

User Manual 3.4.1 Data management system

De Wiki

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Introduction

Scope

The scope of this chapter is to present data management in the OREKIT library. This section presents the three modules of the data management system provided by Orekit :

- how does the data management system of Orekit work?
- how to set it up?
- how to use it?
- how to add data to what already exists?
- what are the pros and cons of this system?

NOTE : this page describes Orekit's data management system assuming it will be used "as is" in PATRIUS- but this is subject to change in later development stages.

Javadoc

The data objects are available in the package `org.orekit.data` in the Orekit.

Library	Javadoc
Orekit	Package org.orekit.data

Links

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Useful Documents

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Package Overview

The data loading process is organized through three main objects.

The `DataProvider` classes handle data sources. Each one of them has a particular type of source it can browse. The `DirectoryCrawler` performs a bottom-first search in a directory tree. The `ZipJarCrawler` works alike, but inside a compressed file. The `ClassPathCrawler` handles a list of data files and/or compressed files that are in the classpath (it can not search recursively like the `DirectoryCrawler` though). Finally, the `NetworkCrawler` works like the `ClassPathCrawler`, although in its case, it has a list of URLs instead of files. There is no limit to the number of `DataProviders` a program can use at once.

The Providers are listed and put to work through the `DataProvidersManager` singleton. This is the single point of access to the data management system. It contains a list of Providers that are queried every time a user needs data.

The various crawlers provide streams to the `DataLoader`. From these streams, the `DataLoaders` can reconstruct data that was stored in files (either compressed or not), even if some files come from different sources. These streams effectively separate the machine world from the program world, because they hide the former to the latter. Therefore, parsing data from a new format only means creating a loader, and being able to read another kind of file means creating a `DataProvider`. Note that the `DataLoaders` usually serve as a facade for the higher layers of the program.

[Fichier:DataPackageFunctions.png](#)

Features Description

Default provider

The data management system can use a system-wide property, `orekit.data.path`, as an entry point for default data. This default data must be file-based (either a file system entry point or a java resource) and either a directory or a zip/jar file. Setting a default provider is not mandatory, and must be done explicitly by :

- setting a value to `orekit.data.path`,

- calling `addDefaultProviders` on the data provider manager.

The Orekit library jar contains data that can be used as default data.

Adding a provider

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Using the data management system

The data management system main operation is through the `feed` method. This method takes a `DataLoader`, and a regexp string matching the name of files the `DataLoader` is able to process. In this method call :

- the `DataProviders` list is traversed in the priority order.
- the first `DataProvider` providing a file matching the regexp is the one (and only) used to feed the `DataLoader`.

Adding new data

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Getting Started

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Interfaces

The data package includes the following interfaces :

Data

Interface	Summary	Javadoc
DataLoader	Interface for loading data files from <code>DataProvider</code> data providers.	...
DataProvider	Interface for providing data files to <code>DataLoader</code> file loaders.	...

Classes

The data package includes the following classes :

Data

Class	Summary	Javadoc
DataProvidersManager	This class is the single point of access for all data loading features.	...
DirectoryCrawler	This class handles data files recursively starting from a root directories.	...
NetworkCrawler	This class handles a list of URLs pointing to data files or zip/jar on the net.	...

✖ Tips & Tricks

Strengths

- Lightweight implementation. The providers never load data, they merely provide streams on demand to the loaders.
- Scalable for using data from several heterogeneous sources.
- Scalable for new data types : the user only needs to create a new `DataLoader` implementation to use a new data type in this system.

Weaknesses

- The user must be aware the data loading overhead happens any time a `DataLoader` is fed, so the user must manage its loaders so that they are fed only once.
- Several sources for the same type of data cannot be used, since only the last provider added is used to feed data to a loader- unless the user manages the providers list accordingly, knowing one can only add elements or reset the whole list.
- The regexp is the only way to match a data file and a `DataLoader`.
- As of today, the data management system is a thread-hostile singleton : a multithreaded application shares the same providers list for all threads, and it may deadlock on a concurrent access!

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