirtualClassMap.rend(); ++itVC)
{
00235         stdair::VirtualClassStruct& lVC = itVC->second;
00236
00237         ioLegCabin.addVirtualClass (lVC);
00238         if (isEmpty == false) {
00239             isEmpty = true;
00240         }
00241     }
00242     return isEmpty;
00243 }
00244
00245 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00246 double Optimiser::
00247 optimiseUsingOnDForecast (stdair::FlightDate&

```



```

ioFlightDate,
00248                                     const bool& iReduceFluctuations) {
00249     double lMaxBPVariation = 0.0;
00250     // Check if the flight date holds a list of leg dates.
00251     // If so, retrieve it and optimise the cabins.
00252     const bool hasLegDateList =
00253         stdair::BomManager::hasList<stdair::LegDate> (ioFlightDate);
00254     if (hasLegDateList == true) {
00255         STDAIR_LOG_DEBUG ("Optimisation for the flight date: "
00256             << ioFlightDate.toString());
00257         const stdair::LegDateList_T& lLDList =
00258             stdair::BomManager::getList<stdair::LegDate> (ioFlightDate);
00259         for (stdair::LegDateList_T::const_iterator itLD = lLDList.begin();
00260             itLD != lLDList.end(); ++itLD) {
00261             stdair::LegDate* lLD_ptr = *itLD;
00262             assert (lLD_ptr != NULL);
00263
00264             //
00265             const stdair::LegCabinList_T& lLCList =
00266                 stdair::BomManager::getList<stdair::LegCabin> (*lLD_ptr);
00267             for (stdair::LegCabinList_T::const_iterator itLC = lLCList.begin();
00268                 itLC != lLCList.end(); ++itLC) {
00269                 stdair::LegCabin* lLC_ptr = *itLC;
00270                 assert (lLC_ptr != NULL);
00271                 MCOptimiser::optimisationByMCIntegration
00272                     (*lLC_ptr);
00273                 const stdair::BidPrice_T& lCurrentBidPrice =
00274                     lLC_ptr->getCurrentBidPrice();
00275                 const stdair::BidPrice_T& lPreviousBidPrice =
00276                     lLC_ptr->getPreviousBidPrice();
00277                 assert (lPreviousBidPrice != 0);
00278                 const double lBPVariation =
00279                     std::abs((lCurrentBidPrice - lPreviousBidPrice)/lPreviousBidPrice);
00280                 lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
00281             }
00282         }
00283         return lMaxBPVariation;
00284     }
00285 }
00286 }

```

26.113 rmol/command/Optimiser.hpp File Reference

```

#include <stdair/basic/OptimisationMethod.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::Optimiser](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.114 Optimiser.hpp

```

00001 #ifndef __RMOL_COMMAND_OPTIMISER_HPP
00002 #define __RMOL_COMMAND_OPTIMISER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STDAIR
00008 #include <stdair/basic/OptimisationMethod.hpp>
00009 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations
00013 namespace stdair {
00014     class FlightDate;

```

```

00015  class LegCabin;
00016 }
00017
00018 namespace RMOL {
00020  class Optimiser {
00021  public:
00022
00034      static void optimalOptimisationByMCIntegration
00035      (const stdair::NbOfSamples_T&,
00036       stdair::LegCabin&);
00040      static void optimalOptimisationByDP (
00041      stdair::LegCabin&);
00045      static void heuristicOptimisationByEmsr (
00046      stdair::LegCabin&);
00050      static void heuristicOptimisationByEmsrA (
00051      stdair::LegCabin&);
00055      static void heuristicOptimisationByEmsrB (
00056      stdair::LegCabin&);
00060      static bool optimise (stdair::FlightDate&,
00061                          const stdair::OptimisationMethod&);
00062
00066      static bool buildVirtualClassListForLegBasedOptimisation
00067      (stdair::LegCabin&);
00069      static double optimiseUsingOnDForecast (
00070      stdair::FlightDate&,
00071                          const bool& iReduceFluctuations =
00072                          false);
00072  private:
00076      static bool optimise (stdair::LegDate&,
00077                          const stdair::OptimisationMethod&);
00081      static bool optimise (stdair::LegCabin&,
00082                          const stdair::OptimisationMethod&);
00083
00084
00085  };
00086 }
00087 #endif // __RMOL_COMMAND_OPTIMISER_HPP

```

26.115 rmol/command/PreOptimiser.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/basic/RandomGeneration.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/command/PreOptimiser.hpp>
#include <rmol/command/DemandInputPreparation.hpp>
#include <rmol/command/FareAdjustment.hpp>
#include <rmol/command/MarginalRevenueTransformation.hpp>

```

Namespaces

- namespace [RMOL](#)

26.116 PreOptimiser.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/basic/RandomGeneration.hpp>
00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/FlightDate.hpp>
00014 #include <stdair/bom/SegmentDate.hpp>
00015 #include <stdair/bom/SegmentCabin.hpp>
00016 #include <stdair/bom/SegmentSnapshotTable.hpp>
00017 #include <stdair/bom/BookingClass.hpp>
00018 #include <stdair/service/Logger.hpp>
00019 // RMOL
00020 #include <rmol/bom/Utilities.hpp>
00021 #include <rmol/command/PreOptimiser.hpp>
00022 #include <rmol/command/DemandInputPreparation.hpp>
00023 >
00024 #include <rmol/command/FareAdjustment.hpp>
00025 #include <rmol/command/MarginalRevenueTransformation.hpp>
00026 >
00027 namespace RMOL {
00028 // //////////////////////////////////////
00029 bool PreOptimiser::
00030 preOptimise (stdair::FlightDate& ioFlightDate,
00031             const stdair::PreOptimisationMethod& iPreOptimisationMethod) {
00032     bool isSucceeded = true;
00033     const stdair::SegmentDateList_T& LSDList =
00034         stdair::BomManager::getList<stdair::SegmentDate> (ioFlightDate);
00035     for (stdair::SegmentDateList_T::const_iterator itSD = LSDList.begin();
00036          itSD != LSDList.end(); ++itSD) {
00037         stdair::SegmentDate* LSD_ptr = *itSD;
00038         assert (LSD_ptr != NULL);
00039
00040         //
00041         const stdair::SegmentCabinList_T& LSCList =
00042             stdair::BomManager::getList<stdair::SegmentCabin> (*LSD_ptr);
00043         for (stdair::SegmentCabinList_T::const_iterator itSC = LSCList.begin();
00044              itSC != LSCList.end(); ++itSC) {
00045             stdair::SegmentCabin* LSC_ptr = *itSC;
00046             assert (LSC_ptr != NULL);
00047
00048             //
00049             // STDAIR_LOG_NOTIFICATION (ioFlightDate.getDepartureDate()
00050             // << " " << LSegmentDTD);
00051             bool isPreOptimised = preOptimise (*LSC_ptr,
00052         iPreOptimisationMethod);
00053             if (isPreOptimised == false) {
00054                 isSucceeded = false;
00055             }
00056         }
00057     }
00058     return isSucceeded;
00059 }
00060 // //////////////////////////////////////
00061 bool PreOptimiser::
00062 preOptimise (stdair::SegmentCabin& ioSegmentCabin,
00063             const stdair::PreOptimisationMethod& iPreOptimisationMethod) {
00064     const stdair::PreOptimisationMethod& EN_PreOptimisationMethod&
00065     lPreOptimisationMethod =
00066         iPreOptimisationMethod.getMethod();
00067     switch (lPreOptimisationMethod) {
00068     case stdair::PreOptimisationMethod::NONE: {
00069         return DemandInputPreparation::prepareDemandInput
00070             (ioSegmentCabin);
00071     }
00072     case stdair::PreOptimisationMethod::FA: {
00073         return FareAdjustment::adjustYield (
00074             ioSegmentCabin);
00075     }
00076     case stdair::PreOptimisationMethod::MRT: {
00077         if (ioSegmentCabin.getFareFamilyStatus() == false) {
00078             return FareAdjustment::adjustYield (
00079                 ioSegmentCabin);
00080         } else {
00081             return MarginalRevenueTransformation::

```

```

00079         prepareDemandInput (ioSegmentCabin);
00080     }
00081 }
00082 default:{
00083     assert (false);
00084     break;
00085 }
00086 }
00087 return false;
00088 }
00089
00090 // //////////////////////////////////////
00091 // void PreOptimiser::
00092 // setDemandForecastsToZero(const stdair::SegmentCabin& iSegmentCabin) {
00093 // }
00094 }

```

26.117 rmol/command/PreOptimiser.hpp File Reference

```

#include <map>
#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::PreOptimiser](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.118 PreOptimiser.hpp

```

00001 #ifndef __RMOL_COMMAND_PREOPTIMISER_HPP
00002 #define __RMOL_COMMAND_PREOPTIMISER_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 // StdAir
00010 #include <stdair/stdair_inventory_types.hpp>
00011 // RMOL
00012 #include <rmol/RMOL_Types.hpp>
00013
00014 // Forward declarations
00015 namespace stdair {
00016     class FlightDate;
00017     class SegmentCabin;
00018 }
00019
00020 namespace RMOL {
00022     class PreOptimiser {
00023     public:
00027         static bool preOptimise (stdair::FlightDate&,
00028                                 const stdair::PreOptimisationMethod&);
00029
00030     private:
00034         static bool preOptimise (stdair::SegmentCabin&,
00035                                 const stdair::PreOptimisationMethod&);
00036
00040         //static void setDemandForecastsToZero (const stdair::SegmentCabin&);
00041
00042     };
00043 }
00044 #endif // __RMOL_COMMAND_PREOPTIMISER_HPP

```

26.119 rmol/command/QForecasting.cpp File Reference

```

#include <cassert>
#include <sstream>
#include <cmath>
#include <stdair/basic/BasConst_General.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/SegmentSnapshotTable.hpp>
#include <stdair/bom/FareFamily.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/SegmentSnapshotTableHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/command/QForecasting.hpp>
#include <rmol/command/Detruncator.hpp>

```

Namespaces

- namespace [RMOL](#)

26.120 QForecasting.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 #include <cmath>
00008 // StdAir
00009 #include <stdair/basic/BasConst_General.hpp>
00010 #include <stdair/basic/BasConst_Inventory.hpp>
00011 #include <stdair/bom/BomManager.hpp>
00012 #include <stdair/bom/LegDate.hpp>
00013 #include <stdair/bom/SegmentDate.hpp>
00014 #include <stdair/bom/LegCabin.hpp>
00015 #include <stdair/bom/SegmentCabin.hpp>
00016 #include <stdair/bom/SegmentSnapshotTable.hpp>
00017 #include <stdair/bom/FareFamily.hpp>
00018 #include <stdair/bom/BookingClass.hpp>
00019 #include <stdair/service/Logger.hpp>
00020 // RMOL
00021 #include <rmol/bom/Utilities.hpp>
00022 #include <rmol/bom/SegmentSnapshotTableHelper.hpp>
00023 #include <rmol/bom/HistoricalBookingHolder.hpp>
00024 #include <rmol/bom/HistoricalBooking.hpp>
00025 #include <rmol/command/QForecasting.hpp>
00026 #include <rmol/command/Detruncator.hpp>
00027
00028 namespace RMOL {
00029 // //////////////////////////////////////
00030 bool QForecasting::
00031 forecast (stdair::SegmentCabin& ioSegmentCabin,
00032          const stdair::Date_T& iCurrentDate,
00033          const stdair::DTD_T& iCurrentDTD,
00034          const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00035          const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00036     // Retrieve the snapshot table.
00037     const stdair::SegmentSnapshotTable& lSegmentSnapshotTable =
00038         ioSegmentCabin.getSegmentSnapshotTable();

```

```

00039
00040 // Retrieve the FRAT5Curve.
00041 const stdair::FareFamilyList_T& lFFList =
00042     stdair::BomManager::getList<stdair::FareFamily>(ioSegmentCabin);
00043 stdair::FareFamilyList_T::const_reverse_iterator itFF = lFFList.rbegin();
00044 assert (itFF != lFFList.rend());
00045 stdair::FareFamily* lFF_ptr = *itFF;
00046 assert (lFF_ptr != NULL);
00047 const stdair::FRAT5Curve_T lFRAT5Curve = lFF_ptr->getFrat5Curve();
00048
00049 // Retrieve the booking class list and compute the sell up curves
00050 // and the dispatching curves.
00051 const stdair::BookingClassList_T& lBCList =
00052     stdair::BomManager::getList<stdair::BookingClass>(ioSegmentCabin);
00053 const stdair::BookingClassSellUpCurveMap_T lBCSellUpCurveMap =
00054     Utilities::computeSellUpFactorCurves
(lFRAT5Curve, lBCList);
00055 const stdair::BookingClassDispatchingCurveMap_T lBCDispatchingCurveMap =
00056     Utilities::computeDispatchingFactorCurves
(lFRAT5Curve, lBCList);
00057
00058 // Browse all remaining DCP's and do unconstraining, forecasting
00059 // and dispatching.
00060 const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST;
00061 stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00062 stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00063 for (; itNextDCP != lWholeDCPList.end(); ++itDCP, ++itNextDCP) {
00064     const stdair::DCP_T& lCurrentDCP = *itDCP;
00065     const stdair::DCP_T& lNextDCP = *itNextDCP;
00066
00067     // The end of the interval is after the current DTD.
00068     if (lNextDCP < iCurrentDTD) {
00069         // Get the number of similar segments which has already passed the
00070         // (lNextDCP+1)
00071         const stdair::NbOfSegments_T& lNbOfUsableSegments =
00072             SegmentSnapshotTableHelper::
00073             getNbOfSegmentAlreadyPassedThisDTD
(lSegmentSnapshotTable,
00074             lNextDCP+1,
00075             iCurrentDate);
00076         stdair::NbOfSegments_T lSegmentBegin = 0;
00077         const stdair::NbOfSegments_T lSegmentEnd = lNbOfUsableSegments-1;
00078         if (iNbOfDepartedSegments > 52) {
00079             lSegmentBegin = iNbOfDepartedSegments - 52;
00080         }
00081
00082         // Retrieve the historical bookings and convert them to
00083         // Q-equivalent bookings.
00084         HistoricalBookingHolder lHBHolder;
00085         preparePriceOrientedHistoricalBooking
(lioSegmentCabin,
00086         lSegmentSnapshotTable, lHBHolder
00087         ,
00088         lCurrentDCP, lNextDCP,
00089         lSegmentBegin, lSegmentEnd,
00090         lBCSellUpCurveMap);
00091
00092         // Unconstrain the historical bookings.
00093         Detruncator::unconstrain (lHBHolder,
iUnconstrainingMethod);
00094
00095         // Retrieve the historical unconstrained demand and perform the
00096         // forecasting.
00097         stdair::UncDemVector_T lUncDemVector;
00098         const short lNbOfHistoricalFlights = lHBHolder.getNbOfFlights
();
00099         for (short i = 0; i < lNbOfHistoricalFlights; ++i) {
00100             const stdair::NbOfBookings_T& lUncDemand =
00101                 lHBHolder.getUnconstrainedDemand (i);
00102             lUncDemVector.push_back (lUncDemand);
00103         }
00104         stdair::MeanValue_T lMean = 0.0;
00105         stdair::StdDevValue_T lStdDev = 0.0;
00106         Utilities::computeDistributionParameters
(lUncDemVector,
00107         lMean, lStdDev);
00108
00109         // Dispatch the forecast to all the classes.
00110         Utilities::dispatchDemandForecast (
lBCDispatchingCurveMap,
00111         lMean, lStdDev, lCurrentDCP);
00112
00113         // Dispatch the forecast to all classes for Fare Adjustment or MRT.
00114         // The sell-up probability will be used in this case.
00115         Utilities::dispatchDemandForecastForFA
(lBCDispatchingCurveMap,

```

```

00116         lMean, lStdDev, lCurrentDCP);
00117
00118     // Add the demand forecast to the fare family.
00119     const stdair::MeanValue_T& lCurrentMean = lFF_ptr->getMean();
00120     const stdair::StdDevValue_T& lCurrentStdDev = lFF_ptr->getStdDev();
00121
00122     const stdair::MeanValue_T lNewMean = lCurrentMean + lMean;
00123     const stdair::StdDevValue_T lNewStdDev =
00124         std::sqrt( lCurrentStdDev * lCurrentStdDev + lStdDev * lStdDev);
00125
00126     lFF_ptr->setMean( lNewMean);
00127     lFF_ptr->setStdDev( lNewStdDev);
00128 }
00129 }
00130
00131 return true;
00132 }
00133
00134 // //////////////////////////////////////
00135 void QForecasting::preparePriceOrientedHistoricalBooking
00136 (const stdair::SegmentCabin& iSegmentCabin,
00137  const stdair::SegmentSnapshotTable& iSegmentSnapshotTable,
00138  HistoricalBookingHolder& ioHBHolder,
00139  const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00140  const stdair::NbOfSegments_T& iSegmentBegin,
00141  const stdair::NbOfSegments_T& iSegmentEnd,
00142  const stdair::BookingClassSellUpCurveMap_T& iBCSellUpCurveMap) {
00143
00144     // Retrieve the segment-cabin index within the snapshot table
00145     std::ostringstream lSCMapKey;
00146     lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00147         << iSegmentCabin.describeKey();
00148     const stdair::ClassIndex_T& lCabinIdx =
00149         iSegmentSnapshotTable.getClassIndex( lSCMapKey.str());
00150
00151     // Retrieve the gross daily booking and availability snapshots.
00152     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lBookingView =
00153         iSegmentSnapshotTable.
00154         getConstSegmentCabinDTRangePriceOrientedGrossBookingSnapshotView( iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00155     const stdair::ConstSegmentCabinDTRangeSnapshotView_T lAvlView =
00156         iSegmentSnapshotTable.
00157         getConstSegmentCabinDTRangeAvailabilitySnapshotView( iSegmentBegin, iSegmentEnd, iDCPEnd, iDCPBegin);
00158
00159     // Browse the list of segments and build the historical booking holder.
00160     const stdair::ClassIndexMap_T& lVTIdxMap =
00161         iSegmentSnapshotTable.getClassIndexMap();
00162     const stdair::NbOfClasses_T lNbOfClasses = lVTIdxMap.size();
00163
00164     for (short i = 0; i <= iSegmentEnd-iSegmentBegin; ++i) {
00165         stdair::Flag_T lCensorshipFlag = false;
00166         const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00167         const stdair::UnsignedIndex_T lIdx = i*lNbOfClasses + lCabinIdx;
00168
00169         // Parse the DTDs during the period and compute the censorship flag
00170         for (short j = 0; j < lNbOfDTDs; ++j) {
00171             // Check if the data has been censored during this day.
00172             // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfClasses: " << lNbOfClasses
00173             // << ", ClassIdx: " << iClassIdx << ", j: " << j);
00174             if (lAvlView[lIdx][j] < 1.0) {
00175                 lCensorshipFlag = true;
00176                 break;
00177             }
00178         }
00179     }
00180
00181     // Compute the Q-equivalent bookings
00182     stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00183     for (stdair::BookingClassSellUpCurveMap_T::const_iterator itBCSUC =
00184         iBCSellUpCurveMap.begin();
00185          itBCSUC != iBCSellUpCurveMap.end(); ++itBCSUC) {
00186         const stdair::BookingClass* lBookingClass_ptr = itBCSUC->first;
00187         assert (lBookingClass_ptr != NULL);
00188         const stdair::SellUpCurve_T& lSellUpCurve = itBCSUC->second;
00189         stdair::SellUpCurve_T::const_iterator itSellUp =
00190             lSellUpCurve.find( iDCPBegin);
00191         assert (itSellUp != lSellUpCurve.end());
00192         const stdair::SellUpProbability_T& lSellUp = itSellUp->second;
00193         assert (lSellUp != 0);
00194
00195         // Retrieve the number of bookings
00196         const stdair::ClassIndex_T& lClassIdx =
00197             iSegmentSnapshotTable.getClassIndex(lBookingClass_ptr->describeKey())
00198         ;
00199         stdair::NbOfBookings_T lNbOfBookings = 0.0;
00200         for (short j = 0; j < lNbOfDTDs; ++j) {
00201             lNbOfBookings += lBookingView[i*lNbOfClasses + lClassIdx][j];
00202         }
00203     }
00204 }

```

```

00200         const stdair::NbOfBookings_T lNbOfQEquivalentBkgs=lNbOfBookings/lSellUp
00201     ;
00202         lNbOfHistoricalBkgs += lNbOfQEquivalentBkgs;
00203     }
00204     HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs,
00205         lCensorshipFlag);
00206     ioHBHolder.addHistoricalBooking (lHistoricalBkg);
00207 }
00208 }

```

26.121 rmol/command/QForecasting.hpp File Reference

```

#include <stdair/stdair_inventory_types.hpp>
#include <rmol/RMOL_Types.hpp>

```

Classes

- class [RMOL::QForecasting](#)

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.122 QForecasting.hpp

```

00001 #ifndef __RMOL_COMMAND_QFORECASTING_HPP
00002 #define __RMOL_COMMAND_QFORECASTING_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // StdAir
00008 #include <stdair/stdair_inventory_types.hpp>
00009 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations
00013 namespace stdair {
00014     class SegmentCabin;
00015     class SegmentSnapshotTable;
00016 }
00017
00018 namespace RMOL {
00019     // Forward declarations
00020     struct HistoricalBookingHolder;
00021
00022     class QForecasting {
00023     public:
00024         static bool forecast (stdair::SegmentCabin&,
00025             const stdair::Date_T&, const stdair::DTD_T&,
00026             const stdair::UnconstrainingMethod&,
00027             const stdair::NbOfSegments_T&);
00028
00029         static void preparePriceOrientedHistoricalBooking
00030             (const stdair::SegmentCabin&, const stdair::SegmentSnapshotTable&,
00031             HistoricalBookingHolder&, const stdair::DCP_T&,
00032             const stdair::DCP_T&,
00033             const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&,
00034             const stdair::BookingClassSellUpCurveMap_T&);
00035     };
00036 }
00037 #endif // __RMOL_COMMAND_QFORECASTING_HPP

```

26.123 rmol/config/rmol-paths.hpp File Reference

Macros

- `#define PACKAGE "rmol"`
- `#define PACKAGE_NAME "RMOL"`
- `#define PACKAGE_VERSION "1.00.0"`
- `#define PREFIXDIR "/usr"`
- `#define EXEC_PREFIX "/usr"`
- `#define BINDIR "/usr/bin"`
- `#define LIBDIR "/usr/lib"`
- `#define LIBEXECDIR "/usr/libexec"`
- `#define SBINDIR "/usr/sbin"`
- `#define SYSCONFDIR "/usr/etc"`
- `#define INCLUDEDIR "/usr/include"`
- `#define DATAROOTDIR "/usr/share"`
- `#define DATADIR "/usr/share"`
- `#define DOCDIR "/usr/share/doc/rmol-1.00.0"`
- `#define MANDIR "/usr/share/man"`
- `#define INFODIR "/usr/share/info"`
- `#define HTMLDIR "/usr/share/doc/rmol-1.00.0/html"`
- `#define PDFDIR "/usr/share/doc/rmol-1.00.0/html"`
- `#define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"`

26.123.1 Macro Definition Documentation

26.123.1.1 `#define PACKAGE "rmol"`

Definition at line 4 of file [rmol-paths.hpp](#).

26.123.1.2 `#define PACKAGE_NAME "RMOL"`

Definition at line 5 of file [rmol-paths.hpp](#).

Referenced by [readConfiguration\(\)](#).

26.123.1.3 `#define PACKAGE_VERSION "1.00.0"`

Definition at line 6 of file [rmol-paths.hpp](#).

Referenced by [readConfiguration\(\)](#).

26.123.1.4 `#define PREFIXDIR "/usr"`

Definition at line 7 of file [rmol-paths.hpp](#).

Referenced by [readConfiguration\(\)](#).

26.123.1.5 `#define EXEC_PREFIX "/usr"`

Definition at line 8 of file [rmol-paths.hpp](#).

26.123.1.6 `#define BINDIR "/usr/bin"`

Definition at line 9 of file [rmol-paths.hpp](#).

26.123.1.7 `#define LIBDIR "/usr/lib"`

Definition at line 10 of file [rmol-paths.hpp](#).

26.123.1.8 `#define LIBEXECDIR "/usr/libexec"`

Definition at line 11 of file [rmol-paths.hpp](#).

26.123.1.9 `#define SBINDIR "/usr/sbin"`

Definition at line 12 of file [rmol-paths.hpp](#).

26.123.1.10 `#define SYSCONFDIR "/usr/etc"`

Definition at line 13 of file [rmol-paths.hpp](#).

26.123.1.11 `#define INCLUDEDIR "/usr/include"`

Definition at line 14 of file [rmol-paths.hpp](#).

26.123.1.12 `#define DATAROOTDIR "/usr/share"`

Definition at line 15 of file [rmol-paths.hpp](#).

26.123.1.13 `#define DATADIR "/usr/share"`

Definition at line 16 of file [rmol-paths.hpp](#).

26.123.1.14 `#define DOCDIR "/usr/share/doc/rmol-1.00.0"`

Definition at line 17 of file [rmol-paths.hpp](#).

26.123.1.15 `#define MANDIR "/usr/share/man"`

Definition at line 18 of file [rmol-paths.hpp](#).

26.123.1.16 `#define INFODIR "/usr/share/info"`

Definition at line 19 of file [rmol-paths.hpp](#).

26.123.1.17 `#define HTMLDIR "/usr/share/doc/rmol-1.00.0/html"`

Definition at line 20 of file [rmol-paths.hpp](#).

26.123.1.18 `#define PDFDIR "/usr/share/doc/rmol-1.00.0/html"`

Definition at line 21 of file [rmol-paths.hpp](#).

26.123.1.19 `#define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"`

Definition at line 22 of file [rmol-paths.hpp](#).

26.124 rmol-paths.hpp

```
00001 #ifndef __RMOL_PATHS_HPP__
00002 #define __RMOL_PATHS_HPP__
00003
00004 #define PACKAGE "rmol"
00005 #define PACKAGE_NAME "RMOL"
00006 #define PACKAGE_VERSION "1.00.0"
00007 #define PREFIXDIR "/usr"
00008 #define EXEC_PREFIX "/usr"
00009 #define BINDIR "/usr/bin"
00010 #define LIBDIR "/usr/lib"
00011 #define LIBEXEC_DIR "/usr/libexec"
00012 #define SBINDIR "/usr/sbin"
00013 #define SYSCONFDIR "/usr/etc"
00014 #define INCLUDEDIR "/usr/include"
00015 #define DATAROOTDIR "/usr/share"
00016 #define DATADIR "/usr/share"
00017 #define DOCDIR "/usr/share/doc/rmol-1.00.0"
00018 #define MANDIR "/usr/share/man"
00019 #define INFODIR "/usr/share/info"
00020 #define HTMLDIR "/usr/share/doc/rmol-1.00.0/html"
00021 #define PDFDIR "/usr/share/doc/rmol-1.00.0/html"
```

```

00022 #define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"
00023
00024 #endif // __RMOL_PATHS_HPP__

```

26.125 rmol/factory/FacRmolServiceContext.cpp File Reference

```

#include <cassert>
#include <stdair/service/FacSupervisor.hpp>
#include <rmol/factory/FacRmolServiceContext.hpp>
#include <rmol/service/RMOL_ServiceContext.hpp>

```

Namespaces

- namespace [RMOL](#)

26.126 FacRmolServiceContext.cpp

```

00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 // StdAir
00007 #include <stdair/service/FacSupervisor.hpp>
00008 // RMOL
00009 #include <rmol/factory/FacRmolServiceContext.hpp>
00010 #include <rmol/service/RMOL_ServiceContext.hpp>
00011
00012 namespace RMOL {
00013
00014     FacRmolServiceContext* FacRmolServiceContext::_instance = NULL;
00015
00016     // //////////////////////////////////////
00017     FacRmolServiceContext::~FacRmolServiceContext
00018     () {
00019         _instance = NULL;
00020     }
00021
00022     // //////////////////////////////////////
00023     FacRmolServiceContext& FacRmolServiceContext::instance
00024     () {
00025         if (_instance == NULL) {
00026             _instance = new FacRmolServiceContext();
00027             assert (_instance != NULL);
00028             stdair::FacSupervisor::instance().
00029                 registerServiceFactory (_instance);
00030             return *_instance;
00031         }
00032
00033         // //////////////////////////////////////
00034         RMOL_ServiceContext& FacRmolServiceContext::create
00035         () {
00036             RMOL_ServiceContext* aServiceContext_ptr = NULL;
00037             aServiceContext_ptr = new RMOL_ServiceContext();
00038             assert (aServiceContext_ptr != NULL);
00039
00040             // The new object is added to the Bom pool
00041             _pool.push_back (aServiceContext_ptr);
00042             return *aServiceContext_ptr;
00043         }
00044     }
00045 }
00046

```

26.127 rmol/factory/FacRmolServiceContext.hpp File Reference

```
#include <string>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/service/FacServiceAbstract.hpp>
```

Classes

- class [RMOL::FacRmolServiceContext](#)
Factory for the service context.

Namespaces

- namespace [RMOL](#)

26.128 FacRmolServiceContext.hpp

```
00001 #ifndef __RMOL_FAC_FACRMOLSERVICECONTEXT_HPP
00002 #define __RMOL_FAC_FACRMOLSERVICECONTEXT_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <string>
00009 // StdAir
00010 #include <stdair/stdair_basic_types.hpp>
00011 #include <stdair/service/FacServiceAbstract.hpp>
00012
00013 namespace RMOL {
00014
00016     class RMOL_ServiceContext;
00017
00018
00022     class FacRmolServiceContext : public
stdair::FacServiceAbstract {
00023     public:
00024
00031         static FacRmolServiceContext& instance();
00032
00039         ~FacRmolServiceContext();
00040
00048         RMOL_ServiceContext& create();
00049
00050
00051     protected:
00057         FacRmolServiceContext() {}
00058
00059
00060     private:
00064         static FacRmolServiceContext* _instance;
00065     };
00066
00067 }
00068 #endif // __RMOL_FAC_FACRMOLSERVICECONTEXT_HPP
```

26.129 rmol/RMOL_Service.hpp File Reference

```
#include <string>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_service_types.hpp>
#include <stdair/stdair_maths_types.hpp>
#include <stdair/basic/UnconstrainingMethod.hpp>
#include <stdair/basic/ForecastingMethod.hpp>
#include <stdair/basic/PreOptimisationMethod.hpp>
#include <stdair/basic/OptimisationMethod.hpp>
#include <stdair/basic/PartnershipTechnique.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::RMOL_Service](#)
Interface for the [RMOL](#) Services.

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.130 RMOL_Service.hpp

```
00001 #ifndef __RMOL_SVC_RMOL_SERVICE_HPP
00002 #define __RMOL_SVC_RMOL_SERVICE_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <string>
00009 // StdAir
00010 #include <stdair/stdair_basic_types.hpp>
00011 #include <stdair/stdair_inventory_types.hpp>
00012 #include <stdair/stdair_service_types.hpp>
00013 #include <stdair/stdair_maths_types.hpp>
00014 #include <stdair/basic/UnconstrainingMethod.hpp>
00015 #include <stdair/basic/ForecastingMethod.hpp>
00016 #include <stdair/basic/PreOptimisationMethod.hpp>
00017 #include <stdair/basic/OptimisationMethod.hpp>
00018 #include <stdair/basic/PartnershipTechnique.hpp>
00019 // RMOL
00020 #include <rmol/RMOL_Types.hpp>
00021
00022 namespace stdair {
00023     class FlightDate;
00024     struct BasLogParams;
00025     struct BasDBParams;
00026     class BomRoot;
00027     class AirlineClassList;
00028     class YieldFeatures;
00029     class Inventory;
00030     class OnDDate;
00031     class SegmentCabin;
00032 }
00033
00034 namespace RMOL {
00035     class RMOL_ServiceContext;
00036
00037     class RMOL_Service {
00038     public:
00039         // ////////////////////////////////// Constructors and destructors //////////////////////////////////
00040         RMOL_Service (const stdair::BasLogParams&, const
00041             stdair::BasDBParams&);
00042     }
```

```

00074     RMOL_Service (const stdair::BasLogParams&);
00075
00091     RMOL_Service (stdair::STDAIR_ServicePtr_T);
00092
00116     void parseAndLoad (const stdair::CabinCapacity_T&
iCabinCapacity,
00117                        const stdair::Filename_T& iDemandAndClassDataFile);
00118
00122     void setUpStudyStatManager();
00123
00127     ~RMOL_Service();
00128
00129
00130 public:
00131     // ////////////////////////////////// Business Methods //////////////////////////////////
00137     void buildSampleBom();
00138
00142     void clonePersistentBom ();
00143
00148     void buildComplementaryLinks (stdair::BomRoot&);
00149
00153     void optimalOptimisationByMCIntegration (
const int K);
00154
00158     void optimalOptimisationByDP();
00159
00163     void heuristicOptimisationByEmsr();
00164
00168     void heuristicOptimisationByEmsrA();
00169
00173     void heuristicOptimisationByEmsrB();
00174
00178     void heuristicOptimisationByMCIntegrationForQFF
00179     ();
00183     void heuristicOptimisationByEmsrBForQFF()
00184     ;
00188     void MRTForNewQFF();
00189
00197     const stdair::SegmentCabin&
00198     retrieveDummySegmentCabin(const bool
isForFareFamilies = false);
00199
00203     bool optimise (stdair::FlightDate&, const stdair::DateTime_T&,
00204                  const stdair::UnconstrainingMethod&,
00205                  const stdair::ForecastingMethod&,
00206                  const stdair::PreOptimisationMethod&,
00207                  const stdair::OptimisationMethod&,
00208                  const stdair::PartnershipTechnique&);
00209
00214     // O&D based forecast
00215     void forecastOnD (const stdair::DateTime_T&);
00216
00217     stdair::YieldFeatures* getYieldFeatures(const
stdair::OnDDate&, const stdair::CabinCode_T&,
00218                                           stdair::BomRoot&);
00219
00220     void forecastOnD (const stdair::YieldFeatures&, stdair::OnDDate&
00221     ,
00222                  const stdair::CabinCode_T&, const stdair::DTD_T&,
00223                  stdair::BomRoot&);
00224     void setOnDForecast (const stdair::AirlineClassList&, const
stdair::MeanValue_T&,
00225                        const stdair::StdDevValue_T&, stdair::OnDDate&, const
stdair::CabinCode_T&,
00226                        stdair::BomRoot&);
00227
00228     // Single segment O&D
00229     void setOnDForecast (const stdair::AirlineCode_T&, const
stdair::Date_T&, const stdair::AirportCode_T&,
00230                        const stdair::AirportCode_T&, const
stdair::CabinCode_T&, const stdair::ClassCode_T&,
00231                        const stdair::MeanValue_T&, const
stdair::StdDevValue_T&, const stdair::Yield_T&, stdair::BomRoot&);
00232
00233     // Multiple segment O&D
00234     void setOnDForecast (const stdair::AirlineCodeList_T&, const
stdair::AirlineCode_T&,const stdair::Date_T&,
00235                        const stdair::AirportCode_T&, const
stdair::AirportCode_T&, const stdair::CabinCode_T&,
00236                        const stdair::ClassCodeList_T&, const
stdair::MeanValue_T&, const stdair::StdDevValue_T&,
00237                        const stdair::Yield_T&, stdair::BomRoot&);
00238
00239     // Initialise (or re-initialise) the demand projections in all leg cabins

```

```

00240     void resetDemandInformation (const stdair::DateTime_T
00241     &);
00242     void resetDemandInformation (const stdair::DateTime_T
00243     &, const stdair::Inventory&);
00244     /* Projection of demand */
00245     // Aggregated demand at booking class level.
00246     void projectAggregatedDemandOnLegCabins(
00247     const stdair::DateTime_T&);
00248     // Static rule prorated yield
00249     void projectOnDDemandOnLegCabinsUsingYP(
00250     const stdair::DateTime_T&);
00251     // Displacement-adjusted yield
00252     void projectOnDDemandOnLegCabinsUsingDA(
00253     const stdair::DateTime_T&);
00254     // Dynamic yield proration (PF = BP_i/BP_{total}, where BP_{total} =
00255     sum(BP_i))
00256     void projectOnDDemandOnLegCabinsUsingDYP
00257     (const stdair::DateTime_T&);
00258     void projectOnDDemandOnLegCabinsUsingDYP
00259     (const stdair::DateTime_T&, const stdair::Inventory&);
00260     // O&D-based optimisation (using demand aggregation or demand aggregation).
00261     void optimiseOnD (const stdair::DateTime_T&);
00262     // O&D-based optimisation using displacement-adjusted yield.
00263     void optimiseOnDUsingRMCooperation (const
00264     stdair::DateTime_T&);
00265     // Advanced version of O&D-based optimisation using displacement-adjusted
00266     yield.
00267     // Network optimisation instead of separate inventory optimisation.
00268     void optimiseOnDUsingAdvancedRMCooperation
00269     (const stdair::DateTime_T&);
00270     // Update bid price and send to partners
00271     void updateBidPrice (const stdair::DateTime_T&);
00272     void updateBidPrice (const stdair::FlightDate&,
00273     stdair::BomRoot&);
00274     public:
00275     // ////////////////////////////////// Export support methods //////////////////////////////////
00276     std::string jsonExport (const stdair::AirlineCode_T&,
00277     const stdair::FlightNumber_T&,
00278     const stdair::Date_T& iDepartureDate) const;
00279     public:
00280     // ////////////////////////////////// Display support methods //////////////////////////////////
00281     std::string csvDisplay() const;
00282     private:
00283     // ////////////////////////////////// Construction and Destruction helper methods //////////////////////////////////
00284     RMOL_Service();
00285     RMOL_Service (const RMOL_Service&);
00286     stdair::STDAIR_ServicePtr_T initStdAirService (const stdair::BasLogParams&,
00287     const stdair::BasDBParams&);
00288     stdair::STDAIR_ServicePtr_T initStdAirService (const stdair::BasLogParams&)
00289     ;
00290     void addStdAirService (stdair::STDAIR_ServicePtr_T,
00291     const bool iOwnStdairService);
00292     void initServiceContext ();
00293     void initRmolService();
00294     void finalise();
00295     private:
00296     // ////////////////////////////////// Service Context //////////////////////////////////
00297     RMOL_ServiceContext* _rmolServiceContext;
00298     stdair::Date_T _previousForecastDate;
00299     };
00300 }

```

```
00380 #endif // __RMOL_SVC_RMOL_SERVICE_HPP
```

26.131 rmol/RMOL_Types.hpp File Reference

```
#include <map>
#include <vector>
#include <boost/shared_ptr.hpp>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_rm_types.hpp>
#include <stdair/stdair_exceptions.hpp>
```

Classes

- class [RMOL::OverbookingException](#)
Overbooking-related exception.
- class [RMOL::UnconstrainingException](#)
Unconstraining-related exception.
- class [RMOL::EmptyNestingStructException](#)
Empty nesting structure in unconstrainer exception.
- class [RMOL::MissingDCPException](#)
Missing a DCP in unconstrainer exception.
- class [RMOL::OptimisationException](#)
Optimisation-related exception.
- class [RMOL::PolicyException](#)
Policy-related exception.
- class [RMOL::ConvexHullException](#)
Convex Hull-related exception.
- class [RMOL::EmptyConvexHullException](#)
Empty convex hull exception.
- class [RMOL::FirstPolicyNotNullException](#)
Missing policy NULL in convex hull exception.
- class [RMOL::YieldConvexHullException](#)
Yield convex hull exception.
- class [RMOL::FareFamilyException](#)
Fare Family-related exception.
- class [RMOL::EmptyBookingClassListException](#)
Empty Booking Class List of Fare Family exception.
- class [RMOL::MissingBookingClassInFareFamilyException](#)
Missing Booking Class in Fare Family exception.
- class [RMOL::FareFamilyDemandVectorSizeException](#)
Fare Family demand exception.

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

Typedefs

- typedef boost::shared_ptr
 < RMOL_Service > [RMOL::RMOL_ServicePtr_T](#)
- typedef std::vector
 < stdair::Flag_T > [RMOL::FlagVector_T](#)
- typedef std::map
 < stdair::BookingClass
 *, stdair::MeanStdDevPair_T > [RMOL::BookingClassMeanStdDevPairMap_T](#)

26.132 RMOL_Types.hpp

```

00001 #ifndef __RMOL_RMOL_TYPES_HPP
00002 #define __RMOL_RMOL_TYPES_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <map>
00009 #include <vector>
00010 // Boost
00011 #include <boost/shared_ptr.hpp>
00012 // StdAir
00013 #include <stdair/stdair_inventory_types.hpp>
00014 #include <stdair/stdair_rm_types.hpp>
00015 #include <stdair/stdair_exceptions.hpp>
00016
00017 // Forward declarations.
00018 namespace stdair {
00019     class BookingClass;
00020 }
00021
00022 namespace RMOL {
00023     // Forward declarations
00024     class RMOL_Service;
00025
00026     // ////////////////////////////////// Exceptions //////////////////////////////////
00027     class OverbookingException : public stdair::RootException
00028     {
00029     public:
00030         OverbookingException (const std::string& iWhat)
00031             : stdair::RootException (iWhat) {}
00032     };
00033
00034     class UnconstrainingException : public
00035         stdair::RootException {
00036     public:
00037         UnconstrainingException (const std::string& iWhat)
00038             : stdair::RootException (iWhat) {}
00039     };
00040
00041     class EmptyNestingStructException : public
00042         UnconstrainingException {
00043     public:
00044         EmptyNestingStructException (const std::string&
00045             iWhat)
00046             : UnconstrainingException (iWhat) {}
00047     };
00048
00049     class MissingDCPEException : public UnconstrainingException
00050     {
00051     public:
00052         MissingDCPEException (const std::string& iWhat)
00053             : UnconstrainingException (iWhat) {}
00054     };
00055
00056     class OptimisationException : public
00057         stdair::RootException {
00058     public:
00059         OptimisationException (const std::string& iWhat)
00060             : stdair::RootException (iWhat) {}
00061     };
00062
00063     class PolicyException : public stdair::RootException {
00064     public:
00065         PolicyException (const std::string& iWhat)
00066             : stdair::RootException (iWhat) {}
00067     };

```

```

00087     };
00088
00089
00093     class ConvexHullException : public PolicyException
00094     {
00095     public:
00096         ConvexHullException (const std::string& iWhat)
00097             : PolicyException (iWhat) {}
00098     };
00099
00103     class EmptyConvexHullException : public
00104     ConvexHullException {
00105     public:
00106         EmptyConvexHullException (const std::string& iWhat)
00107             : ConvexHullException (iWhat) {}
00108     };
00109
00113     class FirstPolicyNotNullException : public
00114     ConvexHullException {
00115     public:
00116         FirstPolicyNotNullException (const std::string&
00117         iWhat)
00118             : ConvexHullException (iWhat) {}
00119     };
00123     class YieldConvexHullException : public
00124     ConvexHullException {
00125     public:
00126         YieldConvexHullException (const std::string& iWhat)
00127             : ConvexHullException (iWhat) {}
00128     };
00129
00130
00134     class FareFamilyException : public stdair::RootException {
00135     public:
00136         FareFamilyException (const std::string& iWhat)
00137             : stdair::RootException (iWhat) {}
00138     };
00139
00140
00144     class EmptyBookingClassListException : public
00145     FareFamilyException {
00146     public:
00147         EmptyBookingClassListException (const
00148         std::string& iWhat)
00149             : FareFamilyException (iWhat) {}
00150     };
00154     class MissingBookingClassInFareFamilyException
00155     : public FareFamilyException {
00156     public:
00157         MissingBookingClassInFareFamilyException
00158         (const std::string& iWhat)
00159             : FareFamilyException (iWhat) {}
00160     };
00164     class FareFamilyDemandVectorSizeException
00165     : public FareFamilyException {
00166     public:
00167         FareFamilyDemandVectorSizeException (
00168         const std::string& iWhat)
00169             : FareFamilyException (iWhat) {}
00170     };
00171
00172     // ////////// Type definitions //////////
00176     typedef boost::shared_ptr<RMOL_Service> RMOL_ServicePtr_T;
00177
00179     typedef std::vector<stdair::Flag_T> FlagVector_T;
00180
00182     typedef std::map<stdair::BookingClass*, stdair::MeanStdDevPair_T>
00183     BookingClassMeanStdDevPairMap_T;
00184 #endif // __RMOL_RMOL_TYPES_HPP

```

26.133 rmol/service/RMOL_Service.cpp File Reference

```
#include <cassert>
#include <boost/make_shared.hpp>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/basic/BasChronometer.hpp>
#include <stdair/basic/ContinuousAttributeLite.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/BomRetriever.hpp>
#include <stdair/bom/BomRoot.hpp>
#include <stdair/bom/Inventory.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/LegCabin.hpp>
#include <stdair/bom/LegDate.hpp>
#include <stdair/bom/YieldFeatures.hpp>
#include <stdair/bom/AirportPair.hpp>
#include <stdair/bom/PosChannel.hpp>
#include <stdair/bom/DatePeriod.hpp>
#include <stdair/bom/TimePeriod.hpp>
#include <stdair/bom/AirlineClassList.hpp>
#include <stdair/basic/BasConst_Request.hpp>
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/bom/OnDDate.hpp>
#include <stdair/bom/OnDDateTypes.hpp>
#include <stdair/command/CmdBomManager.hpp>
#include <stdair/service/Logger.hpp>
#include <stdair/STDAIR_Service.hpp>
#include <rmol/basic/BasConst_RMOL_Service.hpp>
#include <rmol/factory/FacRmolServiceContext.hpp>
#include <rmol/command/InventoryParser.hpp>
#include <rmol/command/Optimiser.hpp>
#include <rmol/command/PreOptimiser.hpp>
#include <rmol/command/Forecaster.hpp>
#include <rmol/service/RMOL_ServiceContext.hpp>
#include <rmol/RMOL_Service.hpp>
```

Namespaces

- namespace [RMOL](#)

26.134 RMOL_Service.cpp

```
00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 // Boost
00007 #include <boost/make_shared.hpp>
00008 // StdAir
00009 #include <stdair/stdair_inventory_types.hpp>
00010 #include <stdair/basic/BasChronometer.hpp>
00011 #include <stdair/basic/ContinuousAttributeLite.hpp>
00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/BomRetriever.hpp>
00014 #include <stdair/bom/BomRoot.hpp>
00015 #include <stdair/bom/Inventory.hpp>
00016 #include <stdair/bom/FlightDate.hpp>
```

```

00017 #include <stdair/bom/LegCabin.hpp>
00018 #include <stdair/bom/LegDate.hpp>
00019 #include <stdair/bom/YieldFeatures.hpp>
00020 #include <stdair/bom/AirportPair.hpp>
00021 #include <stdair/bom/PosChannel.hpp>
00022 #include <stdair/bom/DatePeriod.hpp>
00023 #include <stdair/bom/TimePeriod.hpp>
00024 #include <stdair/bom/AirlineClassList.hpp>
00025 #include <stdair/basic/BasConst_Request.hpp>
00026 #include <stdair/basic/BasConst_Inventory.hpp>
00027 #include <stdair/bom/Inventory.hpp>
00028 #include <stdair/bom/FlightDate.hpp>
00029 #include <stdair/bom/SegmentDate.hpp>
00030 #include <stdair/bom/SegmentCabin.hpp>
00031 #include <stdair/bom/BookingClass.hpp>
00032 #include <stdair/bom/OnDDate.hpp>
00033 #include <stdair/bom/OnDDateTypes.hpp>
00034 #include <stdair/command/CmdBomManager.hpp>
00035 #include <stdair/service/Logger.hpp>
00036 #include <stdair/STDAIR_Service.hpp>
00037 // RMOL
00038 #include <rmol/basic/BasConst_RMOL_Service.hpp>
00039 >
00039 #include <rmol/factory/FacRmolServiceContext.hpp>
00040 >
00040 #include <rmol/command/InventoryParser.hpp>
00041 #include <rmol/command/Optimiser.hpp>
00042 #include <rmol/command/PreOptimiser.hpp>
00043 #include <rmol/command/Forecaster.hpp>
00044 #include <rmol/service/RMOL_ServiceContext.hpp>
00045 >
00045 #include <rmol/RMOL_Service.hpp>
00046
00047 namespace RMOL {
00048
00049 // //////////////////////////////////////
00050 RMOL_Service::RMOL_Service()
00051 : _rmolServiceContext (NULL),
00052   _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00053     assert (false);
00054 }
00055
00056 // //////////////////////////////////////
00057 RMOL_Service::RMOL_Service (const RMOL_Service& iService) :
00058   _rmolServiceContext (NULL),
00059   _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00060     assert (false);
00061 }
00062
00063 // //////////////////////////////////////
00064 RMOL_Service::RMOL_Service (const stdair::BasLogParams& iLogParams) :
00065   _rmolServiceContext (NULL),
00066   _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00067
00068   // Initialise the STDAIR service handler
00069   stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00070     initStdAirService (iLogParams);
00071
00072   // Initialise the service context
00073   initServiceContext();
00074
00075   // Add the StdAir service context to the RMOL service context
00076   // \note RMOL owns the STDAIR service resources here.
00077   const bool ownStdairService = true;
00078   addStdAirService (lSTDAIR_Service_ptr, ownStdairService);
00079
00080   // Initialise the (remaining of the) context
00081   initRmolService();
00082 }
00083
00084 // //////////////////////////////////////
00085 RMOL_Service::RMOL_Service (const stdair::BasLogParams& iLogParams,
00086                             const stdair::BasDBParams& iDBParams) :
00087   _rmolServiceContext (NULL),
00088   _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00089
00090   // Initialise the STDAIR service handler
00091   stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00092     initStdAirService (iLogParams, iDBParams);
00093
00094   // Initialise the service context
00095   initServiceContext();
00096
00097   // Add the StdAir service context to the RMOL service context
00098   // \note RMOL owns the STDAIR service resources here.
00099   const bool ownStdairService = true;
00100   addStdAirService (lSTDAIR_Service_ptr, ownStdairService);

```

```

00101
00102     // Initialise the (remaining of the) context
00103     initRmolService();
00104 }
00105
00106 // //////////////////////////////////////
00107 RMOL_Service::RMOL_Service (stdair::STDAIR_ServicePtr_T ioSTDAIRServicePtr)
00108 : _rmolServiceContext (NULL),
00109   _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00110
00111     // Initialise the context
00112     initServiceContext();
00113
00114     // Add the StdAir service context to the RMOL service context.
00115     // \note RMOL does not own the STDAIR service resources here.
00116     const bool doesNotOwnStdairService = false;
00117     addStdAirService (ioSTDAIRServicePtr, doesNotOwnStdairService);
00118
00119     // Initialise the (remaining of the) context
00120     initRmolService();
00121 }
00122
00123 // //////////////////////////////////////
00124 RMOL_Service::~RMOL_Service() {
00125     // Delete/Clean all the objects from memory
00126     finalise();
00127 }
00128
00129 // //////////////////////////////////////
00130 void RMOL_Service::finalise() {
00131     assert (_rmolServiceContext != NULL);
00132     // Reset the (Boost.)Smart pointer pointing on the STDAIR_Service object.
00133     _rmolServiceContext->reset();
00134 }
00135
00136 // //////////////////////////////////////
00137 void RMOL_Service::initServiceContext() {
00138     // Initialise the service context
00139     RMOL_ServiceContext& lRMOL_ServiceContext =
00140         FacRmolServiceContext::instance().create
00141 ();
00142     _rmolServiceContext = &lRMOL_ServiceContext;
00143 }
00144
00145 // //////////////////////////////////////
00146 void RMOL_Service::
00147 addStdAirService (stdair::STDAIR_ServicePtr_T ioSTDAIR_Service_ptr,
00148                  const bool iOwnStdairService) {
00149
00150     // Retrieve the RMOL service context
00151     assert (_rmolServiceContext != NULL);
00152     RMOL_ServiceContext& lRMOL_ServiceContext = *_rmolServiceContext;
00153
00154     // Store the STDAIR service object within the (AIRINV) service context
00155     lRMOL_ServiceContext.setSTDAIR_Service (ioSTDAIR_Service_ptr,
00156                                             iOwnStdairService);
00157 }
00158
00159 // //////////////////////////////////////
00160 stdair::STDAIR_ServicePtr_T RMOL_Service::
00161 initStdAirService (const stdair::BasLogParams& iLogParams) {
00162
00163     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00164         boost::make_shared<stdair::STDAIR_Service> (iLogParams);
00165
00166     return lSTDAIR_Service_ptr;
00167 }
00168
00169 // //////////////////////////////////////
00170 stdair::STDAIR_ServicePtr_T RMOL_Service::
00171 initStdAirService (const stdair::BasLogParams& iLogParams,
00172                  const stdair::BasDBParams& iDBParams) {
00173
00174     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00175         boost::make_shared<stdair::STDAIR_Service> (iLogParams, iDBParams);
00176
00177     return lSTDAIR_Service_ptr;
00178 }
00179
00180 // //////////////////////////////////////
00181 void RMOL_Service::initRmolService() {
00182     // Do nothing at this stage. A sample BOM tree may be built by
00183     // calling the buildSampleBom() method
00184 }
00185
00186 // //////////////////////////////////////
00187 void RMOL_Service::

```

```

00201 parseAndLoad (const stdair::CabinCapacity_T& iCabinCapacity,
00202               const stdair::Filename_T& iInputFileName) {
00203
00204     // Retrieve the RMOL service context
00205     if (_rmolServiceContext == NULL) {
00206         throw stdair::NonInitialisedServiceException ("The RMOL service has not"
00207                                                       " been initialised");
00208     }
00209     assert (_rmolServiceContext != NULL);
00210     RMOL_ServiceContext& lRMOL_ServiceContext = *
00211     _rmolServiceContext;
00212     const bool doesOwnStdairService =
00213         lRMOL_ServiceContext.getOwnStdairServiceFlag();
00214
00215     // Retrieve the StdAir service object from the (RMOL) service context
00216     stdair::STDAIR_Service& lSTDAIR_Service =
00217         lRMOL_ServiceContext.getSTDAIR_Service();
00218     stdair::BomRoot& lPersistentBomRoot =
00219         lSTDAIR_Service.getPersistentBomRoot();
00220
00221     lSTDAIR_Service.buildDummyInventory (iCabinCapacity);
00222
00223     InventoryParser::parseInputFileAndBuildBom
00224     (iInputFileName,
00225      lPersistentBomRoot);
00226
00227     buildComplementaryLinks (lPersistentBomRoot);
00228
00229     if (doesOwnStdairService == true) {
00230
00231         //
00232         clonePersistentBom ();
00233     }
00234 }
00235
00236 // //////////////////////////////////////
00237 void RMOL_Service::buildSampleBom() {
00238
00239     // Retrieve the RMOL service context
00240     if (_rmolServiceContext == NULL) {
00241         throw stdair::NonInitialisedServiceException ("The RMOL service has not"
00242                                                       " been initialised");
00243     }
00244     assert (_rmolServiceContext != NULL);
00245
00246     // Retrieve the RMOL service context and whether it owns the Stdair
00247     // service
00248     RMOL_ServiceContext& lRMOL_ServiceContext = *
00249     _rmolServiceContext;
00250     const bool doesOwnStdairService =
00251         lRMOL_ServiceContext.getOwnStdairServiceFlag();
00252
00253     // Retrieve the StdAir service object from the (RMOL) service context
00254     stdair::STDAIR_Service& lSTDAIR_Service =
00255         lRMOL_ServiceContext.getSTDAIR_Service();
00256     stdair::BomRoot& lPersistentBomRoot =
00257         lSTDAIR_Service.getPersistentBomRoot();
00258
00259     if (doesOwnStdairService == true) {
00260         //
00261         lSTDAIR_Service.buildSampleBom();
00262     }
00263
00264     buildComplementaryLinks (lPersistentBomRoot);
00265
00266     if (doesOwnStdairService == true) {
00267
00268         //
00269         clonePersistentBom ();
00270     }
00271 }
00272
00273 // //////////////////////////////////////
00274 void RMOL_Service::clonePersistentBom () {
00275
00276     // Retrieve the RMOL service context
00277     if (_rmolServiceContext == NULL) {
00278         throw stdair::NonInitialisedServiceException ("The RMOL service has not "
00279                                                       "been initialised");
00280     }
00281     assert (_rmolServiceContext != NULL);
00282
00283     // Retrieve the RMOL service context and whether it owns the Stdair
00284     // service
00285     RMOL_ServiceContext& lRMOL_ServiceContext = *
00286     _rmolServiceContext;
00287     const bool doesOwnStdairService =

```

```

00332     lRMOL_ServiceContext.getOwnStdairServiceFlag();
00333
00334     // Retrieve the StdAir service object from the (RMOL) service context
00335     stdair::STDAIR_Service& lSTDAIR_Service =
00336         lRMOL_ServiceContext.getSTDAIR_Service();
00337
00342     if (doesOwnStdairService == true) {
00343
00344         //
00345         lSTDAIR_Service.clonePersistentBom ();
00346     }
00347
00351     stdair::BomRoot& lBomRoot =
00352         lSTDAIR_Service.getBomRoot();
00353     buildComplementaryLinks (lBomRoot);
00354 }
00355
00356 // //////////////////////////////////////
00357 void RMOL_Service::buildComplementaryLinks
00358 (stdair::BomRoot& ioBomRoot) {
00359
00360     // Retrieve the RMOL service context
00361     if (_rmolServiceContext == NULL) {
00362         throw stdair::NonInitialisedServiceException("The RMOL service has not "
00363             "been initialised");
00364     }
00365     assert (_rmolServiceContext != NULL);
00366
00367     // Retrieve the RMOL service context and whether it owns the Stdair
00368     // service
00369     RMOL_ServiceContext& lRMOL_ServiceContext = *
00370         _rmolServiceContext;
00371
00372     // Retrieve the StdAir service object from the (RMOL) service context
00373     stdair::STDAIR_Service& lSTDAIR_Service =
00374         lRMOL_ServiceContext.getSTDAIR_Service();
00375
00376     lSTDAIR_Service.buildDummyLegSegmentAccesses (ioBomRoot);
00377 }
00378
00381 // //////////////////////////////////////
00382 void RMOL_Service::optimalOptimisationByMCIntegration
00383 (const int K) {
00384     assert (_rmolServiceContext != NULL);
00385     RMOL_ServiceContext& lRMOL_ServiceContext = *
00386         _rmolServiceContext;
00387
00388     // Retrieve the StdAir service
00389     stdair::STDAIR_Service& lSTDAIR_Service =
00390         lRMOL_ServiceContext.getSTDAIR_Service();
00391     // TODO: gsabatier
00392     // Replace the getPersistentBomRoot method by the getBomRoot method,
00393     // in order to work on the clone Bom root instead of the persistent one.
00394     // Does not work for now because virtual classes are not cloned.
00395     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getPersistentBomRoot();
00396
00397     //
00398     stdair::LegCabin& lLegCabin =
00399         stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00400
00401     stdair::BasChronometer lOptimisationChronometer;
00402     lOptimisationChronometer.start();
00403
00404     Optimiser::optimalOptimisationByMCIntegration
00405     (K, lLegCabin);
00406
00407     const double lOptimisationMeasure = lOptimisationChronometer.elapsed();
00408
00409     // DEBUG
00410     STDAIR_LOG_DEBUG ("Optimisation by Monte-Carlo performed in "
00411         "<< lOptimisationMeasure);
00412     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00413
00414     std::ostream logStream;
00415     stdair::BidPriceVector_T lBidPriceVector = lLegCabin.getBidPriceVector();
00416     logStream << "Bid-Price Vector (BPV): ";
00417     const unsigned int size = lBidPriceVector.size();
00418     for (unsigned int i = 0; i < size - 1; ++i) {
00419         const double bidPrice = lBidPriceVector.at(i);
00420         logStream << std::fixed << std::setprecision (2) << bidPrice << ", ";
00421     }
00422     const double bidPrice = lBidPriceVector.at(size - 1);
00423     logStream << std::fixed << std::setprecision (2) << bidPrice;
00424     STDAIR_LOG_DEBUG (logStream.str());
00425 }

```

```

00425 // //////////////////////////////////////
00426 void RMOL_Service::optimalOptimisationByDP
00427 () {
00428 }
00429 // //////////////////////////////////////
00430 void RMOL_Service::heuristicOptimisationByEmsr
00431 () {
00432     assert (_rmolServiceContext != NULL);
00433     RMOL_ServiceContext& lRMOL_ServiceContext = *
00434     _rmolServiceContext;
00435     // Retrieve the StdAir service
00436     stdair::STDAIR_Service& lSTDAIR_Service =
00437     lRMOL_ServiceContext.getSTDAIR_Service();
00438     // TODO: gsabatier
00439     // Replace the getPersistentBomRoot method by the getBomRoot method,
00440     // in order to work on the clone Bom root instead of the persistent one.
00441     // Does not work for now because virtual classes are not cloned.
00442     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getPersistentBomRoot();
00443     //
00444     stdair::LegCabin& lLegCabin =
00445     stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00446     stdair::BasChronometer lOptimisationChronometer;
00447     lOptimisationChronometer.start();
00448     Optimiser::heuristicOptimisationByEmsr
00449     (lLegCabin);
00450     const double lOptimisationMeasure = lOptimisationChronometer.elapsed();
00451     // DEBUG
00452     STDAIR_LOG_DEBUG ("Optimisation EMSR performed in "
00453     << lOptimisationMeasure);
00454     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00455     stdair::BidPriceVector_T lBidPriceVector = lLegCabin.getBidPriceVector();
00456     std::ostream logStream;
00457     logStream << "Bid-Price Vector (BPV): ";
00458     stdair::UnsignedIndex_T idx = 0;
00459     for (stdair::BidPriceVector_T::const_iterator itBP = lBidPriceVector.begin()
00460     );
00461     {
00462         itBP != lBidPriceVector.end(); ++itBP) {
00463             if (idx != 0) {
00464                 logStream << ", ";
00465             }
00466             const stdair::BidPrice_T& lBidPrice = *itBP;
00467             logStream << std::fixed << std::setprecision (2) << lBidPrice;
00468         }
00469         // DEBUG
00470         STDAIR_LOG_DEBUG (logStream.str());
00471     }
00472     // //////////////////////////////////////
00473     void RMOL_Service::heuristicOptimisationByEmsrA
00474     () {
00475         assert (_rmolServiceContext != NULL);
00476         RMOL_ServiceContext& lRMOL_ServiceContext = *
00477         _rmolServiceContext;
00478         // Retrieve the StdAir service
00479         stdair::STDAIR_Service& lSTDAIR_Service =
00480         lRMOL_ServiceContext.getSTDAIR_Service();
00481         // TODO: gsabatier
00482         // Replace the getPersistentBomRoot method by the getBomRoot method,
00483         // in order to work on the clone Bom root instead of the persistent one.
00484         // Does not work for now because virtual classes are not cloned.
00485         stdair::BomRoot& lBomRoot = lSTDAIR_Service.getPersistentBomRoot();
00486         //
00487         stdair::LegCabin& lLegCabin =
00488         stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00489         Optimiser::heuristicOptimisationByEmsrA
00490         (lLegCabin);
00491         // DEBUG
00492         STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00493     }
00494     // //////////////////////////////////////
00495     void RMOL_Service::heuristicOptimisationByEmsrB
00496     () {
00497         assert (_rmolServiceContext != NULL);
00498         RMOL_ServiceContext& lRMOL_ServiceContext = *

```



```

_rmolServiceContext;
00503
00504 // Retrieve the StdAir service
00505 stdair::STDAIR_Service& lSTDAIR_Service =
00506     lRMOL_ServiceContext.getSTDAIR_Service();
00507 // TODO: gsabatier
00508 // Replace the getPersistentBomRoot method by the getBomRoot method,
00509 // in order to work on the clone Bom root instead of the persistent one.
00510 // Does not work for now because virtual classes are not cloned.
00511 stdair::BomRoot& lBomRoot = lSTDAIR_Service.getPersistentBomRoot();
00512
00513 //
00514 stdair::LegCabin& lLegCabin =
00515     stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00516
00517 Optimiser::heuristicOptimisationByEmsrB
(lLegCabin);
00518
00519 // DEBUG
00520 STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00521 }
00522
00523 // //////////////////////////////////////
00524 const stdair::SegmentCabin& RMOL_Service::
00525 retrieveDummySegmentCabin(const bool
isForFareFamilies) {
00526     assert (_rmolServiceContext != NULL);
00527     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
00528
00529 // Retrieve the StdAir service
00530 stdair::STDAIR_Service& lSTDAIR_Service =
00531     lRMOL_ServiceContext.getSTDAIR_Service();
00532 // TODO: gsabatier
00533 // Replace the getPersistentBomRoot method by the getBomRoot method,
00534 // in order to work on the clone Bom root instead of the persistent one.
00535 // Does not work for now because virtual classes are not cloned.
00536 stdair::BomRoot& lBomRoot = lSTDAIR_Service.getPersistentBomRoot();
00537
00538 const stdair::SegmentCabin& lSegmentCabin =
00539     stdair::BomRetriever::retrieveDummySegmentCabin
(lBomRoot,
00540                                     isForFareFamilies);
00541     return lSegmentCabin;
00542 }
00543 }
00544
00545 // //////////////////////////////////////
00546 bool RMOL_Service::
00547 optimise (stdair::FlightDate& ioFlightDate,
00548           const stdair::DateTime_T& iRMEventTime,
00549           const stdair::UnconstrainingMethod& iUnconstrainingMethod,
00550           const stdair::ForecastingMethod& iForecastingMethod,
00551           const stdair::PreOptimisationMethod& iPreOptimisationMethod,
00552           const stdair::OptimisationMethod& iOptimisationMethod,
00553           const stdair::PartnershipTechnique& iPartnershipTechnique) {
00554
00555
00556     STDAIR_LOG_DEBUG ("Forecast & Optimisation");
00557
00558     const stdair::PartnershipTechnique::EN_PartnershipTechnique&
lPartnershipTechnique =
00559         iPartnershipTechnique.getTechnique();
00560
00561     switch (lPartnershipTechnique) {
00562     case stdair::PartnershipTechnique::NONE:{
00563         // DEBUG
00564         STDAIR_LOG_DEBUG ("Forecast");
00565
00566         // 1. Forecasting
00567         const bool isForecasted = Forecaster::forecast (
ioFlightDate,
00568                                                         iRMEventTime,
00569                                                         iUnconstrainingMethod,
00570                                                         iForecastingMethod);
00571         // DEBUG
00572         STDAIR_LOG_DEBUG ("Forecast successful: " << isForecasted);
00573
00574         if (isForecasted == true) {
00575             // 2a. MRT or FA
00576             // DEBUG
00577             STDAIR_LOG_DEBUG ("Pre-optimize");
00578
00579             const bool isPreOptimised =
00580                 PreOptimiser::preOptimise (ioFlightDate,
iPreOptimisationMethod);
00581

```

```

00582         // DEBUG
00583         STDAIR_LOG_DEBUG ("Pre-Optimise successful: " << isPreOptimised);
00584
00585         if (isPreOptimised == true) {
00586             // 2b. Optimisation
00587             // DEBUG
00588             STDAIR_LOG_DEBUG ("Optimise");
00589             const bool optimiseSucceeded =
00590                 Optimiser::optimise (ioFlightDate,
00591                                     iOptimisationMethod);
00592             // DEBUG
00593             STDAIR_LOG_DEBUG ("Optimise successful: " << optimiseSucceeded);
00594             return optimiseSucceeded;
00595         }
00596         break;
00597     }
00598     case stdair::PartnershipTechnique::RAE_DA:
00599     case stdair::PartnershipTechnique::IBP_DA: {
00600         if (_previousForecastDate < iRMEEventTime.date()) {
00601             forecastOnD (iRMEEventTime);
00602             resetDemandInformation (iRMEEventTime);
00603             projectAggregatedDemandOnLegCabins (
00604                 iRMEEventTime);
00605             optimiseOnD (iRMEEventTime);
00606         }
00607         break;
00608     }
00609     case stdair::PartnershipTechnique::RAE_YP:
00610     case stdair::PartnershipTechnique::IBP_YP:
00611     case stdair::PartnershipTechnique::IBP_YP_U: {
00612         if (_previousForecastDate < iRMEEventTime.date()) {
00613             forecastOnD (iRMEEventTime);
00614             resetDemandInformation (iRMEEventTime);
00615             projectOnDDemandOnLegCabinsUsingYP (
00616                 iRMEEventTime);
00617             optimiseOnD (iRMEEventTime);
00618         }
00619         break;
00620     }
00621     case stdair::PartnershipTechnique::RMC: {
00622         if (_previousForecastDate < iRMEEventTime.date()) {
00623             forecastOnD (iRMEEventTime);
00624             resetDemandInformation (iRMEEventTime);
00625             updateBidPrice (iRMEEventTime);
00626             projectOnDDemandOnLegCabinsUsingDYP
00627                 (iRMEEventTime);
00628             optimiseOnDUsingRMCooperation (
00629                 iRMEEventTime);
00630         }
00631         break;
00632     }
00633     case stdair::PartnershipTechnique::A_RMC: {
00634         if (_previousForecastDate < iRMEEventTime.date()) {
00635             forecastOnD (iRMEEventTime);
00636             resetDemandInformation (iRMEEventTime);
00637             updateBidPrice (iRMEEventTime);
00638             projectOnDDemandOnLegCabinsUsingDYP
00639                 (iRMEEventTime);
00640             optimiseOnDUsingAdvancedRMCooperation
00641                 (iRMEEventTime);
00642         }
00643         break;
00644     }
00645     default: {
00646         assert (false);
00647         break;
00648     }
00649 }
00650 return false;
00651
00652 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
00653 void RMOL_Service::forecastOnD (const
00654     stdair::DateTime_T& iRMEEventTime) {
00655     if (_rmolServiceContext == NULL) {
00656         throw stdair::NonInitialisedServiceException ("The Rmol service "
00657             "has not been initialised");
00658     }
00659     assert (_rmolServiceContext != NULL);
00660     RMOL_ServiceContext& lRMOL_ServiceContext = *
00661         _rmolServiceContext;
00662     // Retrieve the bom root
00663     stdair::STDAIR_Service& lSTDAIR_Service =

```

```

00659     lRMOL_ServiceContext.getSTDAIR_Service();
00660     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00661
00662     // Retrieve the date from the RM event
00663     const stdair::Date_T lDate = iRMEventTime.date();
00664
00665     _previousForecastDate = lDate;
00666
00667     const stdair::InventoryList_T& lInventoryList =
00668         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
00669     assert (!lInventoryList.empty());
00670     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
;
00671         itInv != lInventoryList.end(); ++itInv) {
00672         const stdair::Inventory* lInventory_ptr = *itInv;
00673         assert (lInventory_ptr != NULL);
00674         const bool hasOnDDateList =
00675             stdair::BomManager::hasList<stdair::OnDDate> (*lInventory_ptr);
00676         if (hasOnDDateList == true) {
00677             const stdair::OnDDateList_T lOnDDateList =
00678                 stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
00679
00680             for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
00681                 itOD != lOnDDateList.end(); ++itOD) {
00682                 stdair::OnDDate* lOnDDate_ptr = *itOD;
00683                 assert (lOnDDate_ptr != NULL);
00684
00685                 const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
00686                 stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
00687                 stdair::DTD_T lDTD = short (lDateOffset.days());
00688
00689                 stdair::DCPLIST_T::const_iterator itDCP =
00690                     std::find (stdair::DEFAULT_DCP_LIST.begin(),
00691                                 stdair::DEFAULT_DCP_LIST.end(), lDTD);
00692                 // Check if the forecast for this O&D date needs to be forecasted.
00693                 if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
00694                     // Retrieve the total forecast map.
00695                     const stdair::CabinForecastMap_T& lTotalForecastMap =
00696                         lOnDDate_ptr->getTotalForecastMap();
00697
00698                     // Browse the map and make a forecast for every cabin.
00699                     for (stdair::CabinForecastMap_T::const_iterator itCF =
00700                         lTotalForecastMap.begin();
00701                         itCF != lTotalForecastMap.end(); ++itCF) {
00702                         const stdair::CabinCode_T lCabinCode = itCF->first;
00703                         stdair::YieldFeatures* lYieldFeatures_ptr =
00704                             getYieldFeatures(*lOnDDate_ptr, lCabinCode,
lBomRoot);
00705                         if (lYieldFeatures_ptr == NULL) {
00706                             STDAIR_LOG_ERROR ("Cannot find yield corresponding to "
00707                                                 << "the O&D date"
00708                                                 << lOnDDate_ptr->toString()
00709                                                 << " Cabin " << lCabinCode);
00710                             assert (false);
00711                         }
00712                         forecastOnD (*lYieldFeatures_ptr, *lOnDDate_ptr,
lCabinCode, lDTD,
00713                                     lBomRoot);
00714                     }
00715                 }
00716             }
00717         }
00718     }
00719 }
00720
00721 // //////////////////////////////////////
00722 stdair::YieldFeatures* RMOL_Service::
00723 getYieldFeatures(const stdair::OnDDate& iOnDDate,
00724                 const stdair::CabinCode_T& iCabinCode,
00725                 stdair::BomRoot& iBomRoot) {
00726
00727     const stdair::AirportCode_T& lOrigin = iOnDDate.getOrigin();
00728     const stdair::AirportCode_T& lDestination = iOnDDate.getDestination();
00729
00730     const stdair::Date_T& lDepartureDate = iOnDDate.getDate();
00731
00732     // Build the airport pair key out of O&D and get the airport pair object
00733     const stdair::AirportPairKey lAirportPairKey(lOrigin, lDestination);
00734     stdair::AirportPair* lAirportPair_ptr = stdair::BomManager::
00735         getObjectPtr<stdair::AirportPair> (iBomRoot,
00736                                             lAirportPairKey.toString());
00737     if (lAirportPair_ptr == NULL) {
00738         STDAIR_LOG_ERROR ("Cannot find yield corresponding to the airport "
00739                             << "pair: " << lAirportPairKey.toString());
00740         assert (false);
00741     }
00742

```

```

00743 // Retrieve the corresponding date period to lDepartureDate.
00744 const stdair::DatePeriodList_T lDatePeriodList =
00745     stdair::BomManager::getList<stdair::DatePeriod> (*lAirportPair_ptr);
00746 for (stdair::DatePeriodList_T::const_iterator itDatePeriod =
00747     lDatePeriodList.begin();
00748     itDatePeriod != lDatePeriodList.end(); ++itDatePeriod) {
00749     const stdair::DatePeriod* lDatePeriod_ptr = *itDatePeriod;
00750     assert (lDatePeriod_ptr != NULL);
00751
00752     const bool isDepartureDateValid =
00753         lDatePeriod_ptr->isDepartureDateValid (lDepartureDate);
00754
00755     if (isDepartureDateValid == true) {
00756         // Retrieve the PoS-Channel.
00757         // TODO: Use POS and Channel from demand instead of default
00758         const stdair::PosChannelKey lPosChannelKey (stdair::DEFAULT_POS,
00759             stdair::DEFAULT_CHANNEL);
00760         stdair::PosChannel* lPosChannel_ptr = stdair::BomManager::
00761             getObjectPtr<stdair::PosChannel> (*lDatePeriod_ptr,
00762                 lPosChannelKey.toString());
00763         if (lPosChannel_ptr == NULL) {
00764             STDAIR_LOG_ERROR ("Cannot find yield corresponding to the PoS-"
00765                 "<< "Channel: " << lPosChannelKey.toString());
00766             assert (false);
00767         }
00768         // Retrieve the yield features.
00769         const stdair::TimePeriodList_T lTimePeriodList = stdair::
00770             BomManager::getList<stdair::TimePeriod> (*lPosChannel_ptr);
00771         for (stdair::TimePeriodList_T::const_iterator itTimePeriod =
00772             lTimePeriodList.begin();
00773             itTimePeriod != lTimePeriodList.end(); ++itTimePeriod) {
00774             const stdair::TimePeriod* lTimePeriod_ptr = *itTimePeriod;
00775             assert (lTimePeriod_ptr != NULL);
00776
00777             // TODO: Use trip type from demand instead of default value.
00778             const stdair::YieldFeaturesKey lYieldFeaturesKey (
00779                 stdair::TRIP_TYPE_ONE_WAY,
00780                 iCabinCode);
00781             stdair::YieldFeatures* oYieldFeatures_ptr = stdair::BomManager::
00782                 getObjectPtr<stdair::YieldFeatures> (*lTimePeriod_ptr,
00783                     lYieldFeaturesKey.toString());
00784             if (oYieldFeatures_ptr != NULL) {
00785                 return oYieldFeatures_ptr;
00786             }
00787         }
00788     }
00789     return NULL;
00790 }
00791 }
00792
00793 // //////////////////////////////////////
00794 void RMOL_Service::
00795 forecastOnD (const stdair::YieldFeatures& iYieldFeatures,
00796     stdair::OnDDate& iOnDDate,
00797     const stdair::CabinCode_T& iCabinCode,
00798     const stdair::DTD_T& iDTD,
00799     stdair::BomRoot& iBomRoot) {
00800
00801     const stdair::AirlineClassListList_T lAirlineClassListList =
00802         stdair::BomManager::getList<stdair::AirlineClassList> (iYieldFeatures);
00803     assert (lAirlineClassListList.begin() != lAirlineClassListList.end());
00804
00805     // Yield order check
00806     stdair::AirlineClassListList_T::const_iterator itACL =
00807         lAirlineClassListList.begin();
00808     stdair::Yield_T lPreviousYield ((*itACL)->getYield());
00809     ++itACL;
00810     for (; itACL != lAirlineClassListList.end(); ++itACL) {
00811         const stdair::AirlineClassList* lAirlineClassList = *itACL;
00812         const stdair::Yield_T& lYield = lAirlineClassList->getYield();
00813         if (lYield <= lPreviousYield) {
00814             lPreviousYield = lYield;
00815         }
00816         else{
00817             STDAIR_LOG_ERROR ("Yields should be given in a descendant order"
00818                 "<< " in the yield input file") ;
00819             assert (false);
00820         }
00821     }
00822
00823     // Proportion factor list initialisation
00824     // Each element corresponds to a yield rule
00825     stdair::ProportionFactorList_T lProportionFactorList;
00826     stdair::ProportionFactor_T lPreviousProportionFactor = 0;
00827
00828     // Retrieve the minimal willingness to pay associated to the demand

```

```

00829     const stdair::WTPDemandPair_T& lTotalForecast =
00830         iOnDDate.getTotalForecast (iCabinCode);
00831     const stdair::WTP_T& lMinWTP = lTotalForecast.first;
00832
00833     // Retrieve the remaining percentage of booking requests
00834     const stdair::ContinuousAttributeLite<stdair::FloatDuration_T>
00835         lArrivalPattern (stdair::DEFAULT_DTD_PROB_MAP);
00836
00837     STDAIR_LOG_DEBUG (lArrivalPattern.displayCumulativeDistribution());
00838     const stdair::Probability_T lRemainingProportion =
00839         lArrivalPattern.getRemainingProportion (~float(iDTD));
00840
00841     // Compute the characteristics (mean and std dev) of the total
00842     // forecast demand to come
00843     const stdair::MeanStdDevPair_T lForecatsMeanStdDevPair =
00844         lTotalForecast.second;
00845     const stdair::MeanValue_T& lMeanValue =
00846         lForecatsMeanStdDevPair.first;
00847     const stdair::MeanValue_T& lRemainingMeanValue =
00848         lRemainingProportion*lMeanValue;
00849     const stdair::StdDevValue_T& lStdDevValue =
00850         lForecatsMeanStdDevPair.second;
00851     const stdair::StdDevValue_T& lRemainingStdDevValue =
00852         lRemainingProportion*lStdDevValue;
00853
00854     // Retrieve the frat5 coef corresponding to the input dtd
00855     stdair::DTDFratMap_T::const_iterator itDFC =
00856         stdair::DEFAULT_DTD_FRAT5COEF_MAP.find(iDTD);
00857     if (itDFC == stdair::DEFAULT_DTD_FRAT5COEF_MAP.end()) {
00858         STDAIR_LOG_ERROR ("Cannot find frat5 coef for DTD = " << iDTD );
00859         assert (false);
00860     }
00861     stdair::RealNumber_T lFrat5Coef =
00862         stdair::DEFAULT_DTD_FRAT5COEF_MAP.at(iDTD);
00863
00864     STDAIR_LOG_DEBUG ("Remaining proportion " << lRemainingProportion
00865         << " Total " << lMeanValue
00866         << " StdDev " << lStdDevValue
00867         << "Frat5 Coef " << lFrat5Coef);
00868
00869     std::ostringstream oStr;
00870     // Compute the "forecast demand to come" proportion by class
00871     itACL = lAirlineClassListList.begin();
00872     for (; itACL != lAirlineClassListList.end(); ++itACL) {
00873         const stdair::AirlineClassList* lAirlineClassList_ptr = *itACL;
00874         const stdair::Yield_T& lYield = lAirlineClassList_ptr->getYield();
00875         stdair::ProportionFactor_T lProportionFactor =
00876             exp ((lYield - lMinWTP)*log(0.5)/(lMinWTP*(lFrat5Coef-1.0)));
00877         // If the yield is smaller than minimal WTP, the factor is greater than
00878         1.
00879         // In that case it should be modified and put to 1.
00880         lProportionFactor = std::min (lProportionFactor, 1.0);
00881         lProportionFactorList.push_back(lProportionFactor -
00882             lPreviousProportionFactor);
00883         lPreviousProportionFactor = lProportionFactor;
00884         oStr << lAirlineClassList_ptr->toString() << lProportionFactor << " ";
00885     }
00886     STDAIR_LOG_DEBUG (oStr.str());
00887
00888     // Sanity check
00889     assert (lAirlineClassListList.size() == lProportionFactorList.size());
00890
00891     STDAIR_LOG_DEBUG ("Forecast for " << iOnDDate.describeKey()
00892         << " " << iDTD << " days to departure");
00893
00894     // store the forecast demand to come characteristics in the booking classes
00895     stdair::ProportionFactorList_T::const_iterator itPF =
00896         lProportionFactorList.begin();
00897     itACL = lAirlineClassListList.begin();
00898     for (; itACL != lAirlineClassListList.end(); ++itACL, ++itPF) {
00899         const stdair::AirlineClassList* lAirlineClassList_ptr = *itACL;
00900         const stdair::ProportionFactor_T& lProportionFactor = *itPF;
00901         stdair::MeanValue_T lMeanValue = lProportionFactor*lRemainingMeanValue;
00902         stdair::StdDevValue_T lStdDevValue =
00903             lProportionFactor*lRemainingStdDevValue;
00904         setOnDForecast (*lAirlineClassList_ptr, lMeanValue,
00905             lStdDevValue,
00906             iOnDDate, iCabinCode, iBomRoot);
00907     }
00908
00909     // //////////////////////////////////////
00910     void RMOL_Service::
00911     setOnDForecast (const stdair::AirlineClassList&
00912         iAirlineClassList,

```

```

00912         const stdair::MeanValue_T& iMeanValue,
00913         const stdair::StdDevValue_T& iStdDevValue,
00914         stdair::OnDDate& iOnDDate,
00915         const stdair::CabinCode_T& iCabinCode,
00916         stdair::BomRoot& iBomRoot) {
00917
00918     const stdair::AirportCode_T& lOrigin = iOnDDate.getOrigin();
00919     const stdair::AirportCode_T& lDestination = iOnDDate.getDestination();
00920
00921     const stdair::Date_T& lDepartureDate = iOnDDate.getDate();
00922
00923     const stdair::AirlineCodeList_T& lAirlineCodeList =
00924         iAirlineClassList.getAirlineCodeList();
00925
00926     // Retrieve the class list (one class per airline)
00927     const stdair::ClassList_StringList_T& lClassList_StringList =
00928         iAirlineClassList.getClassCodeList();
00929     assert (!lClassList_StringList.empty());
00930     stdair::ClassCodeList_T lClassCodeList;
00931     for (stdair::ClassList_StringList_T::const_iterator itCL =
00932         lClassList_StringList.begin();
00933         itCL != lClassList_StringList.end(); ++itCL) {
00934         const stdair::ClassList_String_T& lClassList_String = *itCL;
00935         assert (lClassList_String.size() > 0);
00936         stdair::ClassCode_T lFirstClass;
00937         lFirstClass.append (lClassList_String, 0, 1);
00938         lClassCodeList.push_back(lFirstClass);
00939     }
00940
00941     // Sanity check
00942     assert (lAirlineCodeList.size() == lClassCodeList.size());
00943     assert (!lAirlineCodeList.empty());
00944
00945     if (lAirlineCodeList.size() == 1) {
00946         // Store the forecast information in the case of a single segment
00947         stdair::AirlineCode_T lAirlineCode = lAirlineCodeList.front();
00948         stdair::ClassCode_T lClassCode = lClassCodeList.front();
00949         stdair::Yield_T lYield = iAirlineClassList.getYield();
00950         setOnDForecast(lAirlineCode, lDepartureDate, lOrigin,
00951             lDestination, iCabinCode, lClassCode,
00952             iMeanValue, iStdDevValue, lYield, iBomRoot);
00953     } else {
00954         // Store the forecast information in the case of a multiple segment
00955
00956         stdair::Yield_T lYield = iAirlineClassList.getYield();
00957         for (stdair::AirlineCodeList_T::const_iterator itAC =
00958             lAirlineCodeList.begin();
00959             itAC != lAirlineCodeList.end(); ++itAC) {
00960             const stdair::AirlineCode_T& lAirlineCode = *itAC;
00961             setOnDForecast(lAirlineCodeList, lAirlineCode,
00962                 lDepartureDate, lOrigin,
00963                 lDestination, iCabinCode, lClassCodeList,
00964                 iMeanValue, iStdDevValue, lYield, iBomRoot);
00965         }
00966     }
00967
00968     // //////////////////////////////////////
00969     void RMOL_Service::
00970     setOnDForecast (const stdair::AirlineCode_T& iAirlineCode,
00971         const stdair::Date_T& iDepartureDate,
00972         const stdair::AirportCode_T& iOrigin,
00973         const stdair::AirportCode_T& iDestination,
00974         const stdair::CabinCode_T& iCabinCode,
00975         const stdair::ClassCode_T& iClassCode,
00976         const stdair::MeanValue_T& iMeanValue,
00977         const stdair::StdDevValue_T& iStdDevValue,
00978         const stdair::Yield_T& iYield,
00979         stdair::BomRoot& iBomRoot) {
00980     stdair::Inventory* lInventory_ptr = iBomRoot.getInventory(iAirlineCode);
00981     if (lInventory_ptr == NULL) {
00982         STDAIR_LOG_ERROR ("Cannot find the inventory corresponding"
00983             << " to the airline" << iAirlineCode) ;
00984         assert(false);
00985     }
00986     const stdair::OnDDateList_T lOnDDateList =
00987         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
00988     assert (!lOnDDateList.empty());
00989     bool lFoundOnDDate = false;
00990     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
00991         itOD != lOnDDateList.end(); ++itOD) {
00992         stdair::OnDDate* lOnDDate_ptr = *itOD;
00993         assert (lOnDDate_ptr != NULL);
00994         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
00995         const stdair::AirportCode_T& lOrigin = lOnDDate_ptr->getOrigin();
00996         const stdair::AirportCode_T& lDestination = lOnDDate_ptr->getDestination(

```

```

00997     const bool hasSegmentDateList =
00998         stdair::BomManager::hasList<stdair::SegmentDate> (*lOnDDate_ptr);
00999     if (hasSegmentDateList == false) {
01000         STDAIR_LOG_ERROR ("The O&D date " << lOnDDate_ptr->describeKey()
01001             << "has not been correctly initialized : SegmentDate
list is missing");
01002         assert (false);
01003     }
01004     const stdair::SegmentDateList_T& lSegmentDateList =
01005         stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01006     // Check if the the O&D date is the one we are looking for
01007     if (lDepartureDate == iDepartureDate && lOrigin == iOrigin &&
01008         lDestination == iDestination && lSegmentDateList.size() == 1) {
01009         stdair::CabinClassPair_T lCabinClassPair (iCabinCode, iClassCode);
01010         stdair::CabinClassPairList_T lCabinClassPairList;
01011         lCabinClassPairList.push_back(lCabinClassPair);
01012         const stdair::MeanStdDevPair_T lMeanStdDevPair (iMeanValue,
iStdDevValue);
01013         const stdair::WTPDemandPair_T lWTPDemandPair (iYield, lMeanStdDevPair);
01014         lOnDDate_ptr->setDemandInformation(lCabinClassPairList, lWTPDemandPair)
;
01015         lFoundOnDDate = true;
01016         STDAIR_LOG_DEBUG (iAirlineCode << " Class " << iClassCode
01017             << " Mean " << iMeanValue
01018             << " Std Dev " << iStdDevValue);
01019         break;
01020     }
01021 }
01022
01023 if (!lFoundOnDDate) {
01024     STDAIR_LOG_ERROR ("Cannot find class " << iClassCode << " in cabin "
01025         << iCabinCode << " for the segment "
01026         << iOrigin << "-" << iDestination << " with"
01027         << " the airline " << iAirlineCode);
01028     assert(false);
01029 }
01030 }
01031
01032 // //////////////////////////////////////
01033 void RMOL_Service::
01034 setOnDDForecast (const stdair::AirlineCodeList_T&
iAirlineCodeList,
01035     const stdair::AirlineCode_T& iAirlineCode,
01036     const stdair::Date_T& iDepartureDate,
01037     const stdair::AirportCode_T& iOrigin,
01038     const stdair::AirportCode_T& iDestination,
01039     const stdair::CabinCode_T& iCabinCode,
01040     const stdair::ClassCodeList_T& iClassCodeList,
01041     const stdair::MeanValue_T& iMeanValue,
01042     const stdair::StdDevValue_T& iStdDevValue,
01043     const stdair::Yield_T& iYield,
01044     stdair::BomRoot& iBomRoot) {
01045     stdair::Inventory* lInventory_ptr = iBomRoot.getInventory(iAirlineCode);
01046     if (lInventory_ptr == NULL) {
01047         STDAIR_LOG_ERROR ("Cannot find the inventory corresponding"
01048             << " to the airline" << iAirlineCode) ;
01049         assert(false);
01050     }
01051     const stdair::OnDDateList_T lOnDDateList =
01052         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01053     assert (!lOnDDateList.empty());
01054     bool lFoundOnDDate = false;
01055     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01056         itOD != lOnDDateList.end(); ++itOD) {
01057         stdair::OnDDate* lOnDDate_ptr = *itOD;
01058         assert (lOnDDate_ptr != NULL);
01059         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01060         const stdair::AirportCode_T& lOrigin = lOnDDate_ptr->getOrigin();
01061         const stdair::AirportCode_T& lDestination = lOnDDate_ptr->getDestination(
);
01062         const bool hasSegmentDateList =
01063             stdair::BomManager::hasList<stdair::SegmentDate> (*lOnDDate_ptr);
01064         if (hasSegmentDateList == false) {
01065             STDAIR_LOG_ERROR ("The O&D date " << lOnDDate_ptr->describeKey()
01066                 << "has not been correctly initialized : SegmentDate
list is missing");
01067             assert (false);
01068         }
01069         const stdair::SegmentDateList_T& lSegmentDateList =
01070             stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01071         // Check if the O&D date might be the one we are looking for.
01072         // There still is a test to go through to see if the combination of
airlines is right.
01073         if (lDepartureDate == iDepartureDate && lOrigin == iOrigin &&
01074             lDestination == iDestination && lSegmentDateList.size() ==
iAirlineCodeList.size()) {

```

```

01075     const stdair::SegmentDateList_T& lSegmentDateList =
01076         stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);

01077     stdair::AirlineCodeList_T::const_iterator itAC = iAirlineCodeList.begin
01078     ();
01079     stdair::SegmentDateList_T::const_iterator itSD = lSegmentDateList.begin
01080     ();
01081     for (;itAC != iAirlineCodeList.end(); ++itAC, ++itSD) {
01082         const stdair::AirlineCode_T lForecastAirlineCode = *itAC;
01083         const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01084         // Check if the operating airline is a different one and check if it
01085         // is the airline that we are looking for.
01086         const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01087             lSegmentDate_ptr->getOperatingSegmentDate ();
01088         if (lOperatingSegmentDate_ptr != NULL) {
01089             const stdair::FlightDate* lOperatingFD_ptr =
01090                 stdair::BomManager::getParentPtr<stdair::FlightDate>
01091                 (*lOperatingSegmentDate_ptr);
01092             const stdair::AirlineCode_T lOperatingAirlineCode =
01093                 lOperatingFD_ptr->getAirlineCode();
01094             if (lOperatingAirlineCode != lForecastAirlineCode) {
01095                 break;
01096             }
01097         } else {
01098             const stdair::AirlineCode_T lOperatingAirlineCode =
01099                 lOnDDate_ptr->getAirlineCode();
01100             if (lOperatingAirlineCode != lForecastAirlineCode) {
01101                 break;
01102             }
01103         }
01104         if (itAC == iAirlineCodeList.end()) {lFoundOnDDate = true;}
01105     }
01106     if (lFoundOnDDate) {
01107         stdair::CabinClassPairList_T lCabinClassPairList;
01108         for (stdair::ClassCodeList_T::const_iterator itCC = iClassCodeList.
01109             begin();
01110             itCC != iClassCodeList.end(); ++itCC) {
01111             const stdair::ClassCode_T lClassCode = *itCC;
01112             stdair::CabinClassPair_T lCabinClassPair (iCabinCode, lClassCode);
01113             lCabinClassPairList.push_back(lCabinClassPair);
01114         }
01115         const stdair::MeanStdDevPair_T lMeanStdDevPair (iMeanValue,
01116             iStdDevValue);
01117         const stdair::YieldDemandPair_T lYieldDemandPair (iYield,
01118             lMeanStdDevPair);
01119         lOnDDate_ptr->setDemandInformation(lCabinClassPairList,
01120             lYieldDemandPair);
01121         lFoundOnDDate = true;
01122         std::ostringstream oACStr;
01123         for (stdair::AirlineCodeList_T::const_iterator itAC = iAirlineCodeList.
01124             begin();
01125             itAC != iAirlineCodeList.end(); ++itAC) {
01126             if (itAC == iAirlineCodeList.begin()) {
01127                 oACStr << *itAC;
01128             }
01129             else {
01130                 oACStr << "-" << *itAC;
01131             }
01132         }
01133         std::ostringstream oCCStr;
01134         for (stdair::ClassCodeList_T::const_iterator itCC = iClassCodeList.
01135             begin();
01136             itCC != iClassCodeList.end(); ++itCC) {
01137             if (itCC == iClassCodeList.begin()) {
01138                 oCCStr << *itCC;
01139             }
01140             else {
01141                 oCCStr << "-" << *itCC;
01142             }
01143         }
01144         STDAIR_LOG_DEBUG (oACStr.str() << " Classes " << oCCStr.str()
01145             << " Mean " << iMeanValue << " Std Dev " <<
01146             iStdDevValue);
01147         break;
01148     }
01149     if (!lFoundOnDDate) {
01150         STDAIR_LOG_ERROR ("Cannot find the required multi-segment O&D date: "
01151             << iOrigin << "-" << iDestination << " " <<
01152             iDepartureDate);
01153         assert(false);
01154     }
01155 }
01156 // //////////////////////////////////////

```



```

01150 void RMOL_Service::
01151 resetDemandInformation (const stdair::DateTime_T&
iRMEventTime) {
01152     if (_rmolServiceContext == NULL) {
01153         throw stdair::NonInitialisedServiceException ("The Rmol service "
01154                                                         "has not been initialised")
;
01155     }
01156     assert (_rmolServiceContext != NULL);
01157     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
01158
01159     // Retrieve the bom root
01160     stdair::STDAIR_Service& lSTDAIR_Service =
01161         lRMOL_ServiceContext.getSTDAIR_Service();
01162     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01163
01164     const stdair::InventoryList_T lInventoryList =
01165         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01166     assert (!lInventoryList.empty());
01167     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
;
01168         itInv != lInventoryList.end(); ++itInv) {
01169         const stdair::Inventory* lInventory_ptr = *itInv;
01170         assert (lInventory_ptr != NULL);
01171         resetDemandInformation (iRMEventTime, *
lInventory_ptr);
01172     }
01173 }
01174
01175 // //////////////////////////////////////
01176 void RMOL_Service::
01177 resetDemandInformation (const stdair::DateTime_T&
iRMEventTime,
01178                         const stdair::Inventory& iInventory) {
01179
01180     const stdair::FlightDateList_T lFlightDateList =
01181         stdair::BomManager::getList<stdair::FlightDate> (iInventory);
01182     assert (!lFlightDateList.empty());
01183     for (stdair::FlightDateList_T::const_iterator itFD = lFlightDateList.begin(
);
01184         itFD != lFlightDateList.end(); ++itFD) {
01185         const stdair::FlightDate* lFlightDate_ptr = *itFD;
01186         assert (lFlightDate_ptr != NULL);
01187
01188         // Retrieve the date from the RM event
01189         const stdair::Date_T lDate = iRMEventTime.date();
01190
01191         const stdair::Date_T& lDepartureDate = lFlightDate_ptr->getDepartureDate(
);
01192         stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01193         stdair::DTD_T lDTD = short (lDateOffset.days());
01194
01195         stdair::DCPLIST_T::const_iterator itDCP =
01196             std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST.
end(), lDTD);
01197         // Check if the demand forecast info corresponding to this flight date
needs to be reset.
01198         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01199             // Check if the flight date holds a list of leg dates.
01200             // If so, find all leg cabin and reset the forecast they are holding.
01201             const bool hasLegDateList =
01202                 stdair::BomManager::hasList<stdair::LegDate> (*lFlightDate_ptr);
01203             if (hasLegDateList == true) {
01204                 const stdair::LegDateList_T lLegDateList =
01205                     stdair::BomManager::getList<stdair::LegDate> (*lFlightDate_ptr);
01206                 assert (!lLegDateList.empty());
01207                 for (stdair::LegDateList_T::const_iterator itLD = lLegDateList.begin(
);
01208                     itLD != lLegDateList.end(); ++itLD) {
01209                     const stdair::LegDate* lLegDate_ptr = *itLD;
01210                     assert (lLegDate_ptr != NULL);
01211                     const stdair::LegCabinList_T lLegCabinList =
01212                         stdair::BomManager::getList<stdair::LegCabin> (*lLegDate_ptr);
01213                     assert (!lLegCabinList.empty());
01214                     for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
begin();
01215                         itLC != lLegCabinList.end(); ++itLC) {
01216                         stdair::LegCabin* lLegCabin_ptr = *itLC;
01217                         assert (lLegCabin_ptr != NULL);
01218                         lLegCabin_ptr->emptyYieldLevelDemandMap();
01219                     }
01220                 }
01221             }
01222         }
01223     }
01224 }

```

```

01225
01226 ///////////////////////////////////////////////////////////////////
01227 void RMOL_Service::projectAggregatedDemandOnLegCabins
01228 (const stdair::DateTime_T& irMEventTime) {
01229     if (_rmolServiceContext == NULL) {
01230         throw stdair::NonInitialisedServiceException ("The Rmol service "
01231             "has not been initialised");
01232     };
01233     assert (_rmolServiceContext != NULL);
01234     RMOL_ServiceContext& lRMOL_ServiceContext = *
01235         _rmolServiceContext;
01236     // Retrieve the bom root
01237     stdair::STDAIR_Service& lSTDAIR_Service =
01238         lRMOL_ServiceContext.getSTDAIR_Service();
01239     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01240
01241     // Retrieve the date from the RM event
01242     const stdair::Date_T lDate = irMEventTime.date();
01243
01244     const stdair::InventoryList_T lInventoryList =
01245         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01246     assert (!lInventoryList.empty());
01247     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
01248 ;
01249         itInv != lInventoryList.end(); ++itInv) {
01250         const stdair::Inventory* lInventory_ptr = *itInv;
01251         assert (lInventory_ptr != NULL);
01252         const stdair::OnDDateList_T lOnDDateList =
01253             stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01254         assert (!lOnDDateList.empty());
01255         for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01256             itOD != lOnDDateList.end(); ++itOD) {
01257             stdair::OnDDate* lOnDDate_ptr = *itOD;
01258             assert (lOnDDate_ptr != NULL);
01259
01260             const stdair::Date_T lDepartureDate = lOnDDate_ptr->getDate();
01261             stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01262             stdair::DTD_T lDTD = short (lDateOffset.days());
01263
01264             stdair::DCPList_T::const_iterator itDCP =
01265                 std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST
01266 .end(), lDTD);
01267             // Check if the forecast for this O&D date needs to be projected.
01268             if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01269                 // Browse the demand info map.
01270                 const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01271                     lOnDDate_ptr->getDemandInfoMap ();
01272                 for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
01273                     lStringDemandStructMap.begin();
01274                     itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01275                     std::string lCabinClassPath = itStrDS->first;
01276                     const stdair::YieldDemandPair_T& lYieldDemandPair =
01277                         itStrDS->second;
01278                     const stdair::CabinClassPairList_T& lCabinClassPairList =
01279                         lOnDDate_ptr->getCabinClassPairList (lCabinClassPath);
01280                     const stdair::NbOfSegments_T& lNbOfSegments = lOnDDate_ptr->
01281                         getNbOfSegments ();
01282                     // Sanity check
01283                     assert (lCabinClassPairList.size() == lNbOfSegments);
01284
01285                     const stdair::SegmentDateList_T lOnDSegmentDateList =
01286                         stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01287                     // Sanity check
01288                     assert (lOnDSegmentDateList.size() == lNbOfSegments);
01289                     stdair::CabinClassPairList_T::const_iterator itCCP =
01290                         lCabinClassPairList.begin();
01291                     stdair::SegmentDateList_T::const_iterator itSD =
01292                         lOnDSegmentDateList.begin();
01293                     for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01294                         const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01295                         const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01296                             lSegmentDate_ptr->getOperatingSegmentDate ();
01297                         assert (lSegmentDate_ptr != NULL);
01298                         // Only operated legs receive the demand information.
01299                         if (lOperatingSegmentDate_ptr == NULL) {
01300                             const stdair::CabinCode_T lCabinCode = itCCP->first;
01301                             const stdair::ClassCode_T lClassCode = itCCP->second;
01302                             const stdair::SegmentCabin* lSegmentCabin_ptr =
01303                                 stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
01304                                     lSegmentDate_ptr,
01305                                     lCabinCode);
01306                             assert (lSegmentCabin_ptr != NULL);
01307                         }
01308                     }
01309                 }
01310             }
01311         }
01312     }

```

```

01301             // Retrieve the booking class (level of aggregation of demand).
01302             // The yield of the class is assigned to all types of demand
01303             for it.
01304                 const stdair::BookingClass* lBookingClass_ptr =
01305                     stdair::BomManager::getObjectPtr<stdair::BookingClass> (*
01306                         lSegmentCabin_ptr,
01307                         lClassCode);
01308                 assert (lBookingClass_ptr != NULL);
01309                 const stdair::LegCabinList_T lLegCabinList =
01310                     stdair::BomManager::getList<stdair::LegCabin>
01311                     (*lSegmentCabin_ptr);
01312                 assert (!lLegCabinList.empty());
01313                 const int lNbOfLegs = lLegCabinList.size();
01314                 // Determine the yield (equally distributed over legs).
01315                 const stdair::Yield_T& lYield = lBookingClass_ptr->getYield()/
01316                     lNbOfLegs;
01317                 const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01318                     lYieldDemandPair.second;
01319                 const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01320                 const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
01321                     second;
01322                 for (stdair::LegCabinList_T::const_iterator itLC =
01323                     lLegCabinList.begin();
01324                     itLC != lLegCabinList.end(); ++itLC) {
01325                     stdair::LegCabin* lLegCabin_ptr = *itLC;
01326                     assert (lLegCabin_ptr != NULL);
01327                     lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
01328                         lStdDevValue);
01329                 }
01330             }
01331         }
01332     }
01333 }
01334 // //////////////////////////////////////
01335 void RMOL_Service::projectOnDDemandOnLegCabinsUsingYP
01336 (const stdair::DateTime_T& irMEEventTime) {
01337     if (_rmolServiceContext == NULL) {
01338         throw stdair::NonInitialisedServiceException ("The Rmol service "
01339             "has not been initialised");
01340     }
01341     assert (_rmolServiceContext != NULL);
01342     RMOL_ServiceContext& lRMOL_ServiceContext = *
01343         _rmolServiceContext;
01344     // Retrieve the bom root
01345     stdair::STDAIR_Service& lSTDAIR_Service =
01346         lRMOL_ServiceContext.getSTDAIR_Service();
01347     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01348     // Retrieve the date from the RM event
01349     const stdair::Date_T lDate = irMEEventTime.date();
01350     const stdair::InventoryList_T lInventoryList =
01351         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01352     assert (!lInventoryList.empty());
01353     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin();
01354         itInv != lInventoryList.end(); ++itInv) {
01355         const stdair::Inventory* lInventory_ptr = *itInv;
01356         assert (lInventory_ptr != NULL);
01357         const stdair::OnDDateList_T lOnDDateList =
01358             stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01359         assert (!lOnDDateList.empty());
01360         for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01361             itOD != lOnDDateList.end(); ++itOD) {
01362             stdair::OnDDate* lOnDDate_ptr = *itOD;
01363             assert (lOnDDate_ptr != NULL);
01364             const stdair::Date_T lDepartureDate = lOnDDate_ptr->getDate();
01365             stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01366             stdair::DTD_T lDTD = short (lDateOffset.days());
01367             stdair::DCPLIST_T::const_iterator itDCP =
01368                 std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST
01369                     .end(), lDTD);
01370             // Check if the forecast for this O&D date needs to be projected.
01371             if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01372                 // Browse the demand info map.
01373                 const stdair::StringDemandStructMap_T& lStringDemandStructMap =

```

```

01375         lOnDDate_ptr->getDemandInfoMap ();
01376         for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
lStringDemandStructMap.begin();
01377             itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01378             std::string lCabinClassPath = itStrDS->first;
01379             const stdair::YieldDemandPair_T& lYieldDemandPair =
01380             itStrDS->second;
01381             const stdair::CabinClassPairList_T& lCabinClassPairList =
01382             lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
01383             const stdair::NbOfSegments_T& lNbOfSegments = lOnDDate_ptr->
getNbOfSegments();
01384             // Sanity check
01385             assert (lCabinClassPairList.size() == lNbOfSegments);
01386
01387             const stdair::SegmentDateList_T lOnDSegmentDateList =
01388             stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01389             // Sanity check
01390             assert (lOnDSegmentDateList.size() == lNbOfSegments);
01391             stdair::CabinClassPairList_T::const_iterator itCCP =
lCabinClassPairList.begin();
01392             stdair::SegmentDateList_T::const_iterator itSD =
lOnDSegmentDateList.begin();
01393             for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01394                 const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01395                 assert (lSegmentDate_ptr != NULL);
01396                 const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01397                 lSegmentDate_ptr->getOperatingSegmentDate ();
01398                 // Only operated legs receive the demand information.
01399                 if (lOperatingSegmentDate_ptr == NULL) {
01400                     const stdair::CabinCode_T lCabinCode = itCCP->first;
01401                     const stdair::ClassCode_T lClassCode = itCCP->second;
01402                     const stdair::SegmentCabin* lSegmentCabin_ptr =
01403                     stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
lSegmentDate_ptr,
01404                     lCabinCode);
01405                     assert (lSegmentCabin_ptr != NULL);
01406                     const stdair::LegCabinList_T lLegCabinList =
01407                     stdair::BomManager::getList<stdair::LegCabin>
(*lSegmentCabin_ptr);
01408                     assert (!lLegCabinList.empty());
01409                     const int lNbOfLegs = lLegCabinList.size();
01410                     // Determine the yield (equally distributed over segments and
01411                     then legs).
01412                     const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01413                     lYieldDemandPair.second;
01414                     const stdair::Yield_T& lYield = lYieldDemandPair.first/(
lNbOfLegs*lNbOfSegments);
01415                     const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01416                     const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
second;
01417                     for (stdair::LegCabinList_T::const_iterator itLC =
lLegCabinList.begin();
01418                         itLC != lLegCabinList.end(); ++itLC) {
01419                         stdair::LegCabin* lLegCabin_ptr = *itLC;
01420                         assert (lLegCabin_ptr != NULL);
01421                         lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
lStdDevValue);
01422                     }
01423                 }
01424             }
01425         }
01426     }
01427 }
01428 }
01429
01430 // //////////////////////////////////////
01431 void RMOL_Service::optimiseOnD (const
stdair::DateTime_T& iRMEventTime) {
01432
01433     if (_rmolServiceContext == NULL) {
01434         throw stdair::NonInitialisedServiceException ("The Rmol service "
01435             "has not been initialised")
;
01436     }
01437     assert (_rmolServiceContext != NULL);
01438     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
01439
01440     // Retrieve the bom root
01441     stdair::STDAIR_Service& lSTDAIR_Service =
01442     lRMOL_ServiceContext.getSTDAIR_Service();
01443     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01444
01445     // Retrieve the date from the RM event
01446     const stdair::Date_T lDate = iRMEventTime.date();

```

```

01447
01448     const stdair::InventoryList_T& lInvList =
01449         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01450     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01451          itInv != lInvList.end(); ++itInv) {
01452         stdair::Inventory* lCurrentInv_ptr = *itInv;
01453         assert (lCurrentInv_ptr != NULL);
01454
01455         const stdair::FlightDateList_T& lFlightDateList =
01456             stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01457         for (stdair::FlightDateList_T::const_iterator itFlightDate =
01458              lFlightDateList.begin();
01459              itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01460             stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01461             assert (lCurrentFlightDate_ptr != NULL);
01462
01463             const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr->
getDepartureDate();
01464             stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01465             stdair::DTD_T lDTD = short (lDateOffset.days());
01466
01467             stdair::DCPLIST_T::const_iterator itDCP =
01468                 std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST
.end(), lDTD);
01469             // Check if the optimisation is needed.
01470             if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01471                 STDAIR_LOG_DEBUG ("Optimisation using O&D forecast: " <<
lCurrentInv_ptr->getAirlineCode()
01472                                     << " Departure " << lCurrentDepartureDate << " DTD
" << lDTD);
01473                 Optimiser::optimiseUsingOnDForecast
(*lCurrentFlightDate_ptr);
01474             }
01475         }
01476     }
01477 }
01478
01479 // //////////////////////////////////////
01480 void RMOL_Service::updateBidPrice (const
stdair::DateTime_T& iRMEventTime) {
01481
01482     if (_rmolServiceContext == NULL) {
01483         throw stdair::NonInitialisedServiceException ("The Rmol service "
01484                                                         "has not been initialised")
;
01485     }
01486     assert (_rmolServiceContext != NULL);
01487     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
01488
01489     // Retrieve the bom root
01490     stdair::STDAIR_Service& lSTDAIR_Service =
lRMOL_ServiceContext.getSTDAIR_Service();
01491     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01492
01493     // Retrieve the date from the RM event
01494     const stdair::Date_T lDate = iRMEventTime.date();
01495
01496     const stdair::InventoryList_T& lInvList =
01497         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01498
01499     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01500          itInv != lInvList.end(); ++itInv) {
01501         stdair::Inventory* lCurrentInv_ptr = *itInv;
01502         assert (lCurrentInv_ptr != NULL);
01503
01504         const stdair::FlightDateList_T& lFlightDateList =
01505             stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01506         for (stdair::FlightDateList_T::const_iterator itFlightDate =
01507              lFlightDateList.begin();
01508              itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01509             stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01510             assert (lCurrentFlightDate_ptr != NULL);
01511
01512             const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr->
getDepartureDate();
01513             stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01514             stdair::DTD_T lDTD = short (lDateOffset.days());
01515
01516             stdair::DCPLIST_T::const_iterator itDCP =
01517                 std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST
.end(), lDTD);
01518             // Check if the operation is needed.
01519             if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01520                 updateBidPrice (*lCurrentFlightDate_ptr, lBomRoot);
01521             }
01522         }
01523     }

```

```

01524     }
01525 }
01526
01527 // //////////////////////////////////////
01528 void RMOL_Service::updateBidPrice (const
stdair::FlightDate& iFlightDate,
                                stdair::BomRoot& iBomRoot) {
01529     const stdair::SegmentDateList_T& lSegmentDateList =
01530         stdair::BomManager::getList<stdair::SegmentDate> (iFlightDate);
01531     const stdair::AirlineCode_T& lOptAC = iFlightDate.getAirlineCode();
01532     const std::string lFDKeyStr = iFlightDate.describeKey();
01533
01534     for (stdair::SegmentDateList_T::const_iterator itSegmentDate =
lSegmentDateList.begin();
01535         itSegmentDate != lSegmentDateList.end(); ++itSegmentDate) {
01536         stdair::SegmentDate* lSegmentDate_ptr = *itSegmentDate;
01537         assert (lSegmentDate_ptr != NULL);
01538         const bool hasSegmentDateList =
01539             stdair::BomManager::hasList<stdair::SegmentDate>(*lSegmentDate_ptr);
01540         if (hasSegmentDateList == true) {
01541             const stdair::LegDateList_T& lLegDateList =
01542                 stdair::BomManager::getList<stdair::LegDate>(*lSegmentDate_ptr);
01543             // Get the list of marketing carriers segments.
01544             // These are part of maketing partners inventories images held by the
operating airline.
01545             const stdair::SegmentDateList_T& lMktSegmentDateList =
01546                 stdair::BomManager::getList<stdair::SegmentDate>(*lSegmentDate_ptr);
01547             for (stdair::SegmentDateList_T::const_iterator itMktSD =
lMktSegmentDateList.begin();
01548                 itMktSD != lMktSegmentDateList.end(); ++itMktSD) {
01549                 // Get the marketing airline code.
01550                 stdair::SegmentDate* lMktSD_ptr = *itMktSD;
01551                 assert (lMktSD_ptr != NULL);
01552                 stdair::FlightDate* lMktFD_ptr =
01553                     stdair::BomManager::getParentPtr<stdair::FlightDate>(*lMktSD_ptr);
01554                 assert (lMktFD_ptr != NULL);
01555                 const stdair::AirlineCode_T& lMktAC = lMktFD_ptr->getAirlineCode();
01556                 // Get the (real) marketer inventory.
01557                 const stdair::Inventory* lMktInv_ptr =
01558                     stdair::BomManager::getObjectPtr<stdair::Inventory>(iBomRoot,lMktAC
);
01559                 assert (lMktInv_ptr != NULL);
01560                 // Get the image of the operating airline inventory held by the
marketer.
01561                 const stdair::Inventory* lOptInv_ptr =
01562                     stdair::BomManager::getObjectPtr<stdair::Inventory>(*lMktInv_ptr,
lOptAC);
01563                 assert (lOptInv_ptr != NULL);
01564                 // Find the image of the concerned flight date.
01565                 const stdair::FlightDate* lOptFD_ptr =
01566                     stdair::BomManager::getObjectPtr<stdair::FlightDate>(*lOptInv_ptr,
lFDKeyStr);
01567                 assert (lOptFD_ptr != NULL);
01568                 // Browse the list of leg dates in the real operating inventory.
01569                 // Retrieve the image of each leg date.
01570                 for (stdair::LegDateList_T::const_iterator itLD = lLegDateList.begin(
);
01571                     itLD != lLegDateList.end(); ++itLD) {
01572                     const stdair::LegDate* lLD_ptr = *itLD;
01573                     assert (lLD_ptr != NULL);
01574                     const std::string lLDKeyStr = lLD_ptr->describeKey();
01575                     stdair::LegDate* lOptLD_ptr =
01576                         stdair::BomManager::getObjectPtr<stdair::LegDate>(*lOptFD_ptr,
lLDKeyStr);
01577                     assert (lOptLD_ptr != NULL);
01578                     const stdair::LegCabinList_T& lLegCabinList_T =
01579                         stdair::BomManager::getList<stdair::LegCabin>(*lLD_ptr);
01580                     // Browse the list of leg cabins in the real operating inventory.
01581                     // Retrieve the image of each leg cabin and update the bid price of
the real and send it to the image.
01582                     for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList_T.
begin();
01583                         itLC != lLegCabinList_T.end(); ++itLC) {
01584                         stdair::LegCabin* lLC_ptr = *itLC;
01585                         assert (lLC_ptr != NULL);
01586                         const std::string lLCKeyStr = lLC_ptr->describeKey();
01587                         stdair::LegCabin* lOptLC_ptr =
01588                             stdair::BomManager::getObjectPtr<stdair::LegCabin>(*lOptLD_ptr,
lLCKeyStr);
01589                         assert (lOptLC_ptr != NULL);
01590                         // Update the current bid price of the real leg.
01591                         lLC_ptr->updateCurrentBidPrice();
01592                         // Update the previous bid price (store the current).
01593                         lOptLC_ptr->updatePreviousBidPrice();
01594                         // Update the current bid price.
01595                         lOptLC_ptr->setCurrentBidPrice (lLC_ptr->getCurrentBidPrice());
01596
01597

```

```

01598             STDAIR_LOG_DEBUG ("Update bid price of " << lLC_ptr->getFullerKey
01599             )
01600             << " : " << lOptLC_ptr->getCurrentBidPrice()
01601             << " Availability pool " << lLC_ptr->
01602             getAvailabilityPool());
01603         }
01604     }
01605 }
01606 }
01607
01608 // //////////////////////////////////////
01609 void RMOL_Service::projectOnDDemandOnLegCabinsUsingDA
01610 (const stdair::DateTime_T& iRMEventTime) {
01611     if (_rmolServiceContext == NULL) {
01612         throw stdair::NonInitialisedServiceException ("The Rmol service "
01613         "has not been initialised")
01614     };
01615     assert (_rmolServiceContext != NULL);
01616     RMOL_ServiceContext& lRMOL_ServiceContext = *
01617     _rmolServiceContext;
01618     // Retrieve the bom root
01619     stdair::STDAIR_Service& lSTDAIR_Service =
01620     lRMOL_ServiceContext.getSTDAIR_Service();
01621     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01622
01623     // Retrieve the date from the RM event
01624     const stdair::Date_T lDate = iRMEventTime.date();
01625
01626     const stdair::InventoryList_T lInventoryList =
01627     stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01628     assert (!lInventoryList.empty());
01629     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
01630     ;
01631         itInv != lInventoryList.end(); ++itInv) {
01632         const stdair::Inventory* lInventory_ptr = *itInv;
01633         assert (lInventory_ptr != NULL);
01634         const stdair::OnDDateList_T lOnDDateList =
01635         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01636         assert (!lOnDDateList.empty());
01637         for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01638             itOD != lOnDDateList.end(); ++itOD) {
01639             stdair::OnDDate* lOnDDate_ptr = *itOD;
01640             assert (lOnDDate_ptr != NULL);
01641
01642             const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01643             stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01644             stdair::DTD_T lDTD = short (lDateOffset.days());
01645
01646             stdair::DCPList_T::const_iterator itDCP =
01647             std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST
01648             .end(), lDTD);
01649             // Check if the forecast for this O&D date needs to be projected.
01650             if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01651                 // Browse the demand info map.
01652                 const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01653                 lOnDDate_ptr->getDemandInfoMap ();
01654                 for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
01655                 lStringDemandStructMap.begin();
01656                     itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01657                     std::string lCabinClassPath = itStrDS->first;
01658                     const stdair::YieldDemandPair_T& lYieldDemandPair = itStrDS->second
01659                     ;
01660                     const stdair::CabinClassPairList_T& lCabinClassPairList =
01661                     lOnDDate_ptr->getCabinClassPairList (lCabinClassPath);
01662                     const stdair::NbOfSegments_T& lNbOfSegments = lOnDDate_ptr->
01663                     getNbOfSegments ();
01664                     // Sanity check
01665                     assert (lCabinClassPairList.size() == lNbOfSegments);
01666
01667                     //
01668                     const stdair::SegmentDateList_T lOnDSegmentDateList =
01669                     stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01670                     // Sanity check
01671                     assert (lOnDSegmentDateList.size() == lNbOfSegments);
01672                     stdair::CabinClassPairList_T::const_iterator itCCP =
01673                     lCabinClassPairList.begin();
01674                     stdair::SegmentDateList_T::const_iterator itSD =
01675                     lOnDSegmentDateList.begin();
01676                     // List of bid prices that will be used to easily compute
01677                     displacement-adjusted yields.
01678                     std::list<stdair::BidPrice_T> lBidPriceList;

```

```

01672         // The sum of bid prices that will be stored in the list above.
01673         stdair::BidPrice_T lTotalBidPrice = 0;
01674         // Retrieve the bid prices
01675         for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01676             // Get the operating segment cabin (it holds the bid price
information).
01677             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01678             assert (lSegmentDate_ptr != NULL);
01679             // Get the operating airline code and check if it is the airline
we are looking for.
01680             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
lSegmentDate_ptr->getOperatingSegmentDate ();
01681             if (lOperatingSegmentDate_ptr != NULL) {
01682                 lSegmentDate_ptr = lOperatingSegmentDate_ptr;
01683             }
01684             const stdair::CabinCode_T lCabinCode = itCCP->first;
01685             const stdair::SegmentCabin* lSegmentCabin_ptr =
stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
lSegmentDate_ptr,
01686 lCabinCode);
01687             assert (lSegmentCabin_ptr != NULL);
01688             stdair::BidPrice_T lBidPrice = 0;
01689             const stdair::LegCabinList_T lLegCabinList =
stdair::BomManager::getList<stdair::LegCabin>
(*lSegmentCabin_ptr);
01690             for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
begin();
01691 itLC != lLegCabinList.end(); ++itLC) {
01692                 const stdair::LegCabin* lLegCabin_ptr = *itLC;
01693                 assert (lLegCabin_ptr != NULL);
01694                 lBidPrice += lLegCabin_ptr->getCurrentBidPrice();
01695             }
01696             lBidPriceList.push_back (lBidPrice);
01697             lTotalBidPrice += lBidPrice;
01698         }
01699         itCCP = lCabinClassPairList.begin();
01700         itSD = lOnDSegmentDateList.begin();
01701         std::list<stdair::BidPrice_T>::const_iterator itBP = lBidPriceList.
begin();
01702         for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD, ++itBP)
{
01703             stdair::BidPrice_T lBidPrice = *itBP;
01704             stdair::BidPrice_T lComplementaryBidPrice = lTotalBidPrice -
lBidPrice;
01705             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01706             assert (lSegmentDate_ptr != NULL);
01707             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
lSegmentDate_ptr->getOperatingSegmentDate ();
01708             // Only operated legs receive the demand information.
01709             if (lOperatingSegmentDate_ptr == NULL) {
01710                 const stdair::CabinCode_T lCabinCode = itCCP->first;
01711                 const stdair::ClassCode_T lClassCode = itCCP->second;
01712                 const stdair::SegmentCabin* lSegmentCabin_ptr =
stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
lSegmentDate_ptr,
01713 lCabinCode);
01714                 assert (lSegmentCabin_ptr != NULL);
01715                 const stdair::LegCabinList_T lLegCabinList =
stdair::BomManager::getList<stdair::LegCabin>
(*lSegmentCabin_ptr);
01716                 assert (!lLegCabinList.empty());
01717                 // Determine the displacement adjusted yield.
01718                 // It is set to 100 (positive small value), if the computed
value is negative.
01719                 const stdair::Yield_T& lDAYield =
std::max(100., lYieldDemandPair.first -
lComplementaryBidPrice);
01720                 stdair::Yield_T lYield = lDAYield;
01721                 // In order to be protected against important variations of
partners' bid price,
01722                 // the displacement adjusted yield is not allowed to get out of
a certain range.
01723                 // This range is here chosen to be from 80% to 100% of the
(static rule) prorated yield.
01724                 /*
01725                 const int lNbOfLegs = lLegCabinList.size();
01726                 const stdair::Yield_T& lStaticProrationYield =
lDemandStruct.getYield()/(lNbOfLegs*lNbOfSegments);
01727                 if (lDAYield < 0.8*lStaticProrationYield){
01728                     lYield = 0.8*lStaticProrationYield;
01729                 }
01730             }

```



```

01742         if (lDAYield > lStaticProrationYield) {
01743             lYield = lStaticProrationYield;
01744         }
01745         */
01746         const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01747             lYieldDemandPair.second;
01748         const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01749         const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
second;
01750         for (stdair::LegCabinList_T::const_iterator itLC =
lLegCabinList.begin();
01751             itLC != lLegCabinList.end(); ++itLC) {
01752             stdair::LegCabin* lLegCabin_ptr = *itLC;
01753             assert (lLegCabin_ptr != NULL);
01754             lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
lStdDevValue);
01755         }
01756     }
01757 }
01758 }
01759 }
01760 }
01761 }
01762 }
01763 }
01764 // //////////////////////////////////////
01765 void RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP
(const stdair::DateTime_T& iRMEEventTime) {
01766     if (_rmolServiceContext == NULL) {
01767         throw stdair::NonInitialisedServiceException ("The Rmol service "
01768             "has not been initialised")
;
01770     }
01771     assert (_rmolServiceContext != NULL);
01772     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
01773
01774     // Retrieve the bom root
01775     stdair::STDAIR_Service& lSTDAIR_Service =
lRMOL_ServiceContext.getSTDAIR_Service();
01776     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01777
01778     const stdair::InventoryList_T lInventoryList =
stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01779     assert (!lInventoryList.empty());
01780     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
;
01781         itInv != lInventoryList.end(); ++itInv) {
01782         const stdair::Inventory* lInventory_ptr = *itInv;
01783         assert (lInventory_ptr != NULL);
01784         projectOnDDemandOnLegCabinsUsingDYP (
iRMEEventTime, *lInventory_ptr);
01785     }
01786 }
01787 }
01788 }
01789 }
01790 // //////////////////////////////////////
01791 void RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP
(const stdair::DateTime_T& iRMEEventTime,
01792     const
stdair::Inventory& iInventory) {
01793     const stdair::OnDDateList_T lOnDDateList =
stdair::BomManager::getList<stdair::OnDDate> (iInventory);
01794     assert (!lOnDDateList.empty());
01795     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01796         itOD != lOnDDateList.end(); ++itOD) {
01797         stdair::OnDDate* lOnDDate_ptr = *itOD;
01798         assert (lOnDDate_ptr != NULL);
01799
01800         // Retrieve the date from the RM event
01801         const stdair::Date_T lDate = iRMEEventTime.date();
01802
01803         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01804         stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01805         stdair::DTD_T lDTD = short (lDateOffset.days());
01806
01807         stdair::DCPLIST_T::const_iterator itDCP =
std::find (stdair::DEFAULT_DCP_LIST.begin(), stdair::DEFAULT_DCP_LIST.
end(), lDTD);
01808         // Check if the forecast for this O&D date needs to be projected.
01809         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01810
01811             // Browse the demand info map.
01812             const stdair::StringDemandStructMap_T& lStringDemandStructMap =
lOnDDate_ptr->getDemandInfoMap ();
01813             for (stdair::StringDemandStructMap_T::const_iterator itStrDS =

```

```

lStringDemandStructMap.begin();
01818     itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01819         std::string lCabinClassPath = itStrDS->first;
01820         const stdair::YieldDemandPair_T& lYieldDemandPair = itStrDS->second;
01821         const stdair::CabinClassPairList_T& lCabinClassPairList =
01822             lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
01823         const stdair::NbOfSegments_T& lNbOfSegments = lOnDDate_ptr->
getNbOfSegments();
01824         // Sanity check
01825         assert (lCabinClassPairList.size() == lNbOfSegments);
01826
01827         //
01828         const stdair::SegmentDateList_T lOnDSegmentDateList =
01829             stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01830         // Sanity check
01831         assert (lOnDSegmentDateList.size() == lNbOfSegments);
01832         stdair::CabinClassPairList_T::const_iterator itCCP =
lCabinClassPairList.begin();
01833         stdair::SegmentDateList_T::const_iterator itSD = lOnDSegmentDateList.
begin();
01834         // The sum of bid prices of all cabins.
01835         stdair::BidPrice_T lTotalBidPrice = 0;
01836         for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01837             // Get the operating segment cabin (it holds the bid price
information).
01838             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01839             assert (lSegmentDate_ptr != NULL);
01840             // Get the operating airline code and check if it is the airline we
are looking for.
01841             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
lSegmentDate_ptr->getOperatingSegmentDate ();
01842             if (lOperatingSegmentDate_ptr != NULL) {
01843                 lSegmentDate_ptr = lOperatingSegmentDate_ptr;
01844             }
01845             const stdair::CabinCode_T lCabinCode = itCCP->first;
01846             const stdair::SegmentCabin* lSegmentCabin_ptr =
stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
lSegmentDate_ptr,
01849             lCabinCode);
01850             assert (lSegmentCabin_ptr != NULL);
01851             const stdair::LegCabinList_T lLegCabinList =
stdair::BomManager::getList<stdair::LegCabin>(*lSegmentCabin_ptr)
01852             ;
01853             for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
begin();
01854                 itLC != lLegCabinList.end(); ++itLC) {
01855                 const stdair::LegCabin* lLegCabin_ptr = *itLC;
01856                 assert (lLegCabin_ptr != NULL);
01857                 lTotalBidPrice += lLegCabin_ptr->getCurrentBidPrice();
01858             }
01859         }
01860
01861         itCCP = lCabinClassPairList.begin();
01862         itSD = lOnDSegmentDateList.begin();
01863         for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01864             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01865             assert (lSegmentDate_ptr != NULL);
01866             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
lSegmentDate_ptr->getOperatingSegmentDate ();
01867             // Only operated legs receive the demand information.
01868             if (lOperatingSegmentDate_ptr == NULL) {
01869                 const stdair::CabinCode_T lCabinCode = itCCP->first;
01870                 const stdair::ClassCode_T lClassCode = itCCP->second;
01871                 const stdair::SegmentCabin* lSegmentCabin_ptr =
stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
lSegmentDate_ptr,
01875                 lCabinCode);
01876                 assert (lSegmentCabin_ptr != NULL);
01877                 const stdair::LegCabinList_T lLegCabinList =
stdair::BomManager::getList<stdair::LegCabin>
01878                 (*lSegmentCabin_ptr);
01879                 assert (!lLegCabinList.empty());
01880                 const stdair::Yield_T& lYield = lYieldDemandPair.first;
01881
01882                 const stdair::MeanStdDevPair_T& lMeanStdDevPair =
lYieldDemandPair.second;
01883                 const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01884                 const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
second;
01885                 for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
begin();
01886                     itLC != lLegCabinList.end(); ++itLC) {
01887                     stdair::LegCabin* lLegCabin_ptr = *itLC;
01888                     assert (lLegCabin_ptr != NULL);

```

```

01889         const stdair::BidPrice_T& lBidPrice = lLegCabin_ptr->
getCurrentBidPrice();
01890         const stdair::RealNumber_T lDynamicYieldProrationFactor =
lBidPrice / lTotalBidPrice;
01891         const stdair::Yield_T lProratedYield =
lDynamicYieldProrationFactor*lYield;
01892         lLegCabin_ptr->addDemandInformation (lProratedYield, lMeanValue
, lStdDevValue);
01893
01894         // STDAIR_LOG_DEBUG ("Adding demand information to leg-cabin "
<< lLegCabin_ptr->getFullerKey()
01895         //                                     << " Total yield " << lYield << "
Proration factor "
01896         //                                     << lDynamicYieldProrationFactor << "
Prorated yield " << lProratedYield
01897         //                                     << " Mean demand " << lMeanValue << "
StdDev " << lStdDevValue);
01898     }
01899 }
01900 }
01901 }
01902 }
01903 }
01904 }
01905
01906 // ////////////////////////////////////////
01907 void RMOL_Service::optimiseOnDUsingRMCooperation
(const stdair::DateTime_T& iRMEventTime) {
01908
01909     if (_rmolServiceContext == NULL) {
01910         throw stdair::NonInitialisedServiceException ("The Rmol service "
"has not been initialised")
01911     ;
01912     }
01913     assert (_rmolServiceContext != NULL);
01914     RMOL_ServiceContext& lRMOL_ServiceContext = *
_rmolServiceContext;
01915
01916     // Retrieve the bom root
01917     stdair::STDAIR_Service& lSTDAIR_Service =
lRMOL_ServiceContext.getSTDAIR_Service();
01918     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01919
01920     // Retrieve the date from the RM event
01921     const stdair::Date_T lDate = iRMEventTime.date();
01922
01923     // Browse the list of inventories and optimise within each one
independently.
01924     const stdair::InventoryList_T& lInvList =
stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01925     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
itInv != lInvList.end(); ++itInv) {
01926         stdair::Inventory* lCurrentInv_ptr = *itInv;
01927         assert (lCurrentInv_ptr != NULL);
01928
01929         double lMaxBPVariation = 1.0;
01930         short lIterationCounter = 0;
01931         // Iterate until the variation is under the wanted level or the maximal
number of iterations is reached.
01932         while (lMaxBPVariation > 0.01 && lIterationCounter < 10) {
01933             lMaxBPVariation = 0.0;
01934             lIterationCounter++;
01935             const stdair::FlightDateList_T& lFlightDateList =
stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01936             for (stdair::FlightDateList_T::const_iterator itFlightDate =
lFlightDateList.begin();
itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01937                 stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01938                 assert (lCurrentFlightDate_ptr != NULL);
01939
01940                 const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr
->getDepartureDate();
01941                 stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01942                 stdair::DTD_T lDTD = short (lDateOffset.days());
01943
01944                 stdair::DCPLIST_T::const_iterator itDCP =
std::find (stdair::DEFAULT_DCP_LIST.begin(),
stdair::DEFAULT_DCP_LIST.end(), lDTD);
01945                 // Check if the optimisation is needed.
01946                 if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01947                     const double lBPVariation = Optimiser::optimiseUsingOnDForecast
(*lCurrentFlightDate_ptr);
01948                     lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
01949                 }
01950             }
01951         }
01952         // Update the prorated yields for the current inventory.
01953         resetDemandInformation (iRMEventTime, *

```

```

    lCurrentInv_ptr);
01960     projectOnDDemandOnLegCabinsUsingDYP
    (iRMEventTime, *lCurrentInv_ptr);
01961 }
01962 }
01963 }
01964
01965 // //////////////////////////////////////
01966 void RMOL_Service::optimiseOnDUsingAdvancedRMCooperation
01967 (const stdair::DateTime_T& iRMEventTime) {
01968
01969     if (_rmolServiceContext == NULL) {
01970         throw stdair::NonInitialisedServiceException ("The Rmol service "
01971             "has not been initialised")
;
01972     }
01973     assert (_rmolServiceContext != NULL);
01974     RMOL_ServiceContext& lRMOL_ServiceContext = *
    _rmolServiceContext;
01975
01976     // Retrieve the bom root
01977     stdair::STDAIR_Service& lSTDAIR_Service =
01978         lRMOL_ServiceContext.getSTDAIR_Service();
01979     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01980
01981     // Retrieve the date from the RM event
01982     const stdair::Date_T lDate = iRMEventTime.date();
01983
01984     double lMaxBPVariation = 1.0;
01985     short lIterationCounter = 0;
01986     // Iterate until the variation is under the wanted level or the maximal
    number of iterations is reached.
01987     // Every iteration corresponds to the optimisation of the whole network.
    Bid prices are communicated
    // between partners at the end of each iteration.
01988     while (lMaxBPVariation > 0.01 && lIterationCounter < 50) {
01989         lMaxBPVariation = 0.0;
01990         lIterationCounter++;
01991
01992         const stdair::InventoryList_T& lInvList =
01993             stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01994         for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01995             itInv != lInvList.end(); ++itInv) {
01996             stdair::Inventory* lCurrentInv_ptr = *itInv;
01997             assert (lCurrentInv_ptr != NULL);
01998             const stdair::FlightDateList_T& lFlightDateList =
01999                 stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
02000             for (stdair::FlightDateList_T::const_iterator itFlightDate =
02001                 lFlightDateList.begin();
02002                 itFlightDate != lFlightDateList.end(); ++itFlightDate) {
02003                 stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
02004                 assert (lCurrentFlightDate_ptr != NULL);
02005
02006                 const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr
02007                     ->getDepartureDate();
02008                 stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
02009                 stdair::DTD_T lDTD = short (lDateOffset.days());
02010
02011                 stdair::DCPLIST_T::const_iterator itDCP =
02012                     std::find (stdair::DEFAULT_DCP_LIST.begin(),
02013                         stdair::DEFAULT_DCP_LIST.end(), lDTD);
02014                 if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
02015                     const double lBPVariation = Optimiser::optimiseUsingOnDForecast
02016                         (*lCurrentFlightDate_ptr);
02017                     lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
02018                 }
02019             }
02020             // At the end of each iteration, communicate bid prices and compute
    displacement adjusted yields.
02021             updateBidPrice (iRMEventTime);
02022             resetDemandInformation (iRMEventTime);
02023             projectOnDDemandOnLegCabinsUsingDYP (
02024                 iRMEventTime);
02025         }
02026     }

```

26.135 rmol/service/RMOL_ServiceContext.cpp File Reference

```
#include <cassert>
#include <sstream>
#include <stdair/STDAIR_Service.hpp>
#include <rmol/basic/BasConst_RMOL_Service.hpp>
#include <rmol/service/RMOL_ServiceContext.hpp>
```

Namespaces

- namespace [RMOL](#)

26.136 RMOL_ServiceContext.cpp

```
00001 // //////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 #include <sstream>
00007 // StdAir
00008 #include <stdair/STDAIR_Service.hpp>
00009 // RMOL
00010 #include <rmol/basic/BasConst_RMOL_Service.hpp>
00011 #include <rmol/service/RMOL_ServiceContext.hpp>
00012
00013 namespace RMOL {
00014
00015 // //////////////////////////////////////
00016 RMOL_ServiceContext::RMOL_ServiceContext() : _ownStdairService (false) {
00017 }
00018
00019 // //////////////////////////////////////
00020 RMOL_ServiceContext::RMOL_ServiceContext (const RMOL_ServiceContext&) {
00021     assert (false);
00022 }
00023
00024 // //////////////////////////////////////
00025 RMOL_ServiceContext::~RMOL_ServiceContext() {
00026 }
00027
00028 // //////////////////////////////////////
00029 stdair::STDAIR_Service& RMOL_ServiceContext::getSTDAIR_Service() const {
00030     assert (_stdairService != NULL);
00031     return *_stdairService;
00032 }
00033
00034 // //////////////////////////////////////
00035 const std::string RMOL_ServiceContext::shortDisplay() const {
00036     std::ostringstream oStr;
00037     oStr << "RMOL_ServiceContext -- Owns StdAir service: " << _ownStdairService
00038 ;
00039     return oStr.str();
00040 }
00041
00042 // //////////////////////////////////////
00043 const std::string RMOL_ServiceContext::display() const {
00044     std::ostringstream oStr;
00045     oStr << shortDisplay();
00046     return oStr.str();
00047 }
00048
00049 // //////////////////////////////////////
00050 const std::string RMOL_ServiceContext::describe() const {
00051     return shortDisplay();
00052 }
00053
00054 // //////////////////////////////////////
00055 void RMOL_ServiceContext::reset() {
00056     // The shared_ptr<>::reset() method drops the refcount by one.
00057     // If the count result is dropping to zero, the resource pointed to
00058     // by the shared_ptr<> will be freed.
00059
00060     // Reset the stdair shared pointer
```

```

00061     _stdairService.reset();
00062 }
00063
00064 }
```

26.137 rmol/service/RMOL_ServiceContext.hpp File Reference

```

#include <string>
#include <stdair/stdair_basic_types.hpp>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_maths_types.hpp>
#include <stdair/stdair_service_types.hpp>
#include <stdair/service/ServiceAbstract.hpp>
#include <rmol/RMOL_Types.hpp>
```

Classes

- class [RMOL::RMOL_ServiceContext](#)
Inner class holding the context for the [RMOL](#) Service object.

Namespaces

- namespace [stdair](#)
- namespace [RMOL](#)

26.138 RMOL_ServiceContext.hpp

```

00001 #ifndef __RMOL_SVC_RMOL_SERVICE_CONTEXT_HPP
00002 #define __RMOL_SVC_RMOL_SERVICE_CONTEXT_HPP
00003
00004 // //////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////
00007 // STL
00008 #include <string>
00009 // StdAir
00010 #include <stdair/stdair_basic_types.hpp>
00011 #include <stdair/stdair_inventory_types.hpp>
00012 #include <stdair/stdair_maths_types.hpp>
00013 #include <stdair/stdair_service_types.hpp>
00014 #include <stdair/service/ServiceAbstract.hpp>
00015 // RMOL
00016 #include <rmol/RMOL_Types.hpp>
00017
00019 namespace stdair {
00020     class STDAIR_Service;
00021     class LegCabin;
00022 }
00023
00024 namespace RMOL {
00025
00029     class RMOL_ServiceContext : public stdair::ServiceAbstract
00030     {
00035         friend class RMOL_Service;
00036         friend class FacRmolServiceContext;
00037
00038     private:
00039         // ////////// Getters //////////
00043         stdair::STDAIR_ServicePtr_T getSTDAIR_ServicePtr() const {
00044             return _stdairService;
00045         }
00046
00050         stdair::STDAIR_Service& getSTDAIR_Service() const;
00051
00055         const bool getOwnStdairServiceFlag() const {
00056             return _ownStdairService;
00057         }
00058
00059 }
```

```

00060 private:
00061 // /////////// Setters ///////////
00065 void setSTDAIR_Service (stdair::STDAIR_ServicePtr_T ioSTDAIR_ServicePtr,
00066                        const bool iOwnStdairService) {
00067     _stdairService = ioSTDAIR_ServicePtr;
00068     _ownStdairService = iOwnStdairService;
00069 }
00070
00074 void reset();
00075
00076 private:
00077 // /////////// Display Methods ///////////
00082 const std::string shortDisplay() const;
00083
00087 const std::string display() const;
00088
00092 const std::string describe() const;
00093
00094 private:
00095 // /////////// Construction / initialisation ///////////
00100 RMOL_ServiceContext();
00104 RMOL_ServiceContext (const RMOL_ServiceContext&);
00105
00109 ~RMOL_ServiceContext();
00110
00111 private:
00112 // /////////// Children ///////////
00117 stdair::STDAIR_ServicePtr_T _stdairService;
00118
00122 bool _ownStdairService;
00123 };
00124
00125 }
00126 #endif // __RMOL_SVC_RMOL_SERVICE_CONTEXT_HPP

```

26.139 test/rmol/bomsforforecaster.cpp File Reference

26.140 bomsforforecaster.cpp

```

00001
00005 // //////////////////////////////////////
00006 // Import section
00007 // //////////////////////////////////////
00008 // STL
00009 #include <cassert>
00010 #include <limits>
00011 #include <sstream>
00012 #include <fstream>
00013 #include <string>
00014 // Boost Unit Test Framework (UTF)
00015 #define BOOST_TEST_DYN_LINK
00016 #define BOOST_TEST_MAIN
00017 #define BOOST_TEST_MODULE OptimiseTestSuite
00018 #include <boost/test/unit_test.hpp>
00019 // StdAir
00020 #include <stdair/basic/BasLogParams.hpp>
00021 #include <stdair/basic/BasDBParams.hpp>
00022 #include <stdair/service/Logger.hpp>
00023 // RMOL
00024 #include <rmol/RMOL_Service.hpp>
00025 #include <rmol/config/rmol-paths.hpp>
00026
00027 namespace boost_utf = boost::unit_test;
00028
00029 // (Boost) Unit Test XML Report
00030 std::ofstream utfReportStream ("bomsforforecaster_utfresults.xml");
00031
00035 struct UnitTestConfig {
00037     UnitTestConfig() {
00038         boost_utf::unit_test_log.set_stream (utfReportStream);
00039         boost_utf::unit_test_log.set_format (boost_utf::XML);
00040         boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
00041         //boost_utf::unit_test_log.set_threshold_level
00042         (boost_utf::log_successful_tests);
00043     }
00044
00045     ~UnitTestConfig() {
00046     }
00047 };
00048

```

```

00049 namespace RMOL {
00050
00052     struct BookingClassData {
00053
00054         // Attributes
00055         double _bookingCount;
00056         double _fare;
00057         double _sellupFactor;
00058         bool _censorshipFlag;
00059
00060         // Constructor
00061         BookingClassData (const double iBookingCount, const double iFare,
00062             const double iSellupFactor, const bool iCensorshipFlag)
00063             : _bookingCount(iBookingCount), _fare(iFare),
00064             _sellupFactor(iSellupFactor), _censorshipFlag(iCensorshipFlag) {
00065         }
00066
00067         // Getters
00068         double getFare () const {
00069             return _fare;
00070         }
00071
00072         bool getCensorshipFlag () const {
00073             return _censorshipFlag;
00074         }
00075
00076         // Display
00077         std::string toString() const {
00078             std::ostringstream oStr;
00079             oStr << std::endl
00080                 << "[Booking class data information]" << std::endl
00081                 << "Booking counter: " << _bookingCount << std::endl
00082                 << "Fare: " << _fare << std::endl
00083                 << "Sell-up Factor: " << _sellupFactor << std::endl
00084                 << "censorshipFlag: " << _censorshipFlag << std::endl;
00085             return oStr.str();
00086         }
00087     };
00088
00089     struct BookingClassDataSet {
00090
00091         typedef std::vector<BookingClassData*> BookingClassDataList_T;
00092
00093         // Attributes
00094         int _numberOfClass;
00095         double _minimumFare;
00096         bool _censorshipFlag; // true if any of the classes is censored
00097         BookingClassDataList_T _bookingClassDataList;
00098
00099         // Constructor
00100         BookingClassDataSet ()
00101             : _numberOfClass(0), _minimumFare(0),
00102             _censorshipFlag(false) {
00103         }
00104
00105         // Add BookingClassData
00106         void addBookingClassData (BookingClassData& ioBookingClassData) {
00107             _bookingClassDataList.push_back (&ioBookingClassData);
00108         }
00109
00110         // Getters
00111         stdair::NbOfClasses_T getNumberOfClass () const {
00112             return _bookingClassDataList.size();
00113         }
00114
00115         double getMinimumFare () const {
00116             return _minimumFare;
00117         }
00118
00119         bool getCensorshipFlag () const {
00120             return _censorshipFlag;
00121         }
00122
00123         // Setters
00124         void setMinimumFare (const double iMinFare) {
00125             _minimumFare = iMinFare;
00126         }
00127
00128         void setCensorshipFlag (const bool iCensorshipFlag) {
00129             _censorshipFlag = iCensorshipFlag;
00130         }
00131
00132         // compute minimum fare
00133         void updateMinimumFare() {
00134             double minFare = std::numeric_limits<double>::max();
00135             BookingClassDataList_T::iterator itBookingClassDataList;

```



```

00138     for (itBookingClassDataList = _bookingClassDataList.begin();
00139          itBookingClassDataList != _bookingClassDataList.end();
00140          ++itBookingClassDataList) {
00141         BookingClassData* lBookingClassData = *itBookingClassDataList;
00142         assert (lBookingClassData != NULL);
00143
00144         const double lFare = lBookingClassData->getFare();
00145         if (lFare < minFare) {
00146             minFare = lFare;
00147         }
00148     }
00149     //
00150     setMinimumFare(minFare);
00151 }
00152
00153 // compute censorship flag for the data set
00154 void updateCensorshipFlag () {
00155     bool censorshipFlag = false;
00156     BookingClassDataList_T::iterator itBookingClassDataList;
00157     for (itBookingClassDataList = _bookingClassDataList.begin();
00158          itBookingClassDataList != _bookingClassDataList.end();
00159          ++itBookingClassDataList) {
00160         BookingClassData* lBookingClassData = *itBookingClassDataList;
00161         assert (lBookingClassData != NULL);
00162
00163         const bool lCensorshipFlagOfAClass =
00164             lBookingClassData->getCensorshipFlag();
00165         if (lCensorshipFlagOfAClass) {
00166             censorshipFlag = true;
00167             break;
00168         }
00169     }
00170     //
00171     setCensorshipFlag(censorshipFlag);
00172 }
00173
00174 // Display
00175 std::string toString() const {
00176     std::ostringstream oStr;
00177     oStr << std::endl
00178         << "[Booking class data set information]" << std::endl
00179         << "Number of classes: " << _numberOfClass << std::endl
00180         << "Minimum fare: " << _minimumFare << std::endl
00181         << "The data of the class set are sensed: " << _censorshipFlag
00182         << std::endl;
00183     return oStr.str();
00184 }
00185
00186 };
00187
00188 // /**----- BOM : Q-Forecaster ----- */
00189 // struct QForecaster {
00190
00191 //     // Function focused BOM
00192
00193 //     // 1. calculate sell up probability for Q-eq
00194
00195 //     // 2. calculate Q-Equivalent Booking
00196 //     double calculateQEqBooking (BookingClassDataSet& iBookingClassDataSet) {
00197 //         double lQEqBooking = 0.0;
00198 //         double lMinFare = iBookingClassDataSet.getMinimumFare();
00199
00200
00201 //         return lQEqBooking;
00202 //     }
00203
00204 //     /* Calculate Q-equivalent demand
00205 //     [<- performed by unconstrainer if necessary (Using ExpMax BOM)]
00206 //     */
00207
00208
00209 //     // 3. Partition to each class
00210
00211 //     //
00212 // };
00213
00214 }
00215
00216
00217 // ////////////////////////////////// Main: Unit Test Suite //////////////////////////////////
00218
00219 // Set the UTF configuration (re-direct the output to a specific file)
00220 BOOST_GLOBAL_FIXTURE (UnitTestFixture);
00221
00222 BOOST_AUTO_TEST_SUITE (master_test_suite)
00223
00224
00225

```

```

00230 BOOST_AUTO_TEST_CASE (rmol_forecaster) {
00231
00232     // Output log File
00233     std::string lLogFilename ("bomsforforecaster.log");
00234     std::ofstream logOutputFile;
00235
00236     // Open and clean the log outputfile
00237     logOutputFile.open (lLogFilename.c_str());
00238     logOutputFile.clear();
00239
00240     // Initialise the RMOL service
00241     const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
00242
00243     // Initialise the RMOL service
00244     RMOL::RMOL_Service rmolService (lLogParams);
00245
00246     // Build a sample BOM tree
00247     rmolService.buildSampleBom();
00248
00249     // Register BCDataSet
00250     RMOL::BookingClassDataSet lBookingClassDataSet;
00251
00252     // Register BookingClassData
00253     RMOL::BookingClassData QClassData (10, 100, 1, false);
00254     RMOL::BookingClassData MClassData (5, 150, 0.8, true);
00255     RMOL::BookingClassData BClassData (0, 200, 0.6, false);
00256     RMOL::BookingClassData YClassData (0, 300, 0.3, false);
00257
00258     // Display
00259     STDAIR_LOG_DEBUG (QClassData.toString());
00260     STDAIR_LOG_DEBUG (MClassData.toString());
00261     STDAIR_LOG_DEBUG (BClassData.toString());
00262     STDAIR_LOG_DEBUG (YClassData.toString());
00263
00264     // Add BookingClassData into the BCDataSet
00265     lBookingClassDataSet.addBookingClassData (QClassData);
00266     lBookingClassDataSet.addBookingClassData (MClassData);
00267     lBookingClassDataSet.addBookingClassData (BClassData);
00268     lBookingClassDataSet.addBookingClassData (YClassData);
00269
00270     // DEBUG
00271     STDAIR_LOG_DEBUG (lBookingClassDataSet.toString());
00272
00273     // Number of classes
00274     const stdair::NbOfClasses_T lNbOfClass = lBookingClassDataSet.
getNumberOfClass();
00275
00276     // DEBUG
00277     STDAIR_LOG_DEBUG ("Number of Classes: " << lNbOfClass);
00278
00279     // Minimum fare
00280     BOOST_CHECK_NO_THROW (lBookingClassDataSet.updateMinimumFare());
00281     const double lMinFare = lBookingClassDataSet.getMinimumFare();
00282
00283     // DEBUG
00284     STDAIR_LOG_DEBUG ("Minimum fare: " << lMinFare);
00285
00286     // Censorship flag
00287     BOOST_CHECK_NO_THROW (lBookingClassDataSet.updateCensorshipFlag());
00288     const bool lCensorshipFlag = lBookingClassDataSet.getCensorshipFlag();
00289
00290     // DEBUG
00291     STDAIR_LOG_DEBUG ("Censorship Flag: " << lCensorshipFlag);
00292
00293     // Close the log output file
00294     logOutputFile.close();
00295 }
00296
00297 // End the test suite
00298 BOOST_AUTO_TEST_SUITE_END()
00299
00300

```

26.141 test/rmol/ForecasterTestSuite.cpp File Reference

26.142 ForecasterTestSuite.cpp

```

00001
00005 // //////////////////////////////////////
00006 // Import section
00007 // //////////////////////////////////////
00008 // STL
00009 #include <sstream>

```

```

00010 #include <fstream>
00011 #include <string>
00012 #include <vector>
00013 #include <cmath>
00014 // Boost Unit Test Framework (UTF)
00015 #define BOOST_TEST_DYN_LINK
00016 #define BOOST_TEST_MAIN
00017 #define BOOST_TEST_MODULE ForecasterTestSuite
00018 #include <boost/test/unit_test.hpp>
00019 // StdAir
00020 #include <stdair/basic/BasLogParams.hpp>
00021 #include <stdair/basic/BasDBParams.hpp>
00022 #include <stdair/basic/BasFileMgr.hpp>
00023 #include <stdair/service/Logger.hpp>
00024 // RMOL
00025 #include <rmol/RMOL_Service.hpp>
00026
00027 namespace boost_utf = boost::unit_test;
00028
00029 // (Boost) Unit Test XML Report
00030 std::ofstream utfReportStream ("ForecasterTestSuite_utfresults.xml");
00031
00032 struct UnitTestConfig {
00033     UnitTestConfig() {
00034         boost_utf::unit_test_log.set_stream (utfReportStream);
00035         boost_utf::unit_test_log.set_format (boost_utf::XML);
00036         boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
00037         //boost_utf::unit_test_log.set_threshold_level
00038         (boost_utf::log_successful_tests);
00039     }
00040
00041     ~UnitTestConfig() {
00042     }
00043 };
00044
00045 // Main: Unit Test Suite
00046 // Set the UTF configuration (re-direct the output to a specific file)
00047 BOOST_GLOBAL_FIXTURE (UnitTestConfig);
00048 BOOST_AUTO_TEST_SUITE (master_test_suite)
00049
00050 BOOST_AUTO_TEST_CASE (rmol_forecaster_q_forecasting) {
00051     const bool lTestFlag = true; //testForecasterHelper(0);
00052     BOOST_CHECK_EQUAL (lTestFlag, true);
00053     BOOST_CHECK_MESSAGE (lTestFlag == true,
00054         "The test has failed. Please see the log file for "
00055         "<< \"more details\"");
00056 }
00057
00058 // End the test suite
00059 BOOST_AUTO_TEST_SUITE_END ()
00060
00061
00062

```

26.143 test/rmol/ForecasterTestSuite.hpp File Reference

```

#include <sstream>
#include <cppunit/extensions/HelperMacros.h>

```

Classes

- class [ForecasterTestSuite](#)

Functions

- [CPPUNIT_TEST_SUITE_REGISTRATION](#) ([ForecasterTestSuite](#))

26.143.1 Function Documentation

26.143.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (ForecasterTestSuite)

26.144 ForecasterTestSuite.hpp

```

00001 // STL
00002 #include <sstream>
00003 // CPPUNIT
00004 #include <cppunit/extensions/HelperMacros.h>
00005
00006 class ForecasterTestSuite : public CppUnit::TestFixture {
00007     CPPUNIT_TEST_SUITE (ForecasterTestSuite);
00008     CPPUNIT_TEST (testQForecaster);
00009     CPPUNIT_TEST_SUITE_END ();
00010 public:
00011
00012     void testQForecaster();
00013
00014     ForecasterTestSuite ();
00015
00016 protected:
00017     std::stringstream _describeKey;
00018 };
00019
00020 CPPUNIT_TEST_SUITE_REGISTRATION (
00021     ForecasterTestSuite);

```

26.145 test/rmol/OptimiseTestSuite.cpp File Reference

26.146 OptimiseTestSuite.cpp

```

00001
00002 // Import section
00003 // STL
00004 #include <sstream>
00005 #include <fstream>
00006 #include <string>
00007 // Boost Unit Test Framework (UTF)
00008 #define BOOST_TEST_DYN_LINK
00009 #define BOOST_TEST_MAIN
00010 #define BOOST_TEST_MODULE OptimiseTestSuite
00011 #include <boost/test/unit_test.hpp>
00012 // StdAir
00013 #include <stdair/basic/BasLogParams.hpp>
00014 #include <stdair/basic/BasDBParams.hpp>
00015 #include <stdair/basic/BasFileMgr.hpp>
00016 #include <stdair/service/Logger.hpp>
00017 // RMOL
00018 #include <rmol/basic/BasConst_General.hpp>
00019 #include <rmol/RMOL_Service.hpp>
00020 #include <rmol/config/rmol-paths.hpp>
00021
00022 namespace boost_utf = boost::unit_test;
00023
00024 // (Boost) Unit Test XML Report
00025 std::ofstream utfReportStream ("OptimiseTestSuite_utfresults.xml");
00026
00027 struct UnitTestConfig {
00028     UnitTestConfig() {
00029         boost_utf::unit_test_log.set_stream (utfReportStream);
00030         boost_utf::unit_test_log.set_format (boost_utf::XML);
00031         boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
00032         //boost_utf::unit_test_log.set_threshold_level
00033         (boost_utf::log_successful_tests);
00034     }
00035
00036     ~UnitTestConfig() {
00037     }
00038 };
00039
00040 // Return value
00041 int oExpectedBookingLimit = 0;
00042
00043 // Output log File
00044 std::ostringstream oStr;

```

```

00059  oStr << "OptimiseTestSuite_" << optimisationMethodFlag << "_" << isBuiltin <<
      ".log";
00060  const stdair::Filename_T lLogFilename (oStr.str());
00061
00062  // Number of random draws to be generated (best if greater than 100)
00063  const int K = RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
;
00064
00065  // Methods of optimisation (0 = Monte-Carlo, 1 = Dynamic Programming,
00066  // 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b, 5 = EMSR-a with sellup prob.)
00067  const unsigned short METHOD_FLAG = optimisationMethodFlag;
00068
00069  // Cabin Capacity (it must be greater then 100 here)
00070  const double cabinCapacity = 100.0;
00071
00072  // Set the log parameters
00073  std::ofstream logOutputFile;
00074  // Open and clean the log outputfile
00075  logOutputFile.open (lLogFilename.c_str());
00076  logOutputFile.clear();
00077
00078  // Initialise the RMOL service
00079  const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
00080  RMOL::RMOL_Service rmolService (lLogParams);
00081
00082  // Check wether or not a (CSV) input file should be read
00083  if (isBuiltin == true) {
00084
00085      // Build the default sample BOM tree and build a dummy BOM tree.
00086      rmolService.buildSampleBom();
00087
00088  } else {
00089
00090      // Parse the optimisation data and build a dummy BOM tree
00091      const stdair::Filename_T lRMInputFileName (STDAIR_SAMPLE_DIR
"/rm02.csv");
00092      rmolService.parseAndLoad (cabinCapacity, lRMInputFileName);
00093  }
00094
00095  switch (METHOD_FLAG) {
00096  case 0: {
00097      // DEBUG
00098      STDAIR_LOG_DEBUG ("Optimisation by Monte-Carlo (MC)");
00099
00100      // Calculate the optimal protections by the Monte Carlo
00101      // Integration approach
00102      rmolService.optimalOptimisationByMCIntegration (K);
00103      break;
00104  }
00105
00106  case 1: {
00107      // DEBUG
00108      STDAIR_LOG_DEBUG ("Optimisation by Dynamic Programming (DP)");
00109
00110      // Calculate the optimal protections by DP.
00111      rmolService.optimalOptimisationByDP ();
00112      break;
00113  }
00114
00115  case 2: {
00116      // DEBUG
00117      STDAIR_LOG_DEBUG ("Calculate the Bid-Price Vectors (BPV) by EMSR");
00118
00119      // Calculate the Bid-Price Vector by EMSR
00120      rmolService.heuristicOptimisationByEmsr ();
00121      break;
00122  }
00123
00124  case 3: {
00125      // DEBUG
00126      STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRa");
00127
00128      // Calculate the protections by EMSR-a
00129      // Test the EMSR-a algorithm implementation
00130      rmolService.heuristicOptimisationByEmsrA ();
00131
00132      // Return a cumulated booking limit value to test
00133      // oExpectedBookingLimit = static_cast<int> (lBookingLimitVector.at(2));
00134      break;
00135  }
00136
00137  case 4: {
00138      // DEBUG
00139      STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRb");
00140
00141      // Calculate the protections by EMSR-b
00142      rmolService.heuristicOptimisationByEmsrB ();

```

```

00143     break;
00144 }
00145
00146 default: rmolService.optimalOptimisationByMCIntegration (K);
00147 }
00148
00149 // Close the log file
00150 logOutputFile.close();
00151
00152 return oExpectedBookingLimit;
00153 }
00154
00155
00156 // ////////////////////////////////// Main: Unit Test Suite //////////////////////////////////
00157
00158 // Set the UTF configuration (re-direct the output to a specific file)
00159 BOOST_GLOBAL_FIXTURE (UnitTestFixture);
00160
00161 // ////////////////////////////////////////
00162 // Tests are based on the following input values
00163 // price; mean; standard deviation;
00164 // 1050; 17.3; 5.8;
00165 // 567; 45.1; 15.0;
00166 // 534; 39.6; 13.2;
00167 // 520; 34.0; 11.3;
00168 // ////////////////////////////////////////
00169
00170 BOOST_AUTO_TEST_SUITE (master_test_suite)
00171
00172
00173 BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo) {
00174     // State whether the BOM tree should be built-in or parsed from an input file
00175     const bool isBuiltin = false;
00176     BOOST_CHECK_NO_THROW (testOptimiseHelper(0, isBuiltin));
00177 }
00178
00179 BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming) {
00180     // State whether the BOM tree should be built-in or parsed from an input file
00181     const bool isBuiltin = false;
00182     BOOST_CHECK_NO_THROW (testOptimiseHelper(1, isBuiltin));
00183 }
00184
00185 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bpv) {
00186     // State whether the BOM tree should be built-in or parsed from an input file
00187     const bool isBuiltin = false;
00188     BOOST_CHECK_NO_THROW (testOptimiseHelper(2, isBuiltin));
00189 }
00190
00191 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a) {
00192     // State whether the BOM tree should be built-in or parsed from an input file
00193     const bool isBuiltin = false;
00194     BOOST_CHECK_NO_THROW (testOptimiseHelper(3, isBuiltin));
00195     // const int lBookingLimit = testOptimiseHelper(3);
00196     // const int lExpectedBookingLimit = 61;
00197     // BOOST_CHECK_EQUAL (lBookingLimit, lExpectedBookingLimit);
00198     // BOOST_CHECK_MESSAGE (lBookingLimit == lExpectedBookingLimit,
00199     //                      "The booking limit is " << lBookingLimit
00200     //                      << ", but it is expected to be "
00201     //                      << lExpectedBookingLimit);
00202 }
00203
00204 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b) {
00205     // State whether the BOM tree should be built-in or parsed from an input file
00206     const bool isBuiltin = false;
00207     BOOST_CHECK_NO_THROW (testOptimiseHelper(4, isBuiltin));
00208 }
00209
00210 BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo_built_in) {
00211     // State whether the BOM tree should be built-in or parsed from an input file
00212     const bool isBuiltin = true;
00213     BOOST_CHECK_NO_THROW (testOptimiseHelper(0, isBuiltin));
00214 }
00215
00216 BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming_built_in) {
00217

```

```

00257 // State whether the BOM tree should be built-in or parsed from an input file
00258 const bool isBuiltin = true;
00259
00260 BOOST_CHECK_NO_THROW (testOptimiseHelper(1, isBuiltin));
00261 }
00262
00267 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bp_v_built_in) {
00268
00269 // State whether the BOM tree should be built-in or parsed from an input file
00270 const bool isBuiltin = true;
00271
00272 BOOST_CHECK_NO_THROW (testOptimiseHelper(2, isBuiltin));
00273 }
00274
00279 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a_built_in) {
00280
00281 // State whether the BOM tree should be built-in or parsed from an input file
00282 const bool isBuiltin = true;
00283
00284 BOOST_CHECK_NO_THROW (testOptimiseHelper(3, isBuiltin));
00285 }
00286
00291 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b_built_in) {
00292
00293 // State whether the BOM tree should be built-in or parsed from an input file
00294 const bool isBuiltin = true;
00295
00296 BOOST_CHECK_NO_THROW (testOptimiseHelper(4, isBuiltin));
00297 }
00298
00299 // End the test suite
00300 BOOST_AUTO_TEST_SUITE_END()
00301
00302

```

26.147 test/rmol/OptimiseTestSuite.hpp File Reference

```

#include <sstream>
#include <cppunit/extensions/HelperMacros.h>

```

Classes

- class [OptimiseTestSuite](#)

Functions

- [CPPUNIT_TEST_SUITE_REGISTRATION](#) ([OptimiseTestSuite](#))

26.147.1 Function Documentation

26.147.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (OptimiseTestSuite)

26.148 OptimiseTestSuite.hpp

```

00001 // STL
00002 #include <sstream>
00003 // CPPUNIT
00004 #include <cppunit/extensions/HelperMacros.h>
00005
00006 class OptimiseTestSuite : public CppUnit::TestFixture {
00007     CPPUNIT_TEST_SUITE (OptimiseTestSuite);
00008     CPPUNIT_TEST (testOptimiseMC);
00009     CPPUNIT_TEST (testOptimiseDP);
00010     CPPUNIT_TEST (testOptimiseEMSR);
00011     CPPUNIT_TEST (testOptimiseEMSRa);
00012     CPPUNIT_TEST (testOptimiseEMSRb);
00013     CPPUNIT_TEST (testOptimiseEMSRaWithSU);
00014     // CPPUNIT_TEST (errorCase);
00015     CPPUNIT_TEST_SUITE_END ();
00016 public:
00017

```

```

00019 void testOptimiseMC();
00020
00022 void testOptimiseDP();
00023
00026 void testOptimiseEMSR();
00027
00030 void testOptimiseEMSRa();
00031
00034 void testOptimiseEMSRb();
00035
00037 // void errorCase ();
00038
00040 OptimiseTestSuite ();
00041
00042 protected:
00043     std::stringstream _describeKey;
00044 };
00045
00046 CPPUNIT_TEST_SUITE_REGISTRATION (
    OptimiseTestSuite);

```

26.149 test/rmol/UnconstrainerTestSuite.cpp File Reference

26.150 UnconstrainerTestSuite.cpp

```

00001
00005 // //////////////////////////////////////
00006 // Import section
00007 // //////////////////////////////////////
00008 // STL
00009 #include <sstream>
00010 #include <fstream>
00011 #include <string>
00012 // Boost Unit Test Framework (UTF)
00013 #define BOOST_TEST_DYN_LINK
00014 #define BOOST_TEST_MAIN
00015 #define BOOST_TEST_MODULE UnconstrainerTestSuite
00016 #include <boost/test/unit_test.hpp>
00017 // StdAir
00018 #include <stdair/basic/BasLogParams.hpp>
00019 #include <stdair/basic/BasDBParams.hpp>
00020 #include <stdair/basic/BasFileMgr.hpp>
00021 #include <stdair/service/Logger.hpp>
00022 // RMOL
00023 #include <rmol/RMOL_Service.hpp>
00024
00025 namespace boost_utf = boost::unit_test;
00026
00027 // (Boost) Unit Test XML Report
00028 std::ofstream utfReportStream ("UnconstrainerTestSuite_utfresults.xml");
00029
00033 struct UnitTestConfig {
00035     UnitTestConfig() {
00036         boost_utf::unit_test_log.set_stream (utfReportStream);
00037         boost_utf::unit_test_log.set_format (boost_utf::XML);
00038         boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
00039         //boost_utf::unit_test_log.set_threshold_level
        (boost_utf::log_successful_tests);
00040     }
00041
00043     ~UnitTestConfig() {
00044     }
00045 };
00046
00047
00048 // ////////////////////////////////// Main: Unit Test Suite //////////////////////////////////
00049
00050 // Set the UTF configuration (re-direct the output to a specific file)
00051 BOOST_GLOBAL_FIXTURE (UnitTestConfig);
00052
00057 BOOST_AUTO_TEST_SUITE (master_test_suite)
00058
00059
00062 BOOST_AUTO_TEST_CASE (rmol_unconstraining_em) {
00063     const bool lTestFlag = true; // testUnconstrainerHelper(0);
00064     BOOST_CHECK_EQUAL (lTestFlag, true);
00065     BOOST_CHECK_MESSAGE (lTestFlag == true,
00066         "The test has failed. Please see the log file for "
00067         "<< \"more details\"");
00068 }
00069
00070 // End the test suite
00071 BOOST_AUTO_TEST_SUITE_END()

```


00072
00073

26.151 test/rmol/UnconstrainerTestSuite.hpp File Reference

```
#include <sstream>
#include <cppunit/extensions/HelperMacros.h>
```

Classes

- class [UnconstrainerTestSuite](#)

Functions

- [CPPUNIT_TEST_SUITE_REGISTRATION](#) ([UnconstrainerTestSuite](#))

26.151.1 Function Documentation

26.151.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (UnconstrainerTestSuite)

26.152 UnconstrainerTestSuite.hpp

```
00001 // STL
00002 #include <sstream>
00003 // CPPUNIT
00004 #include <cppunit/extensions/HelperMacros.h>
00005
00006 class UnconstrainerTestSuite : public
    CppUnit::TestFixture {
00007     CPPUNIT_TEST_SUITE (UnconstrainerTestSuite);
00008     CPPUNIT_TEST (testUnconstrainingByEM);
00009     CPPUNIT_TEST_SUITE_END ();
00010 public:
00011
00012     void testUnconstrainingByEM();
00013
00014     UnconstrainerTestSuite ();
00015
00016 protected:
00017     std::stringstream _describeKey;
00018 };
00019
00020 CPPUNIT_TEST_SUITE_REGISTRATION (
    UnconstrainerTestSuite);
```