RMOL

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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

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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.

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4.1.1 Version 2.1, February 1999

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```

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```
a) Accompany the work with the complete corresponding
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changes were used in the work (which must be distributed under
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```

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   ```
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   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.
   ```

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4.3.2 END OF TERMS AND CONDITIONS

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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,
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    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}/simfqt-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

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=P-REFIX' 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 ouput 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;rmollib
-- Binaries to build/install ...... : airrac;rmol
-- Modules to test ................ : rmol
-- Binaries to test ............... : UnconstrainerTesttst;UnconstrainerTesttst;ForecasterTesttst;Unconstraine
--
-- * 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 . : rmollib
--   + Executables to build/install : rmol
--   + Tests to perform ........... : UnconstrainerTesttst;UnconstrainerTesttst;ForecasterTesttst;Unconstraine
--
-- 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
--   - SOCIMYSQL_INCLUDE_DIR ....... : /usr/include/soci
--   - SOCI_LIBRARIES .............. : /usr/lib64/libsoci_core.so
--   - SOCIMYSQL_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;stdairuicllib
--   - 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 rmollib
[ 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

10.2 Introdution

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 he `'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

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

13.2 Introdution

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 sucessful. 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/Progra~1/AMD/acml3.1.0/gnu32/lib"
% export CPPFLAGS="-I/c/Progra~1/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

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:

- Instanciate the BOM Root Object
- Instanciate the (Airline) Inventory Object
- Link the Inventory Object with the BOM Root

15.3.1 Instanciate 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::STDAIR_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 Instanciate 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]../../../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, Avl, 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, 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, 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;

    // Constructer
    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
    unsigned int 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 sensored: " << _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 (UnitTestConfig);

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 unsigned int lNoOfClass = lBookingClassDataSet.getNumberOfClass();

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

  // 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/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 << ".log";
  const stdair::Filename_T lLogFilename (oStr.str());

  // Number of random draws to be generated (best if greater than 100)
  const int K = 100000;

  // 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 wether 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 (UnitTestConfig);

// ////////////////////////////////////////////////////////////////////
// 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(5, 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(6, 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(7, 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(8, 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(9, 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:

21 Class Index

21.1 Class Hierarchy

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

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 >

22 Class Index

22.1 Class List

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

23 File Index

23.1 File List

Here is a list of all files with brief descriptions:

24 Namespace Documentation

24.1 RMOL Namespace Reference

Classes

- struct DefaultMap
- struct DefaultDCPList
- class DPOptimiser
- class EMDetruncator
- class Emsr
- class EmsrUtils
- class GuillotineBlockHelper
- 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 Utilities
- class Detruncator
- class Forecaster
- class InventoryParser

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

  Forecast-related exception.
- class OptimisationException

Optimisation-related 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::NbOfRequests_T > UnconstrainedDemandVector_T
- typedef std::vector < stdair::NbOfBookings_T > BookingVector_T
- typedef std::vector < stdair::Flag_T > FlagVector_T
- typedef std::map < stdair::BookingClass *, UnconstrainedDemandVector_T > BookingClassUnconstrainedDemandVectorMap_T
- typedef std::map < stdair::BookingClass *, stdair::NbOfRequests_T > BookingClassUnconstrainedDemandMap_T
- typedef std::map< const stdair::DTD_T, double > FRAT5Curve_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 = 100000
- 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
- const FRAT5Curve_T DEFAULT_CUMULATIVE_FRAT5_CURVE
- const stdair::DCPList_T DEFAULT_DCP_LIST = DefaultDCPList::init()

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 73 of file RMOL_Types.hpp.

24.1.1.5 typedef std::vector<stdair::NbOfRequests_T> RMOL::UnconstrainedDemandVector_T

Define the vector of historical unconstrained demand.

Definition at line 76 of file RMOL_Types.hpp.

24.1.1.6 typedef std::vector<stdair::NbOfBookings_T> RMOL::BookingVector_T

Define the vector of historical bookings.

Definition at line 79 of file RMOL_Types.hpp.

24.1.1.7 typedef std::vector<stdair::Flag_T> RMOL::FlagVector_T

Define the vector of censorship flags.

Definition at line 82 of file RMOL_Types.hpp.

24.1.1.8 typedef std::map<stdair::BookingClass*, UnconstrainedDemandVector_T> RMOL::BookingClassUnconstrainedDemandVectorMap_T

Define the map betweent the booking class and it's corresponding unconstrained demand vector.

Definition at line 86 of file RMOL_Types.hpp.

24.1.1.9 typedef std::map<stdair::BookingClass*, stdair::NbOfRequests_T> RMOL::BookingClassUnconstrainedDemandMap_T

Define the map betweent the booking class and it's corresponding unconstrained demand.

Definition at line 90 of file RMOL_Types.hpp.

24.1.1.10 typedef std::map<const stdair::DTD_T, double> RMOL::FRAT5Curve_T

Define the FRAT5 curve.

Definition at line 93 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 11 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 14 of file BasConst.cpp.

24.1.2.3 const int RMOL::DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION = 100000

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

Definition at line 18 of file BasConst.cpp.

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 23 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 26 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 29 of file BasConst.cpp.

24.1.2.7 const double RMOL::DEFAULT_INITIALIZER_DOUBLE_NEGATIVE = -10.0

Default negative value used to initialze a double variable.

Definition at line 32 of file BasConst.cpp.

24.1.2.8 const FRAT5Curve_T RMOL::DEFAULT_CUMULATIVE_FRAT5_CURVE

Initial value:

```
DefaultMap::createCumulativeFRAT5Curve()
```

Default cumulative[for the remaining period] FRAT5 curve for forecasting and optimisation.

Default cumulative (for the remaining period) FRAT5 curve for forecasting and optimisation.

Definition at line 36 of file BasConst.cpp.

24.1.2.9 const stdair::DCPList_T RMOL::DEFAULT_DCP_LIST = DefaultDCPList::init()

Defaut data collection point list.

Definition at line 69 of file BasConst.cpp.

Referenced by RMOL::Utilities::buildRemainingDCPList(), RMOL::Utilities::buildRemainingDCPList2(), RMOL::RMOL_Service::forecastOnD(), RMOL::RMOL_Service::optimiseOnD(), RMOL::RMOL_Service::optimiseOnDUsingAdvancedRMCooperation(), RMOL::RMOL_Service::optimiseOnDUsingRMCooperation(), RMOL::RMOL_Service::projectAggregatedDemandOnLegCabins(), RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDA(), RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP(), RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingYP(), RMOL::RMOL_Service::resetDemandInformation(), and RMOL::RMOL_Service::updateBidPrice().

24.2 stdair Namespace Reference

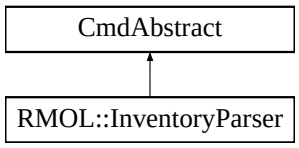
24.2.1 Detailed Description

Forward declarations.

25 Class Documentation

25.1 CmdAbstract Class Reference

Inheritance diagram for CmdAbstract:



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

- rmol/command/InventoryParser.hpp

25.2 RMOL::DefaultDCPList Struct Reference

`#include <rmol/basic/BasConst_General.hpp>`

Static Public Member Functions

- static stdair::DCPList_T init ()

25.2.1 Detailed Description

Definition at line 31 of file BasConst_General.hpp.

25.2.2 Member Function Documentation

25.2.2.1 stdair::DCPList_T RMOL::DefaultDCPList::init ( ) [static]

Definition at line 70 of file BasConst.cpp.

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

- rmol/basic/BasConst_General.hpp
- rmol/basic/BasConst.cpp

25.3 RMOL::DefaultMap Struct Reference

`#include <rmol/basic/BasConst_Curves.hpp>`

Static Public Member Functions

- static FRAT5Curve_T createCumulativeFRAT5Curve ()

25.3.1 Detailed Description

Default PoS probability mass.

Definition at line 17 of file BasConst_Curves.hpp.

25.3.2 Member Function Documentation

25.3.2.1 FRAT5Curve_T RMOL::DefaultMap::createCumulativeFRAT5Curve ( ) [static]

Definition at line 38 of file BasConst.cpp.

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

- rmol/basic/BasConst_Curves.hpp
- rmol/basic/BasConst.cpp

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::Detruncator Class Reference

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

Static Public Member Functions

- static void unconstrainUsingAdditivePickUp (const stdair::SegmentCabin &, BookingClassUnconstrainedDemandVectorMap_T &, UnconstrainedDemandVector_T &, const stdair::DCP_T &, const stdair::DCP_T &, const stdair::Date_T &)
- static void unconstrainUsingMultiplicativePickUp (const stdair::SegmentCabin &, BookingClassUnconstrainedDemandVectorMap_T &, UnconstrainedDemandVector_T &, const stdair::DCP_T &, const stdair::DCP_T &, const stdair::Date_T &, const stdair::NbOfSegments_T &)
- static void retrieveUnconstrainedDemandForFirstDCP (const stdair::SegmentCabin &, BookingClassUnconstrainedDemandVectorMap_T &, UnconstrainedDemandVector_T &, const stdair::DCP_T &, const stdair::NbOfSegments_T &, const stdair::NbOfSegments_T &)
- static void unconstrainUsingMultiplicativePickUp (HistoricalBookingHolder &)

25.5.1 Detailed Description

Class wrapping the principal unconstraining algorithms and some accessory algorithms.

Definition at line 24 of file Detruncator.hpp.

25.5.2 Member Function Documentation

25.5.2.1 void RMOL::Detruncator::unconstrainUsingAdditivePickUp (const stdair::SegmentCabin & *iSegmentCabin,* BookingClassUnconstrainedDemandVectorMap_T & *ioBkgClassUncDemMap,* UnconstrainedDemandVector_T & *ioQEquivalentDemandVector,* const stdair::DCP_T & *iDCPBegin,* const stdair::DCP_T & *iDCPEnd,* const stdair::Date_T & *iCurrentDate*) [static]

Unconstrain booking figures between two DCP's.

Definition at line 25 of file Detruncator.cpp.

References RMOL::GuillotineBlockHelper::getNbOfSegmentAlreadyPassedThisDTD().

25.5.2.2 void RMOL::Detruncator::unconstrainUsingMultiplicativePickUp (const stdair::SegmentCabin & *iSegmentCabin,* BookingClassUnconstrainedDemandVectorMap_T & *ioBkgClassUncDemMap,* UnconstrainedDemandVector_T & *ioQEquivalentDemandVector,* const stdair::DCP_T & *iDCPBegin,* const stdair::DCP_T & *iDCPEnd,* const stdair::Date_T & *iCurrentDate,* const stdair::NbOfSegments_T & *iNbOfDepartedSegments*) [static]

Unconstrain booking figures between two DCP's.

Definition at line 317 of file Detruncator.cpp.

References RMOL::GuillotineBlockHelper::getNbOfSegmentAlreadyPassedThisDTD().

25.5.2.3 void RMOL::Detruncator::retrieveUnconstrainedDemandForFirstDCP (const stdair::SegmentCabin & *iSegmentCabin,* BookingClassUnconstrainedDemandVectorMap_T & *ioBkgClassUncDemVectorMap,* UnconstrainedDemandVector_T & *ioQEquivalentDemandVector,* const stdair::DCP_T & *iFirstDCP,* const stdair::NbOfSegments_T & *iNbOfSegments,* const stdair::NbOfSegments_T & *iNbOfUsedSegments*) [static]

Retrieve unconstrained demand figures for the first DCP.

Definition at line 239 of file Detruncator.cpp.

25.5.2.4 void RMOL::Detruncator::unconstrainUsingMultiplicativePickUp (HistoricalBookingHolder & *ioHBHolder*) [static]

Unconstrain the product-oriented booking figures for a given class ou Q-equivalent class.

Definition at line 558 of file Detruncator.cpp.

References RMOL::HistoricalBookingHolder::getCensorshipFlag(), RMOL::HistoricalBookingHolder::getHistoricalBooking(), RMOL::HistoricalBookingHolder::getNbOfFlights(), RMOL::HistoricalBookingHolder::getNbOfUncensoredData(), and RMOL::HistoricalBookingHolder::setUnconstrainedDemand().

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

- rmol/command/Detruncator.hpp
- rmol/command/Detruncator.cpp

25.6 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)

25.6.1 Detailed Description

Utility methods for the Dynamic Programming algorithms.

Definition at line 17 of file DPOptimiser.hpp.

25.6.2 Member Function Documentation

25.6.2.1 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.

25.6.2.2 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

25.7 RMOL::EMDetruncator Class Reference

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

Static Public Member Functions

- static void unconstrainUsingEMMethod (HistoricalBookingHolder &)

25.7.1 Detailed Description

Utility for the Expectation-Maximisation algorithm.

Definition at line 12 of file EMDetruncator.hpp.

25.7.2 Member Function Documentation

25.7.2.1 void RMOL::EMDetruncator::unconstrainUsingEMMethod (HistoricalBookingHolder & *ioHistoricalBookingHolder*) [static]

Unconstrain the censored booking data using the Expection-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

25.8 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 &)

25.8.1 Detailed Description

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

Definition at line 18 of file Emsr.hpp.

25.8.2 Member Function Documentation

25.8.2.1 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 pj and demand Dj, compute pj∗Pr(Dj>=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().

25.8.2.2 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().

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

Complute 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

25.9 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 &)

25.9.1 Detailed Description

Forward declarations.

Definition at line 19 of file EmsrUtils.hpp.

25.9.2 Member Function Documentation

25.9.2.1 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().

25.9.2.2 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().

25.9.2.3 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:

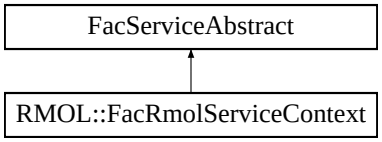
- rmol/bom/EmsrUtils.hpp
- rmol/bom/EmsrUtils.cpp

25.10 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 ()

25.10.1 Detailed Description

Factory for the service context.

Definition at line 22 of file FacRmolServiceContext.hpp.

25.10.2 Constructor & Destructor Documentation

25.10.2.1 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.

25.10.2.2 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().

25.10.3 Member Function Documentation

25.10.3.1 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().

25.10.3.2 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.

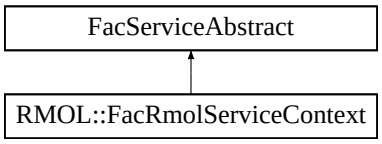
Definition at line 34 of file FacRmolServiceContext.cpp.

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

- rmol/factory/FacRmolServiceContext.hpp
- rmol/factory/FacRmolServiceContext.cpp

25.11 FacServiceAbstract Class Reference

Inheritance diagram for FacServiceAbstract:



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

- rmol/factory/FacRmolServiceContext.hpp

25.12 RMOL::Forecaster Class Reference

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

Static Public Member Functions

- static bool forecastUsingAdditivePickUp (stdair::FlightDate &, const stdair::DateTime_T &)
- static bool forecastUsingMultiplicativePickUp (stdair::FlightDate &, const stdair::DateTime_T &)

25.12.1 Detailed Description

Class wrapping the optimisation algorithms.

Definition at line 23 of file Forecaster.hpp.

25.12.2 Member Function Documentation

25.12.2.1 bool RMOL::Forecaster::forecastUsingAdditivePickUp (stdair::FlightDate & *ioFlightDate,* const stdair::DateTime_T & *iEventTime*) [static]

Forecast demand for a flight-date using additive pick-up method.

Definition at line 35 of file Forecaster.cpp.

References RMOL::Utilities::buildRemainingDCPList(), and RMOL::Utilities::buildRemainingDCPList2().

Referenced by RMOL::RMOL_Service::optimise().

25.12.2.2 bool RMOL::Forecaster::forecastUsingMultiplicativePickUp (stdair::FlightDate & *ioFlightDate,* const stdair::DateTime_T & *iEventTime*) [static]

Forecast demand for a flight-date using multiplicative pick-up method.

Definition at line 276 of file Forecaster.cpp.

Referenced by RMOL::RMOL_Service::optimise().

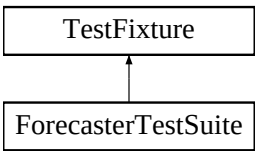
The documentation for this class was generated from the following files:

- rmol/command/Forecaster.hpp
- rmol/command/Forecaster.cpp

25.13 ForecasterTestSuite Class Reference

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

Inheritance diagram for ForecasterTestSuite:



Public Member Functions

- void testQForecaster ()
- ForecasterTestSuite ()

Protected Attributes

- std::stringstream _describeKey

25.13.1 Detailed Description

Definition at line 6 of file ForecasterTestSuite.hpp.

25.13.2 Constructor & Destructor Documentation

25.13.2.1 ForecasterTestSuite::ForecasterTestSuite ( )

Constructor.

25.13.3 Member Function Documentation

25.13.3.1 void ForecasterTestSuite::testQForecaster ( )

Test Q-forecaster.

25.13.4 Member Data Documentation

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

Definition at line 19 of file ForecasterTestSuite.hpp.

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

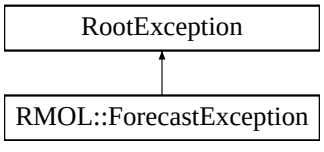
- test/rmol/ForecasterTestSuite.hpp

25.14 RMOL::ForecastException Class Reference

Forecast-related exception.

`#include <rmol/RMOL_Types.hpp>`

Inheritance diagram for RMOL::ForecastException:



Public Member Functions

- ForecastException (const std::string &iWhat)

25.14.1 Detailed Description

Forecast-related exception.

Definition at line 51 of file RMOL_Types.hpp.

25.14.2 Constructor & Destructor Documentation

25.14.2.1 RMOL::ForecastException::ForecastException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 54 of file RMOL_Types.hpp.

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

- rmol/RMOL_Types.hpp

25.15 RMOL::GuillotineBlockHelper Class Reference

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

Static Public Member Functions

- static stdair::NbOfSegments_T getNbOfSegmentAlreadyPassedThisDTD (const stdair::GuillotineBlock &, const stdair::DTD_T &, const stdair::Date_T &)
- static bool hasPassedThisDTD (const stdair::SegmentCabin &, const stdair::DTD_T &, const stdair::Date_T &)

25.15.1 Detailed Description

Class representing the actual business functions for an airline guillotine block.

Definition at line 23 of file GuillotineBlockHelper.hpp.

25.15.2 Member Function Documentation

25.15.2.1 stdair::NbOfSegments_T RMOL::GuillotineBlockHelper::getNbOfSegmentAlreadyPassedThisDTD (const stdair::GuillotineBlock & *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 GuillotineBlockHelper.cpp.

References hasPassedThisDTD().

Referenced by RMOL::Utilities::getNbOfDepartedSimilarSegments(), RMOL::Detruncator::unconstrainUsingAdditivePickUp(), and RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

25.15.2.2 bool RMOL::GuillotineBlockHelper::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 GuillotineBlockHelper.cpp.

Referenced by getNbOfSegmentAlreadyPassedThisDTD().

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

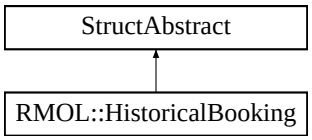
- rmol/bom/GuillotineBlockHelper.hpp
- rmol/bom/GuillotineBlockHelper.cpp

25.16 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 ()

25.16.1 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.

25.16.2 Constructor & Destructor Documentation

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

Main constructor.

Definition at line 21 of file HistoricalBooking.cpp.

25.16.2.2 RMOL::HistoricalBooking::HistoricalBooking ( )

Default constructor.

Definition at line 15 of file HistoricalBooking.cpp.

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

Copy constructor.

Definition at line 29 of file HistoricalBooking.cpp.

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

Destructor.

Definition at line 36 of file HistoricalBooking.cpp.

25.16.3 Member Function Documentation

25.16.3.1 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().

25.16.3.2 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().

25.16.3.3 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().

25.16.3.4 void RMOL::HistoricalBooking::setUnconstrainedDemand (const stdair::NbOfBookings_T & *iDemand*) [inline]

Setter for the unconstraining demand.

Definition at line 38 of file HistoricalBooking.hpp.

25.16.3.5 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.

25.16.3.6 void RMOL::HistoricalBooking::toStream (std::ostream & *ioOut*) const

Dump a Business Object into an output stream.

Parameters

ostream&	the output stream

Returns

ostream& the output stream.

Definition at line 57 of file HistoricalBooking.cpp.

References getFlag(), getNbOfBookings(), and getUnconstrainedDemand().

Referenced by display().

25.16.3.7 const std::string RMOL::HistoricalBooking::describe ( ) const

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

Definition at line 48 of file HistoricalBooking.cpp.

25.16.3.8 void RMOL::HistoricalBooking::display ( ) const

Display on standard output.

Definition at line 66 of file HistoricalBooking.cpp.

References toStream().

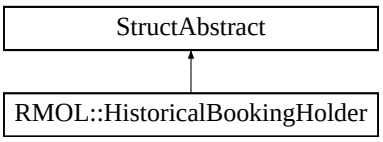
The documentation for this struct was generated from the following files:

- rmol/bom/HistoricalBooking.hpp
- rmol/bom/HistoricalBooking.cpp

25.17 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 ()

25.17.1 Detailed Description

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

Definition at line 23 of file HistoricalBookingHolder.hpp.

25.17.2 Constructor & Destructor Documentation

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

Destructor.

Definition at line 23 of file HistoricalBookingHolder.cpp.

25.17.2.2 RMOL::HistoricalBookingHolder::HistoricalBookingHolder ( )

Constructor.

Protected to force the use of the Factory.

Definition at line 19 of file HistoricalBookingHolder.cpp.

25.17.3 Member Function Documentation

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

Get number of flights.

Definition at line 28 of file HistoricalBookingHolder.cpp.

Referenced by RMOL::EMDetruncator::unconstrainUsingEMMethod(), and RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

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

Get number of uncensored booking data.

Definition at line 33 of file HistoricalBookingHolder.cpp.

Referenced by RMOL::EMDetruncator::unconstrainUsingEMMethod(), and RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

25.17.3.3 const stdair::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::unconstrainUsingEMMethod().

25.17.3.4 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::unconstrainUsingEMMethod().

25.17.3.5 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::unconstrainUsingEMMethod().

25.17.3.6 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::unconstrainUsingEMMethod().

25.17.3.7 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::unconstrainUsingEMMethod().

25.17.3.8 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().

Referenced by RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

25.17.3.9 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 getUnconstrainedDemandOnFirstElement(), and RMOL::EMDetruncator::unconstrainUsingEMMethod().

25.17.3.10 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().

Referenced by RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

25.17.3.11 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().

25.17.3.12 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().

25.17.3.13 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::unconstrainUsingEMMethod(), and RMOL::Detruncator::unconstrainUsingMultiplicativePickUp().

25.17.3.14 void RMOL::HistoricalBookingHolder::addHistoricalBooking (const HistoricalBooking & *iHistoricalBooking*)

Add a HistoricalBooking object to the holder.

Definition at line 236 of file HistoricalBookingHolder.cpp.

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

Dump a Business Object into an output stream.

Parameters

ostream&	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().

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

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

Definition at line 265 of file HistoricalBookingHolder.cpp.

25.17.3.17 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:

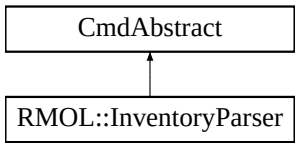
- rmol/bom/HistoricalBookingHolder.hpp
- rmol/bom/HistoricalBookingHolder.cpp

25.18 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 &)

25.18.1 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.

25.18.2 Member Function Documentation

25.18.2.1 bool RMOL::InventoryParser::parseInputFileAndBuildBom (const std::string & *iInputFileName,* stdair::BomRoot & *ioBomRoot*) [static]

Parse the input values from a CSV-formatted inventory file.

Parameters

const	std::string& iInputFileName Inventory file to be parsed.
stdair::BomRoot&	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

25.19 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 unsigned int &)
- static void optimisationByMCIntegration (stdair::LegCabin &)

25.19.1 Detailed Description

Utility methods for the Monte-Carlo algorithms.

Definition at line 19 of file MCOptimiser.hpp.

25.19.2 Member Function Documentation

25.19.2.1 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.

25.19.2.2 stdair::GeneratedDemandVector_T RMOL::MCOptimiser::generateDemandVector (const stdair::MeanValue_T & *iMean,* const stdair::StdDevValue_T & *iStdDev,* const unsigned int & *K*) [static]

Monte-Carlo

Definition at line 154 of file MCOptimiser.cpp.

Referenced by optimisationByMCIntegration().

25.19.2.3 void RMOL::MCOptimiser::optimisationByMCIntegration (stdair::LegCabin & *ioLegCabin*) [static]

Definition at line 175 of file MCOptimiser.cpp.

References generateDemandVector().

Referenced by RMOL::Optimiser::optimiseUsingOnDForecast().

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

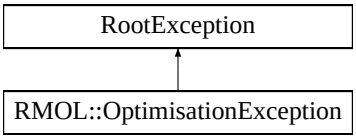
- rmol/bom/MCOptimiser.hpp
- rmol/bom/MCOptimiser.cpp

25.20 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)

25.20.1 Detailed Description

Optimisation-related exception.

Definition at line 61 of file RMOL_Types.hpp.

25.20.2 Constructor & Destructor Documentation

25.20.2.1 RMOL::OptimisationException::OptimisationException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 64 of file RMOL_Types.hpp.

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

- rmol/RMOL_Types.hpp

25.21 RMOL::Optimiser Class Reference

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

Static Public Member Functions

- static void optimalOptimisationByMCIntegration (const int K, stdair::LegCabin &)
- static void optimalOptimisationByDP (stdair::LegCabin &)
- static void heuristicOptimisationByEmsr (stdair::LegCabin &)
- static void heuristicOptimisationByEmsrA (stdair::LegCabin &)
- static void heuristicOptimisationByEmsrB (stdair::LegCabin &)
- static void optimise (stdair::FlightDate &)
- static void buildVirtualClassListForLegBasedOptimisation (stdair::LegCabin &)
- static double optimiseUsingOnDForecast (stdair::FlightDate &, const bool &iReduceFluctuations=false)

25.21.1 Detailed Description

Class wrapping the optimisation algorithms.

Definition at line 18 of file Optimiser.hpp.

25.21.2 Member Function Documentation

25.21.2.1 void RMOL::Optimiser::optimalOptimisationByMCIntegration (const int *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 29 of file Optimiser.cpp.

Referenced by optimise().

25.21.2.2 void RMOL::Optimiser::optimalOptimisationByDP (stdair::LegCabin & *ioLegCabin*) [static]

Dynamic Programming.

Definition at line 63 of file Optimiser.cpp.

25.21.2.3 void RMOL::Optimiser::heuristicOptimisationByEmsr (stdair::LegCabin & *ioLegCabin*) [static]

EMRS algorithm.

Definition at line 68 of file Optimiser.cpp.

25.21.2.4 void RMOL::Optimiser::heuristicOptimisationByEmsrA (stdair::LegCabin & *ioLegCabin*) [static]

EMRS-a algorithm.

Definition at line 73 of file Optimiser.cpp.

25.21.2.5 void RMOL::Optimiser::heuristicOptimisationByEmsrB (stdair::LegCabin & *ioLegCabin*) [static]

EMRS-b algorithm.

Definition at line 78 of file Optimiser.cpp.

25.21.2.6 void RMOL::Optimiser::optimise (stdair::FlightDate & *ioFlightDate*) [static]

Optimise a flight-date using leg-based Monte Carlo Integration.

Definition at line 83 of file Optimiser.cpp.

References buildVirtualClassListForLegBasedOptimisation(), and optimalOptimisationByMCIntegration().

25.21.2.7 void RMOL::Optimiser::buildVirtualClassListForLegBasedOptimisation (stdair::LegCabin & *ioLegCabin*) [static]

Build the virtual class list for the given leg-cabin.

Definition at line 112 of file Optimiser.cpp.

Referenced by optimise().

25.21.2.8 double RMOL::Optimiser::optimiseUsingOnDForecast (stdair::FlightDate & *ioFlightDate*, const bool & *iReduceFluctuations* = false) [static]

Optimiser

Definition at line 156 of file Optimiser.cpp.

References RMOL::MCOptimiser::optimisationByMCIntegration().

Referenced by RMOL::RMOL_Service::optimiseOnD(), RMOL::RMOL_Service::optimiseOnDUsingAdvancedRMCooperation(), and RMOL::RMOL_Service::optimiseOnDUsingRMCooperation().

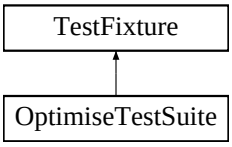
The documentation for this class was generated from the following files:

- rmol/command/Optimiser.hpp
- rmol/command/Optimiser.cpp

25.22 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

25.22.1 Detailed Description

Definition at line 6 of file OptimiseTestSuite.hpp.

25.22.2 Constructor & Destructor Documentation

25.22.2.1 OptimiseTestSuite::OptimiseTestSuite ( )

Test some error detection functionalities. Constructor.

25.22.3 Member Function Documentation

25.22.3.1 void OptimiseTestSuite::testOptimiseMC ( )

Test the Monte-Carlo (MC) Optimisation functionality.

25.22.3.2 void OptimiseTestSuite::testOptimiseDP ( )

Test the Dynamic Programming (DP) Optimisation functionality.

25.22.3.3 void OptimiseTestSuite::testOptimiseEMSR ( )

Test the Expected Marginal Seat Revenue (EMSR) Optimisation functionality.

25.22.3.4 void OptimiseTestSuite::testOptimiseEMSRa ( )

Test the Expected Marginal Seat Revenue, variant a (EMSR-a), Optimisation functionality.

25.22.3.5 void OptimiseTestSuite::testOptimiseEMSRb ( )

Test the Expected Marginal Seat Revenue, variant b (EMSR-b), Optimisation functionality.

25.22.4 Member Data Documentation

25.22.4.1 std::stringstream OptimiseTestSuite::_describeKey [protected]

Definition at line 43 of file OptimiseTestSuite.hpp.

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

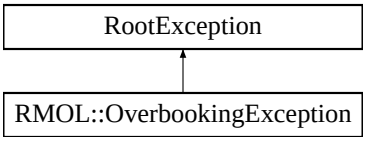
- test/rmol/OptimiseTestSuite.hpp

25.23 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)

25.23.1 Detailed Description

Overbooking-related exception.

Definition at line 31 of file RMOL_Types.hpp.

25.23.2 Constructor & Destructor Documentation

25.23.2.1 RMOL::OverbookingException::OverbookingException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 34 of file RMOL_Types.hpp.

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

- rmol/RMOL_Types.hpp

25.24 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 optimalOptimisationByMCIntegration (const int K)
- void optimalOptimisationByDP ()
- void heuristicOptimisationByEmsr ()
- void heuristicOptimisationByEmsrA ()
- void heuristicOptimisationByEmsrB ()
- bool optimise (stdair::FlightDate &, const stdair::DateTime_T &, const stdair::ForecastingMethod &, 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

25.24.1 Detailed Description

Interface for the RMOL Services.

Definition at line 39 of file RMOL_Service.hpp.

25.24.2 Constructor & Destructor Documentation

25.24.2.1 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

const	stdair::BasLogParams& Parameters for the output log stream.
const	stdair::BasDBParams& Parameters for the database access.

Definition at line 84 of file RMOL_Service.cpp.

25.24.2.2 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

const	stdair::BasLogParams& Parameters for the output log stream.

Definition at line 63 of file RMOL_Service.cpp.

25.24.2.3 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

STDAIR_ServicePtr_T	the shared pointer of stdair service.

Definition at line 106 of file RMOL_Service.cpp.

25.24.2.4 RMOL::RMOL_Service::~RMOL_Service ( )

Destructor.

Definition at line 123 of file RMOL_Service.cpp.

25.24.3 Member Function Documentation

25.24.3.1 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 miminum 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

const	stdair::CabinCapacity& Capacity of the leg-cabin to be optimised.
const	stdair::Filename_T& (CSV) input file.

Definition at line 200 of file RMOL_Service.cpp.

References RMOL::InventoryParser::parseInputFileAndBuildBom().

Referenced by main().

25.24.3.2 void RMOL::RMOL_Service::setUpStudyStatManager ( )

Set up the StudyStatManager.

25.24.3.3 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 224 of file RMOL_Service.cpp.

Referenced by main().

25.24.3.4 void RMOL::RMOL_Service::optimalOptimisationByMCIntegration (const int *K*)

Single resource optimization using the Monte Carlo algorithm.

Definition at line 272 of file RMOL_Service.cpp.

Referenced by optimise().

25.24.3.5 void RMOL::RMOL_Service::optimalOptimisationByDP ( )

Single resource optimization using dynamic programming.

Definition at line 312 of file RMOL_Service.cpp.

Referenced by optimise().

25.24.3.6 void RMOL::RMOL_Service::heuristicOptimisationByEmsr ( )

Single resource optimization using EMSR heuristic.

Definition at line 316 of file RMOL_Service.cpp.

Referenced by optimise().

25.24.3.7 void RMOL::RMOL_Service::heuristicOptimisationByEmsrA ( )

Single resource optimization using EMSR-a heuristic.

Definition at line 357 of file RMOL_Service.cpp.

Referenced by optimise().

25.24.3.8 void RMOL::RMOL_Service::heuristicOptimisationByEmsrB ( )

Single resource optimization using EMSR-b heuristic.

Definition at line 378 of file RMOL_Service.cpp.

Referenced by optimise().

25.24.3.9 bool RMOL::RMOL_Service::optimise (stdair::FlightDate & *ioFlightDate,* const stdair::DateTime_T & *iRMEventTime,* const stdair::ForecastingMethod & *iForecastingMethod,* const stdair::PartnershipTechnique & *iPartnershipTechnique*)

Optimise (revenue management) an flight-date/network-date

Definition at line 399 of file RMOL_Service.cpp.

References forecastOnD(), RMOL::Forecaster::forecastUsingAdditivePickUp(), RMOL::Forecaster::forecastUsingMultiplicativePickUp(), optimiseOnD(), optimiseOnDUsingAdvancedRMCooperation(), optimiseOnDUsingRMCooperation(), projectAggregatedDemandOnLegCabins(), projectOnDDemandOnLegCabinsUsingDYP(), projectOnDDemandOnLegCabinsUsingYP(), resetDemandInformation(), and updateBidPrice().

25.24.3.10 void RMOL::RMOL_Service::forecastOnD (const stdair::DateTime_T & *iRMEventTime*)

Forecaster

Definition at line 500 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST, and getYieldFeatures().

Referenced by optimise().

25.24.3.11 stdair::YieldFeatures * RMOL::RMOL_Service::getYieldFeatures (const stdair::OnDDate & *iOnDDate,* const stdair::CabinCode_T & *iCabinCode,* stdair::BomRoot & *iBomRoot*)

Definition at line 573 of file RMOL_Service.cpp.

Referenced by forecastOnD().

25.24.3.12 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 646 of file RMOL_Service.cpp.

References setOnDForecast().

25.24.3.13 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 761 of file RMOL_Service.cpp.

Referenced by forecastOnD().

25.24.3.14 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 820 of file RMOL_Service.cpp.

25.24.3.15 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 882 of file RMOL_Service.cpp.

25.24.3.16 void RMOL::RMOL_Service::resetDemandInformation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 997 of file RMOL_Service.cpp.

Referenced by optimise(), optimiseOnDUsingAdvancedRMCooperation(), and optimiseOnDUsingRMCooperation().

25.24.3.17 void RMOL::RMOL_Service::resetDemandInformation (const stdair::DateTime_T & *iRMEventTime,* const stdair::Inventory & *ilInventory*)

Definition at line 1023 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

25.24.3.18 void RMOL::RMOL_Service::projectAggregatedDemandOnLegCabins (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1071 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

Referenced by optimise().

25.24.3.19 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingYP (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1176 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

Referenced by optimise().

25.24.3.20 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDA (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1451 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

25.24.3.21 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1607 of file RMOL_Service.cpp.

Referenced by optimise(), optimiseOnDUsingAdvancedRMCooperation(), and optimiseOnDUsingRMCooperation().

25.24.3.22 void RMOL::RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP (const stdair::DateTime_T & *iRMEventTime,* const stdair::Inventory & *ilInventory*)

Definition at line 1633 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

25.24.3.23 void RMOL::RMOL_Service::optimiseOnD (const stdair::DateTime_T & *iRMEventTime*)

Optimiser

Definition at line 1275 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST, and RMOL::Optimiser::optimiseUsingOnDForecast().

Referenced by optimise().

25.24.3.24 void RMOL::RMOL_Service::optimiseOnDUsingRMCooperation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1749 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST, RMOL::Optimiser::optimiseUsingOnDForecast(), projectOnDDemandOnLegCabinsUsingDYP(), and resetDemandInformation().

Referenced by optimise().

25.24.3.25 void RMOL::RMOL_Service::optimiseOnDUsingAdvancedRMCooperation (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1809 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST, RMOL::Optimiser::optimiseUsingOnDForecast(), projectOnDDemandOnLegCabinsUsingDYP(), resetDemandInformation(), and updateBidPrice().

Referenced by optimise().

25.24.3.26 void RMOL::RMOL_Service::updateBidPrice (const stdair::DateTime_T & *iRMEventTime*)

Definition at line 1324 of file RMOL_Service.cpp.

References RMOL::DEFAULT_DCP_LIST.

Referenced by optimise(), and optimiseOnDUsingAdvancedRMCooperation().

25.24.3.27 void RMOL::RMOL_Service::updateBidPrice (const stdair::FlightDate & *iFlightDate,* stdair::BomRoot & *iBomRoot*)

Definition at line 1372 of file RMOL_Service.cpp.

25.24.3.28 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

const	stdair::AirlineCode_T& Airline code of the flight to dump.
const	stdair::FlightNumber_T& Flight number of the flight to dump.
const	stdair::Date_T& Departure date of a flight to dump.

Returns

std::string Output string in which the BOM tree is JSON-ified.

25.24.3.29 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:

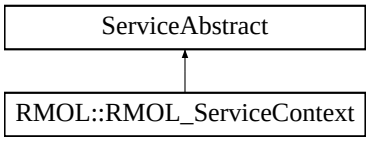
- rmol/RMOL_Service.hpp
- rmol/service/RMOL_Service.cpp

25.25 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

25.25.1 Detailed Description

Inner class holding the context for the RMOL Service object.

Definition at line 29 of file RMOL_ServiceContext.hpp.

25.25.2 Friends And Related Function Documentation

25.25.2.1 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.

25.25.2.2 friend class FacRmolServiceContext [friend]

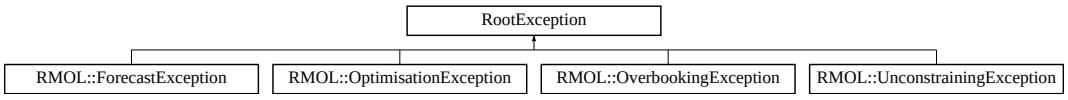
Definition at line 36 of file RMOL_ServiceContext.hpp.

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

- rmol/service/RMOL_ServiceContext.hpp
- rmol/service/RMOL_ServiceContext.cpp

25.26 RootException Class Reference

Inheritance diagram for RootException:

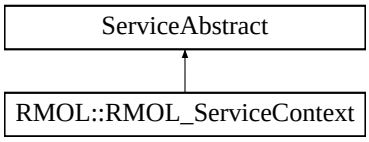


The documentation for this class was generated from the following file:

- rmol/RMOL_Types.hpp

25.27 ServiceAbstract Class Reference

Inheritance diagram for ServiceAbstract:

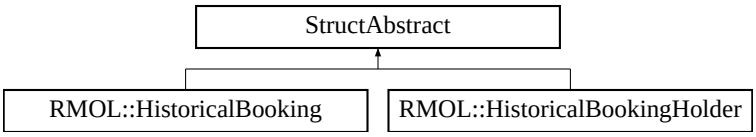


The documentation for this class was generated from the following file:

- rmol/service/RMOL_ServiceContext.hpp

25.28 StructAbstract Class Reference

Inheritance diagram for StructAbstract:

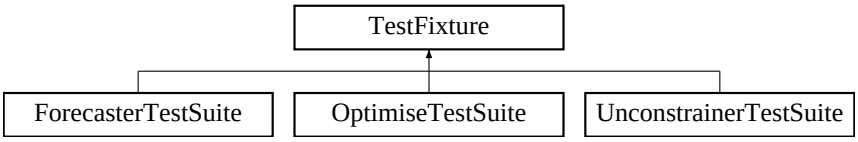


The documentation for this class was generated from the following file:

- rmol/bom/HistoricalBooking.hpp

25.29 TestFixture Class Reference

Inheritance diagram for TestFixture:



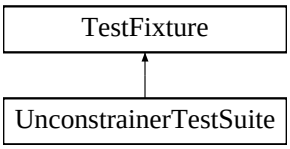
The documentation for this class was generated from the following file:

- test/rmol/OptimiseTestSuite.hpp

25.30 UnconstrainerTestSuite Class Reference

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

Inheritance diagram for UnconstrainerTestSuite:



Public Member Functions

- void testUnconstrainingByEM ()
- UnconstrainerTestSuite ()

Protected Attributes

- std::stringstream _describeKey

25.30.1 Detailed Description

Definition at line 6 of file UnconstrainerTestSuite.hpp.

25.30.2 Constructor & Destructor Documentation

25.30.2.1 UnconstrainerTestSuite::UnconstrainerTestSuite ( )

Constructor.

25.30.3 Member Function Documentation

25.30.3.1 void UnconstrainerTestSuite::testUnconstrainingByEM ( )

Test data unconstraining by Expectation Maximization.

25.30.4 Member Data Documentation

25.30.4.1 std::stringstream UnconstrainerTestSuite::_describeKey [protected]

Definition at line 19 of file UnconstrainerTestSuite.hpp.

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

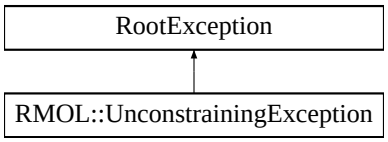
- test/rmol/UnconstrainerTestSuite.hpp

25.31 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)

25.31.1 Detailed Description

Unconstraining-related exception.

Definition at line 41 of file RMOL_Types.hpp.

25.31.2 Constructor & Destructor Documentation

25.31.2.1 RMOL::UnconstrainingException::UnconstrainingException (const std::string & *iWhat*) [inline]

Constructor.

Definition at line 44 of file RMOL_Types.hpp.

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

- rmol/RMOL_Types.hpp

25.32 RMOL::Utilities Class Reference

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

Static Public Member Functions

- static void computeDistributionParameters (const UnconstrainedDemandVector_T &, double &, double &)
- static stdair::DCPList_T buildRemainingDCPList (const stdair::DTD_T &)
- static stdair::DCPList_T buildRemainingDCPList2 (const stdair::DTD_T &)
- static stdair::NbOfSegments_T getNbOfDepartedSimilarSegments (const stdair::SegmentCabin &, const stdair::Date_T &)

25.32.1 Detailed Description

Class holding helper methods.

Definition at line 19 of file Utilities.hpp.

25.32.2 Member Function Documentation

25.32.2.1 void RMOL::Utilities::computeDistributionParameters (const UnconstrainedDemandVector_T & *iVector,* double & *ioMean,* double & *ioStdDev*) [static]

Compute the mean and the standard deviation from a set of samples.

Definition at line 24 of file Utilities.cpp.

25.32.2.2 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 55 of file Utilities.cpp.

References RMOL::DEFAULT_DCP_LIST.

Referenced by RMOL::Forecaster::forecastUsingAdditivePickUp().

25.32.2.3 stdair::DCPList_T RMOL::Utilities::buildRemainingDCPList2 (const stdair::DTD_T & *iDTD*) [static]

Definition at line 80 of file Utilities.cpp.

References RMOL::DEFAULT_DCP_LIST.

Referenced by RMOL::Forecaster::forecastUsingAdditivePickUp().

25.32.2.4 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 105 of file Utilities.cpp.

References RMOL::GuillotineBlockHelper::getNbOfSegmentAlreadyPassedThisDTD().

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

- rmol/bom/Utilities.hpp
- rmol/bom/Utilities.cpp

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_Curves.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 = 100000
- 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
- const FRAT5Curve_T RMOL::DEFAULT_CUMULATIVE_FRAT5_CURVE
- const stdair::DCPList_T RMOL::DEFAULT_DCP_LIST = DefaultDCPList::init()

26.16 BasConst.cpp

```
00001 // //////////////////////////////////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////////////////////////////////
00004 #include <rmol/basic/BasConst_General.hpp>
00005 #include <rmol/basic/BasConst_Curves.hpp>
00006 #include <rmol/basic/BasConst_RMOL_Service.hpp
      >
00007
00008 namespace RMOL {
00009
00011   const stdair::AirlineCode_T DEFAULT_RMOL_SERVICE_AIRLINE_CODE
       = "BA";
00012
00014   const double DEFAULT_RMOL_SERVICE_CAPACITY = 1.0
      ;
00015
00018   const int DEFAULT_NUMBER_OF_DRAWS_FOR_MC_SIMULATION
       = 100000;
00019
00023   const int DEFAULT_PRECISION = 10;
00024
00026   const double DEFAULT_EPSILON = 0.0001;
00027
00029   const double DEFAULT_STOPPING_CRITERION = 0.01;
00030
00032   const double DEFAULT_INITIALIZER_DOUBLE_NEGATIVE
       = -10.0;
00033
00036   const FRAT5Curve_T DEFAULT_CUMULATIVE_FRAT5_CURVE
       =
00037     DefaultMap::createCumulativeFRAT5Curve
      ();
00038   FRAT5Curve_T DefaultMap::createCumulativeFRAT5Curve
      () {
00039     FRAT5Curve_T oCurve;
00040     // oCurve[63] = 1.4;  oCurve[56] = 1.45;
00041     // oCurve[49] = 1.5;  oCurve[42] = 1.55; oCurve[35] = 1.6;
00042     // oCurve[31] = 1.7;  oCurve[27] = 1.8;  oCurve[23] = 2.0;
00043     // oCurve[19] = 2.3;  oCurve[16] = 2.6;  oCurve[13] = 3.0;
00044     // oCurve[10] = 3.3;  oCurve[7]  = 3.4;  oCurve[5]  = 3.44;
00045     // oCurve[3] = 3.47;  oCurve[1]  = 3.5;
00046     oCurve[63] = 1.1;   oCurve[56] = 1.11;
00047     oCurve[49] = 1.17;  oCurve[42] = 1.27;
00048     oCurve[35] = 1.28;  oCurve[31] = 1.28; oCurve[27] = 1.28;
00049     oCurve[23] = 1.37;  oCurve[19] = 1.37;
00050     oCurve[16] = 1.6;  oCurve[13] = 1.6;
00051     oCurve[10] = 1.8;  oCurve[7]  = 1.8;
00052     oCurve[5]  = 2.23; oCurve[3] = 2.23;
00053     oCurve[1]  = 2.5;
00054     // oCurve[63] = 1.05;  oCurve[56] = 1.07;
00055     // oCurve[49] = 1.09;  oCurve[42] = 1.11; oCurve[35] = 1.14;
00056     // oCurve[31] = 1.16;  oCurve[27] = 1.18;  oCurve[23] = 1.21;
00057     // oCurve[19] = 1.24;  oCurve[16] = 1.27;  oCurve[13] = 1.3;
00058     // oCurve[10] = 1.33;  oCurve[7]  = 1.37;  oCurve[5]  = 1.4;
00059     // oCurve[3] = 1.45;  oCurve[1]  = 1.5;
00060     // oCurve[63] = 1.4;
00061     // oCurve[49] = 1.5;  oCurve[35] = 1.6;
00062     // oCurve[23] = 2.0;  oCurve[16] = 2.6;
```

```
00063     // oCurve[10] = 3.3;  oCurve[5]  = 3.44;
00064     // oCurve[1]  = 3.5;
00065     return oCurve;
00066   };
00067
00069   const stdair::DCPList_T DEFAULT_DCP_LIST =
      DefaultDCPList::init();
00070   stdair::DCPList_T DefaultDCPList::init() {
00071     stdair::DCPList_T oDCPList;
00072     oDCPList.push_back (63); oDCPList.push_back (49);
00073     oDCPList.push_back (35); oDCPList.push_back (23);
00074     oDCPList.push_back (16); oDCPList.push_back (10);
00075     oDCPList.push_back (5);  oDCPList.push_back (1);
00076     oDCPList.push_back (0);
00077     return oDCPList;
00078   }
00079
00080 }
```

26.17 rmol/basic/BasConst_Curves.hpp File Reference

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

Classes

- struct RMOL::DefaultMap

Namespaces

- namespace RMOL

26.18 BasConst_Curves.hpp

```
00001 #ifndef __RMOL_BAS_BASCONST_CURVES_HPP
00002 #define __RMOL_BAS_BASCONST_CURVES_HPP
00003
00004 // //////////////////////////////////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////////////////////////////////
00007 // RMOL
00008 #include <rmol/RMOL_Types.hpp>
00009
00010 namespace RMOL {
00011
00014   extern const FRAT5Curve_T DEFAULT_CUMULATIVE_FRAT5_CURVE
      ;
00015
00017   struct DefaultMap {
00018     static FRAT5Curve_T createCumulativeFRAT5Curve
      ();
00019   };
00020 }
00021 #endif // __RMOL_BAS_BASCONST_CURVES_HPP
```

26.19 rmol/basic/BasConst_General.hpp File Reference

```
#include <stdair/stdair_types.hpp>
```

Classes

- struct RMOL::DefaultDCPList

Namespaces

- namespace RMOL

26.20 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
00014   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
00030   extern const stdair::DCPList_T DEFAULT_DCP_LIST;
00031   struct DefaultDCPList { static stdair::DCPList_T init(); };
00032 }
00033 #endif // __RMOL_BAS_BASCONST_GENERAL_HPP
```

26.21 rmol/basic/BasConst_RMOL_Service.hpp File Reference

```
#include <vector>
#include <stdair/stdair_basic_types.hpp>
#include <rmol/RMOL_Types.hpp>
```

Namespaces

- namespace RMOL

26.22 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
```

26.23 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/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 &ioIsBuiltin, 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 = 100000
- const double K_RMOL_DEFAULT_CAPACITY = 500.0
- const short K_RMOL_DEFAULT_METHOD = 0
- const int K_RMOL_EARLY_RETURN_STATUS = 99

26.23.1 Function Documentation

26.23.1.1 const std::string K_RMOL_DEFAULT_LOG_FILENAME ("rmol.log")

Default name and location for the log file.

Referenced by readConfiguration().

26.23.1.2 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().

26.23.1.3 template<class T > std::ostream& operator<< (std::ostream & *os*, const std::vector< T > & *v*)

Definition at line 47 of file rmol.cpp.

26.23.1.4 int readConfiguration (int *argc*, char * *argv[]*, int & *ioRandomDraws*, double & *ioCapacity*, short & *ioMethod*, bool & *ioIsBuiltin*, std::string & *ioInputFilename*, std::string & *ioLogFilename*)

Read and parse the command line options.

Definition at line 57 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().

26.23.1.5 void optimise (RMOL::RMOL_Service & *rmolService,* const short & *iMethod,* const int & *iRandomDraws*)

Definition at line 167 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().

26.23.1.6 int main (int *argc,* char * *argv[]*)

Definition at line 204 of file rmol.cpp.

References RMOL::RMOL_Service::buildSampleBom(), K_RMOL_EARLY_RETURN_STATUS, optimise(), RMOL::RMOL_Service::parseAndLoad(), and readConfiguration().

26.23.2 Variable Documentation

26.23.2.1 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 23 of file rmol.cpp.

Referenced by readConfiguration().

26.23.2.2 const int K_RMOL_DEFAULT_RANDOM_DRAWS = 100000

Default number of random draws to be generated (best if over 100).

Definition at line 29 of file rmol.cpp.

Referenced by readConfiguration().

26.23.2.3 const double K_RMOL_DEFAULT_CAPACITY = 500.0

Default value for the capacity of the resource (e.g., a flight cabin).

Definition at line 32 of file rmol.cpp.

Referenced by readConfiguration().

26.23.2.4 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 43 of file rmol.cpp.

Referenced by readConfiguration().

26.23.2.5 const int K_RMOL_EARLY_RETURN_STATUS = 99

Early return status (so that it can be differentiated from an error).

Definition at line 54 of file rmol.cpp.

Referenced by main(), and readConfiguration().

26.24 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/RMOL_Service.hpp>
00015 #include <rmol/config/rmol-paths.hpp>
00016
00017 // //////// Constants //////
00019 const std::string K_RMOL_DEFAULT_LOG_FILENAME ("
      rmol.log");
00020
00023 const bool K_RMOL_DEFAULT_BUILT_IN_INPUT = false;
00024
00026 const std::string K_RMOL_DEFAULT_INPUT_FILENAME (
      STDAIR_SAMPLE_DIR "/rm01.csv");
00027
00029 const int K_RMOL_DEFAULT_RANDOM_DRAWS = 100000;
00030
00032 const double K_RMOL_DEFAULT_CAPACITY = 500.0;
00033
00043 const short K_RMOL_DEFAULT_METHOD = 0;
00044
00045 // ///////// Parsing of Options & Configuration /////////
00046 // A helper function to simplify the main part.
00047 template<class T> std::ostream& operator<< (std::ostream& os,
00048                                             const std::vector<T>& v) {
00049   std::copy (v.begin(), v.end(), std::ostream_iterator<T> (std::cout, " "));
00050   return os;
00051 }
00052
00054 const int K_RMOL_EARLY_RETURN_STATUS = 99;
00055
00057 int readConfiguration(int argc, char* argv[],
00058                       int& ioRandomDraws, double& ioCapacity,
00059                       short& ioMethod, bool& ioIsBuiltin,
00060                       std::string& ioInputFilename, std::string& ioLogFilename)
      {
00061
00062   // Default for the built-in input
00063   ioIsBuiltin = K_RMOL_DEFAULT_BUILT_IN_INPUT;
00064
00065   // Declare a group of options that will be allowed only on command line
00066   boost::program_options::options_description generic ("Generic options");
00067   generic.add_options()
00068     ("prefix", "print installation prefix")
00069     ("version,v", "print version string")
00070     ("help,h", "produce help message");
00071
00072   // Declare a group of options that will be allowed both on command
00073   // line and in config file
00074   boost::program_options::options_description config ("Configuration");
00075   config.add_options()
00076     ("draws,d",
00077      boost::program_options::value<int>(&ioRandomDraws)->default_value(
      K_RMOL_DEFAULT_RANDOM_DRAWS),
00078      "Number of to-be-generated random draws")
00079     ("capacity,c",
00080      boost::program_options::value<double>(&ioCapacity)->default_value(
      K_RMOL_DEFAULT_CAPACITY),
```

```
00081       "Resource capacity (e.g., for a flight leg)")
00082      ("method,m",
00083       boost::program_options::value<short>(&ioMethod)->default_value(
      K_RMOL_DEFAULT_METHOD),
00084       "Revenue Management method to be used (0 = Monte-Carlo, 1 = Dynamic
       Programming, 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b)")
00085      ("builtin,b",
00086       "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")
00087      ("input,i",
00088       boost::program_options::value< std::string >(&ioInputFilename)->
      default_value(K_RMOL_DEFAULT_INPUT_FILENAME),
00089       "(CSV) input file for the demand distribution parameters and resource
       (leg-cabin) capacities")
00090      ("log,l",
00091       boost::program_options::value< std::string >(&ioLogFilename)->
      default_value(K_RMOL_DEFAULT_LOG_FILENAME),
00092       "Filename for the logs")
00093      ;
00094
00095    // Hidden options, will be allowed both on command line and
00096    // in config file, but will not be shown to the user.
00097    boost::program_options::options_description hidden ("Hidden options");
00098    hidden.add_options()
00099      ("copyright",
00100       boost::program_options::value< std::vector<std::string> >(),
00101       "Show the copyright (license)");
00102
00103    boost::program_options::options_description cmdline_options;
00104    cmdline_options.add(generic).add(config).add(hidden);
00105
00106    boost::program_options::options_description config_file_options;
00107    config_file_options.add(config).add(hidden);
00108
00109    boost::program_options::options_description visible ("Allowed options");
00110    visible.add(generic).add(config);
00111
00112    boost::program_options::positional_options_description p;
00113    p.add ("copyright", -1);
00114
00115    boost::program_options::variables_map vm;
00116    boost::program_options::
00117      store (boost::program_options::command_line_parser (argc, argv).
00118             options (cmdline_options).positional(p).run(), vm);
00119
00120    std::ifstream ifs ("rmol.cfg");
00121    boost::program_options::store (parse_config_file (ifs, config_file_options),
00122                                   vm);
00123    boost::program_options::notify (vm);
00124
00125    if (vm.count ("help")) {
00126      std::cout << visible << std::endl;
00127      return K_RMOL_EARLY_RETURN_STATUS;
00128    }
00129
00130    if (vm.count ("version")) {
00131      std::cout << PACKAGE_NAME << ", version " << PACKAGE_VERSION
       << std::endl;
00132      return K_RMOL_EARLY_RETURN_STATUS;
00133    }
00134
00135    if (vm.count ("prefix")) {
00136      std::cout << "Installation prefix: " << PREFIXDIR << std::endl;
00137      return K_RMOL_EARLY_RETURN_STATUS;
00138    }
00139
00140    if (vm.count ("builtin")) {
00141      ioIsBuiltin = true;
00142    }
00143    const std::string isBuiltinStr = (ioIsBuiltin == true)?"yes":"no";
00144    std::cout << "The BOM should be built-in? " << isBuiltinStr << std::endl;
00145
00146    if (ioIsBuiltin == false) {
00147      if (vm.count ("input")) {
00148        ioInputFilename = vm["input"].as< std::string >();
00149        std::cout << "Input filename is: " << ioInputFilename << std::endl;
00150      }
00151    }
00152
00153    if (vm.count ("log")) {
00154      ioLogFilename = vm["log"].as< std::string >();
00155      std::cout << "Log filename is: " << ioLogFilename << std::endl;
00156    }
00157
00158    std::cout << "The number of random draws is: " << ioRandomDraws << std::endl;
00159    std::cout << "The resource capacity is: " << ioCapacity << std::endl;
00160    std::cout << "The optimisation method is: " << ioMethod << std::endl;
```

```
00161   std::cout << std::endl;
00162
00163   return 0;
00164 }
00165
00166 // ////////////////////////////////////////////////////
00167 void optimise (RMOL::RMOL_Service& rmolService,
00168                const short& iMethod, const int& iRandomDraws) {
00169
00170   switch (iMethod) {
00171   case 0: {
00172     // Calculate the optimal protections by the Monte Carlo
00173     // Integration approach
00174     rmolService.optimalOptimisationByMCIntegration
       (iRandomDraws);
00175     break;
00176   }
00177   case 1: {
00178     // Calculate the optimal protections by DP.
00179     rmolService.optimalOptimisationByDP ();
00180     break;
00181   }
00182   case 2: {
00183     // Calculate the Bid-Price Vector by EMSR
00184     rmolService.heuristicOptimisationByEmsr ();
00185     break;
00186   }
00187   case 3: {
00188     // Calculate the protections by EMSR-a
00189     rmolService.heuristicOptimisationByEmsrA ();
00190     break;
00191   }
00192   case 4: {
00193     // Calculate the protections by EMSR-b
00194     rmolService.heuristicOptimisationByEmsrB ();
00195     break;
00196   }
00197   default: {
00198     rmolService.optimalOptimisationByMCIntegration
       (iRandomDraws);
00199   }
00200   }
00201 }
00202
00203 // ///////// M A I N ////////////
00204 int main (int argc, char* argv[]) {
00205
00206   // Number of random draws to be generated (best if greater than 100)
00207   int lRandomDraws = 0;
00208
00209   // Cabin Capacity (it must be greater then 100 here)
00210   double lCapacity = 0.0;
00211
00212   // Methods of optimisation (0 = Monte-Carlo, 1 = Dynamic Programming,
00213   // 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b)
00214   short lMethod = 0;
00215
00216   // Built-in
00217   bool isBuiltin;
00218
00219   // Input file name
00220   std::string lInputFilename;
00221
00222   // Output log File
00223   std::string lLogFilename;
00224
00225   // Call the command-line option parser
00226   const int lOptionParserStatus =
00227     readConfiguration (argc, argv, lRandomDraws, lCapacity,
       lMethod,
00228                        isBuiltin, lInputFilename, lLogFilename);
00229
00230   if (lOptionParserStatus == K_RMOL_EARLY_RETURN_STATUS
       ) {
00231     return 0;
00232   }
00233
00234   // Set the log parameters
00235   std::ofstream logOutputFile;
00236   // Open and clean the log outputfile
00237   logOutputFile.open (lLogFilename.c_str());
00238   logOutputFile.clear();
00239
00240   // Initialise the log stream
00241   const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
00242
00243   // Initialise the RMOL service
```

```
00244   RMOL::RMOL_Service rmolService (lLogParams);
00245
00246   if (isBuiltin == true) {
00247     // DEBUG
00248     STDAIR_LOG_DEBUG ("No input file has been given."
00249                       "A sample BOM tree will therefore be built.");
00250
00251     // Build a sample BOM tree
00252     rmolService.buildSampleBom();
00253
00254   } else {
00255     // DEBUG
00256     STDAIR_LOG_DEBUG ("RMOL will parse " << lInputFilename
00257                       << " and build the corresponding BOM tree.");
00258
00259     //
00260     rmolService.parseAndLoad (lCapacity, lInputFilename);
00261   }
00262
00263   // Launch the optimisation
00264   optimise (rmolService, lMethod, lRandomDraws);
00265
00266   //
00267   logOutputFile.close();
00268
00269   return 0;
00270 }
```

26.25 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

26.26 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
```

26.27 rmol/bom/DistributionParameterList.hpp File Reference

```
#include <list>
```

```
#include <rmol/field/FldDistributionParameters.hpp>
```

Namespaces

- namespace RMOL

Typedefs

- typedef std::list
  < FldDistributionParameters > RMOL::DistributionParameterList_T

26.28 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
```

26.29 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

26.30 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> (iCabinCapacity *
      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     // //while (currentBucketIndex == 1) {
00045     //   bool protectionChanged = false;
00046     //   double nextProtection = 0.0;
00047     //   std::vector<double> currentMERVector;
00048     //   // double testGradient = 10000;
00049
00050     //   Bucket& currentBucket = ioBucketHolder.getCurrentBucket();
00051     //   const double meanDemand = currentBucket.getMean();
00052     //   const double SDDemand = currentBucket.getStandardDeviation();
00053     //   const double currentYield = currentBucket.getAverageYield();
00054     //   const double errorFactor = 1.0;
00055
00056     //   Bucket& nextBucket = ioBucketHolder.getNextBucket();
00057     //   const double nextYield = nextBucket.getAverageYield();
00058
00059     //   // For x <= currentProtection (y_(j-1)), V_j(x) = V_(j-1)(x).
00060     //   for (int x = 0; x <= currentProtection; ++x) {
00061     //     const double MERValue =
      MERVectorHolder.at(currentBucketIndex-1).at(x);
00062     //     currentMERVector.push_back (MERValue);
00063     //   }
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     //
00110     //     double integralResult2 = 0.0;
00111     //
00112     //     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 }
```

26.31 rmol/bom/DPOptimiser.hpp File Reference

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

Classes

- class RMOL::DPOptimiser

Namespaces

- namespace stdair
- namespace RMOL

26.32 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 (
      stdair::LegCabin&);
00026
00030     static double cdfGaussianQ (const double, const double);
00031   };
00032 }
00033 #endif // __RMOL_BOM_DPOPTIMISER_HPP
```

26.33 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

26.34 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 #include <rmol/bom/EMDetruncator.hpp>
00015
00016 namespace RMOL {
00017
00018   // ////////////////////////////////////////////////////////////////////
00019   void EMDetruncator::unconstrainUsingEMMethod
00020   (HistoricalBookingHolder& ioHistoricalBookingHolder) {
00021
00022     // Number of flights.
00023     const short lNbOfFlights =
00024       ioHistoricalBookingHolder.getNbOfFlights();
00025
00026     // Number of uncensored booking data.
00027     const short lNbOfUncensoredData =
00028       ioHistoricalBookingHolder.getNbOfUncensoredData();
00029
00030     if (lNbOfUncensoredData > 1) {
00031       // Number of uncensored bookings.
00032       const stdair::NbOfBookings_T lNbOfUncensoredBookings =
00033         ioHistoricalBookingHolder.getNbOfUncensoredBookings
      ();
00034
00035       const double lMeanOfUncensoredBookings =
00036         static_cast<double>(lNbOfUncensoredBookings/lNbOfUncensoredData);
00037
00038       const double lStdDevOfUncensoredBookings =
00039         ioHistoricalBookingHolder.getUncensoredStandardDeviation
00040         (lMeanOfUncensoredBookings, lNbOfUncensoredData);
00041
00042       std::vector<bool> toBeUnconstrained =
00043         ioHistoricalBookingHolder.getListOfToBeUnconstrainedFlags
      ();
00044
00045       double lDemandMean = lMeanOfUncensoredBookings;
00046       double lStdDev = lStdDevOfUncensoredBookings;
00047
00048       // DEBUG
00049       STDAIR_LOG_DEBUG ("mean: " << lDemandMean << ", std: " << lStdDev);
00050
00051       if (lStdDev != 0) {
00052         bool stopUnconstraining = false;
00053         while (stopUnconstraining == false) {
00054           stopUnconstraining = true;
00055
```

```
00056           for (short i = 0; i < lNbOfFlights; ++i) {
00057             if (toBeUnconstrained.at(i) == true) {
00058               // Get the unconstrained demand of the (i+1)-th flight.
00059               const stdair::NbOfBookings_T demand =
00060                 ioHistoricalBookingHolder.getUnconstrainedDemand
      (i);
00061               //STDAIR_LOG_DEBUG ("demand: " << demand);
00062
00063               // Execute the Expectation step.
00064               const stdair::NbOfBookings_T expectedDemand =
00065                 ioHistoricalBookingHolder.
00066                 calculateExpectedDemand (lDemandMean, lStdDev, i, demand);
00067               //STDAIR_LOG_DEBUG ("expected: " << expectedDemand);
00068               assert (expectedDemand >= 0 || expectedDemand < 0);
00069
00070               double absDiff =
00071                 static_cast<double>(expectedDemand - demand);
00072
00073               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
      (expectedDemand,
00084                                                                 i);
00085             }
00086           }
00087
00088           if (stopUnconstraining == false) {
00089             lDemandMean = ioHistoricalBookingHolder.getDemandMean(
      );
00090             lStdDev =
00091               ioHistoricalBookingHolder.getStandardDeviation
      (lDemandMean);
00092           }
00093         }
00094       }
00095     }
00096
00097   }
00098 }
```

26.35 rmol/bom/EMDetruncator.hpp File Reference

Classes

- class RMOL::EMDetruncator

Namespaces

- namespace RMOL

26.36 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
00012   class EMDetruncator {
00013   public:
00016     static void unconstrainUsingEMMethod (
      HistoricalBookingHolder&);
00017   };
00018 }
00019 #endif // __RMOL_BOM_EMDETRUNCATOR_HPP
```

26.37 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

26.38 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
00032     stdair::VirtualClassList_T::iterator itVC =lVirtualClassList.begin();
00033     assert (itVC != lVirtualClassList.end());
00034
00035     stdair::VirtualClassStruct& lFirstVC = *itVC;
00036     lFirstVC.setCumulatedBookingLimit (lCabinCapacity);
00037     ++itVC;
00038     for (; itVC != lVirtualClassList.end(); ++itVC) {
00039       stdair::VirtualClassStruct& lNextVC = *itVC;
00040
00041       // Initialise the protection for class/bucket j.
00042       stdair::ProtectionLevel_T lProtectionLevel = 0.0;
00043
00044       for(stdair::VirtualClassList_T::iterator itHigherVC =
00045             lVirtualClassList.begin(); itHigherVC != itVC; ++itHigherVC) {
00046         stdair::VirtualClassStruct& lHigherVC = *itHigherVC;
00047         const double lPartialProtectionLevel =
00048           EmsrUtils::computeProtectionLevel (
      lHigherVC, lNextVC);
00049         lProtectionLevel += lPartialProtectionLevel;
00050       }
00051       stdair::VirtualClassList_T::iterator itCurrentVC = itVC; --itCurrentVC;
00052       stdair::VirtualClassStruct& lCurrentVC = *itCurrentVC;
00053       lCurrentVC.setCumulatedProtection (lProtectionLevel);
00054
00055       // Compute the booking limit for the class/bucket j+1 (can be negative).
00056       const double lBookingLimit = lCabinCapacity - lProtectionLevel;
00057
00058       // Set the booking limit for class/bucket j+1.
```

```
00059       lNextVC.setCumulatedBookingLimit (lBookingLimit);
00060     }
00061   }
00062
00063   // ////////////////////////////////////////////////////////////////////
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   // ////////////////////////////////////////////////////////////////////
00108   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();
00128          itVC != lVirtualClassList.end(); ++itVC) {
00129       stdair::VirtualClassStruct& lCurrentVC = *itVC;
00130       for (int k = 1; k <= lCabinCapacity; ++k) {
00131         const double emsrValue = EmsrUtils::computeEmsrValue
       (k, lCurrentVC);
00132         lEmsrValueList.push_back(emsrValue);
00133       }
00134     }
00135
00136     // 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 =
00145       lEmsrValueList.begin();
00146     for (int j = 0; j < lCabinCapacity; ++j, ++itCurrentValue) {
00147       const double lBidPrice = *itCurrentValue;
00148       lBidPriceVector.push_back (lBidPrice);
00149     }
00150     lEmsrValueList.clear();
```

```
00151
00152     // 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 }
```

26.39 rmol/bom/Emsr.hpp File Reference

`#include <rmol/RMOL_Types.hpp>`

Classes

- class RMOL::Emsr

Namespaces

- namespace stdair
- namespace RMOL

26.40 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 (
      stdair::LegCabin&);
00032
00037     static void heuristicOptimisationByEmsrA (
      stdair::LegCabin&);
00038
00043     static void heuristicOptimisationByEmsrB (
      stdair::LegCabin&);
00044
00045   };
00046 }
00047 #endif // __RMOL_EMSR_HPP
```

26.41 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

26.42 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       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&
      ioAggregatedVirtualClass,
00054                           stdair::VirtualClassStruct& ioNextVirtualClass) {
00055     // Retrive the mean & standard deviation of the aggregated
00056     // class/bucket and the average yield of all the two
00057     // classes/buckets.
00058     const stdair::MeanValue_T lMean = ioAggregatedVirtualClass.getMean();
00059     const stdair::StdDevValue_T lSD = ioAggregatedVirtualClass.getStdDev();
```

```
00060     const stdair::Yield_T lAggreatedYield = ioAggregatedVirtualClass.getYield()
      ;
00061     const stdair::Yield_T lNextYield = ioNextVirtualClass.getYield();
00062     assert (lAggreatedYield != 0);
00063
00064     // Compute the yield ratio between the higher bucket and the current one
00065     const double lYieldRatio = lNextYield / lAggreatedYield;
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 }
```

26.43 rmol/bom/EmsrUtils.hpp File Reference

```
#include <stdair/stdair_inventory_types.hpp>
```

Classes

- class RMOL::EmsrUtils

Namespaces

- namespace stdair
- namespace RMOL

26.44 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 (
      stdair::VirtualClassStruct&,
00024                                                stdair::VirtualClassStruct&);
00025
```

```
00027     static const stdair::ProtectionLevel_T computeProtectionLevel
       (stdair::VirtualClassStruct&, stdair::VirtualClassStruct&);
00028
00030     static const double computeEmsrValue (double,
      stdair::VirtualClassStruct&);
00031   };
00032 }
00033 #endif // __RMOL_EMSRUTILS_HPP
```

26.45 rmol/bom/GuillotineBlockHelper.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/GuillotineBlock.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/GuillotineBlockHelper.hpp>
```

Namespaces

- namespace RMOL

26.46 GuillotineBlockHelper.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/GuillotineBlock.hpp>
00013 #include <stdair/service/Logger.hpp>
00014 // RMOL
00015 #include <rmol/bom/GuillotineBlockHelper.hpp>
00016
00017 namespace RMOL {
00018   // ////////////////////////////////////////////////////////////////////
00019   stdair::NbOfSegments_T GuillotineBlockHelper::
00020   getNbOfSegmentAlreadyPassedThisDTD (const
       stdair::GuillotineBlock& iGB,
00021                                       const stdair::DTD_T& iDTD,
00022                                       const stdair::Date_T& iCurrentDate) {
00023     stdair::NbOfSegments_T oNbOfSegments = 0;
00024
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) ==
      true) {
00033         ++oNbOfSegments;
00034       }
00035     }
00036
00037     return oNbOfSegments;
00038   }
00039
00040   // ////////////////////////////////////////////////////////////////////
00041   bool GuillotineBlockHelper::
00042   hasPassedThisDTD (const stdair::SegmentCabin& iSegmentCabin
      ,
```

```
00043                     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 false;
00056     } else {
00057       return true;
00058     }
00059   }
00060 }
```

26.47 rmol/bom/GuillotineBlockHelper.hpp File Reference

```
#include <string>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_date_time_types.hpp>
```

Classes

- class RMOL::GuillotineBlockHelper

Namespaces

- namespace stdair
- namespace RMOL

26.48 GuillotineBlockHelper.hpp

```
00001 #ifndef __RMOL_BOM_GUILLOTINEBLOCKHELPER_HPP
00002 #define __RMOL_BOM_GUILLOTINEBLOCKHELPER_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 GuillotineBlock;
00016   class SegmentCabin;
00017 }
00018
00019 namespace RMOL {
00020
00023   class GuillotineBlockHelper {
00024   public:
00025     // ////////// Business Methods /////////
00030     static stdair::NbOfSegments_T getNbOfSegmentAlreadyPassedThisDTD
       (const stdair::GuillotineBlock&, 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_GUILLOTINEBLOCKHELPER_HPP
```

26.49 rmol/bom/HistoricalBooking.cpp File Reference

```
#include <sstream>
#include <cassert>
#include <iomanip>
#include <iostream>
#include <rmol/bom/HistoricalBooking.hpp>
```

Namespaces

- namespace RMOL

26.50 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
      iNbOfBookings,
00022                      const stdair::Flag_T iFlag)
00023     : _numberOfBookings (iNbOfBookings),
00024       _unconstrainedDemand (iNbOfBookings), _flag (iFlag) {
00025   }
00026
00027   // //////////////////////////////////////////////////////////////////////
00028   HistoricalBooking::HistoricalBooking
00029   (const HistoricalBooking& iHistoricalBooking) :
00030     _numberOfBookings (iHistoricalBooking.getNbOfBookings()),
00031     _unconstrainedDemand (iHistoricalBooking.getUnconstrainedDemand
      ()),
00032     _flag (iHistoricalBooking.getFlag()) {
00033   }
00034
00035   // //////////////////////////////////////////////////////////////////////
00036   HistoricalBooking::~HistoricalBooking()
      {
00037   }
00038
00039   // //////////////////////////////////////////////////////////////////////
00040   void HistoricalBooking::setParameters
00041   (const stdair::NbOfBookings_T iNbOfBookings, const stdair::Flag_T iFlag) {
00042     _numberOfBookings = iNbOfBookings;
00043     _unconstrainedDemand = iNbOfBookings;
00044     _flag = iFlag;
00045   }
00046
00047   // //////////////////////////////////////////////////////////////////////
00048   const std::string HistoricalBooking::describe()
       const {
00049     std::ostringstream ostr;
00050     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 }
```

26.51 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

26.52 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
```

26.53 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

26.54 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     _historicalBookingVector.clear();
00025   }
00026
00027   // ////////////////////////////////////////////////////////////////////
00028   const short HistoricalBookingHolder::getNbOfFlights
       () const {
```

```
00029     return _historicalBookingVector.size();
00030   }
00031
00032   // ////////////////////////////////////////////////////////////////////
00033   const short HistoricalBookingHolder::getNbOfUncensoredData
       () const {
00034     short lResult = 0;
00035     const short lSize = _historicalBookingVector.size();
00036
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
00044     return lResult;
00045   }
00046
00047   // ////////////////////////////////////////////////////////////////////
00048   const stdair::NbOfBookings_T HistoricalBookingHolder::
00049   getNbOfUncensoredBookings () const {
00050     stdair::NbOfBookings_T lResult = 0;
00051     const short lSize = _historicalBookingVector.size();
00052
00053     for (short ite = 0; ite < lSize; ++ite) {
00054       const HistoricalBooking& lHistorialBooking =
00055         _historicalBookingVector.at (ite);
00056       const stdair::Flag_T lFlag = lHistorialBooking.getFlag ();
00057       if (lFlag == false) {
00058         const stdair::NbOfBookings_T& lBooking =
00059           lHistorialBooking.getNbOfBookings ();
00060         lResult += lBooking;
00061       }
00062     }
00063
00064     return lResult;
00065   }
00066
00067   // ////////////////////////////////////////////////////////////////////
00068   const double HistoricalBookingHolder::
00069   getUncensoredStandardDeviation (const double&
       iMeanOfUncensoredBookings,
00070                                   const short iNbOfUncensoredData) const {
00071
00072     double lResult = 0;
00073     const short lSize = _historicalBookingVector.size();
00074
00075     for (short ite = 0; ite < lSize; ++ite) {
00076       const stdair::Flag_T lFlag = _historicalBookingVector.at(ite).getFlag ();
00077       if (lFlag == false) {
00078         const HistoricalBooking& lHistorialBooking =
00079           _historicalBookingVector.at (ite);
00080
00081         const stdair::NbOfBookings_T& lBooking =
00082           lHistorialBooking.getNbOfBookings ();
00083
00084         lResult += (lBooking - iMeanOfUncensoredBookings)
00085           * (lBooking - iMeanOfUncensoredBookings);
00086       }
00087     }
00088     lResult /= (iNbOfUncensoredData - 1);
00089     lResult = sqrt (lResult);
00090
00091     return lResult;
00092   }
00093
00094   // ////////////////////////////////////////////////////////////////////
00095   const double HistoricalBookingHolder::getDemandMean
       () const {
00096     double lResult = 0;
00097     const short lSize = _historicalBookingVector.size();
00098
00099     for (short ite = 0; ite < lSize; ++ite) {
00100       const HistoricalBooking& lHistorialBooking =
00101         _historicalBookingVector.at(ite);
00102
00103       const stdair::NbOfBookings_T& lDemand =
00104         lHistorialBooking.getUnconstrainedDemand ();
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 = 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 = 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 / 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 }
```

26.55 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

26.56 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     // ////// Getters //////
00028     const short getNbOfFlights () const;
00029
00031     const short getNbOfUncensoredData () const;
00032
00034     const stdair::NbOfBookings_T getNbOfUncensoredBookings
       () const;
00035
00037     const double getUncensoredStandardDeviation
00038     (const double& iMeanOfUncensoredBookings,
00039      const short iNbOfUncensoredData) const;
00040
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
```

26.57 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/bom/MCOptimiser.hpp>
```

Namespaces

- namespace RMOL

26.58 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
00019 #include <stdair/basic/RandomGeneration.hpp>
00020 #include <stdair/basic/BasConst_General.hpp>
00021 // RMOL
00022 #include <rmol/bom/MCOptimiser.hpp>
00023
00024 namespace RMOL {
00025
00026   // // ////////////////////////////////////////////////////////////////////
00027   void MCOptimiser::
00028   optimalOptimisationByMCIntegration (
      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     assert (itSC != lSegmentCabinList.end());
00034     const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00035     assert (lSegmentCabin_ptr != NULL);
00036
00037     // Retrieve the class list.
00038     const stdair::BookingClassList_T lBookingClassList =
00039       stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00040
00041     // Retrieve the remaining cabin capacity.
00042     const stdair::Availability_T& lCap = ioLegCabin.getAvailabilityPool();
00043     const int lCapacity = static_cast<const int> (lCap);
00044     const stdair::UnsignedIndex_T lCapacityIndex =
00045       static_cast<const stdair::UnsignedIndex_T> ((lCapacity+abs(lCapacity))/2)
      ;
00046
00047     // Retrieve the virtual class list.
00048     stdair::VirtualClassList_T& lVCList = ioLegCabin.getVirtualClassList();
00049
00050     // Parse the virtual class list and compute the protection levels.
00051     stdair::VirtualClassList_T::iterator itCurrentVC = lVCList.begin();
00052     assert (itCurrentVC != lVCList.end());
00053     stdair::VirtualClassList_T::iterator itNextVC = itCurrentVC; ++itNextVC;
00054
00055     // Initialise  the partial sum holder with the demand sample of the first
00056     // virtual class.
00057     stdair::VirtualClassStruct& lFirstVC = *itCurrentVC;
00058     stdair::GeneratedDemandVector_T lPartialSumHolder =
00059       lFirstVC.getGeneratedDemandVector();
00060
00061     // Initialise the booking limit for the first class, which is equal to
00062     // the remaining capacity.
00063     lFirstVC.setCumulatedBookingLimit (lCap);
00064
00065     // Initialise bid price vector with the first element (index 0) equal to
00066     // the highest yield.
00067     ioLegCabin.emptyBidPriceVector();
00068     stdair::BidPriceVector_T& lBPV = ioLegCabin.getBidPriceVector();
00069     //const stdair::Yield_T& y1 = lFirstVC.getYield ();
00070     //lBPV.push_back (y1);
00071     stdair::UnsignedIndex_T idx = 1;
00072
00073     for (; itNextVC != lVCList.end(); ++itCurrentVC, ++itNextVC) {
00074       // Get the yields of the two classes.
00075       stdair::VirtualClassStruct& lCurrentVC = *itCurrentVC;
00076       stdair::VirtualClassStruct& lNextVC = *itNextVC;
00077       const stdair::Yield_T& yj = lCurrentVC.getYield ();
00078       const stdair::Yield_T& yj1 = lNextVC.getYield ();
00079
00080       // Consistency check: the yield/price of a higher class/bucket
00081       // (with the j index lower) must be higher.
00082       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 ljdouble = std::floor (K * (yj - yj1) / yj);
00090       stdair::UnsignedIndex_T lj =
00091         static_cast<stdair::UnsignedIndex_T> (ljdouble);
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 sjl = lPartialSumHolder.at (lj - 1);
00098       const double sjlp1 = lPartialSumHolder.at (lj + 1 - 1);
00099       const double pj = (sjl + 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 unsigned int& 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     unsigned int K = 100000;
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 ljdouble = std::floor (K * (yj - yj1) / yj);
00226       stdair::UnsignedIndex_T lj =
00227         static_cast<stdair::UnsignedIndex_T> (ljdouble);
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;
00238       const stdair::UnsignedIndex_T pjint = static_cast<const int> (pj);
00239       stdair::GeneratedDemandVector_T::iterator itLowerBound =
00240         lPartialSumHolder.begin();
00241       for (; idx <= pjint && idx <= lAvailabilityPool; ++idx) {
00242         itLowerBound =
00243           std::lower_bound (itLowerBound, lPartialSumHolder.end(), idx);
00244         const stdair::UnsignedIndex_T pos =
00245           itLowerBound - lPartialSumHolder.begin();
00246
00247         const stdair::BidPrice_T lBP = yj * (K - pos) / K;
00248         lBidPriceVector.push_back (lBP);
00249       }
00250       // Update the partial sum holder.
00251       lMeanStdDevPair = itNextYD->second;
00252       const stdair::GeneratedDemandVector_T& lNextDV =
00253         generateDemandVector (lMeanStdDevPair.first,
00254                               lMeanStdDevPair.second, K - lj);
00255       for (stdair::UnsignedIndex_T i = 0; i < K - lj; ++i) {
00256         lPartialSumHolder.at(i) = lPartialSumHolder.at(i + lj) + lNextDV.at(i);
00257       }
00258       lPartialSumHolder.resize (K - lj);
00259     }
00268     // STDAIR_LOG_DEBUG ("Partial sums : max = " << lPartialSumHolder.back()
00269     //                   << " min = " << lPartialSumHolder.front());
00270
00271     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 }
```

26.59 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

26.60 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
00030     static void optimalOptimisationByMCIntegration
       (stdair::LegCabin&);
00031
00035     static stdair::GeneratedDemandVector_T
00036     generateDemandVector (const stdair::MeanValue_T&,
00037                           const stdair::StdDevValue_T&, const unsigned int&);
00038
00039     static void optimisationByMCIntegration (
      stdair::LegCabin&);
00040
00041   };
00042 }
00043 #endif // __RMOL_BOM_MCUTILS_HPP
```

26.61 rmol/bom/old/DemandGeneratorList.cpp File Reference

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

Namespaces

- namespace RMOL

26.62 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     const DistributionParameterList_T
      aDistributionParameterList;
00012     init (aDistributionParameterList);
00013   }
00014
00015   // ////////////////////////////////////////////////////////////////////
00016   DemandGeneratorList::
00017   DemandGeneratorList (const DemandGeneratorList
      & iDemandGeneratorList) {
00018     // TODO: copy the distribution parameters of the input generator list
00019     const DistributionParameterList_T
      aDistributionParameterList;
00020     init (aDistributionParameterList);
00021   }
00022
00023   // ////////////////////////////////////////////////////////////////////
00024   DemandGeneratorList::
00025   DemandGeneratorList (const DistributionParameterList_T
      & iDistributionParameterList) {
00026     init (iDistributionParameterList);
00027   }
00028
00029   // ////////////////////////////////////////////////////////////////////
00030   DemandGeneratorList::~DemandGeneratorList
       () {
00031   }
00032
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 }
```

26.63 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

26.64 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
```

26.65 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/service/Logger.hpp>
#include <rmol/basic/BasConst_General.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/GuillotineBlockHelper.hpp>
```

Namespaces

- namespace RMOL

26.66 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/service/Logger.hpp>
00016 // RMOL
00017 #include <rmol/basic/BasConst_General.hpp>
00018 #include <rmol/bom/Utilities.hpp>
00019 #include <rmol/bom/GuillotineBlockHelper.hpp>
00020
00021 namespace RMOL {
00022   // ////////////////////////////////////////////////////////////////////
00023   void Utilities::
00024   computeDistributionParameters (const
      UnconstrainedDemandVector_T& iVector,
00025                                  double& ioMean, double& ioStdDev) {
00026     ioMean = 0.0; ioStdDev = 0.0;
00027     unsigned int lNbOfSamples = iVector.size();
00028     assert (lNbOfSamples > 1);
00029
00030     // Compute the mean
00031     for (UnconstrainedDemandVector_T::const_iterator itSample = iVector.begin()
      ;
00032          itSample != iVector.end(); ++itSample) {
00033       //STDAIR_LOG_NOTIFICATION (*itSample);
00034       ioMean += *itSample;
```

```
00035     }
00036     ioMean /= lNbOfSamples;
00037
00038     // Compute the standard deviation
00039     for (UnconstrainedDemandVector_T::const_iterator itSample = iVector.begin()
      ;
00040          itSample != iVector.end(); ++itSample) {
00041       const double& lSample = *itSample;
00042       ioStdDev += ((lSample - ioMean) * (lSample - ioMean));
00043     }
00044     ioStdDev /= (lNbOfSamples - 1);
00045     ioStdDev = sqrt (ioStdDev);
00046
00047     // Sanity check
00048     if (ioStdDev == 0) {
00049       ioStdDev = 0.1;
00050     }
00051   }
00052
00053   // ////////////////////////////////////////////////////////////////////
00054   stdair::DCPList_T Utilities::
00055   buildRemainingDCPList (const stdair::DTD_T& iDTD) {
00056     stdair::DCPList_T oDCPList;
00057
00058     const stdair::DCPList_T lWholeDCPList = stdair::DEFAULT_DCP_LIST
      ;
00059     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00060     while (itDCP != lWholeDCPList.end()) {
00061       const stdair::DCP_T& lDCP = *itDCP;
00062       if (iDTD >= lDCP) {
00063         break;
00064       }
00065       ++itDCP;
00066     }
00067     assert (itDCP != lWholeDCPList.end());
00068
00069     oDCPList.push_back (iDTD);
00070     ++itDCP;
00071     for (; itDCP != lWholeDCPList.end(); ++itDCP) {
00072       oDCPList.push_back (*itDCP);
00073     }
00074
00075     return oDCPList;
00076   }
00077
00078   // ////////////////////////////////////////////////////////////////////
00079   stdair::DCPList_T Utilities::
00080   buildRemainingDCPList2 (const stdair::DTD_T& iDTD) {
00081     stdair::DCPList_T oDCPList;
00082
00083     const stdair::DCPList_T lWholeDCPList = RMOL::DEFAULT_DCP_LIST
      ;
00084     stdair::DCPList_T::const_iterator itDCP = lWholeDCPList.begin();
00085     while (itDCP != lWholeDCPList.end()) {
00086       const stdair::DCP_T& lDCP = *itDCP;
00087       if (iDTD >= lDCP) {
00088         break;
00089       }
00090       ++itDCP;
00091     }
00092     assert (itDCP != lWholeDCPList.end());
00093
00094     oDCPList.push_back (iDTD);
00095     ++itDCP;
00096     for (; itDCP != lWholeDCPList.end(); ++itDCP) {
00097       oDCPList.push_back (*itDCP);
00098     }
00099
00100     return oDCPList;
00101   }
00102
00103   // ////////////////////////////////////////////////////////////////////
00104   stdair::NbOfSegments_T Utilities::
00105   getNbOfDepartedSimilarSegments (const
      stdair::SegmentCabin& iSegmentCabin,
00106                                   const stdair::Date_T& iEventDate) {
00107     stdair::DTD_T lDTD = 0;
00108     // Retrieve the guillotine block.
00109     const stdair::GuillotineBlock& lGuillotineBlock =
00110       iSegmentCabin.getGuillotineBlock();
00111     return GuillotineBlockHelper::
00112       getNbOfSegmentAlreadyPassedThisDTD
       (lGuillotineBlock, lDTD, iEventDate);
00113   }
00114
00115 }
```

26.67 rmol/bom/Utilities.hpp File Reference

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

Classes

- class RMOL::Utilities

Namespaces

- namespace stdair
- namespace RMOL

26.68 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 // RMOL
00009 #include <rmol/RMOL_Types.hpp>
00010
00011 // Forward declarations
00012 namespace stdair {
00013   class SegmentCabin;
00014 }
00015
00016 namespace RMOL {
00017
00019   class Utilities {
00020   public:
00022     static void computeDistributionParameters (
      const UnconstrainedDemandVector_T&, double&, double&);
00023
00027     static stdair::DCPList_T buildRemainingDCPList (const
      stdair::DTD_T&);
00028     static stdair::DCPList_T buildRemainingDCPList2 (
      const stdair::DTD_T&);
00029
00033     static stdair::NbOfSegments_T getNbOfDepartedSimilarSegments
       (const stdair::SegmentCabin&, const stdair::Date_T&);
00034
00035   };
00036
00037 }
00038
00039 #endif // __RMOL_BOM_UTILITIES_HPP
```

26.69 rmol/command/Detruncator.cpp File Reference

```
#include <cassert>
```

```
#include <stdair/basic/BasConst_Inventory.hpp>
#include <stdair/bom/GuillotineBlock.hpp>
#include <stdair/bom/BomManager.hpp>
#include <stdair/bom/FlightDate.hpp>
#include <stdair/bom/SegmentDate.hpp>
#include <stdair/bom/SegmentCabin.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/bom/GuillotineBlockHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/bom/EMDetruncator.hpp>
#include <rmol/command/Detruncator.hpp>
```

Namespaces

- namespace RMOL

26.70 Detruncator.cpp

```
00001 // //////////////////////////////////////////////////////////////////////
00002 // Import section
00003 // //////////////////////////////////////////////////////////////////////
00004 // STL
00005 #include <cassert>
00006 // StdAir
00007 #include <stdair/basic/BasConst_Inventory.hpp>
00008 #include <stdair/bom/GuillotineBlock.hpp>
00009 #include <stdair/bom/BomManager.hpp>
00010 #include <stdair/bom/FlightDate.hpp>
00011 #include <stdair/bom/SegmentDate.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/GuillotineBlockHelper.hpp>
00017 #include <rmol/bom/HistoricalBookingHolder.hpp
      >
00018 #include <rmol/bom/HistoricalBooking.hpp>
00019 #include <rmol/bom/EMDetruncator.hpp>
00020 #include <rmol/command/Detruncator.hpp>
00021
00022 namespace RMOL {
00023   // //////////////////////////////////////////////////////////////////////
00024   void Detruncator::
00025   unconstrainUsingAdditivePickUp (const
      stdair::SegmentCabin& iSegmentCabin,
00026                   BookingClassUnconstrainedDemandVectorMap_T
      & ioBkgClassUncDemMap,
00027                   UnconstrainedDemandVector_T&
      ioQEquivalentDemandVector,
00028                   const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00029                   const stdair::Date_T& iCurrentDate) {
00030
00031     // Retrieve the guillotine block.
00032     const stdair::GuillotineBlock& lGuillotineBlock =
00033       iSegmentCabin.getGuillotineBlock();
00034
00035     // Build the historical booking holders for the product-oriented bookings
00036     // of the casses and the Q-equivalent (price-oriented) bookings of the
       cabin
00037     const stdair::NbOfSegments_T lNbOfUsableSegments = GuillotineBlockHelper::
00038       getNbOfSegmentAlreadyPassedThisDTD
       (lGuillotineBlock, iDCPEnd,
00039                                         iCurrentDate);
00040
00041     // Parse the booking class list and unconstrain historical bookings.
00042     for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00043            ioBkgClassUncDemMap.begin(); itBCUDV != ioBkgClassUncDemMap.end();
00044          ++itBCUDV) {
00045       stdair::BookingClass* lBC_ptr = itBCUDV->first;
00046       assert (lBC_ptr != NULL);
00047       const stdair::MapKey_T& lBCKey = lBC_ptr->describeKey();
00048       const stdair::BlockIndex_T& lBlockIdx =
```

```
00049         lGuillotineBlock.getBlockIndex (lBCKey);
00050       UnconstrainedDemandVector_T& lUncDemVector =
    itBCUDV->second;
00051
00052       STDAIR_LOG_DEBUG ("Unconstrain product-oriented bookings for " << lBCKey)
    ;
00053       // STDAIR_LOG_NOTIFICATION (lBCKey << ";" << iDCPBegin
00054       //                          << ";" << iDCPEnd);
00055       unconstrainUsingAdditivePickUp (
    lGuillotineBlock, lUncDemVector,
00056                                       iDCPBegin, iDCPEnd,
00057                                       lNbOfUsableSegments, lBlockIdx);
00058     }
00059
00060     // Unconstrain the Q-equivalent bookings.
00061     // Retrieve the block index of the segment-cabin.
00062     std::ostringstream lSCMapKey;
00063     lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00064               << iSegmentCabin.describeKey();
00065     const stdair::BlockIndex_T& lCabinIdx =
00066       lGuillotineBlock.getBlockIndex (lSCMapKey.str());
00067
00068     STDAIR_LOG_DEBUG ("Unconstrain price-oriented bookings");
00069     //STDAIR_LOG_NOTIFICATION (iDCPBegin << ";" << iDCPEnd);
00070     unconstrainUsingAdditivePickUp (
    lGuillotineBlock, ioQEquivalentDemandVector,
00071                                     iDCPBegin, iDCPEnd, lNbOfUsableSegments,
00072                                     lCabinIdx, iSegmentCabin, iCurrentDate);
00073   }
00074
00075   // ////////////////////////////////////////////////////////////////////
00076   void Detruncator::unconstrainUsingAdditivePickUp
00077   (const stdair::GuillotineBlock& iGuillotineBlock,
00078    UnconstrainedDemandVector_T& ioUncDemVector,
00079    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00080    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00081    const stdair::BlockIndex_T& iBlockIdx) {
00082     // TODO:
00083     stdair::NbOfSegments_T lSegBegin = 0;
00084     if (iNbOfUsableSegments > 52) lSegBegin = iNbOfUsableSegments - 52;
00085     // Retrieve the gross daily booking and availability snapshots.
00086     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00087       iGuillotineBlock.
    getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCP
00088     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00089       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
    lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00090
00091     // Browse the list of segments and build the historical booking holder.
00092     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00093       iGuillotineBlock.getValueTypeIndexMap();
00094     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00095     HistoricalBookingHolder lHBHolder;
00096     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00097       stdair::Flag_T lCensorshipFlag = false;
00098       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00099       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00100
00101       // Parse the DTDs during the period
00102       for (short j = 0; j < lNbOfDTDs; ++j) {
00103         // Check if the data has been censored during this day.
00104         // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfValues: " << lNbOfValueTypes
00105         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00106         if (lCensorshipFlag == false) {
00107           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00108             lCensorshipFlag = true;
00109           }
00110         }
00111
00112         // Get the bookings of the day.
00113         //STDAIR_LOG_DEBUG ("Bookings of the day: " <<
     lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00114         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00115       }
00116
00117       HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs, lCensorshipFlag);
00118       lHBHolder.addHistoricalBooking (lHistoricalBkg);
00119
00120       // DEBUG
00121       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00122                         << ", censored: " << lCensorshipFlag);
00123       // STDAIR_LOG_NOTIFICATION (lNbOfHistoricalBkgs
00124       //                          << ";" << lCensorshipFlag);
00125     }
00126
00127     // DEBUG
00128     STDAIR_LOG_DEBUG ("Unconstrain by EM");
```

```
00129
00130     // Unconstrain the booking figures
00131     EMDetruncator::unconstrainUsingEMMethod
      (lHBHolder);
00132
00133     // Add the unconstrained demand of the period to the unconstrained demand
00134     // vector.
00135     short idx = 0;
00136     for (UnconstrainedDemandVector_T::iterator itUD = ioUncDemVector.begin();
00137          itUD != ioUncDemVector.end(); ++itUD, ++idx) {
00138       *itUD += lHBHolder.getUnconstrainedDemand (idx);
00139       //STDAIR_LOG_NOTIFICATION (lHBHolder.getUnconstrainedDemand (idx));
00140     }
00141   }
00142
00143   // ////////////////////////////////////////////////////////////////////
00144   void Detruncator::unconstrainUsingAdditivePickUp
00145   (const stdair::GuillotineBlock& iGuillotineBlock,
00146    UnconstrainedDemandVector_T& ioUncDemVector,
00147    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00148    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00149    const stdair::BlockIndex_T& iBlockIdx,
00150    const stdair::SegmentCabin& iSegmentCabin,
00151    const stdair::Date_T& iCurrentDate) {
00152     // TODO
00153     stdair::NbOfSegments_T lSegBegin = 0;
00154     if (iNbOfUsableSegments > 52) lSegBegin = iNbOfUsableSegments - 52;
00155     // Retrieve the gross daily booking and availability snapshots.
00156     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00157       iGuillotineBlock.
      getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCP
00158     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00159       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
      lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00160
00161     // Browse the list of segments and build the historical booking holder.
00162     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00163       iGuillotineBlock.getValueTypeIndexMap();
00164     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00165     HistoricalBookingHolder lHBHolder;
00166     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00167       stdair::Flag_T lCensorshipFlag = false;
00168       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00169       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00170
00171       // Parse the DTDs during the period
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 << ", NbOfValues: " << lNbOfValueTypes
00175         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00176         if (lCensorshipFlag == false) {
00177           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00178             lCensorshipFlag = true;
00179           }
00180         }
00181
00182         // Get the bookings of the day.
00183         //STDAIR_LOG_DEBUG ("Bookings of the day: " <<
      lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00184         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00185       }
00186
00187       HistoricalBooking lHistoricalBkg (lNbOfHistoricalBkgs, lCensorshipFlag);
00188       lHBHolder.addHistoricalBooking (lHistoricalBkg);
00189
00190       // DEBUG
00191       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00192                         << ", censored: " << lCensorshipFlag);
00193       // STDAIR_LOG_NOTIFICATION (lNbOfHistoricalBkgs
00194       //                          << ";" << lCensorshipFlag);
00195     }
00196
00197     // DEBUG
00198     STDAIR_LOG_DEBUG ("Unconstrain by EM");
00199
00200     // Unconstrain the booking figures
00201     EMDetruncator::unconstrainUsingEMMethod
      (lHBHolder);
00202
00203     // Add the unconstrained demand of the period to the unconstrained demand
00204     // vector.
00205     // LOG
00206     const stdair::SegmentDate& lSegmentDate = stdair::BomManager::
00207       getParent<stdair::SegmentDate, stdair::SegmentCabin> (iSegmentCabin);
00208     const stdair::FlightDate& lFlightDate = stdair::BomManager::
00209       getParent<stdair::FlightDate, stdair::SegmentDate> (lSegmentDate);
00210     const stdair::Date_T& lDepDate = lFlightDate.getDepartureDate();
```

```
00211     const boost::gregorian::date_duration lDD = lDepDate - iCurrentDate;
00212     const long lDTD = lDD.days();
00213     stdair::Date_T lRefDate (2012, boost::gregorian::Jan, 01);
00214
00215     short idx = 0;
00216     for (UnconstrainedDemandVector_T::iterator itUD = ioUncDemVector.begin();
00217          itUD != ioUncDemVector.end(); ++itUD, ++idx) {
00218       *itUD += lHBHolder.getUnconstrainedDemand (idx);
00219       if (lDepDate > lRefDate) {
00220         const stdair::DateOffset_T lDateOffset (7 *(52 - idx) + 420);
00221         const stdair::Date_T lHDate = lDepDate - lDateOffset;
00222         STDAIR_LOG_NOTIFICATION (boost::gregorian::to_iso_string(lDepDate)
00223                                  << ";" << lDTD << ";" << iDCPBegin << ";"
00224                                  << iDCPEnd << ";"
00225                                  << boost::gregorian::to_iso_string (lHDate)
00226                                  <<";"<<lHBHolder.getUnconstrainedDemand (idx))
      ;
00227
00228         STDAIR_LOG_NOTIFICATION (boost::gregorian::to_iso_string(lDepDate)
00229                                  << ";" << lDTD << ";" << iDCPBegin << ";"
00230                                  << iDCPEnd << ";"
00231                                  << boost::gregorian::to_iso_string (lHDate)
00232                                  <<";"<<lHBHolder.getHistoricalBooking (idx));
00233       }
00234     }
00235   }
00236
00237   // ////////////////////////////////////////////////////////////////////
00238   void Detruncator::retrieveUnconstrainedDemandForFirstDCP
00239   (const stdair::SegmentCabin& iSegmentCabin,
00240    BookingClassUnconstrainedDemandVectorMap_T
      & ioBkgClassUncDemVectorMap,
00241    UnconstrainedDemandVector_T&
      ioQEquivalentDemandVector,
00242    const stdair::DCP_T& iFirstDCP, const stdair::NbOfSegments_T& iNbOfSegments,
00243    const stdair::NbOfSegments_T& iNbOfUsedSegments){
00244
00245     // Retrieve the guillotine block.
00246     const stdair::GuillotineBlock& lGuillotineBlock =
00247       iSegmentCabin.getGuillotineBlock();
00248
00249     // Parse the booking class list and unconstrain historical bookings.
00250     for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00251            ioBkgClassUncDemVectorMap.begin();
00252          itBCUDV != ioBkgClassUncDemVectorMap.end(); ++itBCUDV) {
00253       stdair::BookingClass* lBC_ptr = itBCUDV->first;
00254       assert (lBC_ptr != NULL);
00255       const stdair::MapKey_T& lBCKey = lBC_ptr->describeKey();
00256       const stdair::BlockIndex_T& lBlockIdx =
00257         lGuillotineBlock.getBlockIndex (lBCKey);
00258       UnconstrainedDemandVector_T& lUncDemVector =
      itBCUDV->second;
00259
00260       STDAIR_LOG_DEBUG("Retrieve the unconstrained product-oriented demand for
      "
00261                        << lBCKey);
00262       retrieveUnconstrainedDemandForFirstDCP (lGuillotineBlock, lUncDemVector,
00263                                               iFirstDCP, lBlockIdx,
00264                                               iNbOfSegments, iNbOfUsedSegments)
      ;
00265     }
00266
00267     // Unconstrain the Q-equivalent bookings.
00268     // Retrieve the block index of the segment-cabin.
00269     std::ostringstream lSCMapKey;
00270     lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00271               << iSegmentCabin.describeKey();
00272     const stdair::BlockIndex_T& lCabinValueIdx =
00273       lGuillotineBlock.getBlockIndex (lSCMapKey.str());
00274
00275     STDAIR_LOG_DEBUG ("Retrieve the unconstrained price-oriented demand");
00276     retrieveUnconstrainedDemandForFirstDCP (lGuillotineBlock,
00277                                             ioQEquivalentDemandVector,iFirstDCP
      ,
00278                                             lCabinValueIdx, iNbOfSegments,
00279                                             iNbOfUsedSegments);
00280   }
00281
00282   // ////////////////////////////////////////////////////////////////////
00283   void Detruncator::retrieveUnconstrainedDemandForFirstDCP
00284   (const stdair::GuillotineBlock& iGuillotineBlock,
00285    UnconstrainedDemandVector_T&
      ioUnconstrainedDemandVector,
00286    const stdair::DCP_T& iFirstDCP, const stdair::BlockIndex_T& iValueIdx,
00287    const stdair::NbOfSegments_T& iNbOfSegments,
00288    const stdair::NbOfSegments_T& iNbOfUsedSegments) {
00289
```

```
00290     //TODO
00291     stdair::NbOfSegments_T lSegBegin = iNbOfSegments - iNbOfUsedSegments;
00292
00293     // Retrieve the snapshots of the corresponding booking value from the
00294     // first DTD (usually 365) till the given iFirstDCP.
00295     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lRangeBookingView =
00296       iGuillotineBlock.
      getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfSegments -1, iFirstDCP, stdair:
      ;
00297
00298     // Sum the bookings from the first day till the given iFirstDCP in order to
00299     // get the supposing unconstrained demand for this period.
00300     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00301       iGuillotineBlock.getValueTypeIndexMap();
00302     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00303     for (int itSegment = 0; itSegment < iNbOfSegments-lSegBegin; ++itSegment) {
00304       for (int i = iFirstDCP; i <= stdair::DEFAULT_MAX_DTD; ++i) {
00305         stdair::NbOfRequests_T& lUncDemand =
00306           ioUnconstrainedDemandVector.at(itSegment);
00307         lUncDemand +=
00308           lRangeBookingView[iValueIdx + itSegment*lNbOfValueTypes][i-iFirstDCP]
      ;
00309       }
00310       // STDAIR_LOG_NOTIFICATION (ioUnconstrainedDemandVector.at(itSegment)
00311       //                          << ";" << itSegment);
00312     }
00313   }
00314
00315   // ////////////////////////////////////////////////////////////////////
00316   void Detruncator::unconstrainUsingMultiplicativePickUp
00317   (const stdair::SegmentCabin& iSegmentCabin,
00318    BookingClassUnconstrainedDemandVectorMap_T
      & ioBkgClassUncDemMap,
00319    UnconstrainedDemandVector_T&
      ioQEquivalentDemandVector,
00320    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00321    const stdair::Date_T& iCurrentDate,
00322    const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00323
00324     // Retrieve the guillotine block.
00325     const stdair::GuillotineBlock& lGuillotineBlock =
00326       iSegmentCabin.getGuillotineBlock();
00327
00328     // Build the historical booking holders for the product-oriented bookings
00329     // of the casses and the Q-equivalent (price-oriented) bookings of the
       cabin
00330     const stdair::NbOfSegments_T lNbOfUsableSegments = GuillotineBlockHelper::
00331       getNbOfSegmentAlreadyPassedThisDTD
       (lGuillotineBlock, iDCPEnd,
00332                                          iCurrentDate);
00333
00334     // Parse the booking class list and unconstrain historical bookings.
00335     for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00336            ioBkgClassUncDemMap.begin(); itBCUDV != ioBkgClassUncDemMap.end();
00337          ++itBCUDV) {
00338       stdair::BookingClass* lBC_ptr = itBCUDV->first;
00339       assert (lBC_ptr != NULL);
00340       const stdair::MapKey_T& lBCKey = lBC_ptr->describeKey();
00341       const stdair::BlockIndex_T& lBlockIdx =
00342         lGuillotineBlock.getBlockIndex (lBCKey);
00343       UnconstrainedDemandVector_T& lUncDemVector =
      itBCUDV->second;
00344
00345       STDAIR_LOG_DEBUG ("Unconstrain product-oriented bookings for " << lBCKey)
      ;
00346       unconstrainUsingMultiplicativePickUp (lGuillotineBlock, lUncDemVector,
00347                                             iDCPBegin, iDCPEnd,
00348                                             lNbOfUsableSegments, lBlockIdx,
00349                                             iNbOfDepartedSegments);
00350     }
00351
00352     // Unconstrain the Q-equivalent bookings.
00353     // Retrieve the block index of the segment-cabin.
00354     std::ostringstream lSCMapKey;
00355     lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00356               << iSegmentCabin.describeKey();
00357     const stdair::BlockIndex_T& lCabinIdx =
00358       lGuillotineBlock.getBlockIndex (lSCMapKey.str());
00359
00360     STDAIR_LOG_DEBUG ("Unconstrain price-oriented bookings");
00361     unconstrainUsingMultiplicativePickUp (lGuillotineBlock,
00362                                           ioQEquivalentDemandVector,
00363                                           iDCPBegin, iDCPEnd,
00364                                           lNbOfUsableSegments, lCabinIdx,
00365                                           iNbOfDepartedSegments,
00366                                           iSegmentCabin, iCurrentDate);
00367   }
```

```
00368
00369   // ////////////////////////////////////////////////////////////////////
00370   void Detruncator::unconstrainUsingMultiplicativePickUp
00371   (const stdair::GuillotineBlock& iGuillotineBlock,
00372    UnconstrainedDemandVector_T& ioUncDemVector,
00373    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00374    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00375    const stdair::BlockIndex_T& iBlockIdx,
00376    const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00377     // TODO:
00378     stdair::NbOfSegments_T lSegBegin = 0;
00379     if (iNbOfDepartedSegments > 52) {
00380       lSegBegin = iNbOfDepartedSegments - 52;
00381     }
00382
00383     // Retrieve the gross daily booking and availability snapshots.
00384     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00385       iGuillotineBlock.
      getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCP
00386     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00387       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
      lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00388
00389     // Browse the list of segments and build the historical booking holder.
00390     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00391       iGuillotineBlock.getValueTypeIndexMap();
00392     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00393     HistoricalBookingHolder lHBHolder;
00394     std::vector<short> lDataIndexList;
00395     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00396       stdair::Flag_T lCensorshipFlag = false;
00397       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00398       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00399
00400       // Parse the DTDs during the period
00401       for (short j = 0; j < lNbOfDTDs; ++j) {
00402         // Check if the data has been censored during this day.
00403         // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfValues: " << lNbOfValueTypes
00404         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00405         if (lCensorshipFlag == false) {
00406           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00407             lCensorshipFlag = true;
00408           }
00409         }
00410
00411         // Get the bookings of the day.
00412         //STDAIR_LOG_DEBUG ("Bookings of the day: " <<
       lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00413         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00414       }
00415
00416       // If there is no booking till now for this class and for this segment,
00417       // there will be no unconstraining process.
00418       stdair::NbOfRequests_T& lUncDemand = ioUncDemVector.at (i);
00419       if (lUncDemand < 1.0) {
00420         lUncDemand += lNbOfHistoricalBkgs;
00421       } else {
00422         double lBkgDemandFactor = lNbOfHistoricalBkgs / lUncDemand;
00423         HistoricalBooking lHistoricalBkg (lBkgDemandFactor, lCensorshipFlag);
00424         lHBHolder.addHistoricalBooking (lHistoricalBkg);
00425         lDataIndexList.push_back (i);
00426       }
00427
00428       // DEBUG
00429       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00430                         << ", censored: " << lCensorshipFlag);
00431     }
00432
00433     // DEBUG
00434     STDAIR_LOG_DEBUG ("Unconstrain by multiplicative pick-up using EM");
00435
00436     // Unconstrain the booking figures
00437     unconstrainUsingMultiplicativePickUp (
      lHBHolder);
00438
00439     // Update the unconstrained demand vector.
00440     short i = 0;
00441     for (std::vector<short>::iterator itIdx = lDataIndexList.begin();
00442          itIdx != lDataIndexList.end(); ++itIdx, ++i) {
00443       short lIdx = *itIdx;
00444       stdair::NbOfRequests_T& lPastDemand = ioUncDemVector.at (lIdx);
00445       const stdair::NbOfRequests_T& lUncDemandFactorOfThisPeriod =
00446         lHBHolder.getUnconstrainedDemand (i);
00447       lPastDemand *= (1+lUncDemandFactorOfThisPeriod);
00448     }
00449   }
00450
```

```
00451   // ////////////////////////////////////////////////////////////////////
00452   void Detruncator::unconstrainUsingMultiplicativePickUp
00453   (const stdair::GuillotineBlock& iGuillotineBlock,
00454    UnconstrainedDemandVector_T& ioUncDemVector,
00455    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00456    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00457    const stdair::BlockIndex_T& iBlockIdx,
00458    const stdair::NbOfSegments_T& iNbOfDepartedSegments,
00459    const stdair::SegmentCabin& iSegmentCabin,
00460    const stdair::Date_T& iCurrentDate) {
00461     // TODO:
00462     stdair::NbOfSegments_T lSegBegin = 0;
00463     if (iNbOfDepartedSegments > 52) {
00464       lSegBegin = iNbOfDepartedSegments - 52;
00465     }
00466
00467     // Retrieve the gross daily booking and availability snapshots.
00468     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00469       iGuillotineBlock.
      getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCP
00470     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00471       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
      lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00472
00473     // Browse the list of segments and build the historical booking holder.
00474     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00475       iGuillotineBlock.getValueTypeIndexMap();
00476     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00477     HistoricalBookingHolder lHBHolder;
00478     std::vector<short> lDataIndexList;
00479     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00480       stdair::Flag_T lCensorshipFlag = false;
00481       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00482       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00483
00484       // Parse the DTDs during the period
00485       for (short j = 0; j < lNbOfDTDs; ++j) {
00486         // Check if the data has been censored during this day.
00487         // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfValues: " << lNbOfValueTypes
00488         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00489         if (lCensorshipFlag == false) {
00490           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00491             lCensorshipFlag = true;
00492           }
00493         }
00494
00495         // Get the bookings of the day.
00496         //STDAIR_LOG_DEBUG ("Bookings of the day: " <<
       lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00497         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00498       }
00499
00500       // If there is no booking till now for this class and for this segment,
00501       // there will be no unconstraining process.
00502       stdair::NbOfRequests_T& lUncDemand = ioUncDemVector.at (i);
00503       if (lUncDemand < 1.0) {
00504         lUncDemand += lNbOfHistoricalBkgs;
00505       } else {
00506         double lBkgDemandFactor = lNbOfHistoricalBkgs / lUncDemand;
00507         HistoricalBooking lHistoricalBkg (lBkgDemandFactor, lCensorshipFlag);
00508         lHBHolder.addHistoricalBooking (lHistoricalBkg);
00509         lDataIndexList.push_back (i);
00510       }
00511
00512       // DEBUG
00513       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00514                         << ", censored: " << lCensorshipFlag);
00515     }
00516
00517     // DEBUG
00518     STDAIR_LOG_DEBUG ("Unconstrain by multiplicative pick-up");
00519
00520     // Unconstrain the booking figures
00521     unconstrainUsingMultiplicativePickUp (
      lHBHolder);
00522
00523     // Update the unconstrained demand vector.
00524     // LOG
00525     const stdair::SegmentDate& lSegmentDate = stdair::BomManager::
00526       getParent<stdair::SegmentDate, stdair::SegmentCabin> (iSegmentCabin);
00527     const stdair::FlightDate& lFlightDate = stdair::BomManager::
00528       getParent<stdair::FlightDate, stdair::SegmentDate> (lSegmentDate);
00529     const stdair::Date_T& lDepDate = lFlightDate.getDepartureDate();
00530     const boost::gregorian::date_duration lDD = lDepDate - iCurrentDate;
00531     const long lDTD = lDD.days();
00532     stdair::Date_T lRefDate (2012, boost::gregorian::Jan, 01);
00533
```

```
00534     short i = 0;
00535     for (std::vector<short>::iterator itIdx = lDataIndexList.begin();
00536          itIdx != lDataIndexList.end(); ++itIdx, ++i) {
00537       short lIdx = *itIdx;
00538       stdair::NbOfRequests_T& lPastDemand = ioUncDemVector.at (lIdx);
00539       const stdair::NbOfRequests_T& lUncDemandFactorOfThisPeriod =
00540         lHBHolder.getUnconstrainedDemand (i);
00541       const double lUncDemThisPeriod =
00542         lPastDemand * lUncDemandFactorOfThisPeriod;
00543       lPastDemand *= (1+lUncDemandFactorOfThisPeriod);
00544       if (lDepDate > lRefDate) {
00545         const stdair::DateOffset_T lDateOffset (7 *(53 - lIdx) + 420);
00546         const stdair::Date_T lHDate = lDepDate - lDateOffset;
00547         STDAIR_LOG_NOTIFICATION (boost::gregorian::to_iso_string(lDepDate)
00548                                  << ";" << lDTD << ";" << iDCPBegin << ";"
00549                                  << iDCPEnd << ";"
00550                                  << boost::gregorian::to_iso_string (lHDate)
00551                                  << ";" << lUncDemThisPeriod);
00552       }
00553     }
00554   }
00555
00556   // ////////////////////////////////////////////////////////////////////
00557   void Detruncator::
00558   unconstrainUsingMultiplicativePickUp (
      HistoricalBookingHolder& ioHBHolder) {
00559     // We use two loops in this algorithm. The first one is for calculating the
00560     // average of unconstrained data. The second one is fore calculating the
00561     // average of unconstrained data and the constrained data which are higher
00562     // than the first average.
00563     short lNbOfUsedData = ioHBHolder.getNbOfUncensoredData
      ();
00564     if (lNbOfUsedData > 0) {
00565       double lSumOfValues = 0.0;
00566       const short lNbOfData = ioHBHolder.getNbOfFlights();
00567
00568       // First loop
00569       for (short i = 0; i < lNbOfData; ++i) {
00570         if (ioHBHolder.getCensorshipFlag (i) == false) {
00571           lSumOfValues += ioHBHolder.getHistoricalBooking (
      i);
00572         }
00573       }
00574       double lFirstAverage = lSumOfValues / lNbOfUsedData;
00575
00576       // Second loop
00577       for (short i = 0; i < lNbOfData; ++i) {
00578         if (ioHBHolder.getCensorshipFlag (i) == true) {
00579           const stdair::NbOfBookings_T& lBkgs =
00580             ioHBHolder.getHistoricalBooking (i);
00581           if (lBkgs >= lFirstAverage) {
00582             lSumOfValues += lBkgs;
00583             ++lNbOfUsedData;
00584           }
00585         }
00586       }
00587       double lSecondAverage = lSumOfValues / lNbOfUsedData;
00588
00589       // Last loop for updating the demand.
00590       for (short i = 0; i < lNbOfData; ++i) {
00591         if (ioHBHolder.getCensorshipFlag (i) == true) {
00592           const stdair::NbOfBookings_T& lBkgs =
00593             ioHBHolder.getHistoricalBooking (i);
00594           if (lBkgs < lSecondAverage) {
00595             ioHBHolder.setUnconstrainedDemand (
      lSecondAverage, i);
00596           }
00597         }
00598       }
00599     }
00600   }
00601 }
00602
```

26.71 rmol/command/Detruncator.hpp File Reference

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

Classes

- class RMOL::Detruncator

Namespaces

- namespace stdair
- namespace RMOL

26.72 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 // RMOL
00010 #include <rmol/RMOL_Types.hpp>
00011
00012 // Forward declarations.
00013 namespace stdair {
00014   class GuillotineBlock;
00015   class SegmentCabin;
00016 }
00017
00018 namespace RMOL {
00019   // Forward declarations.
00020   struct HistoricalBookingHolder;
00021
00024   class Detruncator {
00025   public:
00029     static void unconstrainUsingAdditivePickUp (
      const stdair::SegmentCabin&,
00030                                 BookingClassUnconstrainedDemandVectorMap_T
      &,
00031                                 UnconstrainedDemandVector_T
      &,
00032                                 const stdair::DCP_T&, const stdair::DCP_T&,
00033                                 const stdair::Date_T&);
00034
00038     static void unconstrainUsingMultiplicativePickUp
00039     (const stdair::SegmentCabin&, BookingClassUnconstrainedDemandVectorMap_T
      &,
00040      UnconstrainedDemandVector_T&, const
      stdair::DCP_T&, const stdair::DCP_T&,
00041      const stdair::Date_T&, const stdair::NbOfSegments_T&);
00042
00046     static void retrieveUnconstrainedDemandForFirstDCP
00047     (const stdair::SegmentCabin&,
00048      BookingClassUnconstrainedDemandVectorMap_T
      &,
00049      UnconstrainedDemandVector_T&, const
      stdair::DCP_T&,
00050      const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&);
00051
00055     static void unconstrainUsingMultiplicativePickUp
       (HistoricalBookingHolder&);
00056
00057   private:
00061     static void unconstrainUsingAdditivePickUp (
      const stdair::GuillotineBlock&,
00062                                                 UnconstrainedDemandVector_T
      &,
00063                                                 const stdair::DCP_T&,
00064                                                 const stdair::DCP_T&,
00065                                                 const stdair::NbOfSegments_T&,
00066                                                 const stdair::BlockIndex_T&);
00070     static void unconstrainUsingAdditivePickUp (
      const stdair::GuillotineBlock&,
00071                                                 UnconstrainedDemandVector_T
      &,
00072                                                 const stdair::DCP_T&,
00073                                                 const stdair::DCP_T&,
00074                                                 const stdair::NbOfSegments_T&,
00075                                                 const stdair::BlockIndex_T&,
00076                                                 const stdair::SegmentCabin&,
00077                                                 const stdair::Date_T&);
```

```
00078
00082     static void unconstrainUsingMultiplicativePickUp
00083     (const stdair::GuillotineBlock&, UnconstrainedDemandVector_T
      &,
00084      const stdair::DCP_T&, const stdair::DCP_T&,
00085      const stdair::NbOfSegments_T&, const stdair::BlockIndex_T&,
00086      const stdair::NbOfSegments_T&);
00087
00091     static void unconstrainUsingMultiplicativePickUp
00092     (const stdair::GuillotineBlock&, UnconstrainedDemandVector_T
      &,
00093      const stdair::DCP_T&, const stdair::DCP_T&,
00094      const stdair::NbOfSegments_T&, const stdair::BlockIndex_T&,
00095      const stdair::NbOfSegments_T&,
00096      const stdair::SegmentCabin&, const stdair::Date_T&);
00097
00101     static void retrieveUnconstrainedDemandForFirstDCP
00102     (const stdair::GuillotineBlock&, UnconstrainedDemandVector_T
      &,
00103      const stdair::DCP_T&, const stdair::BlockIndex_T&,
00104      const stdair::NbOfSegments_T&, const stdair::NbOfSegments_T&);
00105   };
00106 }
00107 #endif // __RMOL_COMMAND_DETRUNCATOR_HPP
00108
00109
```

26.73 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/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/GuillotineBlock.hpp>
#include <stdair/bom/BookingClass.hpp>
#include <stdair/service/Logger.hpp>
#include <rmol/basic/BasConst_Curves.hpp>
#include <rmol/bom/Utilities.hpp>
#include <rmol/bom/GuillotineBlockHelper.hpp>
#include <rmol/bom/HistoricalBookingHolder.hpp>
#include <rmol/bom/HistoricalBooking.hpp>
#include <rmol/bom/EMDetruncator.hpp>
#include <rmol/command/Forecaster.hpp>
#include <rmol/command/Detruncator.hpp>
```

Namespaces

- namespace RMOL

26.74 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/basic/RandomGeneration.hpp>
00012 #include <stdair/bom/BomManager.hpp>
00013 #include <stdair/bom/FlightDate.hpp>
00014 #include <stdair/bom/LegDate.hpp>
00015 #include <stdair/bom/SegmentDate.hpp>
00016 #include <stdair/bom/LegCabin.hpp>
00017 #include <stdair/bom/SegmentCabin.hpp>
00018 #include <stdair/bom/GuillotineBlock.hpp>
00019 #include <stdair/bom/BookingClass.hpp>
00020 #include <stdair/service/Logger.hpp>
00021 // RMOL
00022 #include <rmol/basic/BasConst_Curves.hpp>
00023 #include <rmol/bom/Utilities.hpp>
00024 #include <rmol/bom/GuillotineBlockHelper.hpp>
00025 #include <rmol/bom/HistoricalBookingHolder.hpp
    >
00026 #include <rmol/bom/HistoricalBooking.hpp>
00027 #include <rmol/bom/EMDetruncator.hpp>
00028 #include <rmol/command/Forecaster.hpp>
00029 #include <rmol/command/Detruncator.hpp>
00030
00031 namespace RMOL {
00032
00033   // ////////////////////////////////////////////////////////////////////
00034   bool Forecaster::
00035   forecastUsingAdditivePickUp (stdair::FlightDate&
    ioFlightDate,
00036                                const stdair::DateTime_T& iEventTime) {
00037     // Build the offset dates.
00038     const stdair::Date_T& lEventDate = iEventTime.date();
00039     stdair::Date_T lRefDate (2012, boost::gregorian::Jan, 01);
00040
00041     //
00042     bool isSucceeded = true;
00043     const stdair::SegmentDateList_T& lSDList =
00044       stdair::BomManager::getList<stdair::SegmentDate> (ioFlightDate);
00045     for (stdair::SegmentDateList_T::const_iterator itSD = lSDList.begin();
00046          itSD != lSDList.end(); ++itSD) {
00047       stdair::SegmentDate* lSD_ptr = *itSD;
00048       assert (lSD_ptr != NULL);
00049
00050       const stdair::Date_T& lBoardingDate = lSD_ptr->getBoardingDate();
00051       const stdair::DateOffset_T lSegmentDateOffset =
00052         lBoardingDate - lEventDate;
00053       const stdair::DTD_T lSegmentDTD = lSegmentDateOffset.days();
00054
00055       // Build remaining DCP's for the segment-date.
00056       // TODO: treat the case where the segment departure is not the
00057       // same as the flight-date departure.
00058       stdair::DCPList_T lDCPList;
00059
00060       if (lEventDate < lRefDate) {
00061         lDCPList = Utilities::buildRemainingDCPList
    (lSegmentDTD);
00062       } else {
00063         lDCPList = Utilities::buildRemainingDCPList2
    (lSegmentDTD);
00064       }
00065
00066       //
00067       const stdair::SegmentCabinList_T& lSCList =
00068         stdair::BomManager::getList<stdair::SegmentCabin> (*lSD_ptr);
00069       for (stdair::SegmentCabinList_T::const_iterator itSC = lSCList.begin();
00070            itSC != lSCList.end(); ++itSC) {
00071         stdair::SegmentCabin* lSC_ptr = *itSC;
00072         assert (lSC_ptr != NULL);
00073
00074         //
00075         // STDAIR_LOG_NOTIFICATION (ioFlightDate.getDepartureDate()
00076         //                          << ";" << lSegmentDTD);
00077         bool isForecasted = forecastUsingAdditivePickUp
    (*lSC_ptr, lDCPList,
00078                                                         lEventDate);
00079         if (isForecasted == false) {
00080           isSucceeded = false;
00081         }
00082       }
00083     }
00084
00085     return isSucceeded;
00086   }
00087
00088   // ////////////////////////////////////////////////////////////////////
```

```
00089   bool Forecaster::
00090    forecastUsingAdditivePickUp (
      stdair::SegmentCabin& ioSegmentCabin,
00091                                 const stdair::DCPList_T& iDCPList,
00092                                 const stdair::Date_T& iEventDate) {
00093     // Retrieve the number of departed similar segments.
00094     stdair::NbOfSegments_T lNbOfDepartedSegments =
00095       Utilities::getNbOfDepartedSimilarSegments
       (ioSegmentCabin, iEventDate);
00096     // TODO
00097     if (lNbOfDepartedSegments > 52) lNbOfDepartedSegments = 52;
00098
00099     // DEBUG
00100     STDAIR_LOG_DEBUG ("Nb of similar departed segments: "
00101                       << lNbOfDepartedSegments);
00102
00103     // If the DCP list includes only DTD0 or the number of departed
00104     // segments are less than two, remaining demand for all classes
00105     // will be set to zero.
00106     stdair::DCPList_T::const_iterator itDCP = iDCPList.begin();
00107     assert (itDCP != iDCPList.end());
00108     const stdair::DCP_T& lCurrentDTD = *itDCP;
00109     if (iDCPList.size() == 1 || lNbOfDepartedSegments < 2) {
00110       setRemainingDemandForecastToZero (ioSegmentCabin);
00111       return false;
00112     } else {
00113       // Initialise a holder for the unconstrained demand.
00114       UnconstrainedDemandVector_T
      lQEquivalentDemandVector (lNbOfDepartedSegments, 0.0);
00115       BookingClassUnconstrainedDemandVectorMap_T
       lBkgClassUncDemMap;
00116       const stdair::BookingClassList_T& lBCList =
00117         stdair::BomManager::getList<stdair::BookingClass> (ioSegmentCabin);
00118       for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00119            itBC != lBCList.end(); ++itBC) {
00120         stdair::BookingClass* lBC_ptr = *itBC;
00121         assert (lBC_ptr != NULL);
00122         std::vector<stdair::NbOfRequests_T> lUncDemandVector (
      lNbOfDepartedSegments, 0.0);
00123         bool insertionSucceeded = lBkgClassUncDemMap.insert
00124           (BookingClassUnconstrainedDemandVectorMap_T
      ::
00125            value_type (lBC_ptr, lUncDemandVector)).second;
00126         assert (insertionSucceeded == true);
00127       }
00128
00129       // Build the DCP intervals and unconstrain censored booking figures for
00130       // each interval.
00131       stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00132       for (; itNextDCP != iDCPList.end(); ++itDCP, ++itNextDCP) {
00133         const stdair::DCP_T& lCurrentDCP = *itDCP;
00134         const stdair::DCP_T& lNextDCP = *itNextDCP;
00135
00136         // DEBUG
00137         STDAIR_LOG_DEBUG ("Unconstrain demand for "
00138                           << ioSegmentCabin.describeKey()
00139                           << " and the DCP's " << lCurrentDCP << ", "
00140                           << lNextDCP);
00141         Detruncator::unconstrainUsingAdditivePickUp
       (ioSegmentCabin,
00142                                                     lBkgClassUncDemMap,
00143                                                     lQEquivalentDemandVector,
00144                                                     lCurrentDCP-1, lNextDCP,
00145                                                     iEventDate);
00146         STDAIR_LOG_DEBUG ("Detrucation successful");
00147       }
00148
00149       // Retrieve the FRAT5 coefficient and compute the sell-up coef.
00150       FRAT5Curve_T::const_iterator itFRAT5 =
00151         DEFAULT_CUMULATIVE_FRAT5_CURVE.
      lower_bound (lCurrentDTD);
00152       assert (itFRAT5 != DEFAULT_CUMULATIVE_FRAT5_CURVE
      .end());
00153       const double lFRAT5Coef = itFRAT5->second;
00154       const double lSellUpCoef = -log(0.5) / (lFRAT5Coef - 1);
00155
00156       forecastUsingAdditivePickUp (ioSegmentCabin,
      lBkgClassUncDemMap,
00157                                    lQEquivalentDemandVector, lSellUpCoef);
00158       return true;
00159     }
00160   }
00161
00162   // ////////////////////////////////////////////////////////////////////
00163   void Forecaster::
00164    forecastUsingAdditivePickUp (
      stdair::SegmentCabin& ioSegmentCabin,
```

```
00165                                 const BookingClassUnconstrainedDemandVectorMap_T
      & iClassUncDemMap,
00166                                 const UnconstrainedDemandVector_T
      & iUncDemVector,
00167                                 const double& iSellUpFactor) {
00168     double lPriceOriMean; double lPriceOriStdDev;
00169     Utilities::computeDistributionParameters
       (iUncDemVector, lPriceOriMean,
00170                                               lPriceOriStdDev);
00171
00172     // DEBUG
00173     //STDAIR_LOG_NOTIFICATION (lPriceOriMean << ";" << lPriceOriStdDev);
00174
00175     // Retrieve the classes from low to high and compute the distributions of
00176     // product-oriented and price-oriented demand.
00177     // Retrieve the lowest class.
00178     const stdair::BookingClassList_T& lBCList =
00179       stdair::BomManager::getList<stdair::BookingClass> (ioSegmentCabin);
00180     stdair::BookingClassList_T::const_reverse_iterator itCurrentClass =
00181       lBCList.rbegin();
00182     assert (itCurrentClass != lBCList.rend());
00183     stdair::BookingClassList_T::const_reverse_iterator itNextClass =
00184       itCurrentClass;
00185     ++itNextClass;
00186     // If there is only one class in the cabin, the demand distribution of this
00187     // class is equal to the price-oriented demand distribution of the cabin.
00188     if (itNextClass == lBCList.rend()) {
00189       stdair::BookingClass* lLowestBC_ptr = *itCurrentClass;
00190       lLowestBC_ptr->setMean (lPriceOriMean);
00191       lLowestBC_ptr->setStdDev (lPriceOriStdDev);
00192     } else {
00193       // Compute the demand for higher class using the formula
00194       // Pro_sell_up_from_Q_to_F = e ^ ((y_F/y_Q - 1) * ln (0.5) / (FRAT5 - 1))
00195       for (; itNextClass != lBCList.rend(); ++itCurrentClass, ++itNextClass) {
00196         stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00197         assert (lCurrentBC_ptr != NULL);
00198         const stdair::Yield_T& lCurrentYield = lCurrentBC_ptr->getYield();
00199         stdair::BookingClass* lNextBC_ptr = *itNextClass;
00200         assert (lNextBC_ptr != NULL);
00201         const stdair::Yield_T& lNextYield = lNextBC_ptr->getYield();
00202
00203         // Compute the part of price-oriented demand distributed to the
00204         // current class.
00205         const double lSellUp =
00206           exp ((1.0 - lNextYield/lCurrentYield) * iSellUpFactor);
00207         const double lPriceOriDemMeanFrac = lPriceOriMean * (1.0 - lSellUp);
00208         const double lPriceOriDemStdDevFrac = lPriceOriStdDev * (1.0 - lSellUp)
      ;
00209
00210         // Compute the product-oriented demand distribution for the
00211         // current class.
00212         BookingClassUnconstrainedDemandVectorMap_T::const_iterator itBCUD =
00213           iClassUncDemMap.find (lCurrentBC_ptr);
00214         assert (itBCUD != iClassUncDemMap.end());
00215         const UnconstrainedDemandVector_T&
      lDemandVector = itBCUD->second;
00216         double lMean; double lStdDev;
00217         Utilities::computeDistributionParameters
      (lDemandVector, lMean, lStdDev);
00218
00219         // Compute the demand distribution for the current class;
00220         lMean += lPriceOriDemMeanFrac;
00221         lStdDev = sqrt (lStdDev * lStdDev +
00222                         lPriceOriDemStdDevFrac * lPriceOriDemStdDevFrac);
00223         lCurrentBC_ptr->setMean (lMean);
00224         lCurrentBC_ptr->setStdDev (lStdDev);
00225
00226         // DEBUG
00227         // STDAIR_LOG_NOTIFICATION ("Class " << lCurrentBC_ptr->describeKey()
00228         //                          << ", mean = " << lMean
00229         //                          << ", stddev = " << lStdDev);
00230
00231         // Update the price-oriented demand
00232         lPriceOriMean *= lSellUp;
00233         lPriceOriStdDev *= lSellUp;
00234       }
00235
00236       // Compute the demand distribution for the highest class (which is the
00237       // "current class")
00238       stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00239       assert (lCurrentBC_ptr != NULL);
00240       BookingClassUnconstrainedDemandVectorMap_T::const_iterator itBCUD =
00241         iClassUncDemMap.find (lCurrentBC_ptr);
00242       assert (itBCUD != iClassUncDemMap.end());
00243       const UnconstrainedDemandVector_T&
      lDemandVector = itBCUD->second;
00244       double lMean; double lStdDev;
```

```
00245       Utilities::computeDistributionParameters
      (lDemandVector, lMean, lStdDev);
00246
00247       // Compute the demand distribution for the current class;
00248       lMean += lPriceOriMean;
00249       lStdDev = sqrt (lStdDev * lStdDev + lPriceOriStdDev * lPriceOriStdDev);
00250       lCurrentBC_ptr->setMean (lMean);
00251       lCurrentBC_ptr->setStdDev (lStdDev);
00252
00253       // DEBUG
00254       // STDAIR_LOG_NOTIFICATION ("Class " << lCurrentBC_ptr->describeKey()
00255       //                          << ", mean = " << lMean
00256       //                          << ", stddev = " << lStdDev);
00257     }
00258   }
00259
00260   // ////////////////////////////////////////////////////////////////////
00261   void Forecaster::
00262   setRemainingDemandForecastToZero (const stdair::SegmentCabin& iSegmentCabin)
      {
00263     // Set the demand forecast for all classes to zero.
00264     const stdair::BookingClassList_T& lBCList =
00265       stdair::BomManager::getList<stdair::BookingClass> (iSegmentCabin);
00266     for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00267          itBC != lBCList.end(); ++itBC) {
00268       stdair::BookingClass* lBC_ptr = *itBC;
00269       assert (lBC_ptr != NULL);
00270       lBC_ptr->setMean (0.0);
00271     }
00272   }
00273
00274   // ////////////////////////////////////////////////////////////////////
00275   bool Forecaster::
00276   forecastUsingMultiplicativePickUp (
      stdair::FlightDate& ioFlightDate,
00277                                      const stdair::DateTime_T& iEventTime) {
00278     // Build the offset dates.
00279     const stdair::Date_T& lEventDate = iEventTime.date();
00280
00281     //
00282     bool isSucceeded = true;
00283     const stdair::SegmentDateList_T& lSDList =
00284       stdair::BomManager::getList<stdair::SegmentDate> (ioFlightDate);
00285     for (stdair::SegmentDateList_T::const_iterator itSD = lSDList.begin();
00286          itSD != lSDList.end(); ++itSD) {
00287       stdair::SegmentDate* lSD_ptr = *itSD;
00288       assert (lSD_ptr != NULL);
00289
00290       const stdair::Date_T& lBoardingDate = lSD_ptr->getBoardingDate();
00291       const stdair::DateOffset_T lSegmentDateOffset =
00292         lBoardingDate - lEventDate;
00293       const stdair::DTD_T lSegmentDTD = lSegmentDateOffset.days();
00294
00295       //
00296       const stdair::SegmentCabinList_T& lSCList =
00297         stdair::BomManager::getList<stdair::SegmentCabin> (*lSD_ptr);
00298       for (stdair::SegmentCabinList_T::const_iterator itSC = lSCList.begin();
00299            itSC != lSCList.end(); ++itSC) {
00300         stdair::SegmentCabin* lSC_ptr = *itSC;
00301         assert (lSC_ptr != NULL);
00302
00303         bool isForecasted = forecastUsingMultiplicativePickUp
       (*lSC_ptr,
00304                                                               lEventDate,
00305                                                               lSegmentDTD);
00306         if (isForecasted == false) {
00307           isSucceeded = false;
00308         }
00309       }
00310     }
00311     return isSucceeded;
00312   }
00313
00314   // ////////////////////////////////////////////////////////////////////
00315   bool Forecaster::
00316   forecastUsingMultiplicativePickUp (
      stdair::SegmentCabin& ioSegmentCabin,
00317                                      const stdair::Date_T& iEventDate,
00318                                      const stdair::DTD_T& iSegmentDTD) {
00319     // Retrieving the number of anterior similar segments.
00320     const stdair::GuillotineBlock& lGuillotineBlock =
00321       ioSegmentCabin.getGuillotineBlock();
00322     stdair::NbOfSegments_T lNbOfAnteriorSimilarSegments =
00323       GuillotineBlockHelper::
00324       getNbOfSegmentAlreadyPassedThisDTD
       (lGuillotineBlock, iSegmentDTD,
00325                                        iEventDate) - 1;
```

```
00326     // Retrieve the number of departed similar segments.
00327     stdair::NbOfSegments_T lNbOfDepartedSegments =
00328       Utilities::getNbOfDepartedSimilarSegments
       (ioSegmentCabin, iEventDate);
00329     // TODO:
00330     if (lNbOfDepartedSegments > 52) {
00331       lNbOfAnteriorSimilarSegments =
00332         lNbOfAnteriorSimilarSegments  - lNbOfDepartedSegments + 52;
00333     }
00334
00335     // DEBUG
00336     STDAIR_LOG_DEBUG ("Nb of anterior similar segments: "
00337                       << lNbOfAnteriorSimilarSegments);
00338
00339     // If the iSegmentDTD is the last DCP or there is no anterior similar
00340     // segment, remaining demand for all classes will be set to zero
00341     stdair::DCPList_T::const_reverse_iterator itLastDCP =
00342       stdair::DEFAULT_DCP_LIST.rbegin();
00343     assert (itLastDCP != stdair::DEFAULT_DCP_LIST.rend(
      ));
00344     const stdair::DCP_T& lLastDCP = *itLastDCP;
00345     if (lNbOfAnteriorSimilarSegments < 1.0 || iSegmentDTD <= lLastDCP) {
00346       setRemainingDemandForecastToZero (ioSegmentCabin);
00347       return false;
00348     } else {
00349       // Retrieve the booking figures of the first DCP and consider them
00350       // as unconstrained demand figures.
00351       stdair::DCPList_T::const_iterator itDCP =stdair::DEFAULT_DCP_LIST
      .begin();
00352       assert (itDCP != stdair::DEFAULT_DCP_LIST.end());
00353       const stdair::DCP_T& lFirstDCP = *itDCP;
00354
00355       // Initialise the unconstrained demand for classes.
00356       stdair::NbOfSegments_T lNbOfUsableSegments =
00357         GuillotineBlockHelper::
00358         getNbOfSegmentAlreadyPassedThisDTD
       (lGuillotineBlock, lFirstDCP,
00359                                             iEventDate);
00360       // TODO
00361       unsigned short lSize = lNbOfUsableSegments;
00362       if (lNbOfDepartedSegments > 52) {
00363         lSize = lNbOfUsableSegments - lNbOfDepartedSegments + 52;
00364       }
00365
00366       STDAIR_LOG_DEBUG ("Nb of usable similar segments: "
00367                         << lNbOfUsableSegments);
00368
00369       UnconstrainedDemandVector_T
      lQEquivalentDemandVector (lSize, 0.0);
00370       stdair::NbOfBookings_T lCurrentSegmentQEquivalentDemand = 0.0;
00371       BookingClassUnconstrainedDemandVectorMap_T
       lBkgClassUncDemVectorMap;
00372       BookingClassUnconstrainedDemandMap_T
      lCurrentSegmentBkgClassDemMap;
00373       const stdair::BookingClassList_T& lBCList =
00374         stdair::BomManager::getList<stdair::BookingClass> (ioSegmentCabin);
00375       for (stdair::BookingClassList_T::const_iterator itBC = lBCList.begin();
00376            itBC != lBCList.end(); ++itBC) {
00377         stdair::BookingClass* lBC_ptr = *itBC;
00378         assert (lBC_ptr != NULL);
00379
00380         UnconstrainedDemandVector_T lUncDemandVector
       (lSize, 0.0);
00381         bool insertionSucceeded = lBkgClassUncDemVectorMap.
00382           insert (BookingClassUnconstrainedDemandVectorMap_T
      ::
00383                   value_type (lBC_ptr, lUncDemandVector)).second;
00384         assert (insertionSucceeded == true);
00385         insertionSucceeded =
00386           lCurrentSegmentBkgClassDemMap.
00387           insert (BookingClassUnconstrainedDemandMap_T
      ::
00388                   value_type (lBC_ptr, 0.0)).second;
00389         assert (insertionSucceeded == true);
00390       }
00391       Detruncator::
00392         retrieveUnconstrainedDemandForFirstDCP
       (ioSegmentCabin,
00393                                                 lBkgClassUncDemVectorMap,
00394                                                 lQEquivalentDemandVector,
00395                                                 lFirstDCP, lNbOfUsableSegments,
00396                                                 lSize);
00397
00398       // Unconstrain the booking figures.
00399       stdair::DCPList_T::const_iterator itNextDCP = itDCP; ++itNextDCP;
00400       while (itNextDCP != stdair::DEFAULT_DCP_LIST.end(
      )) {
```

```
00401         const stdair::DCP_T& lCurrentDCP = *itDCP;
00402         const stdair::DCP_T& lNextDCP = *itNextDCP;
00403         if (lCurrentDCP <= iSegmentDTD) {
00404           break;
00405         }
00406         Detruncator::
00407           unconstrainUsingMultiplicativePickUp
      (ioSegmentCabin,
00408                                                lBkgClassUncDemVectorMap,
00409                                                lQEquivalentDemandVector,
00410                                                lCurrentDCP-1, lNextDCP,
00411                                                iEventDate,
00412                                                lNbOfDepartedSegments);
00413         ++itNextDCP; ++itDCP;
00414       }
00415
00416       // Update the unconstrained demand for all the classes of the current
00417       // segment.
00418       lCurrentSegmentQEquivalentDemand =
00419         lQEquivalentDemandVector.at (lNbOfAnteriorSimilarSegments);
00420       BookingClassUnconstrainedDemandMap_T::iterator itBCUD =
00421         lCurrentSegmentBkgClassDemMap.begin();
00422       for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00423              lBkgClassUncDemVectorMap.begin();
00424            itBCUDV != lBkgClassUncDemVectorMap.end(); ++itBCUDV, ++itBCUD) {
00425         assert (itBCUD != lCurrentSegmentBkgClassDemMap.end());
00426         assert (itBCUD->first == itBCUDV->first);
00427         stdair::NbOfRequests_T& lUncDem = itBCUD->second;
00428         UnconstrainedDemandVector_T& lUncDemVector =
     itBCUDV->second;
00429         lUncDem = lUncDemVector.at (lNbOfAnteriorSimilarSegments);
00430       }
00431
00432       // Forecast the remaining demand for all classes
00433       const stdair::DCP_T& lCurrentDTD = *itDCP;
00434       for (; itNextDCP != stdair::DEFAULT_DCP_LIST.end(
      ); ++itNextDCP, ++itDCP){
00435         const stdair::DCP_T& lCurrentDCP = *itDCP;
00436         const stdair::DCP_T& lNextDCP = *itNextDCP;
00437         forecastUsingMultiplicativePickUp (
      ioSegmentCabin,
00438                                            lBkgClassUncDemVectorMap,
00439                                            lQEquivalentDemandVector,
00440                                            lCurrentDCP-1, lNextDCP, iEventDate,
00441                                            lNbOfAnteriorSimilarSegments,
00442                                            lNbOfDepartedSegments);
00443       }
00444
00445       // Update the remaining demand for all classes
00446       lCurrentSegmentQEquivalentDemand =
00447         lQEquivalentDemandVector.at (lNbOfAnteriorSimilarSegments)
00448         - lCurrentSegmentQEquivalentDemand;
00449       itBCUD = lCurrentSegmentBkgClassDemMap.begin();
00450       for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00451              lBkgClassUncDemVectorMap.begin();
00452            itBCUDV != lBkgClassUncDemVectorMap.end(); ++itBCUDV, ++itBCUD) {
00453         assert (itBCUD != lCurrentSegmentBkgClassDemMap.end());
00454         assert (itBCUD->first == itBCUDV->first);
00455         stdair::NbOfRequests_T& lUncDem = itBCUD->second;
00456         UnconstrainedDemandVector_T& lUncDemVector =
     itBCUDV->second;
00457         lUncDem = lUncDemVector.at (lNbOfAnteriorSimilarSegments) - lUncDem;
00458       }
00459
00460       // Retrieve the FRAT5 coefficient and compute the sell-up coef.
00461       FRAT5Curve_T::const_iterator itFRAT5 =
00462         DEFAULT_CUMULATIVE_FRAT5_CURVE.
      lower_bound (lCurrentDTD);
00463       assert (itFRAT5 != DEFAULT_CUMULATIVE_FRAT5_CURVE
      .end());
00464       const double lFRAT5Coef = itFRAT5->second;
00465       const double lSellUpCoef = -log(0.5) / (lFRAT5Coef - 1);
00466
00467       return forecastUsingMultiplicativePickUp
      (ioSegmentCabin,
00468                                            lCurrentSegmentBkgClassDemMap,
00469                                            lCurrentSegmentQEquivalentDemand
      ,
00470                                            lSellUpCoef);
00471
00472     }
00473   }
00474
00475   // ////////////////////////////////////////////////////////////////////
00476   void Forecaster::forecastUsingMultiplicativePickUp
00477   (const stdair::SegmentCabin& iSegmentCabin,
00478    BookingClassUnconstrainedDemandVectorMap_T
```

```
& ioBkgClassUncDemMap,
00479    UnconstrainedDemandVector_T&
ioQEquivalentDemandVector,
00480    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00481    const stdair::Date_T& iCurrentDate,
00482    const stdair::NbOfSegments_T& iNbOfAnteriorSimilarSegments,
00483    const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00484
00485     // Retrieve the guillotine block.
00486     const stdair::GuillotineBlock& lGuillotineBlock =
00487       iSegmentCabin.getGuillotineBlock();
00488
00489     // Build the historical booking holders for the product-oriented bookings
00490     // of the casses and the Q-equivalent (price-oriented) bookings of the
 cabin
00491     const stdair::NbOfSegments_T lNbOfUsableSegments = GuillotineBlockHelper::
00492       getNbOfSegmentAlreadyPassedThisDTD
 (lGuillotineBlock, iDCPEnd,
00493                                          iCurrentDate);
00494
00495     STDAIR_LOG_DEBUG ("Nb of usable similar segments: "
00496                       << lNbOfUsableSegments);
00497
00498     if (lNbOfUsableSegments > 0) {
00499
00500       // Parse the booking class list and unconstrain historical bookings.
00501       for (BookingClassUnconstrainedDemandVectorMap_T::iterator itBCUDV =
00502              ioBkgClassUncDemMap.begin(); itBCUDV != ioBkgClassUncDemMap.end();
00503            ++itBCUDV) {
00504         stdair::BookingClass* lBC_ptr = itBCUDV->first;
00505         assert (lBC_ptr != NULL);
00506         const stdair::MapKey_T& lBCKey = lBC_ptr->describeKey();
00507         const stdair::BlockIndex_T& lBlockIdx =
00508           lGuillotineBlock.getBlockIndex (lBCKey);
00509         UnconstrainedDemandVector_T& lUncDemVector =
 itBCUDV->second;
00510
00511         STDAIR_LOG_DEBUG ("Unconstrain product-oriented bookings for "<<lBCKey)
;
00512         forecastUsingMultiplicativePickUp (
lGuillotineBlock, lUncDemVector,
00513                                            iDCPBegin, iDCPEnd,
00514                                            lNbOfUsableSegments, lBlockIdx,
00515                                            iNbOfAnteriorSimilarSegments,
00516                                            iNbOfDepartedSegments);
00517       }
00518
00519       // Unconstrain the Q-equivalent bookings.
00520       // Retrieve the block index of the segment-cabin.
00521       std::ostringstream lSCMapKey;
00522       lSCMapKey << stdair::DEFAULT_SEGMENT_CABIN_VALUE_TYPE
00523                 << iSegmentCabin.describeKey();
00524       const stdair::BlockIndex_T& lCabinIdx =
00525         lGuillotineBlock.getBlockIndex (lSCMapKey.str());
00526
00527       STDAIR_LOG_DEBUG ("Unconstrain price-oriented bookings");
00528       forecastUsingMultiplicativePickUp (
lGuillotineBlock,
00529                                          ioQEquivalentDemandVector,
00530                                          iDCPBegin, iDCPEnd,
00531                                          lNbOfUsableSegments, lCabinIdx,
00532                                          iNbOfAnteriorSimilarSegments,
00533                                          iNbOfDepartedSegments,
00534                                          iSegmentCabin, iCurrentDate);
00535     }
00536   }
00537
00538   // ////////////////////////////////////////////////////////////////////
00539   void Forecaster::forecastUsingMultiplicativePickUp
00540   (const stdair::GuillotineBlock& iGuillotineBlock,
00541    UnconstrainedDemandVector_T& ioUncDemVector,
00542    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00543    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00544    const stdair::BlockIndex_T& iBlockIdx,
00545    const stdair::NbOfSegments_T& iNbOfAnteriorSimilarSegments,
00546    const stdair::NbOfSegments_T& iNbOfDepartedSegments) {
00547     // TODO
00548     stdair::NbOfSegments_T lSegBegin = 0;
00549     if (iNbOfDepartedSegments > 52) {
00550       lSegBegin = iNbOfDepartedSegments - 52;
00551     }
00552     // Retrieve the gross daily booking and availability snapshots.
00553     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00554       iGuillotineBlock.
getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCI
00555     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00556       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
```

```
      lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00557
00558     // Browse the list of segments and build the historical booking holder.
00559     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00560       iGuillotineBlock.getValueTypeIndexMap();
00561     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00562     HistoricalBookingHolder lHBHolder;
00563     std::vector<short> lDataIndexList;
00564     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00565       stdair::Flag_T lCensorshipFlag = false;
00566       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00567       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00568
00569       // Parse the DTDs during the period
00570       for (short j = 0; j < lNbOfDTDs; ++j) {
00571         // Check if the data has been censored during this day.
00572         // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfValues: " << lNbOfValueTypes
00573         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00574         if (lCensorshipFlag == false) {
00575           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00576             lCensorshipFlag = true;
00577           }
00578         }
00579
00580         // Get the bookings of the day.
00581         // STDAIR_LOG_DEBUG ("Bookings of the day: " <<
      lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00582         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00583       }
00584
00585       // If there is no booking till now for this class and for this segment,
00586       // there will be no unconstraining process.
00587       stdair::NbOfRequests_T& lUncDemand = ioUncDemVector.at (i);
00588       if (lUncDemand < 1.0) {
00589         lUncDemand += lNbOfHistoricalBkgs;
00590       } else {
00591         double lBkgDemandFactor = lNbOfHistoricalBkgs / lUncDemand;
00592         HistoricalBooking lHistoricalBkg (lBkgDemandFactor, lCensorshipFlag);
00593         lHBHolder.addHistoricalBooking (lHistoricalBkg);
00594         lDataIndexList.push_back (i);
00595       }
00596
00597       // DEBUG
00598       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00599                         << ", censored: " << lCensorshipFlag);
00600     }
00601
00602     // DEBUG
00603     STDAIR_LOG_DEBUG ("Unconstrain by multiplicative pick-up using EM");
00604
00605     // Unconstrain the booking figures
00606     Detruncator::unconstrainUsingMultiplicativePickUp
      (lHBHolder);
00607
00608     // Update the unconstrained demand vector.
00609     short i = 0;
00610     for (std::vector<short>::iterator itIdx = lDataIndexList.begin();
00611          itIdx != lDataIndexList.end(); ++itIdx, ++i) {
00612       short lIdx = *itIdx;
00613       stdair::NbOfRequests_T& lPastDemand = ioUncDemVector.at (lIdx);
00614       const stdair::NbOfRequests_T& lUncDemandFactorOfThisPeriod =
00615         lHBHolder.getUnconstrainedDemand (i);
00616       lPastDemand *= (1+lUncDemandFactorOfThisPeriod);
00617     }
00618
00619     // Update the unconstrained demand for the current segment.
00620     if (lHBHolder.getNbOfFlights() > 0) {
00621       const stdair::NbOfRequests_T& lUncDemandFactorMean =
00622         lHBHolder.getDemandMean();
00623       stdair::NbOfRequests_T& lPastDemand =
00624         ioUncDemVector.at (iNbOfAnteriorSimilarSegments);
00625       lPastDemand *= (1+lUncDemandFactorMean);
00626     }
00627   }
00628
00629   // ////////////////////////////////////////////////////////////////////
00630   void Forecaster::forecastUsingMultiplicativePickUp
00631   (const stdair::GuillotineBlock& iGuillotineBlock,
00632    UnconstrainedDemandVector_T& ioUncDemVector,
00633    const stdair::DCP_T& iDCPBegin, const stdair::DCP_T& iDCPEnd,
00634    const stdair::NbOfSegments_T& iNbOfUsableSegments,
00635    const stdair::BlockIndex_T& iBlockIdx,
00636    const stdair::NbOfSegments_T& iNbOfAnteriorSimilarSegments,
00637    const stdair::NbOfSegments_T& iNbOfDepartedSegments,
00638    const stdair::SegmentCabin& iSegmentCabin,
00639    const stdair::Date_T& iCurrentDate) {
00640     // TODO
```

```
00641     stdair::NbOfSegments_T lSegBegin = 0;
00642     if (iNbOfDepartedSegments > 52) {
00643       lSegBegin = iNbOfDepartedSegments - 52;
00644     }
00645     // Retrieve the gross daily booking and availability snapshots.
00646     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lBookingView =
00647       iGuillotineBlock.
      getConstSegmentCabinDTDRangeProductAndPriceOrientedBookingSnapshotView (lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCP
00648     stdair::ConstSegmentCabinDTDRangeSnapshotView_T lAvlView =
00649       iGuillotineBlock.getConstSegmentCabinDTDRangeAvailabilitySnapshotView (
      lSegBegin, iNbOfUsableSegments -1, iDCPEnd, iDCPBegin);
00650
00651     // Browse the list of segments and build the historical booking holder.
00652     const stdair::ValueTypeIndexMap_T& lVTIdxMap =
00653       iGuillotineBlock.getValueTypeIndexMap();
00654     const unsigned int lNbOfValueTypes = lVTIdxMap.size();
00655     HistoricalBookingHolder lHBHolder;
00656     std::vector<short> lDataIndexList;
00657     for (short i = 0; i < iNbOfUsableSegments-lSegBegin; ++i) {
00658       stdair::Flag_T lCensorshipFlag = false;
00659       stdair::NbOfBookings_T lNbOfHistoricalBkgs = 0.0;
00660       const short lNbOfDTDs = iDCPBegin - iDCPEnd + 1;
00661
00662       // Parse the DTDs during the period
00663       for (short j = 0; j < lNbOfDTDs; ++j) {
00664         // Check if the data has been censored during this day.
00665         // STDAIR_LOG_DEBUG ("i: " << i << ", NbOfValues: " << lNbOfValueTypes
00666         //                   << ", BlockIdx: " << iBlockIdx << ", j: " << j);
00667         if (lCensorshipFlag == false) {
00668           if (lAvlView[i*lNbOfValueTypes + iBlockIdx][j] < 1.0) {
00669             lCensorshipFlag = true;
00670           }
00671         }
00672
00673         // Get the bookings of the day.
00674         // STDAIR_LOG_DEBUG ("Bookings of the day: " <<
      lBookingView[i*lNbOfValueTypes + iBlockIdx][j]);
00675         lNbOfHistoricalBkgs += lBookingView[i*lNbOfValueTypes + iBlockIdx][j];
00676       }
00677
00678       // If there is no booking till now for this class and for this segment,
00679       // there will be no unconstraining process.
00680       stdair::NbOfRequests_T& lUncDemand = ioUncDemVector.at (i);
00681       if (lUncDemand < 1.0) {
00682         lUncDemand += lNbOfHistoricalBkgs;
00683       } else {
00684         double lBkgDemandFactor = lNbOfHistoricalBkgs / lUncDemand;
00685         HistoricalBooking lHistoricalBkg (lBkgDemandFactor, lCensorshipFlag);
00686         lHBHolder.addHistoricalBooking (lHistoricalBkg);
00687         lDataIndexList.push_back (i);
00688       }
00689
00690       // DEBUG
00691       STDAIR_LOG_DEBUG ("Historical bkgs: " << lNbOfHistoricalBkgs
00692                         << ", censored: " << lCensorshipFlag);
00693     }
00694
00695     // DEBUG
00696     STDAIR_LOG_DEBUG ("Unconstrain by multiplicative pick-up using EM");
00697
00698     // Unconstrain the booking figures
00699     Detruncator::unconstrainUsingMultiplicativePickUp
      (lHBHolder);
00700
00701     // Update the unconstrained demand vector.
00702     // LOG
00703     const stdair::SegmentDate& lSegmentDate = stdair::BomManager::
00704       getParent<stdair::SegmentDate, stdair::SegmentCabin> (iSegmentCabin);
00705     const stdair::FlightDate& lFlightDate = stdair::BomManager::
00706       getParent<stdair::FlightDate, stdair::SegmentDate> (lSegmentDate);
00707     const stdair::Date_T& lDepDate = lFlightDate.getDepartureDate();
00708     const boost::gregorian::date_duration lDD = lDepDate - iCurrentDate;
00709     const long lDTD = lDD.days();
00710     stdair::Date_T lRefDate (2012, boost::gregorian::Jan, 01);
00711     short i = 0;
00712     for (std::vector<short>::iterator itIdx = lDataIndexList.begin();
00713          itIdx != lDataIndexList.end(); ++itIdx, ++i) {
00714       short lIdx = *itIdx;
00715       stdair::NbOfRequests_T& lPastDemand = ioUncDemVector.at (lIdx);
00716       const stdair::NbOfRequests_T& lUncDemandFactorOfThisPeriod =
00717         lHBHolder.getUnconstrainedDemand (i);
00718       const double lUncDemThisPeriod =
00719         lPastDemand * lUncDemandFactorOfThisPeriod;
00720       const double lQEBkgThisPeriod =
00721         lPastDemand * lHBHolder.getHistoricalBooking (i);
00722       lPastDemand *= (1+lUncDemandFactorOfThisPeriod);
00723       if (lDepDate > lRefDate) {
```

```
00724         const stdair::DateOffset_T lDateOffset (7 *(52 - i) + 420);
00725         const stdair::Date_T lHDate = lDepDate - lDateOffset;
00726         STDAIR_LOG_NOTIFICATION (boost::gregorian::to_iso_string(lDepDate)
00727                                  << ";" << lDTD << ";" << iDCPBegin << ";"
00728                                  << iDCPEnd << ";"
00729                                  << boost::gregorian::to_iso_string (lHDate)
00730                                  << ";" << lUncDemThisPeriod);
00731         STDAIR_LOG_NOTIFICATION (boost::gregorian::to_iso_string(lDepDate)
00732                                  << ";" << lDTD << ";" << iDCPBegin << ";"
00733                                  << iDCPEnd << ";"
00734                                  << boost::gregorian::to_iso_string (lHDate)
00735                                  << ";" << lQEBkgThisPeriod);
00736       }
00737     }
00738
00739     // Update the unconstrained demand for the current segment.
00740     if (lHBHolder.getNbOfFlights() > 0) {
00741       const stdair::NbOfRequests_T& lUncDemandFactorMean =
00742         lHBHolder.getDemandMean();
00743       stdair::NbOfRequests_T& lPastDemand =
00744         ioUncDemVector.at (iNbOfAnteriorSimilarSegments);
00745       lPastDemand *= (1+lUncDemandFactorMean);
00746     }
00747   }
00748
00749   // ////////////////////////////////////////////////////////////////////
00750   bool Forecaster::
00751   forecastUsingMultiplicativePickUp (
      stdair::SegmentCabin& ioSegmentCabin,
00752                                      const BookingClassUnconstrainedDemandMap_T
      & iClassUncDemMap,
00753                                      const stdair::NbOfRequests_T& iUncDem,
00754                                      const double& iSellUpFactor) {
00755     double lPriceOriMean = iUncDem;
00756     double lPriceOriStdDev = sqrt (iUncDem);
00757
00758     // DEBUG
00759     STDAIR_LOG_DEBUG ("Price-oriented demand: mean = " << lPriceOriMean
00760                       << ", stddev = " << lPriceOriStdDev);
00761
00762     // Retrieve the classes from low to high and compute the distributions of
00763     // product-oriented and price-oriented demand.
00764     // Retrieve the lowest class.
00765     const stdair::BookingClassList_T& lBCList =
00766       stdair::BomManager::getList<stdair::BookingClass> (ioSegmentCabin);
00767     stdair::BookingClassList_T::const_reverse_iterator itCurrentClass =
00768       lBCList.rbegin();
00769     assert (itCurrentClass != lBCList.rend());
00770     stdair::BookingClassList_T::const_reverse_iterator itNextClass =
00771       itCurrentClass;
00772     ++itNextClass;
00773     // If there is only one class in the cabin, the demand distribution of this
00774     // class is equal to the price-oriented demand distribution of the cabin.
00775     if (itNextClass == lBCList.rend()) {
00776       stdair::BookingClass* lLowestBC_ptr = *itCurrentClass;
00777       lLowestBC_ptr->setMean (lPriceOriMean);
00778       lLowestBC_ptr->setStdDev (lPriceOriStdDev);
00779       if (lPriceOriMean > 0) {
00780         return true;
00781       } else {
00782         return false;
00783       }
00784     } else {
00785       bool isSucceeded = false;
00786       // Compute the demand for higher class using the formula
00787       // Pro_sell_up_from_Q_to_F = e ^ ((y_F/y_Q - 1) * ln (0.5) / (FRAT5 - 1))
00788       for (; itNextClass != lBCList.rend(); ++itCurrentClass, ++itNextClass) {
00789         stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00790         assert (lCurrentBC_ptr != NULL);
00791         const stdair::Yield_T& lCurrentYield = lCurrentBC_ptr->getYield();
00792         stdair::BookingClass* lNextBC_ptr = *itNextClass;
00793         assert (lNextBC_ptr != NULL);
00794         const stdair::Yield_T& lNextYield = lNextBC_ptr->getYield();
00795
00796         // Compute the part of price-oriented demand distributed to the
00797         // current class.
00798         const double lSellUp =
00799           exp ((1.0 - lNextYield/lCurrentYield) * iSellUpFactor);
00800         const double lPriceOriDemMeanFrac = lPriceOriMean * (1.0 - lSellUp);
00801         const double lPriceOriDemStdDevFrac = lPriceOriStdDev * (1.0 - lSellUp)
      ;
00802
00803         // Compute the product-oriented demand distribution for the
00804         // current class.
00805         BookingClassUnconstrainedDemandMap_T::const_iterator itBCUD =
00806           iClassUncDemMap.find (lCurrentBC_ptr);
00807         assert (itBCUD != iClassUncDemMap.end());
```

```
00808         double lMean = itBCUD->second;
00809         double lStdDev = sqrt (lMean);
00810
00811         // Compute the demand distribution for the current class;
00812         lMean += lPriceOriDemMeanFrac;
00813         lStdDev = sqrt (lStdDev * lStdDev +
00814                         lPriceOriDemStdDevFrac * lPriceOriDemStdDevFrac);
00815         lCurrentBC_ptr->setMean (lMean);
00816         lCurrentBC_ptr->setStdDev (lStdDev);
00817
00818         if (lMean > 0) {
00819           isSucceeded = true;
00820         }
00821
00822         // DEBUG
00823         STDAIR_LOG_DEBUG ("Class " << lCurrentBC_ptr->describeKey()
00824                           << ", mean = " << lMean
00825                           << ", stddev = " << lStdDev);
00826
00827         // Update the price-oriented demand
00828         lPriceOriMean *= lSellUp;
00829         lPriceOriStdDev *= lSellUp;
00830       }
00831
00832       // Compute the demand distribution for the highest class (which is the
00833       // "current class")
00834       stdair::BookingClass* lCurrentBC_ptr = *itCurrentClass;
00835       assert (lCurrentBC_ptr != NULL);
00836       BookingClassUnconstrainedDemandMap_T::const_iterator itBCUD =
00837         iClassUncDemMap.find (lCurrentBC_ptr);
00838       assert (itBCUD != iClassUncDemMap.end());
00839       double lMean = itBCUD->second;
00840       double lStdDev = sqrt (lMean);
00841
00842       // Compute the demand distribution for the current class;
00843       lMean += lPriceOriMean;
00844       lStdDev = sqrt (lStdDev * lStdDev + lPriceOriStdDev * lPriceOriStdDev);
00845       lCurrentBC_ptr->setMean (lMean);
00846       lCurrentBC_ptr->setStdDev (lStdDev);
00847
00848       if (lMean > 0) {
00849         isSucceeded = true;
00850       }
00851
00852       // DEBUG
00853       STDAIR_LOG_DEBUG ("Class " << lCurrentBC_ptr->describeKey()
00854                         << ", mean = " << lMean
00855                         << ", stddev = " << lStdDev);
00856       return isSucceeded;
00857     }
00858   }
00859
00860 }
```

26.75 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

26.76 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   class GuillotineBlock;
00019 }
00020
00021 namespace RMOL {
00023   class Forecaster {
00024   public:
00028     static bool forecastUsingAdditivePickUp (
      stdair::FlightDate&,
00029                                              const stdair::DateTime_T&);
00030
00034     static bool forecastUsingMultiplicativePickUp
       (stdair::FlightDate&,
00035                                                   const stdair::DateTime_T&);
00036
00037
00038   private:
00042     static bool forecastUsingAdditivePickUp (
      stdair::SegmentCabin&,
00043                                              const stdair::DCPList_T&,
00044                                              const stdair::Date_T&);
00045
00050     static void forecastUsingAdditivePickUp (
      stdair::SegmentCabin&,
00051                                              const
      BookingClassUnconstrainedDemandVectorMap_T
      &, const UnconstrainedDemandVector_T&, const double&)
      ;
00052
00056     static bool forecastUsingMultiplicativePickUp
       (stdair::SegmentCabin&,
00057                                                    const stdair::Date_T&,
00058                                                    const stdair::DTD_T&);
00062     static void forecastUsingMultiplicativePickUp
      (const stdair::SegmentCabin&,
00063
      BookingClassUnconstrainedDemandVectorMap_T
      &,
00064                                                  UnconstrainedDemandVector_T
      &,
00065                                                  const stdair::DCP_T&,
00066                                                  const stdair::DCP_T&,
00067                                                  const stdair::Date_T&,
00068                                                  const stdair::NbOfSegments_T&
      ,
00069                                                  const stdair::NbOfSegments_T&
      );
00070
00074     static void forecastUsingMultiplicativePickUp
      (const stdair::GuillotineBlock&,
00075                                                  UnconstrainedDemandVector_T
      &,
00076                                                  const stdair::DCP_T&,
00077                                                  const stdair::DCP_T&,
00078                                                  const stdair::NbOfSegments_T&
      ,
00079                                                  const stdair::BlockIndex_T&,
00080                                                  const stdair::NbOfSegments_T&
      ,
00081                                                  const stdair::NbOfSegments_T&
      );
00082
00086     static void forecastUsingMultiplicativePickUp
      (const stdair::GuillotineBlock&,
00087                                                  UnconstrainedDemandVector_T
      &,
00088                                                  const stdair::DCP_T&,
00089                                                  const stdair::DCP_T&,
00090                                                  const stdair::NbOfSegments_T&
      ,
00091                                                  const stdair::BlockIndex_T&,
00092                                                  const stdair::NbOfSegments_T&
```

```
    ,
00093                                                 const stdair::NbOfSegments_T&
    ,
00094                                                 const stdair::SegmentCabin&,
00095                                                 const stdair::Date_T&);
00096
00101     static bool forecastUsingMultiplicativePickUp
      (stdair::SegmentCabin&,
00102                                                 const
      BookingClassUnconstrainedDemandMap_T&,
00103                                                 const stdair::NbOfRequests_T&
    ,
00104                                                 const double&);
00105
00109     static void setRemainingDemandForecastToZero (const stdair::SegmentCabin&);
00110   };
00111 }
00112 #endif // __RMOL_COMMAND_FORECASTER_HPP
```

26.77 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

26.78 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&
    iInputFileName,
00037                              stdair::BomRoot& ioBomRoot) {
00038     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 hasAllPArams = true;
00070     stdair::Yield_T lYield;
00071     stdair::MeanValue_T lMean;
00072     stdair::StdDevValue_T lStdDev;
00073     stdair::BookingClassKey lBCKey (stdair::DEFAULT_CLASS_CODE);
00074
00075     while (inputFile.getline (buffer, sizeof (buffer), ';')) {
00076       std::istringstream iStringStr (buffer);
00077
00078       if (i == 1) {
00079         hasAllPArams = true;
00080       }
00081
00082       if (iStringStr >> dval) {
00083         if (i == 1) {
00084           lYield = dval;
00085           // std::cout << "Yield[" << i << "] = '" << dval << "'" << std::endl;
00086
00087         } else if (i == 2) {
00088           lMean = dval;
00089           // std::cout << "Mean[" << i << "] = '" << dval << "'" << std::endl;
00090
00091         } else if (i == 3) {
00092           lStdDev = dval;
00093           //std::cout << "stdDev[" << i << "] = '" << dval << "'" << std::endl;
00094           i = 0;
00095         }
00096         i++;
00097
00098       } else {
00099         hasAllPArams = false;
```

```
00100       }
00101
00102       if (hasAllPArams && i == 1) {
00103         stdair::BookingClass& lBookingClass =
00104           stdair::FacBom<stdair::BookingClass>::instance().create (lBCKey);
00105         stdair::FacBomManager::addToList (lSegmentCabin, lBookingClass);
00106         lBookingClass.setYield (lYield);
00107         lBookingClass.setMean (lMean);
00108         lBookingClass.setStdDev (lStdDev);
00109
00110         stdair::VirtualClassStruct lVirtualClass (lBookingClass);
00111         lVirtualClass.setYield (lYield);
00112         lVirtualClass.setMean (lMean);
00113         lVirtualClass.setStdDev (lStdDev);
00114         lLegCabin.addVirtualClass (lVirtualClass);
00115       }
00116     }
00117
00118     //
00119     if (!inputFile.eof()) {
00120       STDAIR_LOG_ERROR ("Problem when reading input file '" << iInputFileName
00121                         << "'");
00122       return hasReadBeenSuccessful;
00123     }
00124
00125     //
00126     hasReadBeenSuccessful = true;
00127     return hasReadBeenSuccessful;
00128   }
00129
00130 }
```

26.79 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

26.80 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,
00036                                            stdair::BomRoot&);
00037   };
00038 }
00039 #endif // __RMOL_CMD_INVENTORYPARSER_HPP
```

26.81 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/bom/MCOptimiser.hpp>
#include <rmol/bom/Emsr.hpp>
#include <rmol/bom/DPOptimiser.hpp>
#include <rmol/command/Optimiser.hpp>
```

Namespaces

- namespace RMOL

26.82 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/bom/MCOptimiser.hpp>
00021 #include <rmol/bom/Emsr.hpp>
00022 #include <rmol/bom/DPOptimiser.hpp>
00023 #include <rmol/command/Optimiser.hpp>
00024
00025 namespace RMOL {
00026
00027   // ////////////////////////////////////////////////////////////////////
00028   void Optimiser::
00029   optimalOptimisationByMCIntegration (const
      int K,
00030                                       stdair::LegCabin& ioLegCabin) {
00031     // Retrieve the segment-cabin
00032     const stdair::SegmentCabinList_T lSegmentCabinList =
00033       stdair::BomManager::getList<stdair::SegmentCabin> (ioLegCabin);
00034     stdair::SegmentCabinList_T::const_iterator itSC = lSegmentCabinList.begin()
```

```
    ;
00035     assert (itSC != lSegmentCabinList.end());
00036     const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00037     assert (lSegmentCabin_ptr != NULL);
00038
00039     // Retrieve the class list.
00040     const stdair::BookingClassList_T lBookingClassList =
00041       stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00042     stdair::RandomGeneration lSeedGenerator (stdair::DEFAULT_RANDOM_SEED);
00043
00044     // Generate the demand samples for the booking classes.
00045     for (stdair::BookingClassList_T::const_iterator itBC =
00046           lBookingClassList.begin(); itBC != lBookingClassList.end(); ++itBC)
    {
00047       stdair::RandomSeed_T lRandomSeed =
00048         lSeedGenerator.generateUniform01 () * 1e9;
00049       stdair::BookingClass* lBookingClass_ptr = *itBC;
00050       assert (lBookingClass_ptr != NULL);
00051       lBookingClass_ptr->generateDemandSamples (K, lRandomSeed);
00052
00053       // DEBUG
00054       //STDAIR_LOG_DEBUG ("Generating " << K << " demand samples for the class
     "
00055       //                  << lBookingClass_ptr->describeKey());
00056     }
00057
00058     // Call the class performing the actual algorithm
00059     MCOptimiser::optimalOptimisationByMCIntegration
     (ioLegCabin);
00060   }
00061
00062   // ////////////////////////////////////////////////////////////////////
00063   void Optimiser::optimalOptimisationByDP (
    stdair::LegCabin& ioLegCabin) {
00064     DPOptimiser::optimalOptimisationByDP (
    ioLegCabin);
00065   }
00066
00067   // ////////////////////////////////////////////////////////////////////
00068   void Optimiser::heuristicOptimisationByEmsr
     (stdair::LegCabin& ioLegCabin) {
00069     Emsr::heuristicOptimisationByEmsr (
    ioLegCabin);
00070   }
00071
00072   // ////////////////////////////////////////////////////////////////////
00073   void Optimiser::heuristicOptimisationByEmsrA
     (stdair::LegCabin& ioLegCabin) {
00074     Emsr::heuristicOptimisationByEmsrA (
    ioLegCabin);
00075   }
00076
00077   // ////////////////////////////////////////////////////////////////////
00078   void Optimiser::heuristicOptimisationByEmsrB
     (stdair::LegCabin& ioLegCabin) {
00079     Emsr::heuristicOptimisationByEmsrB (
    ioLegCabin);
00080   }
00081
00082   // ////////////////////////////////////////////////////////////////////
00083   void Optimiser::optimise (stdair::FlightDate& ioFlightDate
    ) {
00084     // Browse the leg-cabin list and build the virtual class list for
00085     // each cabin.
00086     const stdair::LegDateList_T& lLDList =
00087       stdair::BomManager::getList<stdair::LegDate> (ioFlightDate);
00088     for (stdair::LegDateList_T::const_iterator itLD = lLDList.begin();
00089          itLD != lLDList.end(); ++itLD) {
00090       stdair::LegDate* lLD_ptr = *itLD;
00091       assert (lLD_ptr != NULL);
00092
00093       //
00094       const stdair::LegCabinList_T& lLCList =
00095         stdair::BomManager::getList<stdair::LegCabin> (*lLD_ptr);
00096       for (stdair::LegCabinList_T::const_iterator itLC = lLCList.begin();
00097            itLC != lLCList.end(); ++itLC) {
00098         stdair::LegCabin* lLC_ptr = *itLC;
00099         assert (lLC_ptr != NULL);
00100
00101         // Build the virtual class list.
00102         buildVirtualClassListForLegBasedOptimisation
     (*lLC_ptr);
00103
00104         // Optimise using Monte-Carlo Integration method.
00105         optimalOptimisationByMCIntegration (1
    0000, *lLC_ptr);
00106       }
```

```
00107     }
00108   }
00109
00110   // ////////////////////////////////////////////////////////////////////
00111   void Optimiser::
00112   buildVirtualClassListForLegBasedOptimisation
       (stdair::LegCabin& ioLegCabin) {
00113     // The map holding all virtual classes to be created.
00114     stdair::VirtualClassMap_T lVirtualClassMap;
00115
00116     // Retrieve the segment-cabin
00117     const stdair::SegmentCabinList_T lSegmentCabinList =
00118       stdair::BomManager::getList<stdair::SegmentCabin> (ioLegCabin);
00119     stdair::SegmentCabinList_T::const_iterator itSC = lSegmentCabinList.begin()
      ;
00120     assert (itSC != lSegmentCabinList.end());
00121     const stdair::SegmentCabin* lSegmentCabin_ptr = *itSC;
00122     assert (lSegmentCabin_ptr != NULL);
00123
00124     // Retrieve the class list.
00125     const stdair::BookingClassList_T lBookingClassList =
00126       stdair::BomManager::getList<stdair::BookingClass> (*lSegmentCabin_ptr);
00127
00128     // Generate the demand samples for the booking classes.
00129     for (stdair::BookingClassList_T::const_iterator itBC =
00130            lBookingClassList.begin(); itBC != lBookingClassList.end(); ++itBC)
      {
00131       stdair::BookingClass* lBookingClass_ptr = *itBC;
00132       assert (lBookingClass_ptr != NULL);
00133
00134       const stdair::Yield_T& lYield = lBookingClass_ptr->getYield();
00135       stdair::VirtualClassStruct lVirtualClass (*lBookingClass_ptr);
00136       lVirtualClass.setYield (lYield);
00137       lVirtualClass.setMean (lBookingClass_ptr->getMean());
00138       lVirtualClass.setStdDev (lBookingClass_ptr->getStdDev());
00139
00140       lVirtualClassMap.insert (stdair::VirtualClassMap_T::
00141                                value_type (lYield, lVirtualClass));
00142     }
00143
00144     // Browse the virtual class map from high to low yield.
00145     ioLegCabin.emptyVirtualClassList();
00146     for (stdair::VirtualClassMap_T::reverse_iterator itVC =
00147            lVirtualClassMap.rbegin(); itVC != lVirtualClassMap.rend(); ++itVC)
      {
00148       stdair::VirtualClassStruct& lVC = itVC->second;
00149
00150       ioLegCabin.addVirtualClass (lVC);
00151     }
00152   }
00153
00154   // ////////////////////////////////////////////////////////////////////
00155   double Optimiser::
00156   optimiseUsingOnDForecast (stdair::FlightDate&
      ioFlightDate,
00157                             const bool& iReduceFluctuations) {
00158     double lMaxBPVariation = 0.0;
00159     // Check if the flight date holds a list of leg dates.
00160     // If so, retieve it and optimise the cabins.
00161     if (stdair::BomManager::hasList<stdair::LegDate> (ioFlightDate)) {
00162       STDAIR_LOG_DEBUG ("Optimisation for the flight date: "
00163                         << ioFlightDate.toString());
00164       const stdair::LegDateList_T& lLDList =
00165         stdair::BomManager::getList<stdair::LegDate> (ioFlightDate);
00166       for (stdair::LegDateList_T::const_iterator itLD = lLDList.begin();
00167            itLD != lLDList.end(); ++itLD) {
00168         stdair::LegDate* lLD_ptr = *itLD;
00169         assert (lLD_ptr != NULL);
00170
00171         //
00172         const stdair::LegCabinList_T& lLCList =
00173           stdair::BomManager::getList<stdair::LegCabin> (*lLD_ptr);
00174         for (stdair::LegCabinList_T::const_iterator itLC = lLCList.begin();
00175              itLC != lLCList.end(); ++itLC) {
00176           stdair::LegCabin* lLC_ptr = *itLC;
00177           assert (lLC_ptr != NULL);
00178           MCOptimiser::optimisationByMCIntegration
       (*lLC_ptr);
00179           const stdair::BidPrice_T& lCurrentBidPrice =
00180             lLC_ptr->getCurrentBidPrice();
00181           const stdair::BidPrice_T& lPreviousBidPrice =
00182             lLC_ptr->getPreviousBidPrice();
00183           assert (lPreviousBidPrice != 0);
00184           const double lBPVariation =
00185             std::abs((lCurrentBidPrice - lPreviousBidPrice)/lPreviousBidPrice);
00186           lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
00187         }
```

```
00188       }
00189     }
00190     return lMaxBPVariation;
00191   }
00192
00193 }
```

26.83 rmol/command/Optimiser.hpp File Reference

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

Classes

- class RMOL::Optimiser

Namespaces

- namespace stdair
- namespace RMOL

26.84 Optimiser.hpp

```
00001 #ifndef __RMOL_COMMAND_OPTIMISER_HPP
00002 #define __RMOL_COMMAND_OPTIMISER_HPP
00003
00004 // //////////////////////////////////////////////////////////////////
00005 // Import section
00006 // //////////////////////////////////////////////////////////////////
00007 // RMOL
00008 #include <rmol/RMOL_Types.hpp>
00009
00010 // Forward declarations
00011 namespace stdair {
00012   class FlightDate;
00013   class LegCabin;
00014 }
00015
00016 namespace RMOL {
00018   class Optimiser {
00019   public:
00020
00032     static void optimalOptimisationByMCIntegration
       (const int K,
00033                                                    stdair::LegCabin&);
00034
00038     static void optimalOptimisationByDP (
      stdair::LegCabin&);
00039
00043     static void heuristicOptimisationByEmsr (
      stdair::LegCabin&);
00044
00048     static void heuristicOptimisationByEmsrA (
      stdair::LegCabin&);
00049
00053     static void heuristicOptimisationByEmsrB (
      stdair::LegCabin&);
00054
00058     static void optimise (stdair::FlightDate&);
00059
00063     static void buildVirtualClassListForLegBasedOptimisation
      (stdair::LegCabin&);
00064
00066     static double optimiseUsingOnDForecast (
      stdair::FlightDate&,
00067                                             const bool& iReduceFluctuations =
      false);
00068
00069   };
00070 }
00071 #endif // __RMOL_COMMAND_OPTIMISER_HPP
```

26.85 rmol/config/rmol-paths.hpp File Reference

Macros

- #define PACKAGE "rmol"
- #define PACKAGE_NAME "RMOL"
- #define PACKAGE_VERSION "0.25.3"
- #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-0.25.3"
- #define MANDIR "/usr/share/man"
- #define INFODIR "/usr/share/info"
- #define HTMLDIR "/usr/share/doc/rmol-0.25.3/html"
- #define PDFDIR "/usr/share/doc/rmol-0.25.3/html"
- #define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"

26.85.1 Macro Definition Documentation

26.85.1.1 #define PACKAGE "rmol"

Definition at line 4 of file rmol-paths.hpp.

26.85.1.2 #define PACKAGE_NAME "RMOL"

Definition at line 5 of file rmol-paths.hpp.

Referenced by readConfiguration().

26.85.1.3 #define PACKAGE_VERSION "0.25.3"

Definition at line 6 of file rmol-paths.hpp.

Referenced by readConfiguration().

26.85.1.4 #define PREFIXDIR "/usr"

Definition at line 7 of file rmol-paths.hpp.

Referenced by readConfiguration().

26.85.1.5 #define EXEC_PREFIX "/usr"

Definition at line 8 of file rmol-paths.hpp.

26.85.1.6 #define BINDIR "/usr/bin"

Definition at line 9 of file rmol-paths.hpp.

26.85.1.7 #define LIBDIR "/usr/lib"

Definition at line 10 of file rmol-paths.hpp.

26.85.1.8 #define LIBEXECDIR "/usr/libexec"

Definition at line 11 of file rmol-paths.hpp.

26.85.1.9 #define SBINDIR "/usr/sbin"

Definition at line 12 of file rmol-paths.hpp.

26.85.1.10 #define SYSCONFDIR "/usr/etc"

Definition at line 13 of file rmol-paths.hpp.

26.85.1.11 #define INCLUDEDIR "/usr/include"

Definition at line 14 of file rmol-paths.hpp.

26.85.1.12 #define DATAROOTDIR "/usr/share"

Definition at line 15 of file rmol-paths.hpp.

26.85.1.13 #define DATADIR "/usr/share"

Definition at line 16 of file rmol-paths.hpp.

26.85.1.14 #define DOCDIR "/usr/share/doc/rmol-0.25.3"

Definition at line 17 of file rmol-paths.hpp.

26.85.1.15 #define MANDIR "/usr/share/man"

Definition at line 18 of file rmol-paths.hpp.

26.85.1.16 #define INFODIR "/usr/share/info"

Definition at line 19 of file rmol-paths.hpp.

26.85.1.17 #define HTMLDIR "/usr/share/doc/rmol-0.25.3/html"

Definition at line 20 of file rmol-paths.hpp.

26.85.1.18 #define PDFDIR "/usr/share/doc/rmol-0.25.3/html"

Definition at line 21 of file rmol-paths.hpp.

26.85.1.19 #define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"

Definition at line 22 of file rmol-paths.hpp.

26.86 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 "0.25.3"
00007 #define PREFIXDIR "/usr"
00008 #define EXEC_PREFIX "/usr"
00009 #define BINDIR "/usr/bin"
00010 #define LIBDIR "/usr/lib"
00011 #define LIBEXECDIR "/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-0.25.3"
00018 #define MANDIR "/usr/share/man"
00019 #define INFODIR "/usr/share/info"
00020 #define HTMLDIR "/usr/share/doc/rmol-0.25.3/html"
00021 #define PDFDIR "/usr/share/doc/rmol-0.25.3/html"
00022 #define STDAIR_SAMPLE_DIR "/usr/share/stdair/samples"
00023
00024 #endif // __RMOL_PATHS_HPP__
```

26.87 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

26.88 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     _instance = NULL;
00019   }
00020
00021   // ////////////////////////////////////////////////////////////////////
00022   FacRmolServiceContext& FacRmolServiceContext::instance
      () {
00023
00024     if (_instance == NULL) {
00025       _instance = new FacRmolServiceContext();
00026       assert (_instance != NULL);
00027
00028       stdair::FacSupervisor::instance().
      registerServiceFactory (_instance);
00029     }
00030     return *_instance;
00031   }
00032
00033   // ////////////////////////////////////////////////////////////////////
00034   RMOL_ServiceContext& FacRmolServiceContext::create
      () {
00035     RMOL_ServiceContext* aServiceContext_ptr = NULL;
00036
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
00043     return *aServiceContext_ptr;
00044   }
00045
00046 }
```

26.89 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

26.90 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
```

26.91 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/ForecastingMethod.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

26.92 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/ForecastingMethod.hpp>
00015 #include <stdair/basic/PartnershipTechnique.hpp>
00016 // RMOL
00017 #include <rmol/RMOL_Types.hpp>
00018
00020 namespace stdair {
00021   class FlightDate;
00022   struct BasLogParams;
00023   struct BasDBParams;
00024   class BomRoot;
00025   class AirlineClassList;
00026   class YieldFeatures;
00027   class Inventory;
00028   class OnDDate;
00029 }
00030
00031 namespace RMOL {
00032
00034   class RMOL_ServiceContext;
00035
00039   class RMOL_Service {
00040   public:
00041     // ////////// Constructors and destructors /////////
00057     RMOL_Service (const stdair::BasLogParams&, const
      stdair::BasDBParams&);
00058
00070     RMOL_Service (const stdair::BasLogParams&);
00071
00087     RMOL_Service (stdair::STDAIR_ServicePtr_T);
00088
00112     void parseAndLoad (const stdair::CabinCapacity_T&
      iCabinCapacity,
00113                        const stdair::Filename_T& iDemandAndClassDataFile);
00114
00118     void setUpStudyStatManager();
00119
00123     ~RMOL_Service();
00124
00125
00126   public:
00127     // ///////////////// Business Methods /////////////////
00133     void buildSampleBom();
00134
00138     void optimalOptimisationByMCIntegration (
      const int K);
00139
00143     void optimalOptimisationByDP();
00144
00148     void heuristicOptimisationByEmsr();
00149
00153     void heuristicOptimisationByEmsrA();
00154
00158     void heuristicOptimisationByEmsrB();
00159
```

```
00163     bool optimise (stdair::FlightDate&, const stdair::DateTime_T&,
00164                    const stdair::ForecastingMethod&, const
      stdair::PartnershipTechnique&);
00165
00170     // O&D based forecast
00171     void forecastOnD (const stdair::DateTime_T&);
00172
00173     stdair::YieldFeatures* getYieldFeatures(const
      stdair::OnDDate&, const stdair::CabinCode_T&,
00174                                             stdair::BomRoot&);
00175
00176     void forecastOnD (const stdair::YieldFeatures&, stdair::OnDDate&
      ,
00177                       const stdair::CabinCode_T&, const stdair::DTD_T&,
00178                       stdair::BomRoot&);
00179
00180     void setOnDForecast (const stdair::AirlineClassList&, const
      stdair::MeanValue_T&,
00181                          const stdair::StdDevValue_T&, stdair::OnDDate&, const
      stdair::CabinCode_T&,
00182                          stdair::BomRoot&);
00183
00184     // Single segment O&D
00185     void setOnDForecast (const stdair::AirlineCode_T&, const
      stdair::Date_T&, const stdair::AirportCode_T&,
00186                          const stdair::AirportCode_T&, const
      stdair::CabinCode_T&, const stdair::ClassCode_T&,
00187                          const stdair::MeanValue_T&, const
      stdair::StdDevValue_T&, const stdair::Yield_T&, stdair::BomRoot&);
00188
00189     // Multiple segment O&D
00190     void setOnDForecast (const stdair::AirlineCodeList_T&, const
      stdair::AirlineCode_T&,const stdair::Date_T&,
00191                          const stdair::AirportCode_T&, const
      stdair::AirportCode_T&, const stdair::CabinCode_T&,
00192                          const stdair::ClassCodeList_T&, const
      stdair::MeanValue_T&, const stdair::StdDevValue_T&,
00193                          const stdair::Yield_T&, stdair::BomRoot&);
00194
00195     // Initialise (or re-initialise) the demand projections in all leg cabins
00196     void resetDemandInformation (const stdair::DateTime_T
      &);
00197
00198     void resetDemandInformation (const stdair::DateTime_T
      &, const stdair::Inventory&);
00199
00200     /* Projection of demand */
00201
00202     // Aggregated demand at booking class level.
00203     void projectAggregatedDemandOnLegCabins(
      const stdair::DateTime_T&);
00204
00205     // Static rule prorated yield
00206     void projectOnDDemandOnLegCabinsUsingYP(
      const stdair::DateTime_T&);
00207
00208     // Displacement-adjusted yield
00209     void projectOnDDemandOnLegCabinsUsingDA(
      const stdair::DateTime_T&);
00210
00211     // Dynamic yield proration (PF = BP_i/BP_{total}, where BP_{total} =
       sum(BP_i))
00212     void projectOnDDemandOnLegCabinsUsingDYP
      (const stdair::DateTime_T&);
00213
00214     void projectOnDDemandOnLegCabinsUsingDYP
      (const stdair::DateTime_T&, const stdair::Inventory&);
00215
00217     // O&D-based optimisation (using demand aggregation or demand aggregation).
00218     void optimiseOnD (const stdair::DateTime_T&);
00219
00220     // O&D-based optimisation using displacement-adjusted yield.
00221     void optimiseOnDUsingRMCooperation (const
      stdair::DateTime_T&);
00222
00223     // Advanced version of O&D-based optimisation using displacement-adjusted
       yield.
00224     // Network optimisation instead of separate inventory optimisation.
00225     void optimiseOnDUsingAdvancedRMCooperation
       (const stdair::DateTime_T&);
00226
00227     // Update bid priceand send to partners
00228     void updateBidPrice (const stdair::DateTime_T&);
00229     void updateBidPrice (const stdair::FlightDate&,
      stdair::BomRoot&);
00230
00231   public:
```

```
00232     // ///////////////// Export support methods /////////////////
00243     std::string jsonExport (const stdair::AirlineCode_T&,
00244                             const stdair::FlightNumber_T&,
00245                             const stdair::Date_T& iDepartureDate) const;
00246
00247
00248   public:
00249     // ///////////////// Display support methods /////////////////
00257     std::string csvDisplay() const;
00258
00259
00260   private:
00261     // /////// Construction and Destruction helper methods ///////
00265     RMOL_Service();
00266
00270     RMOL_Service (const RMOL_Service&);
00271
00281     stdair::STDAIR_ServicePtr_T initStdAirService (const stdair::BasLogParams&,
00282                                                    const stdair::BasDBParams&);
00283
00292     stdair::STDAIR_ServicePtr_T initStdAirService (const stdair::BasLogParams&)
    ;
00293
00302     void addStdAirService (stdair::STDAIR_ServicePtr_T,
00303                            const bool iOwnStdairService);
00304
00309     void initServiceContext();
00310
00317     void initRmolService();
00318
00322     void finalise();
00323
00324
00325   private:
00326     // ////////// Service Context //////////
00330     RMOL_ServiceContext* _rmolServiceContext;
00331
00333     stdair::Date_T _previousForecastDate;
00334   };
00335 }
00336 #endif // __RMOL_SVC_RMOL_SERVICE_HPP
```

26.93 rmol/RMOL_Types.hpp File Reference

```
#include <map>
#include <vector>
#include <boost/shared_ptr.hpp>
#include <stdair/stdair_inventory_types.hpp>
#include <stdair/stdair_exceptions.hpp>
```

Classes

- class RMOL::OverbookingException

  Overbooking-related exception.
- class RMOL::UnconstrainingException

  Unconstraining-related exception.
- class RMOL::ForecastException

  Forecast-related exception.
- class RMOL::OptimisationException

  Optimisation-related exception.

Namespaces

- namespace stdair
- namespace RMOL

Typedefs

- typedef boost::shared_ptr < RMOL_Service > RMOL::RMOL_ServicePtr_T
- typedef std::vector < stdair::NbOfRequests_T > RMOL::UnconstrainedDemandVector_T
- typedef std::vector < stdair::NbOfBookings_T > RMOL::BookingVector_T
- typedef std::vector < stdair::Flag_T > RMOL::FlagVector_T
- typedef std::map < stdair::BookingClass *, UnconstrainedDemandVector_T > RMOL::BookingClassUnconstrainedDemandVectorMap_T
- typedef std::map < stdair::BookingClass *, stdair::NbOfRequests_T > RMOL::BookingClassUnconstrainedDemandMap_T
- typedef std::map< const stdair::DTD_T, double > RMOL::FRAT5Curve_T

26.94 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_exceptions.hpp>
00015
00016 // Forward declarations.
00017 namespace stdair {
00018   class BookingClass;
00019 }
00020
00021
00022 namespace RMOL {
00023
00024   // Forward declarations
00025   class RMOL_Service;
00026
00027   // ///////// Exceptions //////////
00031   class OverbookingException : public stdair::RootException
      {
00032   public:
00034     OverbookingException (const std::string& iWhat)
00035       : stdair::RootException (iWhat) {}
00036   };
00037
00041   class UnconstrainingException : public
      stdair::RootException {
00042   public:
00044     UnconstrainingException (const std::string& iWhat)
00045       : stdair::RootException (iWhat) {}
00046   };
00047
00051   class ForecastException : public stdair::RootException {
00052   public:
00054     ForecastException (const std::string& iWhat)
00055       : stdair::RootException (iWhat) {}
00056   };
00057
00061   class OptimisationException : public
      stdair::RootException {
00062   public:
00064     OptimisationException (const std::string& iWhat)
00065       : stdair::RootException (iWhat) {}
00066   };
00067
```

```
00068
00069   // //////// Type definitions /////////
00073   typedef boost::shared_ptr<RMOL_Service> RMOL_ServicePtr_T;
00074
00076   typedef std::vector<stdair::NbOfRequests_T> UnconstrainedDemandVector_T
      ;
00077
00079   typedef std::vector<stdair::NbOfBookings_T> BookingVector_T;
00080
00082   typedef std::vector<stdair::Flag_T> FlagVector_T;
00083
00086   typedef std::map<stdair::BookingClass*, UnconstrainedDemandVector_T>
      BookingClassUnconstrainedDemandVectorMap_T
      ;
00087
00090   typedef std::map<stdair::BookingClass*, stdair::NbOfRequests_T>
      BookingClassUnconstrainedDemandMap_T;
00091
00093   typedef std::map<const stdair::DTD_T, double> FRAT5Curve_T;
00094
00095 }
00096 #endif // __RMOL_RMOL_TYPES_HPP
```

26.95 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/Forecaster.hpp>
#include <rmol/service/RMOL_ServiceContext.hpp>
#include <rmol/RMOL_Service.hpp>
```

Namespaces

- namespace RMOL

26.96 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 #include <rmol/factory/FacRmolServiceContext.hpp
      >
00040 #include <rmol/command/InventoryParser.hpp>
00041 #include <rmol/command/Optimiser.hpp>
00042 #include <rmol/command/Forecaster.hpp>
00043 #include <rmol/service/RMOL_ServiceContext.hpp
      >
00044 #include <rmol/RMOL_Service.hpp>
00045
00046 namespace RMOL {
00047
00048   // //////////////////////////////////////////////////////////////////////
00049   RMOL_Service::RMOL_Service()
00050   : _rmolServiceContext (NULL),
00051     _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00052     assert (false);
00053   }
00054
00055   // //////////////////////////////////////////////////////////////////////
00056   RMOL_Service::RMOL_Service (const RMOL_Service& iService) :
00057     _rmolServiceContext (NULL),
00058     _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00059     assert (false);
00060   }
00061
00062   // //////////////////////////////////////////////////////////////////////
00063   RMOL_Service::RMOL_Service (const stdair::BasLogParams& iLogParams) :
00064     _rmolServiceContext (NULL),
00065     _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00066
00067     // Initialise the STDAIR service handler
00068     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00069       initStdAirService (iLogParams);
00070
00071     // Initialise the service context
00072     initServiceContext();
00073
00074     // Add the StdAir service context to the RMOL service context
```

```
00075     // \note RMOL owns the STDAIR service resources here.
00076     const bool ownStdairService = true;
00077     addStdAirService (lSTDAIR_Service_ptr, ownStdairService);
00078
00079     // Initialise the (remaining of the) context
00080     initRmolService();
00081   }
00082
00083   // //////////////////////////////////////////////////////////////////
00084   RMOL_Service::RMOL_Service (const stdair::BasLogParams& iLogParams,
00085                               const stdair::BasDBParams& iDBParams) :
00086     _rmolServiceContext (NULL),
00087     _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00088
00089     // Initialise the STDAIR service handler
00090     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00091       initStdAirService (iLogParams, iDBParams);
00092
00093     // Initialise the service context
00094     initServiceContext();
00095
00096     // Add the StdAir service context to the RMOL service context
00097     // \note RMOL owns the STDAIR service resources here.
00098     const bool ownStdairService = true;
00099     addStdAirService (lSTDAIR_Service_ptr, ownStdairService);
00100
00101     // Initialise the (remaining of the) context
00102     initRmolService();
00103   }
00104
00105   // //////////////////////////////////////////////////////////////////
00106   RMOL_Service::RMOL_Service (stdair::STDAIR_ServicePtr_T ioSTDAIRServicePtr)
00107     : _rmolServiceContext (NULL),
00108       _previousForecastDate (stdair::Date_T (2000, 1, 1)) {
00109
00110     // Initialise the context
00111     initServiceContext();
00112
00113     // Add the StdAir service context to the RMOL service context.
00114     // \note RMOL does not own the STDAIR service resources here.
00115     const bool doesNotOwnStdairService = false;
00116     addStdAirService (ioSTDAIRServicePtr, doesNotOwnStdairService);
00117
00118     // Initialise the (remaining of the) context
00119     initRmolService();
00120   }
00121
00122   // //////////////////////////////////////////////////////////////////
00123   RMOL_Service::~RMOL_Service() {
00124     // Delete/Clean all the objects from memory
00125     finalise();
00126   }
00127
00128   // //////////////////////////////////////////////////////////////////
00129   void RMOL_Service::finalise() {
00130     assert (_rmolServiceContext != NULL);
00131     // Reset the (Boost.)Smart pointer pointing on the STDAIR_Service object.
00132     _rmolServiceContext->reset();
00133   }
00134
00135   // //////////////////////////////////////////////////////////////////
00136   void RMOL_Service::initServiceContext() {
00137     // Initialise the service context
00138     RMOL_ServiceContext& lRMOL_ServiceContext =
00139       FacRmolServiceContext::instance().create
      ();
00140     _rmolServiceContext = &lRMOL_ServiceContext;
00141   }
00142
00143   // //////////////////////////////////////////////////////////////////
00144   void RMOL_Service::
00145   addStdAirService (stdair::STDAIR_ServicePtr_T ioSTDAIR_Service_ptr,
00146                     const bool iOwnStdairService) {
00147
00148     // Retrieve the RMOL service context
00149     assert (_rmolServiceContext != NULL);
00150     RMOL_ServiceContext& lRMOL_ServiceContext = *_rmolServiceContext;
00151
00152     // Store the STDAIR service object within the (AIRINV) service context
00153     lRMOL_ServiceContext.setSTDAIR_Service (ioSTDAIR_Service_ptr,
00154                                             iOwnStdairService);
00155   }
00156
00157   // //////////////////////////////////////////////////////////////////
00158   stdair::STDAIR_ServicePtr_T RMOL_Service::
00159   initStdAirService (const stdair::BasLogParams& iLogParams) {
00160
```

```
00168     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00169       boost::make_shared<stdair::STDAIR_Service> (iLogParams);
00170
00171     return lSTDAIR_Service_ptr;
00172   }
00173
00174   // ////////////////////////////////////////////////////////////////////
00175   stdair::STDAIR_ServicePtr_T RMOL_Service::
00176   initStdAirService (const stdair::BasLogParams& iLogParams,
00177                      const stdair::BasDBParams& iDBParams) {
00178
00186     stdair::STDAIR_ServicePtr_T lSTDAIR_Service_ptr =
00187       boost::make_shared<stdair::STDAIR_Service> (iLogParams, iDBParams);
00188
00189     return lSTDAIR_Service_ptr;
00190   }
00191
00192   // ////////////////////////////////////////////////////////////////////
00193   void RMOL_Service::initRmolService() {
00194     // Do nothing at this stage. A sample BOM tree may be built by
00195     // calling the buildSampleBom() method
00196   }
00197
00198   // ////////////////////////////////////////////////////////////////////
00199   void RMOL_Service::
00200   parseAndLoad (const stdair::CabinCapacity_T& iCabinCapacity,
00201                 const stdair::Filename_T& iInputFileName) {
00202
00203     // Retrieve the RMOL service context
00204     if (_rmolServiceContext == NULL) {
00205       throw stdair::NonInitialisedServiceException ("The RMOL service has not"
00206                                                     " been initialised");
00207     }
00208     assert (_rmolServiceContext != NULL);
00209     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00210
00211     // Retrieve the StdAir service object from the (RMOL) service context
00212     stdair::STDAIR_Service& lSTDAIR_Service =
00213       lRMOL_ServiceContext.getSTDAIR_Service();
00214     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00215
00216     // Build a dummy inventory with a leg-cabin which has the given capacity.
00217     lSTDAIR_Service.buildDummyInventory (iCabinCapacity);
00218
00219     // Complete the BOM tree with the optimisation problem specification
00220     InventoryParser::parseInputFileAndBuildBom
       (iInputFileName, lBomRoot);
00221   }
00222
00223   // ////////////////////////////////////////////////////////////////////
00224   void RMOL_Service::buildSampleBom() {
00225
00226     // Retrieve the RMOL service context
00227     if (_rmolServiceContext == NULL) {
00228       throw stdair::NonInitialisedServiceException ("The RMOL service has not"
00229                                                     " been initialised");
00230     }
00231     assert (_rmolServiceContext != NULL);
00232
00233     // Retrieve the RMOL service context and whether it owns the Stdair
00234     // service
00235     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00236     const bool doesOwnStdairService =
00237       lRMOL_ServiceContext.getOwnStdairServiceFlag();
00238
00239     // Retrieve the StdAir service object from the (RMOL) service context
00240     stdair::STDAIR_Service& lSTDAIR_Service =
00241       lRMOL_ServiceContext.getSTDAIR_Service();
00242
00247     if (doesOwnStdairService == true) {
00248       //
00249       lSTDAIR_Service.buildSampleBom();
00250     }
00251
00269   }
00270
00271   // ////////////////////////////////////////////////////////////////////
00272   void RMOL_Service::optimalOptimisationByMCIntegration
       (const int K) {
00273     assert (_rmolServiceContext != NULL);
00274     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00275
00276     // Retrieve the StdAir service
00277     stdair::STDAIR_Service& lSTDAIR_Service =
```

```
00278       lRMOL_ServiceContext.getSTDAIR_Service();
00279     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00280
00281     //
00282     stdair::LegCabin& lLegCabin =
00283       stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00284
00285     stdair::BasChronometer lOptimisationChronometer;
00286     lOptimisationChronometer.start();
00287
00288     Optimiser::optimalOptimisationByMCIntegration
      (K, lLegCabin);
00289
00290     const double lOptimisationMeasure = lOptimisationChronometer.elapsed();
00291
00292     // DEBUG
00293     STDAIR_LOG_DEBUG ("Optimisation by Monte-Carlo performed in "
00294                       << lOptimisationMeasure);
00295     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00296
00297     std::ostringstream logStream;
00298     stdair::BidPriceVector_T lBidPriceVector = lLegCabin.getBidPriceVector();
00299     logStream << "Bid-Price Vector (BPV): ";
00300     unsigned int size = lBidPriceVector.size();
00301
00302     for (unsigned int i = 0; i < size - 1; ++i) {
00303       const double bidPrice = lBidPriceVector.at(i);
00304       logStream << std::fixed << std::setprecision (2) << bidPrice << ", ";
00305     }
00306     const double bidPrice = lBidPriceVector.at(size -1);
00307     logStream << std::fixed << std::setprecision (2) << bidPrice;
00308     STDAIR_LOG_DEBUG (logStream.str());
00309   }
00310
00311   // ////////////////////////////////////////////////////////////////////
00312   void RMOL_Service::optimalOptimisationByDP
      () {
00313   }
00314
00315   // ////////////////////////////////////////////////////////////////////
00316   void RMOL_Service::heuristicOptimisationByEmsr
      () {
00317     assert (_rmolServiceContext != NULL);
00318     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00319
00320     // Retrieve the StdAir service
00321     stdair::STDAIR_Service& lSTDAIR_Service =
00322       lRMOL_ServiceContext.getSTDAIR_Service();
00323     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00324
00325     //
00326     stdair::LegCabin& lLegCabin =
00327       stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00328
00329     stdair::BasChronometer lOptimisationChronometer;
00330     lOptimisationChronometer.start();
00331
00332     Optimiser::heuristicOptimisationByEmsr
      (lLegCabin);
00333
00334     const double lOptimisationMeasure = lOptimisationChronometer.elapsed();
00335     // DEBUG
00336     STDAIR_LOG_DEBUG ("Optimisation EMSR performed in "
00337                       << lOptimisationMeasure);
00338     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00339
00340     stdair::BidPriceVector_T lBidPriceVector = lLegCabin.getBidPriceVector();
00341     std::ostringstream logStream;
00342     logStream << "Bid-Price Vector (BPV): ";
00343     unsigned int idx = 0;
00344     for (stdair::BidPriceVector_T::const_iterator itBP = lBidPriceVector.begin(
      );
00345          itBP != lBidPriceVector.end(); ++itBP) {
00346       if (idx != 0) {
00347         logStream << ", ";
00348       }
00349       const stdair::BidPrice_T& lBidPrice = *itBP;
00350       logStream << std::fixed << std::setprecision (2) << lBidPrice;
00351     }
00352     // DEBUG
00353     STDAIR_LOG_DEBUG (logStream.str());
00354   }
00355
00356   // ////////////////////////////////////////////////////////////////////
00357   void RMOL_Service::heuristicOptimisationByEmsrA
      () {
```

```
00358     assert (_rmolServiceContext != NULL);
00359     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00360
00361     // Retrieve the StdAir service
00362     stdair::STDAIR_Service& lSTDAIR_Service =
00363       lRMOL_ServiceContext.getSTDAIR_Service();
00364     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00365
00366     //
00367     stdair::LegCabin& lLegCabin =
00368       stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00369
00370     Optimiser::heuristicOptimisationByEmsrA
       (lLegCabin);
00371
00372     // DEBUG
00373     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00374
00375   }
00376
00377   // ////////////////////////////////////////////////////////////////////
00378   void RMOL_Service::heuristicOptimisationByEmsrB
       () {
00379     assert (_rmolServiceContext != NULL);
00380     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00381
00382     // Retrieve the StdAir service
00383     stdair::STDAIR_Service& lSTDAIR_Service =
00384       lRMOL_ServiceContext.getSTDAIR_Service();
00385     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00386
00387     //
00388     stdair::LegCabin& lLegCabin =
00389       stdair::BomRetriever::retrieveDummyLegCabin (lBomRoot);
00390
00391     Optimiser::heuristicOptimisationByEmsrB
       (lLegCabin);
00392
00393     // DEBUG
00394     STDAIR_LOG_DEBUG ("Result: " << lLegCabin.displayVirtualClassList());
00395   }
00396
00397   // ////////////////////////////////////////////////////////////////////
00398   bool RMOL_Service::
00399   optimise (stdair::FlightDate& ioFlightDate,
00400             const stdair::DateTime_T& iRMEventTime,
00401             const stdair::ForecastingMethod& iForecastingMethod,
00402             const stdair::PartnershipTechnique& iPartnershipTechnique) {
00403
00404
00405     STDAIR_LOG_DEBUG ("Forecast & Optimisation");
00406
00407     const stdair::PartnershipTechnique::EN_PartnershipTechnique&
      lPartnershipTechnique =
00408       iPartnershipTechnique.getTechnique();
00409
00410     switch (lPartnershipTechnique) {
00411     case stdair::PartnershipTechnique::RAE_DA:
00412     case stdair::PartnershipTechnique::IBP_DA:{
00413       if (_previousForecastDate < iRMEventTime.date()) {
00414         forecastOnD (iRMEventTime);
00415         resetDemandInformation (iRMEventTime);
00416         projectAggregatedDemandOnLegCabins (
      iRMEventTime);
00417         optimiseOnD (iRMEventTime);
00418       }
00419       break;
00420     }
00421     case stdair::PartnershipTechnique::RAE_YP:
00422     case stdair::PartnershipTechnique::IBP_YP:
00423     case stdair::PartnershipTechnique::IBP_YP_U:{
00424       if (_previousForecastDate < iRMEventTime.date()) {
00425         forecastOnD (iRMEventTime);
00426         resetDemandInformation (iRMEventTime);
00427         projectOnDDemandOnLegCabinsUsingYP (
      iRMEventTime);
00428         optimiseOnD (iRMEventTime);
00429       }
00430       break;
00431     }
00432     case stdair::PartnershipTechnique::RMC:{
00433       if (_previousForecastDate < iRMEventTime.date()) {
00434         forecastOnD (iRMEventTime);
00435         resetDemandInformation (iRMEventTime);
00436         updateBidPrice (iRMEventTime);
```

```
00437         projectOnDDemandOnLegCabinsUsingDYP
      (iRMEventTime);
00438         optimiseOnDUsingRMCooperation (
      iRMEventTime);
00439       }
00440       break;
00441     }
00442     case stdair::PartnershipTechnique::A_RMC:{
00443       if (_previousForecastDate < iRMEventTime.date()) {
00444         forecastOnD (iRMEventTime);
00445         resetDemandInformation (iRMEventTime);
00446         updateBidPrice (iRMEventTime);
00447         projectOnDDemandOnLegCabinsUsingDYP
      (iRMEventTime);
00448         optimiseOnDUsingAdvancedRMCooperation
       (iRMEventTime);
00449       }
00450       break;
00451     }
00452     case stdair::PartnershipTechnique::NONE:{
00453       // DEBUG
00454       STDAIR_LOG_DEBUG ("Forecast");
00455
00456       // 1. Forecast
00457       bool isForecasted = false;
00458       const stdair::ForecastingMethod::EN_ForecastingMethod& lForecastingMethod
      =
00459         iForecastingMethod.getMethod();
00460       switch (lForecastingMethod) {
00461       case stdair::ForecastingMethod::ADD_PK: {
00462         isForecasted = Forecaster::forecastUsingAdditivePickUp
       (ioFlightDate,
00463                                                                 iRMEventTime);
00464         break;
00465       }
00466       case stdair::ForecastingMethod::MUL_PK: {
00467         isForecasted =
00468           Forecaster::forecastUsingMultiplicativePickUp
       (ioFlightDate,
00469                                                       iRMEventTime);
00470         break;
00471       }
00472       default: {
00473         assert (false);
00474         break;
00475       }
00476       }
00477
00478       // DEBUG
00479       STDAIR_LOG_DEBUG ("Forecast successful: " << isForecasted);
00480
00481       // 2. Optimisation
00482       if (isForecasted == true) {
00483         // DEBUG
00484         STDAIR_LOG_DEBUG ("Optimise");
00485
00486         Optimiser::optimise (ioFlightDate);
00487         return true;
00488       }
00489       break;
00490     }
00491     default:{
00492       assert (false);
00493       break;
00494     }
00495     }
00496     return false;
00497   }
00498
00499   // ////////////////////////////////////////////////////////////////////
00500   void RMOL_Service::forecastOnD (const
      stdair::DateTime_T& iRMEventTime) {
00501
00502     if (_rmolServiceContext == NULL) {
00503       throw stdair::NonInitialisedServiceException ("The Rmol service "
00504                                                     "has not been initialised")
      ;
00505     }
00506     assert (_rmolServiceContext != NULL);
00507     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
00508
00509     // Retrieve the bom root
00510     stdair::STDAIR_Service& lSTDAIR_Service =
00511       lRMOL_ServiceContext.getSTDAIR_Service();
00512     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
00513
```

```
00514     // Retrieve the date from the RM event
00515     const stdair::Date_T lDate = iRMEventTime.date();
00516
00517     _previousForecastDate = lDate;
00518
00519     const stdair::InventoryList_T& lInventoryList =
00520       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
00521     assert (!lInventoryList.empty());
00522     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
      ;
00523          itInv != lInventoryList.end(); ++itInv) {
00524       const stdair::Inventory* lInventory_ptr = *itInv;
00525       assert (lInventory_ptr != NULL);
00526       if (stdair::BomManager::hasList<stdair::OnDDate> (*lInventory_ptr)) {
00527         const stdair::OnDDateList_T lOnDDateList =
00528         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
00529
00530         for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
00531              itOD != lOnDDateList.end(); ++itOD) {
00532           stdair::OnDDate* lOnDDate_ptr = *itOD;
00533           assert (lOnDDate_ptr != NULL);
00534
00535           const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
00536           stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
00537           stdair::DTD_T lDTD = short (lDateOffset.days());
00538
00539           stdair::DCPList_T::const_iterator itDCP =
00540             std::find (stdair::DEFAULT_DCP_LIST.begin()
      ,
00541                        stdair::DEFAULT_DCP_LIST.end(),
      lDTD);
00542           // Check if the forecast for this O&D date needs to be forecasted.
00543           if (itDCP != stdair::DEFAULT_DCP_LIST.end())
      {
00544             // Retrieve the total forecast map.
00545             const stdair::CabinForecastMap_T& lTotalForecastMap =
00546               lOnDDate_ptr->getTotalForecastMap();
00547
00548             // Browse the map and make a forecast for every cabin.
00549             for (stdair::CabinForecastMap_T::const_iterator itCF =
00550                    lTotalForecastMap.begin();
00551                  itCF != lTotalForecastMap.end(); ++itCF) {
00552               const stdair::CabinCode_T lCabinCode = itCF->first;
00553               stdair::YieldFeatures* lYieldFeatures_ptr =
00554                 getYieldFeatures(*lOnDDate_ptr, lCabinCode,
      lBomRoot);
00555               if (lYieldFeatures_ptr == NULL) {
00556                 STDAIR_LOG_ERROR ("Cannot find yield corresponding to "
00557                                   << "the O&D date"
00558                                   << lOnDDate_ptr->toString()
00559                                   << " Cabin " << lCabinCode);
00560                 assert (false);
00561               }
00562               forecastOnD (*lYieldFeatures_ptr, *lOnDDate_ptr,
      lCabinCode, lDTD,
00563                            lBomRoot);
00564             }
00565           }
00566         }
00567       }
00568     }
00569   }
00570
00571   // ////////////////////////////////////////////////////////////////////
00572   stdair::YieldFeatures* RMOL_Service::
00573   getYieldFeatures(const stdair::OnDDate& iOnDDate,
00574                    const stdair::CabinCode_T& iCabinCode,
00575                    stdair::BomRoot& iBomRoot) {
00576
00577     const stdair::AirportCode_T& lOrigin = iOnDDate.getOrigin();
00578     const stdair::AirportCode_T& lDestination = iOnDDate.getDestination();
00579
00580     const stdair::Date_T& lDepartureDate = iOnDDate.getDate();
00581
00582     // Build the airport pair key out of O&D and get the airport pair object
00583     const stdair::AirportPairKey lAirportPairKey(lOrigin, lDestination);
00584     stdair::AirportPair* lAirportPair_ptr = stdair::BomManager::
00585       getObjectPtr<stdair::AirportPair> (iBomRoot,
00586                                          lAirportPairKey.toString());
00587     if (lAirportPair_ptr == NULL) {
00588       STDAIR_LOG_ERROR ("Cannot find yield corresponding to the airport "
00589                         << "pair: " << lAirportPairKey.toString());
00590       assert (false);
00591     }
00592
00593     // Retrieve the corresponding date period to lDepartureDate.
00594     const stdair::DatePeriodList_T lDatePeriodList =
```

```
00595       stdair::BomManager::getList<stdair::DatePeriod> (*lAirportPair_ptr);
00596     for (stdair::DatePeriodList_T::const_iterator itDatePeriod =
00597            lDatePeriodList.begin();
00598          itDatePeriod != lDatePeriodList.end(); ++itDatePeriod) {
00599       const stdair::DatePeriod* lDatePeriod_ptr = *itDatePeriod;
00600       assert (lDatePeriod_ptr != NULL);
00601
00602       const bool isDepartureDateValid =
00603         lDatePeriod_ptr->isDepartureDateValid (lDepartureDate);
00604
00605       if (isDepartureDateValid == true) {
00606         // Retrieve the PoS-Channel.
00607         // TODO: Use POS and Channel from demand instead of default
00608         const stdair::PosChannelKey lPosChannelKey (stdair::DEFAULT_POS,
00609                                                     stdair::DEFAULT_CHANNEL);
00610         stdair::PosChannel* lPosChannel_ptr = stdair::BomManager::
00611           getObjectPtr<stdair::PosChannel> (*lDatePeriod_ptr,
00612                                             lPosChannelKey.toString());
00613         if (lPosChannel_ptr == NULL) {
00614           STDAIR_LOG_ERROR ("Cannot find yield corresponding to the PoS-"
00615                             << "Channel: " << lPosChannelKey.toString());
00616           assert (false);
00617         }
00618         // Retrieve the yield features.
00619         const stdair::TimePeriodList_T lTimePeriodList = stdair::
00620           BomManager::getList<stdair::TimePeriod> (*lPosChannel_ptr);
00621         for (stdair::TimePeriodList_T::const_iterator itTimePeriod =
00622                lTimePeriodList.begin();
00623              itTimePeriod != lTimePeriodList.end(); ++itTimePeriod) {
00624           const stdair::TimePeriod* lTimePeriod_ptr = *itTimePeriod;
00625           assert (lTimePeriod_ptr != NULL);
00626
00627           // TODO: Use trip type from demand instead of default value.
00628           const stdair::YieldFeaturesKey lYieldFeaturesKey (
      stdair::TRIP_TYPE_ONE_WAY,
00629                                                             iCabinCode);
00630           stdair::YieldFeatures* oYieldFeatures_ptr = stdair::BomManager::
00631             getObjectPtr<stdair::YieldFeatures>(*lTimePeriod_ptr,
00632                                                 lYieldFeaturesKey.toString());
00633           if (oYieldFeatures_ptr != NULL) {
00634             return oYieldFeatures_ptr;
00635           }
00636         }
00637       }
00638     }
00639     return NULL;
00640
00641   }
00642
00643
00644   // ////////////////////////////////////////////////////////////////////
00645   void RMOL_Service::
00646   forecastOnD (const stdair::YieldFeatures& iYieldFeatures,
00647                stdair::OnDDate& iOnDDate,
00648                const stdair::CabinCode_T& iCabinCode,
00649                const stdair::DTD_T& iDTD,
00650                stdair::BomRoot& iBomRoot) {
00651
00652     const stdair::AirlineClassListList_T lAirlineClassListList =
00653       stdair::BomManager::getList<stdair::AirlineClassList> (iYieldFeatures);
00654     assert (lAirlineClassListList.begin() != lAirlineClassListList.end());
00655
00656     // Yield order check
00657     stdair::AirlineClassListList_T::const_iterator  itACL =
00658       lAirlineClassListList.begin();
00659     stdair::Yield_T lPreviousYield((*itACL)->getYield());
00660     ++itACL;
00661     for (; itACL != lAirlineClassListList.end(); ++itACL) {
00662       const stdair::AirlineClassList* lAirlineClassList = *itACL;
00663       const stdair::Yield_T& lYield = lAirlineClassList->getYield();
00664       if (lYield <= lPreviousYield) {
00665         lPreviousYield = lYield;
00666       }
00667       else{
00668         STDAIR_LOG_ERROR ("Yields should be given in a descendant order"
00669                           << " in the yield input file") ;
00670         assert (false);
00671       }
00672     }
00673     // Proportion factor list initialisation
00674     // Each element corresponds to a yield rule
00675     stdair::ProportionFactorList_T lProportionFactorList;
00676     stdair::ProportionFactor_T lPreviousProportionFactor = 0;
00677
00678     // Retrieve the minimal willingness to pay associated to the demand
00679     const stdair::WTPDemandPair_T& lTotalForecast =
00680       iOnDDate.getTotalForecast (iCabinCode);
```

```
00681     const stdair::WTP_T& lMinWTP = lTotalForecast.first;
00682
00683     // Retrieve the remaining percentage of booking requests
00684     const stdair::ContinuousAttributeLite<stdair::FloatDuration_T>
00685       lArrivalPattern (stdair::DEFAULT_DTD_PROB_MAP);
00686
00687     STDAIR_LOG_DEBUG (lArrivalPattern.displayCumulativeDistribution());
00688     const stdair::Probability_T lRemainingProportion =
00689       lArrivalPattern.getRemainingProportion(-float(iDTD));
00690
00691     // Compute the characteristics (mean and std dev) of the total
00692     // forecast demand to come
00693     const stdair::MeanStdDevPair_T lForecatsMeanStdDevPair =
00694       lTotalForecast.second;
00695     const stdair::MeanValue_T& lMeanValue =
00696       lForecatsMeanStdDevPair.first;
00697     const stdair::MeanValue_T& lRemainingMeanValue =
00698       lRemainingProportion*lMeanValue;
00699     const stdair::StdDevValue_T& lStdDevValue =
00700       lForecatsMeanStdDevPair.second;
00701     const stdair::StdDevValue_T& lRemainingStdDevValue =
00702       lRemainingProportion*lStdDevValue;
00703
00704     // Retrieve the frat5 coef corresponding to the input dtd
00705     stdair::DTDFratMap_T::const_iterator itDFC =
00706       stdair::DEFAULT_DTD_FRAT5COEF_MAP.find(iDTD);
00707     if (itDFC == stdair::DEFAULT_DTD_FRAT5COEF_MAP.end()) {
00708       STDAIR_LOG_ERROR ("Cannot find frat5 coef for DTD = " << iDTD );
00709       assert (false);
00710     }
00711     stdair::RealNumber_T lFrat5Coef =
00712       stdair::DEFAULT_DTD_FRAT5COEF_MAP.at(iDTD);
00713
00714     STDAIR_LOG_DEBUG ("Remaining proportion " << lRemainingProportion
00715                       << " Total " << lMeanValue
00716                       << " StdDev " << lStdDevValue
00717                       << "Frat5 Coef " << lFrat5Coef);
00718
00719     std::ostringstream oStr;
00720     // Compute the "forecast demand to come" proportion by class
00721     itACL = lAirlineClassListList.begin();
00722     for (; itACL != lAirlineClassListList.end(); ++itACL) {
00723       const stdair::AirlineClassList* lAirlineClassList_ptr = *itACL;
00724       const stdair::Yield_T& lYield = lAirlineClassList_ptr->getYield();
00725       stdair::ProportionFactor_T lProportionFactor =
00726         exp ((lYield - lMinWTP)*log(0.5)/(lMinWTP*(lFrat5Coef-1.0)));
00727       // If the yield is smaller than minimal WTP, the factor is greater than
      1.
00728       // In that case it should be modified and put to 1.
00729       lProportionFactor = std::min (lProportionFactor, 1.0);
00730       lProportionFactorList.push_back(lProportionFactor -
     lPreviousProportionFactor);
00731       lPreviousProportionFactor = lProportionFactor;
00732       oStr << lAirlineClassList_ptr->toString() << lProportionFactor << " ";
00733     }
00734
00735     STDAIR_LOG_DEBUG (oStr.str());
00736
00737     // Sanity check
00738     assert (lAirlineClassListList.size() == lProportionFactorList.size());
00739
00740     STDAIR_LOG_DEBUG ("Forecast for " << iOnDDate.describeKey()
00741                       << " " << iDTD << " days to departure");
00742
00743     // store the forecast demand to come characteristics in the booking classes
00744     stdair::ProportionFactorList_T::const_iterator itPF =
00745       lProportionFactorList.begin();
00746     itACL = lAirlineClassListList.begin();
00747     for (; itACL != lAirlineClassListList.end(); ++itACL, ++itPF) {
00748       const stdair::AirlineClassList* lAirlineClassList_ptr = *itACL;
00749       const stdair::ProportionFactor_T& lProportionFactor = *itPF;
00750       stdair::MeanValue_T lMeanValue = lProportionFactor*lRemainingMeanValue;
00751       stdair::StdDevValue_T lStdDevValue =
00752         lProportionFactor*lRemainingStdDevValue;
00753       setOnDForecast(*lAirlineClassList_ptr, lMeanValue,
     lStdDevValue,
00754                      iOnDDate, iCabinCode, iBomRoot);
00755     }
00756
00757   }
00758
00759   // ////////////////////////////////////////////////////////////////////
00760   void RMOL_Service::
00761   setOnDForecast (const stdair::AirlineClassList&
     iAirlineClassList,
00762                   const stdair::MeanValue_T& iMeanValue,
00763                   const stdair::StdDevValue_T& iStdDevValue,
```

```
00764                   stdair::OnDDate& iOnDDate,
00765                   const stdair::CabinCode_T& iCabinCode,
00766                   stdair::BomRoot& iBomRoot) {
00767
00768     const stdair::AirportCode_T& lOrigin = iOnDDate.getOrigin();
00769     const stdair::AirportCode_T& lDestination = iOnDDate.getDestination();
00770
00771     const stdair::Date_T& lDepartureDate = iOnDDate.getDate();
00772
00773     const stdair::AirlineCodeList_T& lAirlineCodeList =
00774       iAirlineClassList.getAirlineCodeList();
00775
00776     // Retrieve the class list (one class per airline)
00777     const stdair::ClassList_StringList_T& lClassList_StringList =
00778       iAirlineClassList.getClassCodeList();
00779     assert (!lClassList_StringList.empty());
00780     stdair::ClassCodeList_T lClassCodeList;
00781     for (stdair::ClassList_StringList_T::const_iterator itCL =
00782            lClassList_StringList.begin();
00783          itCL != lClassList_StringList.end(); ++itCL){
00784       const stdair::ClassList_String_T& lClassList_String = *itCL;
00785       assert (lClassList_String.size() > 0);
00786       stdair::ClassCode_T lFirstClass;
00787       lFirstClass.append (lClassList_String, 0, 1);
00788       lClassCodeList.push_back(lFirstClass);
00789     }
00790
00791     // Sanity check
00792     assert (lAirlineCodeList.size() == lClassCodeList.size());
00793     assert (!lAirlineCodeList.empty());
00794
00795     if (lAirlineCodeList.size() == 1) {
00796       // Store the forecast information in the case of a single segment
00797       stdair::AirlineCode_T lAirlineCode = lAirlineCodeList.front();
00798       stdair::ClassCode_T lClassCode = lClassCodeList.front();
00799       stdair::Yield_T lYield = iAirlineClassList.getYield();
00800       setOnDForecast(lAirlineCode, lDepartureDate, lOrigin,
00801                      lDestination, iCabinCode, lClassCode,
00802                      iMeanValue, iStdDevValue, lYield, iBomRoot);
00803     } else {
00804       // Store the forecast information in the case of a multiple segment
00805
00806       stdair::Yield_T lYield = iAirlineClassList.getYield();
00807       for (stdair::AirlineCodeList_T::const_iterator itAC =
00808              lAirlineCodeList.begin();
00809            itAC != lAirlineCodeList.end(); ++itAC) {
00810         const stdair::AirlineCode_T& lAirlineCode = *itAC;
00811         setOnDForecast(lAirlineCodeList, lAirlineCode,
      lDepartureDate, lOrigin,
00812                        lDestination, iCabinCode, lClassCodeList,
00813                        iMeanValue, iStdDevValue, lYield, iBomRoot);
00814       }
00815     }
00816   }
00817
00818   // ////////////////////////////////////////////////////////////////////
00819   void RMOL_Service::
00820   setOnDForecast (const stdair::AirlineCode_T& iAirlineCode,
00821                   const stdair::Date_T& iDepartureDate,
00822                   const stdair::AirportCode_T& iOrigin,
00823                   const stdair::AirportCode_T& iDestination,
00824                   const stdair::CabinCode_T& iCabinCode,
00825                   const stdair::ClassCode_T& iClassCode,
00826                   const stdair::MeanValue_T& iMeanValue,
00827                   const stdair::StdDevValue_T& iStdDevValue,
00828                   const stdair::Yield_T& iYield,
00829                   stdair::BomRoot& iBomRoot) {
00830     stdair::Inventory* lInventory_ptr = iBomRoot.getInventory(iAirlineCode);
00831     if (lInventory_ptr == NULL) {
00832       STDAIR_LOG_ERROR ("Cannot find the inventory corresponding"
00833                         << " to the airline" << iAirlineCode) ;
00834       assert(false);
00835     }
00836     const stdair::OnDDateList_T lOnDDateList =
00837       stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
00838     assert (!lOnDDateList.empty());
00839     bool lFoundOnDDate = false;
00840     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
00841          itOD != lOnDDateList.end(); ++itOD) {
00842       stdair::OnDDate* lOnDDate_ptr = *itOD;
00843       assert (lOnDDate_ptr != NULL);
00844       const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
00845       const stdair::AirportCode_T& lOrigin = lOnDDate_ptr->getOrigin();
00846       const stdair::AirportCode_T& lDestination = lOnDDate_ptr->getDestination(
      );
00847       if (!stdair::BomManager::hasList<stdair::SegmentDate> (*lOnDDate_ptr)) {
00848         STDAIR_LOG_ERROR ("The O&D date " << lOnDDate_ptr->describeKey()
```

```
00849                         << "has not been correctly initialized : SegmentDate
      list is missing");
00850         assert (false);
00851       }
00852       const stdair::SegmentDateList_T& lSegmentDateList =
00853         stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
00854       // Check if the the O&D date is the one we are looking for
00855       if (lDepartureDate == iDepartureDate && lOrigin == iOrigin &&
00856           lDestination == iDestination && lSegmentDateList.size() == 1) {

00857         stdair::CabinClassPair_T lCabinClassPair (iCabinCode, iClassCode);
00858         stdair::CabinClassPairList_T lCabinClassPairList;
00859         lCabinClassPairList.push_back(lCabinClassPair);
00860         const stdair::MeanStdDevPair_T lMeanStdDevPair (iMeanValue,
      iStdDevValue);
00861         const stdair::WTPDemandPair_T lWTPDemandPair (iYield, lMeanStdDevPair);
00862         lOnDDate_ptr->setDemandInformation(lCabinClassPairList, lWTPDemandPair)
      ;
00863         lFoundOnDDate = true;
00864         STDAIR_LOG_DEBUG (iAirlineCode << " Class " << iClassCode
00865                           << " Mean " << iMeanValue
00866                           << " Std Dev " << iStdDevValue);
00867         break;
00868       }
00869     }
00870
00871     if (!lFoundOnDDate) {
00872       STDAIR_LOG_ERROR ("Cannot find class " << iClassCode << " in cabin "
00873                         << iCabinCode << " for the segment "
00874                         << iOrigin << "-" << iDestination << " with"
00875                         << " the airline " << iAirlineCode);
00876       assert(false);
00877     }
00878   }
00879
00880   // ////////////////////////////////////////////////////////////////////
00881   void RMOL_Service::
00882   setOnDForecast (const stdair::AirlineCodeList_T&
      iAirlineCodeList,
00883                   const stdair::AirlineCode_T& iAirlineCode,
00884                   const stdair::Date_T& iDepartureDate,
00885                   const stdair::AirportCode_T& iOrigin,
00886                   const stdair::AirportCode_T& iDestination,
00887                   const stdair::CabinCode_T& iCabinCode,
00888                   const stdair::ClassCodeList_T& iClassCodeList,
00889                   const stdair::MeanValue_T& iMeanValue,
00890                   const stdair::StdDevValue_T& iStdDevValue,
00891                   const stdair::Yield_T& iYield,
00892                   stdair::BomRoot& iBomRoot) {
00893     stdair::Inventory* lInventory_ptr = iBomRoot.getInventory(iAirlineCode);
00894     if (lInventory_ptr == NULL) {
00895       STDAIR_LOG_ERROR ("Cannot find the inventory corresponding"
00896                         << " to the airline" << iAirlineCode) ;
00897       assert(false);
00898     }
00899     const stdair::OnDDateList_T lOnDDateList =
00900       stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
00901     assert (!lOnDDateList.empty());
00902     bool lFoundOnDDate = false;
00903     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
00904          itOD != lOnDDateList.end(); ++itOD) {
00905       stdair::OnDDate* lOnDDate_ptr = *itOD;
00906       assert (lOnDDate_ptr != NULL);
00907       const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
00908       const stdair::AirportCode_T& lOrigin = lOnDDate_ptr->getOrigin();
00909       const stdair::AirportCode_T& lDestination = lOnDDate_ptr->getDestination(
      );
00910       if (!stdair::BomManager::hasList<stdair::SegmentDate> (*lOnDDate_ptr)) {
00911         STDAIR_LOG_ERROR ("The O&D date " << lOnDDate_ptr->describeKey()
00912                           << "has not been correctly initialized : SegmentDate
      list is missing");
00913         assert (false);
00914       }
00915       const stdair::SegmentDateList_T& lSegmentDateList =
00916         stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
00917       // Check if the O&D date might be the one we are looking for.
00918       // There still is a test to go through to see if the combination of
      airlines is right.
00919       if (lDepartureDate == iDepartureDate && lOrigin == iOrigin &&
00920           lDestination == iDestination && lSegmentDateList.size() ==
      iAirlineCodeList.size()) {
00921         const stdair::SegmentDateList_T& lSegmentDateList =
00922           stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);

00923         stdair::AirlineCodeList_T::const_iterator itAC = iAirlineCodeList.begin
      ();
00924         stdair::SegmentDateList_T::const_iterator itSD = lSegmentDateList.begin
```

```
      ();
00925         for (;itAC != iAirlineCodeList.end(); ++itAC, ++itSD) {
00926           const stdair::AirlineCode_T lForecastAirlineCode = *itAC;
00927           const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
00928           // Check if the operating airline is a different one and check if it
00929           // is the airline that we are looking for.
00930           const stdair::SegmentDate* lOperatingSegmentDate_ptr =
00931             lSegmentDate_ptr->getOperatingSegmentDate ();
00932           if (lOperatingSegmentDate_ptr != NULL) {
00933             const stdair::FlightDate* lOperatingFD_ptr =
00934               stdair::BomManager::getParentPtr<stdair::FlightDate>
      (*lOperatingSegmentDate_ptr);
00935             const stdair::AirlineCode_T lOperatingAirlineCode =
00936               lOperatingFD_ptr->getAirlineCode();
00937             if (lOperatingAirlineCode != lForecastAirlineCode) {
00938               break;
00939             }
00940           } else {
00941             const stdair::AirlineCode_T lOperatingAirlineCode =
00942               lOnDDate_ptr->getAirlineCode();
00943             if (lOperatingAirlineCode != lForecastAirlineCode) {
00944               break;
00945             }
00946           }
00947         }
00948         if (itAC == iAirlineCodeList.end()) {lFoundOnDDate = true;}
00949       }
00950       if (lFoundOnDDate) {
00951         stdair::CabinClassPairList_T lCabinClassPairList;
00952         for (stdair::ClassCodeList_T::const_iterator itCC = iClassCodeList.
      begin();
00953              itCC != iClassCodeList.end(); ++itCC) {
00954           const stdair::ClassCode_T lClassCode = *itCC;
00955           stdair::CabinClassPair_T lCabinClassPair (iCabinCode, lClassCode);
00956           lCabinClassPairList.push_back(lCabinClassPair);
00957         }
00958         const stdair::MeanStdDevPair_T lMeanStdDevPair (iMeanValue,
      iStdDevValue);
00959         const stdair::YieldDemandPair_T lYieldDemandPair (iYield,
      lMeanStdDevPair);
00960         lOnDDate_ptr->setDemandInformation(lCabinClassPairList,
      lYieldDemandPair);
00961         lFoundOnDDate = true;
00962         std::ostringstream oACStr;
00963         for (stdair::AirlineCodeList_T::const_iterator itAC = iAirlineCodeList.
      begin();
00964              itAC != iAirlineCodeList.end(); ++itAC) {
00965           if (itAC == iAirlineCodeList.begin()) {
00966             oACStr << *itAC;
00967           }
00968           else {
00969             oACStr << "-" << *itAC;
00970           }
00971         }
00972         std::ostringstream oCCStr;
00973         for (stdair::ClassCodeList_T::const_iterator itCC = iClassCodeList.
      begin();
00974              itCC != iClassCodeList.end(); ++itCC) {
00975           if (itCC == iClassCodeList.begin()) {
00976             oCCStr << *itCC;
00977           }
00978           else {
00979             oCCStr << "-" << *itCC;
00980           }
00981         }
00982
00983         STDAIR_LOG_DEBUG (oACStr.str() << " Classes " << oCCStr.str()
00984                           << " Mean " << iMeanValue << " Std Dev " <<
      iStdDevValue);
00985         break;
00986       }
00987     }
00988     if (!lFoundOnDDate) {
00989       STDAIR_LOG_ERROR ("Cannot find the required multi-segment O&D date:  "
00990                         << iOrigin << "-" << iDestination << " " <<
      iDepartureDate);
00991       assert(false);
00992     }
00993   }
00994
00995   // ////////////////////////////////////////////////////////////////////
00996   void RMOL_Service::
00997   resetDemandInformation (const stdair::DateTime_T&
      iRMEventTime) {
00998     if (_rmolServiceContext == NULL) {
00999       throw stdair::NonInitialisedServiceException ("The Rmol service "
01000                                                     "has not been initialised")
```

```
    ;
01001     }
01002     assert (_rmolServiceContext != NULL);
01003     RMOL_ServiceContext& lRMOL_ServiceContext = *
    _rmolServiceContext;
01004
01005     // Retrieve the bom root
01006     stdair::STDAIR_Service& lSTDAIR_Service =
01007       lRMOL_ServiceContext.getSTDAIR_Service();
01008     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01009
01010     const stdair::InventoryList_T lInventoryList =
01011       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01012     assert (!lInventoryList.empty());
01013     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
    ;
01014          itInv != lInventoryList.end(); ++itInv) {
01015       const stdair::Inventory* lInventory_ptr = *itInv;
01016       assert (lInventory_ptr != NULL);
01017       resetDemandInformation (iRMEventTime, *
    lInventory_ptr);
01018     }
01019   }
01020
01021   // ////////////////////////////////////////////////////////////////////
01022   void RMOL_Service::
01023   resetDemandInformation (const stdair::DateTime_T&
    iRMEventTime,
01024                           const stdair::Inventory& iInventory) {
01025
01026     const stdair::FlightDateList_T lFlightDateList =
01027       stdair::BomManager::getList<stdair::FlightDate> (iInventory);
01028     assert (!lFlightDateList.empty());
01029     for (stdair::FlightDateList_T::const_iterator itFD = lFlightDateList.begin(
    );
01030          itFD != lFlightDateList.end(); ++itFD) {
01031       const stdair::FlightDate* lFlightDate_ptr = *itFD;
01032       assert (lFlightDate_ptr != NULL);
01033
01034       // Retrieve the date from the RM event
01035       const stdair::Date_T lDate = iRMEventTime.date();
01036
01037       const stdair::Date_T& lDepartureDate = lFlightDate_ptr->getDepartureDate(
    );
01038       stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01039       stdair::DTD_T lDTD = short (lDateOffset.days());
01040
01041       stdair::DCPList_T::const_iterator itDCP =
01042         std::find (stdair::DEFAULT_DCP_LIST.begin(),
    stdair::DEFAULT_DCP_LIST.end(), lDTD);
01043       // Check if the demand forecast info corresponding to this flight date
     needs to be reset.
01044       if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01045         // Check if the flight date holds a list of leg dates.
01046         // If so, find all leg cabin and reset the forecast they are holding.
01047         if (stdair::BomManager::hasList<stdair::LegDate> (*lFlightDate_ptr)) {
01048           const stdair::LegDateList_T lLegDateList =
01049             stdair::BomManager::getList<stdair::LegDate> (*lFlightDate_ptr);
01050           assert (!lLegDateList.empty());
01051           for (stdair::LegDateList_T::const_iterator itLD = lLegDateList.begin(
    );
01052                itLD != lLegDateList.end(); ++itLD) {
01053             const stdair::LegDate* lLegDate_ptr = *itLD;
01054             assert (lLegDate_ptr != NULL);
01055             const stdair::LegCabinList_T lLegCabinList =
01056               stdair::BomManager::getList<stdair::LegCabin> (*lLegDate_ptr);
01057             assert (!lLegCabinList.empty());
01058             for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
    begin();
01059                  itLC != lLegCabinList.end(); ++itLC) {
01060               stdair::LegCabin* lLegCabin_ptr = *itLC;
01061               assert (lLegCabin_ptr != NULL);
01062               lLegCabin_ptr->emptyYieldLevelDemandMap();
01063             }
01064           }
01065         }
01066       }
01067     }
01068   }
01069
01070   // ////////////////////////////////////////////////////////////////////
01071   void RMOL_Service::projectAggregatedDemandOnLegCabins
    (const stdair::DateTime_T& iRMEventTime) {
01072
01073     if (_rmolServiceContext == NULL) {
01074       throw stdair::NonInitialisedServiceException ("The Rmol service "
01075                                                     "has not been initialised")
```

```
    ;
01076     }
01077     assert (_rmolServiceContext != NULL);
01078     RMOL_ServiceContext& lRMOL_ServiceContext = *
    _rmolServiceContext;
01079
01080     // Retrieve the bom root
01081     stdair::STDAIR_Service& lSTDAIR_Service =
01082       lRMOL_ServiceContext.getSTDAIR_Service();
01083     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01084
01085     // Retrieve the date from the RM event
01086     const stdair::Date_T lDate = iRMEventTime.date();
01087
01088     const stdair::InventoryList_T lInventoryList =
01089       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01090     assert (!lInventoryList.empty());
01091     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
    ;
01092          itInv != lInventoryList.end(); ++itInv) {
01093       const stdair::Inventory* lInventory_ptr = *itInv;
01094       assert (lInventory_ptr != NULL);
01095       const stdair::OnDDateList_T lOnDDateList =
01096         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01097       assert (!lOnDDateList.empty());
01098       for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01099            itOD != lOnDDateList.end(); ++itOD) {
01100         stdair::OnDDate* lOnDDate_ptr = *itOD;
01101         assert (lOnDDate_ptr != NULL);
01102
01103         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01104         stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01105         stdair::DTD_T lDTD = short (lDateOffset.days());
01106
01107         stdair::DCPList_T::const_iterator itDCP =
01108           std::find (stdair::DEFAULT_DCP_LIST.begin(),
    stdair::DEFAULT_DCP_LIST.end(), lDTD);
01109         // Check if the forecast for this O&D date needs to be projected.
01110         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01111
01112           // Browse the demand info map.
01113           const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01114             lOnDDate_ptr->getDemandInfoMap ();
01115           for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
    lStringDemandStructMap.begin();
01116                itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01117             std::string lCabinClassPath = itStrDS->first;
01118             const stdair::YieldDemandPair_T& lYieldDemandPair =
01119               itStrDS->second;
01120             const stdair::CabinClassPairList_T& lCabinClassPairList =
01121               lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
01122             const unsigned int lNbOfSegments = lOnDDate_ptr->getNbOfSegments();
01123             // Sanity check
01124             assert (lCabinClassPairList.size() == lNbOfSegments);
01125
01126             const stdair::SegmentDateList_T lOnDSegmentDateList =
01127               stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01128             // Sanity check
01129             assert (lOnDSegmentDateList.size() == lNbOfSegments);
01130             stdair::CabinClassPairList_T::const_iterator itCCP =
    lCabinClassPairList.begin();
01131             stdair::SegmentDateList_T::const_iterator itSD =
    lOnDSegmentDateList.begin();
01132             for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01133               const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01134               const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01135                 lSegmentDate_ptr->getOperatingSegmentDate ();
01136               assert (lSegmentDate_ptr != NULL);
01137               // Only operated legs receive the demand information.
01138               if (lOperatingSegmentDate_ptr == NULL) {
01139                 const stdair::CabinCode_T lCabinCode = itCCP->first;
01140                 const stdair::ClassCode_T lClassCode = itCCP->second;
01141                 const stdair::SegmentCabin* lSegmentCabin_ptr =
01142                   stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
    lSegmentDate_ptr,
01143
    lCabinCode);
01144                 assert (lSegmentCabin_ptr != NULL);
01145                 // Retrieve the booking class (level of aggregation of demand).
01146                 // The yield of the class is assigned to all types of demand
     for it.
01147                 const stdair::BookingClass* lBookingClass_ptr =
01148                   stdair::BomManager::getObjectPtr<stdair::BookingClass> (*
    lSegmentCabin_ptr,
01149
    lClassCode);
01150                 assert (lBookingClass_ptr != NULL);
```

```
01151                 const stdair::LegCabinList_T lLegCabinList =
01152                   stdair::BomManager::getList<stdair::LegCabin>
      (*lSegmentCabin_ptr);
01153                 assert (!lLegCabinList.empty());
01154                 const int lNbOfLegs = lLegCabinList.size();
01155                 // Determine the yield (equally distributed over legs).
01156                 const stdair::Yield_T& lYield = lBookingClass_ptr->getYield()/
      lNbOfLegs;
01157                 const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01158                   lYieldDemandPair.second;
01159                 const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01160                 const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
      second;
01161                 for (stdair::LegCabinList_T::const_iterator itLC =
      lLegCabinList.begin();
01162                      itLC != lLegCabinList.end(); ++itLC) {
01163                   stdair::LegCabin* lLegCabin_ptr = *itLC;
01164                   assert (lLegCabin_ptr != NULL);
01165                   lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
      lStdDevValue);
01166                 }
01167               }
01168             }
01169           }
01170         }
01171       }
01172     }
01173   }
01174
01175   // ////////////////////////////////////////////////////////////////////
01176   void RMOL_Service::projectOnDDemandOnLegCabinsUsingYP
      (const stdair::DateTime_T& iRMEventTime) {
01177
01178     if (_rmolServiceContext == NULL) {
01179       throw stdair::NonInitialisedServiceException ("The Rmol service "
01180                                                     "has not been initialised")
      ;
01181     }
01182     assert (_rmolServiceContext != NULL);
01183     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01184
01185     // Retrieve the bom root
01186     stdair::STDAIR_Service& lSTDAIR_Service =
01187       lRMOL_ServiceContext.getSTDAIR_Service();
01188     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01189
01190     // Retrieve the date from the RM event
01191     const stdair::Date_T lDate = iRMEventTime.date();
01192
01193     const stdair::InventoryList_T lInventoryList =
01194       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01195     assert (!lInventoryList.empty());
01196     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
      ;
01197          itInv != lInventoryList.end(); ++itInv) {
01198       const stdair::Inventory* lInventory_ptr = *itInv;
01199       assert (lInventory_ptr != NULL);
01200       const stdair::OnDDateList_T lOnDDateList =
01201         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01202       assert (!lOnDDateList.empty());
01203       for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01204            itOD != lOnDDateList.end(); ++itOD) {
01205         stdair::OnDDate* lOnDDate_ptr = *itOD;
01206         assert (lOnDDate_ptr != NULL);
01207
01208         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01209         stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01210         stdair::DTD_T lDTD = short (lDateOffset.days());
01211
01212         stdair::DCPList_T::const_iterator itDCP =
01213           std::find (stdair::DEFAULT_DCP_LIST.begin(),
      stdair::DEFAULT_DCP_LIST.end(), lDTD);
01214         // Check if the forecast for this O&D date needs to be projected.
01215         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01216
01217           // Browse the demand info map.
01218           const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01219             lOnDDate_ptr->getDemandInfoMap ();
01220           for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
      lStringDemandStructMap.begin();
01221                itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01222             std::string lCabinClassPath = itStrDS->first;
01223             const stdair::YieldDemandPair_T& lYieldDemandPair =
01224               itStrDS->second;
01225             const stdair::CabinClassPairList_T& lCabinClassPairList =
01226               lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
```

```
01227             const unsigned int lNbOfSegments = lOnDDate_ptr->getNbOfSegments();
01228             // Sanity check
01229             assert (lCabinClassPairList.size() == lNbOfSegments);
01230
01231             const stdair::SegmentDateList_T lOnDSegmentDateList =
01232               stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01233             // Sanity check
01234             assert (lOnDSegmentDateList.size() == lNbOfSegments);
01235             stdair::CabinClassPairList_T::const_iterator itCCP =
      lCabinClassPairList.begin();
01236             stdair::SegmentDateList_T::const_iterator itSD =
      lOnDSegmentDateList.begin();
01237             for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01238               const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01239               assert (lSegmentDate_ptr != NULL);
01240               const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01241                 lSegmentDate_ptr->getOperatingSegmentDate ();
01242               // Only operated legs receive the demand information.
01243               if (lOperatingSegmentDate_ptr == NULL) {
01244                 const stdair::CabinCode_T lCabinCode = itCCP->first;
01245                 const stdair::ClassCode_T lClassCode = itCCP->second;
01246                 const stdair::SegmentCabin* lSegmentCabin_ptr =
01247                   stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
      lSegmentDate_ptr,
01248
      lCabinCode);
01249                 assert (lSegmentCabin_ptr != NULL);
01250                 const stdair::LegCabinList_T lLegCabinList =
01251                   stdair::BomManager::getList<stdair::LegCabin>
      (*lSegmentCabin_ptr);
01252                 assert (!lLegCabinList.empty());
01253                 const int lNbOfLegs = lLegCabinList.size();
01254                 // Determine the yield (equally distributed over segments and
       then legs).
01255                 const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01256                   lYieldDemandPair.second;
01257                 const stdair::Yield_T& lYield = lYieldDemandPair.first/(
      lNbOfLegs*lNbOfSegments);
01258                 const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01259                 const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
      second;
01260                 for (stdair::LegCabinList_T::const_iterator itLC =
      lLegCabinList.begin();
01261                      itLC != lLegCabinList.end(); ++itLC) {
01262                   stdair::LegCabin* lLegCabin_ptr = *itLC;
01263                   assert (lLegCabin_ptr != NULL);
01264                   lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
      lStdDevValue);
01265                 }
01266               }
01267             }
01268           }
01269         }
01270       }
01271     }
01272   }
01273
01274   // ////////////////////////////////////////////////////////////////////
01275   void RMOL_Service::optimiseOnD (const
      stdair::DateTime_T& iRMEventTime) {
01276
01277     if (_rmolServiceContext == NULL) {
01278       throw stdair::NonInitialisedServiceException ("The Rmol service "
01279                                                     "has not been initialised")
      ;
01280     }
01281     assert (_rmolServiceContext != NULL);
01282     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01283
01284     // Retrieve the bom root
01285     stdair::STDAIR_Service& lSTDAIR_Service =
01286       lRMOL_ServiceContext.getSTDAIR_Service();
01287     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01288
01289     // Retrieve the date from the RM event
01290     const stdair::Date_T lDate = iRMEventTime.date();
01291
01292     const stdair::InventoryList_T& lInvList =
01293       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01294     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01295          itInv != lInvList.end(); ++itInv) {
01296       stdair::Inventory* lCurrentInv_ptr = *itInv;
01297       assert (lCurrentInv_ptr != NULL);
01298
01299       const stdair::FlightDateList_T& lFlightDateList =
01300         stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
```

```
01301       for (stdair::FlightDateList_T::const_iterator itFlightDate =
01302              lFlightDateList.begin();
01303            itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01304         stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01305         assert (lCurrentFlightDate_ptr != NULL);
01306
01307         const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr->
      getDepartureDate();
01308         stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01309         stdair::DTD_T lDTD = short (lDateOffset.days());
01310
01311         stdair::DCPList_T::const_iterator itDCP =
01312           std::find (stdair::DEFAULT_DCP_LIST.begin(),
      stdair::DEFAULT_DCP_LIST.end(), lDTD);
01313         // Check if the optimisation is needed.
01314         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01315           STDAIR_LOG_DEBUG ("Optimisation using O&D forecast: " <<
      lCurrentInv_ptr->getAirlineCode()
01316                             << " Departure " << lCurrentDepartureDate << " DTD
      " << lDTD);
01317           Optimiser::optimiseUsingOnDForecast
       (*lCurrentFlightDate_ptr);
01318         }
01319       }
01320     }
01321   }
01322
01323   // ////////////////////////////////////////////////////////////////////
01324   void RMOL_Service::updateBidPrice (const
      stdair::DateTime_T& iRMEventTime) {
01325
01326     if (_rmolServiceContext == NULL) {
01327       throw stdair::NonInitialisedServiceException ("The Rmol service "
01328                                                     "has not been initialised")
      ;
01329     }
01330     assert (_rmolServiceContext != NULL);
01331     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01332
01333     // Retrieve the bom root
01334     stdair::STDAIR_Service& lSTDAIR_Service =
01335       lRMOL_ServiceContext.getSTDAIR_Service();
01336     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01337
01338     // Retrieve the date from the RM event
01339     const stdair::Date_T lDate = iRMEventTime.date();
01340
01341     const stdair::InventoryList_T& lInvList =
01342       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01343
01344     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01345          itInv != lInvList.end(); ++itInv) {
01346       stdair::Inventory* lCurrentInv_ptr = *itInv;
01347       assert (lCurrentInv_ptr != NULL);
01348
01349       const stdair::FlightDateList_T& lFlightDateList =
01350         stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01351       for (stdair::FlightDateList_T::const_iterator itFlightDate =
01352              lFlightDateList.begin();
01353            itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01354         stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01355         assert (lCurrentFlightDate_ptr != NULL);
01356
01357         const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr->
      getDepartureDate();
01358         stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01359         stdair::DTD_T lDTD = short (lDateOffset.days());
01360
01361         stdair::DCPList_T::const_iterator itDCP =
01362           std::find (stdair::DEFAULT_DCP_LIST.begin(),
      stdair::DEFAULT_DCP_LIST.end(), lDTD);
01363         // Check if the operation is needed.
01364         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01365           updateBidPrice (*lCurrentFlightDate_ptr, lBomRoot);
01366         }
01367       }
01368     }
01369   }
01370
01371   // ////////////////////////////////////////////////////////////////////
01372   void RMOL_Service::updateBidPrice (const
      stdair::FlightDate& iFlightDate,
01373                                      stdair::BomRoot& iBomRoot) {
01374     const stdair::SegmentDateList_T& lSegmentDateList =
01375       stdair::BomManager::getList<stdair::SegmentDate> (iFlightDate);
01376     const stdair::AirlineCode_T& lOptAC = iFlightDate.getAirlineCode();
```

```
01377     const std::string lFDKeyStr = iFlightDate.describeKey();
01378
01379     for (stdair::SegmentDateList_T::const_iterator itSegmentDate =
      lSegmentDateList.begin();
01380          itSegmentDate != lSegmentDateList.end(); ++itSegmentDate) {
01381       stdair::SegmentDate* lSegmentDate_ptr = *itSegmentDate;
01382       assert (lSegmentDate_ptr != NULL);
01383       if (stdair::BomManager::hasList<stdair::SegmentDate>(*lSegmentDate_ptr))
      {
01384         const stdair::LegDateList_T& lLegDateList =
01385           stdair::BomManager::getList<stdair::LegDate>(*lSegmentDate_ptr);
01386         // Get the list of marketing carriers segments.
01387         // These are part of maketing partners inventories images held by the
       operating airline.
01388         const stdair::SegmentDateList_T& lMktSegmentDateList =
01389           stdair::BomManager::getList<stdair::SegmentDate>(*lSegmentDate_ptr);
01390         for (stdair::SegmentDateList_T::const_iterator itMktSD =
      lMktSegmentDateList.begin();
01391              itMktSD != lMktSegmentDateList.end(); ++itMktSD) {
01392           // Get the marketing airline code.
01393           stdair::SegmentDate* lMktSD_ptr = *itMktSD;
01394           assert (lMktSD_ptr != NULL);
01395           stdair::FlightDate* lMktFD_ptr =
01396             stdair::BomManager::getParentPtr<stdair::FlightDate>(*lMktSD_ptr);
01397           assert (lMktFD_ptr != NULL);
01398           const stdair::AirlineCode_T& lMktAC = lMktFD_ptr->getAirlineCode();
01399           // Get the (real) marketer inventory.
01400           const stdair::Inventory* lMktInv_ptr =
01401             stdair::BomManager::getObjectPtr<stdair::Inventory>(iBomRoot,lMktAC
      );
01402           assert (lMktInv_ptr != NULL);
01403           // Get the image of the operating airline inventory held by the
       marketer.
01404           const stdair::Inventory* lOptInv_ptr =
01405             stdair::BomManager::getObjectPtr<stdair::Inventory>(*lMktInv_ptr,
      lOptAC);
01406           assert (lOptInv_ptr != NULL);
01407           // Find the image of the concerned flight date.
01408           const stdair::FlightDate* lOptFD_ptr =
01409             stdair::BomManager::getObjectPtr<stdair::FlightDate>(*lOptInv_ptr,
      lFDKeyStr);
01410           assert (lOptFD_ptr != NULL);
01411           // Browse the list of leg dates in the real operating inventory.
01412           // Retrieve the image of each leg date.
01413           for (stdair::LegDateList_T::const_iterator itLD = lLegDateList.begin(
      );
01414                itLD != lLegDateList.end(); ++itLD) {
01415             const stdair::LegDate* lLD_ptr = *itLD;
01416             assert (lLD_ptr != NULL);
01417             const std::string lLDKeyStr = lLD_ptr->describeKey();
01418             stdair::LegDate* lOptLD_ptr =
01419               stdair::BomManager::getObjectPtr<stdair::LegDate>(*lOptFD_ptr,
      lLDKeyStr);
01420             assert (lOptLD_ptr != NULL);
01421             const stdair::LegCabinList_T& lLegCabinList_T =
01422               stdair::BomManager::getList<stdair::LegCabin>(*lLD_ptr);
01423             // Browse the list of leg cabins in the real operating inventory.
01424             // Retrieve the image of each leg cabin and update the bid price of
       the real and send it to the image.
01425             for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList_T.
      begin();
01426                  itLC != lLegCabinList_T.end(); ++itLC) {
01427               stdair::LegCabin* lLC_ptr = *itLC;
01428               assert (lLC_ptr != NULL);
01429               const std::string lLCKeyStr = lLC_ptr->describeKey();
01430               stdair::LegCabin* lOptLC_ptr =
01431                 stdair::BomManager::getObjectPtr<stdair::LegCabin>(*lOptLD_ptr,
       lLCKeyStr);
01432               assert (lOptLC_ptr != NULL);
01433               // Update the current bid price of the real leg.
01434               lLC_ptr->updateCurrentBidPrice();
01435               // Update the previous bid price (store the current).
01436               lOptLC_ptr->updatePreviousBidPrice();
01437               // Update the current bid price.
01438               lOptLC_ptr->setCurrentBidPrice (lLC_ptr->getCurrentBidPrice());
01439
01440               STDAIR_LOG_DEBUG ("Update bid price of " << lLC_ptr->getFullerKey
      ()
01441                                 << " : " << lOptLC_ptr->getCurrentBidPrice()
01442                                 << " Availability pool " << lLC_ptr->
      getAvailabilityPool());
01443             }
01444           }
01445         }
01446       }
01447     }
01448   }
```

```
01449
01450   // ////////////////////////////////////////////////////////////////////
01451   void RMOL_Service::projectOnDDemandOnLegCabinsUsingDA
      (const stdair::DateTime_T& iRMEventTime) {
01452
01453     if (_rmolServiceContext == NULL) {
01454       throw stdair::NonInitialisedServiceException ("The Rmol service "
01455                                                     "has not been initialised")
      ;
01456     }
01457     assert (_rmolServiceContext != NULL);
01458     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01459
01460     // Retrieve the bom root
01461     stdair::STDAIR_Service& lSTDAIR_Service =
01462       lRMOL_ServiceContext.getSTDAIR_Service();
01463     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01464
01465     // Retrieve the date from the RM event
01466     const stdair::Date_T lDate = iRMEventTime.date();
01467
01468     const stdair::InventoryList_T lInventoryList =
01469       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01470     assert (!lInventoryList.empty());
01471     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
      ;
01472          itInv != lInventoryList.end(); ++itInv) {
01473       const stdair::Inventory* lInventory_ptr = *itInv;
01474       assert (lInventory_ptr != NULL);
01475       const stdair::OnDDateList_T lOnDDateList =
01476         stdair::BomManager::getList<stdair::OnDDate> (*lInventory_ptr);
01477       assert (!lOnDDateList.empty());
01478       for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01479            itOD != lOnDDateList.end(); ++itOD) {
01480         stdair::OnDDate* lOnDDate_ptr = *itOD;
01481         assert (lOnDDate_ptr != NULL);
01482
01483         const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01484         stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01485         stdair::DTD_T lDTD = short (lDateOffset.days());
01486
01487         stdair::DCPList_T::const_iterator itDCP =
01488           std::find (stdair::DEFAULT_DCP_LIST.begin(),
      stdair::DEFAULT_DCP_LIST.end(), lDTD);
01489         // Check if the forecast for this O&D date needs to be projected.
01490         if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01491
01492           // Browse the demand info map.
01493           const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01494             lOnDDate_ptr->getDemandInfoMap ();
01495           for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
      lStringDemandStructMap.begin();
01496                itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01497             std::string lCabinClassPath = itStrDS->first;
01498             const stdair::YieldDemandPair_T& lYieldDemandPair = itStrDS->second
      ;
01499             const stdair::CabinClassPairList_T& lCabinClassPairList =
01500               lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
01501             const unsigned int lNbOfSegments = lOnDDate_ptr->getNbOfSegments();
01502             // Sanity check
01503             assert (lCabinClassPairList.size() == lNbOfSegments);
01504
01505             //
01506             const stdair::SegmentDateList_T lOnDSegmentDateList =
01507               stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01508             // Sanity check
01509             assert (lOnDSegmentDateList.size() == lNbOfSegments);
01510             stdair::CabinClassPairList_T::const_iterator itCCP =
      lCabinClassPairList.begin();
01511             stdair::SegmentDateList_T::const_iterator itSD =
      lOnDSegmentDateList.begin();
01512             // List of bid prices that will be used to easily compute
       displacement-ajusted yields.
01513             std::list<stdair::BidPrice_T> lBidPriceList;
01514             // The sum of bid prices that will be stored in the list above.
01515             stdair::BidPrice_T lTotalBidPrice = 0;
01516             // Retrieve the bid prices
01517             for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01518               // Get the operating segment cabin (it holds the bid price
       information).
01519               const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01520               assert (lSegmentDate_ptr != NULL);
01521               // Get the operating airline code and check if it is the airline
       we are looking for.
01522               const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01523                 lSegmentDate_ptr->getOperatingSegmentDate ();
```

```
01524               if (lOperatingSegmentDate_ptr != NULL) {
01525                 lSegmentDate_ptr = lOperatingSegmentDate_ptr;
01526               }
01527               const stdair::CabinCode_T lCabinCode = itCCP->first;
01528               const stdair::SegmentCabin* lSegmentCabin_ptr =
01529                 stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
    lSegmentDate_ptr,
01530
    lCabinCode);
01531               assert (lSegmentCabin_ptr != NULL);
01532               stdair::BidPrice_T lBidPrice = 0;
01533               const stdair::LegCabinList_T lLegCabinList =
01534                 stdair::BomManager::getList<stdair::LegCabin>
    (*lSegmentCabin_ptr);
01535               for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
    begin();
01536                    itLC != lLegCabinList.end(); ++itLC) {
01537                 const stdair::LegCabin* lLegCabin_ptr = *itLC;
01538                 assert (lLegCabin_ptr != NULL);
01539                 lBidPrice += lLegCabin_ptr->getCurrentBidPrice();
01540               }
01541               lBidPriceList.push_back (lBidPrice);
01542               lTotalBidPrice += lBidPrice;
01543             }
01544
01545
01546             itCCP = lCabinClassPairList.begin();
01547             itSD = lOnDSegmentDateList.begin();
01548             std::list<stdair::BidPrice_T>::const_iterator itBP = lBidPriceList.
    begin();
01549             for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD, ++itBP)
    {
01550               stdair::BidPrice_T lBidPrice = *itBP;
01551               stdair::BidPrice_T lComplementaryBidPrice = lTotalBidPrice -
    lBidPrice;
01552               const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01553               assert (lSegmentDate_ptr != NULL);
01554               const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01555                 lSegmentDate_ptr->getOperatingSegmentDate ();
01556               // Only operated legs receive the demand information.
01557               if (lOperatingSegmentDate_ptr == NULL) {
01558                 const stdair::CabinCode_T lCabinCode = itCCP->first;
01559                 const stdair::ClassCode_T lClassCode = itCCP->second;
01560                 const stdair::SegmentCabin* lSegmentCabin_ptr =
01561                   stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
    lSegmentDate_ptr,
01562
    lCabinCode);
01563                 assert (lSegmentCabin_ptr != NULL);
01564                 const stdair::LegCabinList_T lLegCabinList =
01565                   stdair::BomManager::getList<stdair::LegCabin>
    (*lSegmentCabin_ptr);
01566                 assert (!lLegCabinList.empty());
01567                 // Determine the displacement-adjusted yield.
01568                 // It is set to 100 (positive small value), if the computed
     value is negative.
01569                 const stdair::Yield_T& lDAYield =
01570                   std::max(100., lYieldDemandPair.first -
    lComplementaryBidPrice);
01571
01572
01573                 stdair::Yield_T lYield = lDAYield;
01574                 // In order to be protected against important variations of
     partners' bid price,
01575                 // the displacement adjusted yield is noy allowed to get out of
     a certain range.
01576                 // This range is here chosen to be from 80% to 100% of the
     (static rule) prorated yield.
01577                 /*
01578                 const int lNbOfLegs = lLegCabinList.size();
01579                 const stdair::Yield_T& lStaticProrationYield =
01580                   lDemandStruct.getYield()/(lNbOfLegs*lNbOfSegments);
01581                 if (lDAYield < 0.8*lStaticProrationYield){
01582                   lYield = 0.8*lStaticProrationYield;
01583                 }
01584                 if (lDAYield > lStaticProrationYield) {
01585                   lYield = lStaticProrationYield;
01586                 }
01587                 */
01588                 const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01589                   lYieldDemandPair.second;
01590                 const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01591                 const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
    second;
01592                 for (stdair::LegCabinList_T::const_iterator itLC =
    lLegCabinList.begin();
01593                      itLC != lLegCabinList.end(); ++itLC) {
```

```
01594                   stdair::LegCabin* lLegCabin_ptr = *itLC;
01595                   assert (lLegCabin_ptr != NULL);
01596                   lLegCabin_ptr->addDemandInformation (lYield, lMeanValue,
      lStdDevValue);
01597                 }
01598               }
01599             }
01600           }
01601         }
01602       }
01603     }
01604   }
01605
01606   // ////////////////////////////////////////////////////////////////////
01607   void RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP
      (const stdair::DateTime_T& iRMEventTime) {
01608
01609     if (_rmolServiceContext == NULL) {
01610       throw stdair::NonInitialisedServiceException ("The Rmol service "
01611                                                     "has not been initialised")
      ;
01612     }
01613     assert (_rmolServiceContext != NULL);
01614     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01615
01616     // Retrieve the bom root
01617     stdair::STDAIR_Service& lSTDAIR_Service =
01618       lRMOL_ServiceContext.getSTDAIR_Service();
01619     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01620
01621     const stdair::InventoryList_T lInventoryList =
01622       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01623     assert (!lInventoryList.empty());
01624     for (stdair::InventoryList_T::const_iterator itInv = lInventoryList.begin()
      ;
01625          itInv != lInventoryList.end(); ++itInv) {
01626       const stdair::Inventory* lInventory_ptr = *itInv;
01627       assert (lInventory_ptr != NULL);
01628       projectOnDDemandOnLegCabinsUsingDYP (
      iRMEventTime, *lInventory_ptr);
01629     }
01630   }
01631
01632   // ////////////////////////////////////////////////////////////////////
01633   void RMOL_Service::projectOnDDemandOnLegCabinsUsingDYP
      (const stdair::DateTime_T& iRMEventTime,
01634                                                         const
      stdair::Inventory& iInventory) {
01635
01636     const stdair::OnDDateList_T lOnDDateList =
01637       stdair::BomManager::getList<stdair::OnDDate> (iInventory);
01638     assert (!lOnDDateList.empty());
01639     for (stdair::OnDDateList_T::const_iterator itOD = lOnDDateList.begin();
01640          itOD != lOnDDateList.end(); ++itOD) {
01641       stdair::OnDDate* lOnDDate_ptr = *itOD;
01642       assert (lOnDDate_ptr != NULL);
01643
01644       // Retrieve the date from the RM event
01645       const stdair::Date_T lDate = iRMEventTime.date();
01646
01647       const stdair::Date_T& lDepartureDate = lOnDDate_ptr->getDate();
01648       stdair::DateOffset_T lDateOffset = lDepartureDate - lDate;
01649       stdair::DTD_T lDTD = short (lDateOffset.days());
01650
01651       stdair::DCPList_T::const_iterator itDCP =
01652         std::find (stdair::DEFAULT_DCP_LIST.begin(),
      stdair::DEFAULT_DCP_LIST.end(), lDTD);
01653       // Check if the forecast for this O&D date needs to be projected.
01654       if (itDCP != stdair::DEFAULT_DCP_LIST.end()) {
01655
01656         // Browse the demand info map.
01657         const stdair::StringDemandStructMap_T& lStringDemandStructMap =
01658           lOnDDate_ptr->getDemandInfoMap ();
01659         for (stdair::StringDemandStructMap_T::const_iterator itStrDS =
      lStringDemandStructMap.begin();
01660              itStrDS != lStringDemandStructMap.end(); ++itStrDS) {
01661           std::string lCabinClassPath = itStrDS->first;
01662           const stdair::YieldDemandPair_T& lYieldDemandPair = itStrDS->second;
01663           const stdair::CabinClassPairList_T& lCabinClassPairList =
01664             lOnDDate_ptr->getCabinClassPairList(lCabinClassPath);
01665           const unsigned int lNbOfSegments = lOnDDate_ptr->getNbOfSegments();
01666           // Sanity check
01667           assert (lCabinClassPairList.size() == lNbOfSegments);
01668
01669           //
01670           const stdair::SegmentDateList_T lOnDSegmentDateList =
```

```
01671               stdair::BomManager::getList<stdair::SegmentDate> (*lOnDDate_ptr);
01672           // Sanity check
01673           assert (lOnDSegmentDateList.size() == lNbOfSegments);
01674           stdair::CabinClassPairList_T::const_iterator itCCP =
    lCabinClassPairList.begin();
01675           stdair::SegmentDateList_T::const_iterator itSD = lOnDSegmentDateList.
    begin();
01676           // The sum of bid prices of all cabins.
01677           stdair::BidPrice_T lTotalBidPrice = 0;
01678           for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01679             // Get the operating segment cabin (it holds the bid price
     information).
01680             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01681             assert (lSegmentDate_ptr != NULL);
01682             // Get the operating airline code and check if it is the airline we
     are looking for.
01683             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01684               lSegmentDate_ptr->getOperatingSegmentDate ();
01685             if (lOperatingSegmentDate_ptr != NULL) {
01686               lSegmentDate_ptr = lOperatingSegmentDate_ptr;
01687             }
01688             const stdair::CabinCode_T lCabinCode = itCCP->first;
01689             const stdair::SegmentCabin* lSegmentCabin_ptr =
01690               stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
    lSegmentDate_ptr,
01691
    lCabinCode);
01692             assert (lSegmentCabin_ptr != NULL);
01693             const stdair::LegCabinList_T lLegCabinList =
01694               stdair::BomManager::getList<stdair::LegCabin>(*lSegmentCabin_ptr)
    ;
01695             for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
    begin();
01696                  itLC != lLegCabinList.end(); ++itLC) {
01697               const stdair::LegCabin* lLegCabin_ptr = *itLC;
01698               assert (lLegCabin_ptr != NULL);
01699               lTotalBidPrice += lLegCabin_ptr->getCurrentBidPrice();
01700             }
01701           }
01702
01703
01704           itCCP = lCabinClassPairList.begin();
01705           itSD = lOnDSegmentDateList.begin();
01706           for (; itSD != lOnDSegmentDateList.end(); ++itCCP, ++itSD) {
01707             const stdair::SegmentDate* lSegmentDate_ptr = *itSD;
01708             assert (lSegmentDate_ptr != NULL);
01709             const stdair::SegmentDate* lOperatingSegmentDate_ptr =
01710               lSegmentDate_ptr->getOperatingSegmentDate ();
01711             // Only operated legs receive the demand information.
01712             if (lOperatingSegmentDate_ptr == NULL) {
01713               const stdair::CabinCode_T lCabinCode = itCCP->first;
01714               const stdair::ClassCode_T lClassCode = itCCP->second;
01715               const stdair::SegmentCabin* lSegmentCabin_ptr =
01716                 stdair::BomManager::getObjectPtr<stdair::SegmentCabin> (*
    lSegmentDate_ptr,
01717
    lCabinCode);
01718               assert (lSegmentCabin_ptr != NULL);
01719               const stdair::LegCabinList_T lLegCabinList =
01720                 stdair::BomManager::getList<stdair::LegCabin>
    (*lSegmentCabin_ptr);
01721               assert (!lLegCabinList.empty());
01722               const stdair::Yield_T& lYield = lYieldDemandPair.first;

01723               const stdair::MeanStdDevPair_T& lMeanStdDevPair =
01724                 lYieldDemandPair.second;
01725               const stdair::MeanValue_T& lMeanValue = lMeanStdDevPair.first;
01726               const stdair::StdDevValue_T& lStdDevValue = lMeanStdDevPair.
    second;
01727               for (stdair::LegCabinList_T::const_iterator itLC = lLegCabinList.
    begin();
01728                    itLC != lLegCabinList.end(); ++itLC) {
01729                 stdair::LegCabin* lLegCabin_ptr = *itLC;
01730                 assert (lLegCabin_ptr != NULL);
01731                 const stdair::BidPrice_T& lBidPrice = lLegCabin_ptr->
    getCurrentBidPrice();
01732                 const stdair::RealNumber_T lDynamicYieldProrationFactor =
    lBidPrice / lTotalBidPrice;
01733                 const stdair::Yield_T lProratedYield =
    lDynamicYieldProrationFactor*lYield;
01734                 lLegCabin_ptr->addDemandInformation (lProratedYield, lMeanValue
    , lStdDevValue);
01735
01736                 // STDAIR_LOG_DEBUG ("Addding demand information to leg-cabin "
     << lLegCabin_ptr->getFullerKey()
01737                 //                   << " Total yield " << lYield << "
     Proration factor "
```

```
01738                 //                  << lDynamicYieldProrationFactor << "
      Prorated yield " << lProratedYield
01739                 //                  << " Mean demand " << lMeanValue << "
      StdDev " << lStdDevValue);
01740               }
01741             }
01742           }
01743         }
01744       }
01745     }
01746   }
01747
01748   // ////////////////////////////////////////////////////////////////////
01749   void RMOL_Service::optimiseOnDUsingRMCooperation
      (const stdair::DateTime_T& iRMEventTime) {
01750
01751     if (_rmolServiceContext == NULL) {
01752       throw stdair::NonInitialisedServiceException ("The Rmol service "
01753                                                     "has not been initialised")
      ;
01754     }
01755     assert (_rmolServiceContext != NULL);
01756     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01757
01758     // Retrieve the bom root
01759     stdair::STDAIR_Service& lSTDAIR_Service =
01760       lRMOL_ServiceContext.getSTDAIR_Service();
01761     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01762
01763     // Retrieve the date from the RM event
01764     const stdair::Date_T lDate = iRMEventTime.date();
01765
01766     // Browse the list of inventories and optimise within each one
      independently.
01767     const stdair::InventoryList_T& lInvList =
01768       stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01769     for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01770          itInv != lInvList.end(); ++itInv) {
01771       stdair::Inventory* lCurrentInv_ptr = *itInv;
01772       assert (lCurrentInv_ptr != NULL);
01773
01774       double lMaxBPVariation = 1.0;
01775       short lIterationCounter = 0;
01776       // Iterate until the variation is under the wanted level or the maximal
      number of iterations is reached.
01777       while (lMaxBPVariation > 0.01 && lIterationCounter < 10) {
01778         lMaxBPVariation = 0.0;
01779         lIterationCounter++;
01780         const stdair::FlightDateList_T& lFlightDateList =
01781           stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01782         for (stdair::FlightDateList_T::const_iterator itFlightDate =
01783                lFlightDateList.begin();
01784              itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01785           stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01786           assert (lCurrentFlightDate_ptr != NULL);
01787
01788           const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr
      ->getDepartureDate();
01789           stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01790           stdair::DTD_T lDTD = short (lDateOffset.days());
01791
01792           stdair::DCPList_T::const_iterator itDCP =
01793             std::find (stdair::DEFAULT_DCP_LIST.begin()
      , stdair::DEFAULT_DCP_LIST.end(), lDTD);
01794           // Check if the optimisation is needed.
01795           if (itDCP != stdair::DEFAULT_DCP_LIST.end())
      {
01796             const double lBPVariation = Optimiser::optimiseUsingOnDForecast
      (*lCurrentFlightDate_ptr);
01797             lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
01798           }
01799         }
01800         // Update the prorated yields for the current inventory.
01801         resetDemandInformation (iRMEventTime, *
      lCurrentInv_ptr);
01802         projectOnDDemandOnLegCabinsUsingDYP
      (iRMEventTime, *lCurrentInv_ptr);
01803       }
01804     }
01805   }
01806
01807
01808   // ////////////////////////////////////////////////////////////////////
01809   void RMOL_Service::optimiseOnDUsingAdvancedRMCooperation
      (const stdair::DateTime_T& iRMEventTime) {
01810
```

```
01811     if (_rmolServiceContext == NULL) {
01812       throw stdair::NonInitialisedServiceException ("The Rmol service "
01813                                                     "has not been initialised")
      ;
01814     }
01815     assert (_rmolServiceContext != NULL);
01816     RMOL_ServiceContext& lRMOL_ServiceContext = *
      _rmolServiceContext;
01817
01818     // Retrieve the bom root
01819     stdair::STDAIR_Service& lSTDAIR_Service =
01820       lRMOL_ServiceContext.getSTDAIR_Service();
01821     stdair::BomRoot& lBomRoot = lSTDAIR_Service.getBomRoot();
01822
01823     // Retrieve the date from the RM event
01824     const stdair::Date_T lDate = iRMEventTime.date();
01825
01826     double lMaxBPVariation = 1.0;
01827     short lIterationCounter = 0;
01828     // Iterate until the variation is under the wanted level or the maximal
       number of iterations is reached.
01829     // Every iteration corresponds to the optimisation of the whole network.
       Bid prices are communicated
01830     // between partners at the end of each iteration.
01831     while (lMaxBPVariation > 0.01 && lIterationCounter < 50) {
01832       lMaxBPVariation = 0.0;
01833       lIterationCounter++;
01834
01835       const stdair::InventoryList_T& lInvList =
01836         stdair::BomManager::getList<stdair::Inventory> (lBomRoot);
01837       for (stdair::InventoryList_T::const_iterator itInv = lInvList.begin();
01838            itInv != lInvList.end(); ++itInv) {
01839         stdair::Inventory* lCurrentInv_ptr = *itInv;
01840         assert (lCurrentInv_ptr != NULL);
01841         const stdair::FlightDateList_T& lFlightDateList =
01842           stdair::BomManager::getList<stdair::FlightDate> (*lCurrentInv_ptr);
01843         for (stdair::FlightDateList_T::const_iterator itFlightDate =
01844                lFlightDateList.begin();
01845              itFlightDate != lFlightDateList.end(); ++itFlightDate) {
01846           stdair::FlightDate* lCurrentFlightDate_ptr = *itFlightDate;
01847           assert (lCurrentFlightDate_ptr != NULL);
01848
01849           const stdair::Date_T& lCurrentDepartureDate = lCurrentFlightDate_ptr
      ->getDepartureDate();
01850           stdair::DateOffset_T lDateOffset = lCurrentDepartureDate - lDate;
01851           stdair::DTD_T lDTD = short (lDateOffset.days());
01852
01853           stdair::DCPList_T::const_iterator itDCP =
01854             std::find (stdair::DEFAULT_DCP_LIST.begin()
      , stdair::DEFAULT_DCP_LIST.end(), lDTD);
01855           if (itDCP != stdair::DEFAULT_DCP_LIST.end())
      {
01856             const double lBPVariation = Optimiser::optimiseUsingOnDForecast
       (*lCurrentFlightDate_ptr);
01857             lMaxBPVariation = std::max(lMaxBPVariation, lBPVariation);
01858           }
01859         }
01860       }
01861       // At the end of each iteration, communicate bid prices and compute
       displacement adjusted yields.
01862       updateBidPrice (iRMEventTime);
01863       resetDemandInformation (iRMEventTime);
01864       projectOnDDemandOnLegCabinsUsingDYP (
      iRMEventTime);
01865     }
01866   }
01867
01868 }
```

26.97 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

26.98 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     return oStr.str();
00039   }
00040
00041   // //////////////////////////////////////////////////////////////////
00042   const std::string RMOL_ServiceContext::display() const {
00043     std::ostringstream oStr;
00044     oStr << shortDisplay();
00045     return oStr.str();
00046   }
00047
00048   // //////////////////////////////////////////////////////////////////
00049   const std::string RMOL_ServiceContext::describe() const {
00050     return shortDisplay();
00051   }
00052
00053   // //////////////////////////////////////////////////////////////////
00054   void RMOL_ServiceContext::reset() {
00055     if (_ownStdairService == true) {
00056       _stdairService.reset();
00057     }
00058   }
00059
00060 }
```

26.99 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

26.100 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
      {
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
00077   private:
00078     // ********* Display Methods **********
00082     const std::string shortDisplay() const;
00083
00087     const std::string display() const;
00088
00092     const std::string describe() const;
00093
00094
00095   private:
00096     // /////// Construction / initialisation ////////
00100     RMOL_ServiceContext();
00104     RMOL_ServiceContext (const RMOL_ServiceContext&);
00105
00109     ~RMOL_ServiceContext();
00110
00111
00112   private:
00113     // ************** Children *************
00117     stdair::STDAIR_ServicePtr_T _stdairService;
00118
00122     bool _ownStdairService;
00123   };
00124
00125 }
00126 #endif // __RMOL_SVC_RMOL_SERVICE_CONTEXT_HPP
```

26.101 test/rmol/bomsforforecaster.cpp File Reference

26.102 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
       (boost_utf::log_successful_tests);
00042   }
00043
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     // Constructer
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
00091   struct BookingClassDataSet {
00092
00093     typedef std::vector<BookingClassData*> BookingClassDataList_T;
00094
00095     // Attributes
00096     int _numberOfClass;
00097     double _minimumFare;
00098     bool _censorshipFlag; // true if any of the classes is censored
00099     BookingClassDataList_T _bookingClassDataList;
00100
00101     // Constructor
00102     BookingClassDataSet ()
00103       : _numberOfClass(0), _minimumFare(0),
00104         _censorshipFlag(false) {
00105     }
00106
00107     // Add BookingClassData
00108     void addBookingClassData (BookingClassData& ioBookingClassData) {
00109       _bookingClassDataList.push_back (&ioBookingClassData);
00110     }
00111
00112     // Getters
00113     unsigned int getNumberOfClass () const {
00114       return _bookingClassDataList.size();
00115     }
00116
00117     double getMinimumFare () const {
00118       return _minimumFare;
00119     }
00120
00121     bool getCensorshipFlag () const {
00122       return _censorshipFlag;
00123     }
00124
00125     // Setters
00126     void setMinimumFare (const double iMinFare) {
00127       _minimumFare = iMinFare;
00128     }
00129
00130     void setCensorshipFlag (const bool iCensorshipFlag) {
00131       _censorshipFlag = iCensorshipFlag;
00132     }
00133
00134     // compute minimum fare
00135     void updateMinimumFare() {
00136       double minFare = std::numeric_limits<double>::max();
00137       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 sensored: " << _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 (UnitTestConfig);
00221
00225 BOOST_AUTO_TEST_SUITE (master_test_suite)
00226
00227
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 unsigned int lNoOfClass = lBookingClassDataSet.getNumberOfClass();
00275
00276   // DEBUG
00277   STDAIR_LOG_DEBUG ("Number of Classes: " << lNoOfClass);
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
```

26.103 test/rmol/ForecasterTestSuite.cpp File Reference

26.104 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
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
       (boost_utf::log_successful_tests);
00042   }
00043
00045   ~UnitTestConfig() {
00046   }
00047 };
00048
00049
00050 // ///////////////// Main: Unit Test Suite ///////////////
00051
00052 // Set the UTF configuration (re-direct the output to a specific file)
00053 BOOST_GLOBAL_FIXTURE (UnitTestConfig);
00054
00059 BOOST_AUTO_TEST_SUITE (master_test_suite)
00060
00061
00064 BOOST_AUTO_TEST_CASE (rmol_forecaster_q_forecasting) {
00065   const bool lTestFlag = true; //testForecasterHelper(0);
00066   BOOST_CHECK_EQUAL (lTestFlag, true);
00067   BOOST_CHECK_MESSAGE (lTestFlag == true,
00068                        "The test has failed. Please see the log file for "
00069                        << "more details");
00070 }
00071
00072 // End the test suite
00073 BOOST_AUTO_TEST_SUITE_END()
00074
00075
```

26.105 test/rmol/ForecasterTestSuite.hpp File Reference

```
#include <sstream>
#include <cppunit/extensions/HelperMacros.h>
```

Classes

- class ForecasterTestSuite

Functions

- CPPUNIT_TEST_SUITE_REGISTRATION (ForecasterTestSuite)

26.105.1 Function Documentation

26.105.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (ForecasterTestSuite)

26.106 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
00013   void testQForecaster();
00014
00016   ForecasterTestSuite ();
00017
00018 protected:
00019   std::stringstream _describeKey;
00020 };
00021
00022 CPPUNIT_TEST_SUITE_REGISTRATION (
      ForecasterTestSuite);
```

26.107 test/rmol/OptimiseTestSuite.cpp File Reference

26.108 OptimiseTestSuite.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 OptimiseTestSuite
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 #include <rmol/config/rmol-paths.hpp>
00025
00026 namespace boost_utf = boost::unit_test;
00027
00028 // (Boost) Unit Test XML Report
00029 std::ofstream utfReportStream ("OptimiseTestSuite_utfresults.xml");
00030
00034 struct UnitTestConfig {
00036   UnitTestConfig() {
00037     boost_utf::unit_test_log.set_stream (utfReportStream);
00038     boost_utf::unit_test_log.set_format (boost_utf::XML);
00039     boost_utf::unit_test_log.set_threshold_level (boost_utf::log_test_units);
00040     //boost_utf::unit_test_log.set_threshold_level
       (boost_utf::log_successful_tests);
00041   }
00042
00044   ~UnitTestConfig() {
00045   }
00046 };
00047
00048
00049 // ////////////////////////////////////////////////////////////////////
00050 int testOptimiseHelper (const unsigned short optimisationMethodFlag,
00051                         const bool isBuiltin) {
00052
00053   // Return value
00054   int oExpectedBookingLimit = 0;
00055
00056   // Output log File
00057   std::ostringstream oStr;
00058   oStr << "OptimiseTestSuite_" << optimisationMethodFlag << ".log";
00059   const stdair::Filename_T lLogFilename (oStr.str());
00060
00061   // Number of random draws to be generated (best if greater than 100)
00062   const int K = 100000;
00063
00064   // Methods of optimisation (0 = Monte-Carlo, 1 = Dynamic Programming,
00065   // 2 = EMSR, 3 = EMSR-a, 4 = EMSR-b, 5 = EMSR-a with sellup prob.)
00066   const unsigned short METHOD_FLAG = optimisationMethodFlag;
00067
```

```
00068   // Cabin Capacity (it must be greater then 100 here)
00069   const double cabinCapacity = 100.0;
00070
00071   // Set the log parameters
00072   std::ofstream logOutputFile;
00073   // Open and clean the log outputfile
00074   logOutputFile.open (lLogFilename.c_str());
00075   logOutputFile.clear();
00076
00077   // Initialise the RMOL service
00078   const stdair::BasLogParams lLogParams (stdair::LOG::DEBUG, logOutputFile);
00079   RMOL::RMOL_Service rmolService (lLogParams);
00080
00081   // Check wether or not a (CSV) input file should be read
00082   if (isBuiltin == true) {
00083
00084     // Build the default sample BOM tree and build a dummy BOM tree.
00085     rmolService.buildSampleBom();
00086
00087   } else {
00088
00089     // Parse the optimisation data and build a dummy BOM tree
00090     const stdair::Filename_T lRMInputFileName (STDAIR_SAMPLE_DIR
      "/rm02.csv");
00091     rmolService.parseAndLoad (cabinCapacity, lRMInputFileName);
00092   }
00093
00094   switch (METHOD_FLAG) {
00095   case 0: {
00096     // DEBUG
00097     STDAIR_LOG_DEBUG ("Optimisation by Monte-Carlo (MC)");
00098
00099     // Calculate the optimal protections by the Monte Carlo
00100     // Integration approach
00101     rmolService.optimalOptimisationByMCIntegration (K);
00102     break;
00103   }
00104
00105   case 1: {
00106     // DEBUG
00107     STDAIR_LOG_DEBUG ("Optimisation by Dynamic Programming (DP)");
00108
00109     // Calculate the optimal protections by DP.
00110     rmolService.optimalOptimisationByDP ();
00111     break;
00112   }
00113
00114   case 2: {
00115     // DEBUG
00116     STDAIR_LOG_DEBUG ("Calculate the Bid-Price Vectors (BPV) by EMSR");
00117
00118     // Calculate the Bid-Price Vector by EMSR
00119     rmolService.heuristicOptimisationByEmsr ();
00120     break;
00121   }
00122
00123   case 3: {
00124     // DEBUG
00125     STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRa");
00126
00127     // Calculate the protections by EMSR-a
00128     // Test the EMSR-a algorithm implementation
00129     rmolService.heuristicOptimisationByEmsrA ();
00130
00131     // Return a cumulated booking limit value to test
00132     // oExpectedBookingLimit = static_cast<int> (lBookingLimitVector.at(2));
00133     break;
00134   }
00135
00136   case 4: {
00137     // DEBUG
00138     STDAIR_LOG_DEBUG ("Calculate the Authorisation Levels (AUs) by EMSRb");
00139
00140     // Calculate the protections by EMSR-b
00141     rmolService.heuristicOptimisationByEmsrB ();
00142     break;
00143   }
00144
00145   default: rmolService.optimalOptimisationByMCIntegration (K);
00146   }
00147
00148   // Close the log file
00149   logOutputFile.close();
00150
00151   return oExpectedBookingLimit;
00152 }
00153
```

```
00154
00155 // ///////////////// Main: Unit Test Suite //////////////
00156
00157 // Set the UTF configuration (re-direct the output to a specific file)
00158 BOOST_GLOBAL_FIXTURE (UnitTestConfig);
00159
00160 // ////////////////////////////////////////////////////////////////////
00161 // Tests are based on the following input values
00162 // price; mean; standard deviation;
00163 // 1050; 17.3; 5.8;
00164 // 567; 45.1; 15.0;
00165 // 534; 39.6; 13.2;
00166 // 520; 34.0; 11.3;
00167 // ////////////////////////////////////////////////////////////////////
00168
00173 BOOST_AUTO_TEST_SUITE (master_test_suite)
00174
00175
00178 BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo) {
00179
00180   // State whether the BOM tree should be built-in or parsed from an input file
00181   const bool isBuiltin = false;
00182
00183   BOOST_CHECK_NO_THROW (testOptimiseHelper(0, isBuiltin););
00184 }
00185
00189 BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming) {
00190
00191   // State whether the BOM tree should be built-in or parsed from an input file
00192   const bool isBuiltin = false;
00193
00194   BOOST_CHECK_NO_THROW (testOptimiseHelper(1, isBuiltin););
00195 }
00196
00201 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bpv) {
00202
00203   // State whether the BOM tree should be built-in or parsed from an input file
00204   const bool isBuiltin = false;
00205
00206   BOOST_CHECK_NO_THROW (testOptimiseHelper(2, isBuiltin););
00207 }
00208
00213 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a) {
00214
00215   // State whether the BOM tree should be built-in or parsed from an input file
00216   const bool isBuiltin = false;
00217
00218   BOOST_CHECK_NO_THROW (testOptimiseHelper(3, isBuiltin););
00219   // const int lBookingLimit = testOptimiseHelper(3);
00220   // const int lExpectedBookingLimit = 61;
00221   // BOOST_CHECK_EQUAL (lBookingLimit, lExpectedBookingLimit);
00222   // BOOST_CHECK_MESSAGE (lBookingLimit == lExpectedBookingLimit,
00223   //                      "The booking limit is " << lBookingLimit
00224   //                      << ", but it is expected to be "
00225   //                      << lExpectedBookingLimit);
00226 }
00227
00232 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b) {
00233
00234   // State whether the BOM tree should be built-in or parsed from an input file
00235   const bool isBuiltin = false;
00236
00237   BOOST_CHECK_NO_THROW (testOptimiseHelper(4, isBuiltin););
00238 }
00239
00243 BOOST_AUTO_TEST_CASE (rmol_optimisation_monte_carlo_built_in) {
00244
00245   // State whether the BOM tree should be built-in or parsed from an input file
00246   const bool isBuiltin = true;
00247
00248   BOOST_CHECK_NO_THROW (testOptimiseHelper(5, isBuiltin););
00249 }
00250
00254 BOOST_AUTO_TEST_CASE (rmol_optimisation_dynamic_programming_built_in) {
00255
00256   // State whether the BOM tree should be built-in or parsed from an input file
00257   const bool isBuiltin = true;
00258
00259   BOOST_CHECK_NO_THROW (testOptimiseHelper(6, isBuiltin););
00260 }
00261
00266 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_bpv_built_in) {
00267
00268   // State whether the BOM tree should be built-in or parsed from an input file
00269   const bool isBuiltin = true;
00270
00271   BOOST_CHECK_NO_THROW (testOptimiseHelper(7, isBuiltin););
```

```
00272 }
00273
00278 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_a_built_in) {
00279
00280   // State whether the BOM tree should be built-in or parsed from an input file
00281   const bool isBuiltin = true;
00282
00283   BOOST_CHECK_NO_THROW (testOptimiseHelper(8, isBuiltin););
00284 }
00285
00290 BOOST_AUTO_TEST_CASE (rmol_optimisation_emsr_b_built_in) {
00291
00292   // State whether the BOM tree should be built-in or parsed from an input file
00293   const bool isBuiltin = true;
00294
00295   BOOST_CHECK_NO_THROW (testOptimiseHelper(9, isBuiltin););
00296 }
00297
00298 // End the test suite
00299 BOOST_AUTO_TEST_SUITE_END()
00300
00301
```

26.109 test/rmol/OptimiseTestSuite.hpp File Reference

```
#include <sstream>
#include <cppunit/extensions/HelperMacros.h>
```

Classes

- class OptimiseTestSuite

Functions

- CPPUNIT_TEST_SUITE_REGISTRATION (OptimiseTestSuite)

26.109.1 Function Documentation

26.109.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (OptimiseTestSuite)

26.110 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);
```

26.111 test/rmol/UnconstrainerTestSuite.cpp File Reference

26.112 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
```

26.113 test/rmol/UnconstrainerTestSuite.hpp File Reference

```
#include <sstream>
#include <cppunit/extensions/HelperMacros.h>
```

Classes

- class UnconstrainerTestSuite

Functions

- CPPUNIT_TEST_SUITE_REGISTRATION (UnconstrainerTestSuite)

26.113.1 Function Documentation

26.113.1.1 CPPUNIT_TEST_SUITE_REGISTRATION (UnconstrainerTestSuite)

26.114 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
00013   void testUnconstrainingByEM();
00014
00016   UnconstrainerTestSuite ();
00017
00018 protected:
00019   std::stringstream _describeKey;
00020 };
00021
00022 CPPUNIT_TEST_SUITE_REGISTRATION (
      UnconstrainerTestSuite);
```

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