

Sitools2, a framework for archival systems

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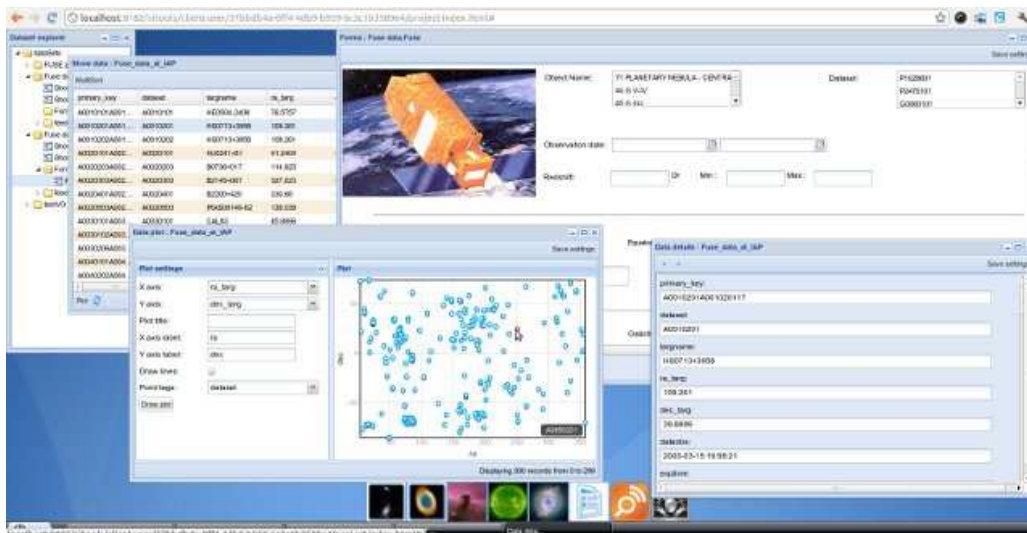
ABSTRACT

CNES (Centre National d'Etudes Spatiales) as well as scientific communities are expected to provide data access to their experiments. This led developers to redevelop some common functionalities contained in each archive facility instead of reusing existing applications. SITools2, a web application under GPLv3 license, has been designed in a community mind. It offers common services through an easy-to-use open source web platform. Furthermore, SITools2 is highly tunable. It allows connecting at different data sources and to expose their contents in different ways: a REST API and/or graphical user interfaces based on AJAX. With its opened architecture, SITools2 is also a framework that permits developers to extend the server API, simply integrating their own applications as plug-ins. Thus developers can act at each steps of the data research, request and retrieval, but also create highly-specific services. The SITools2 client is also extensible by adding modules and advanced graphical components. Some instantiations of SITools2 are already being customized in several data centers as LAM (Laboratoire d'Astrophysique de Marseille) and IAS (Institut d'Astrophysique Spatial d'Orsay) to make available their data to the scientific community. But, as a generic tool to interface data and information sources, SITools2 intends to take part of larger projects in the scientific community.

Keywords: sitools2, data access layer, REST, framework, web 2.0, web 3.0

INTRODUCTION

In 2002, CNES decided to develop SITools, a generic software to set up data access layers in his data centers and scientific laboratories. After eight years of exploitation and maintenance, the product is being to be replaced by SITools2. The needs of SITools2 have been based on feedbacks from developers in scientific laboratories. In order to involve scientific laboratories in SITools2's development, we have conducted the project through an Agile method. This method allows an iterative development and an integration of users feedback.



WHY DO USE IT ?

SITools2 provides a set of common services that can be used by each archive facility for whatever thematic. In addition to these common services, SITools2 provides a set of extension points so that an administrator can plug any services related to his thematic. In other words, SITools2 is a kind of web platform providing some services by default and owning some extension points that can host specific plug-ins. From the administrator point of view, SITools2 is a convivial interface that does not require any specific database schema. Each application in SITools2 (common services and plug-ins) can be configured and securized by the administrator by means of the administration page. From the developer point of view, SITools2 provides a framework that allows both a fast development and a fast integration in the server. From the end-user point of view, SITools2 is a convivial interface that emulates a desktop environment.

ARCHITECTURE

The choice of main technologies has been selected before the startup of the project through two studies: one about the server with the choice of a REST architecture and another one about the client with the choice of a Rich Internet Application.

Global architecture

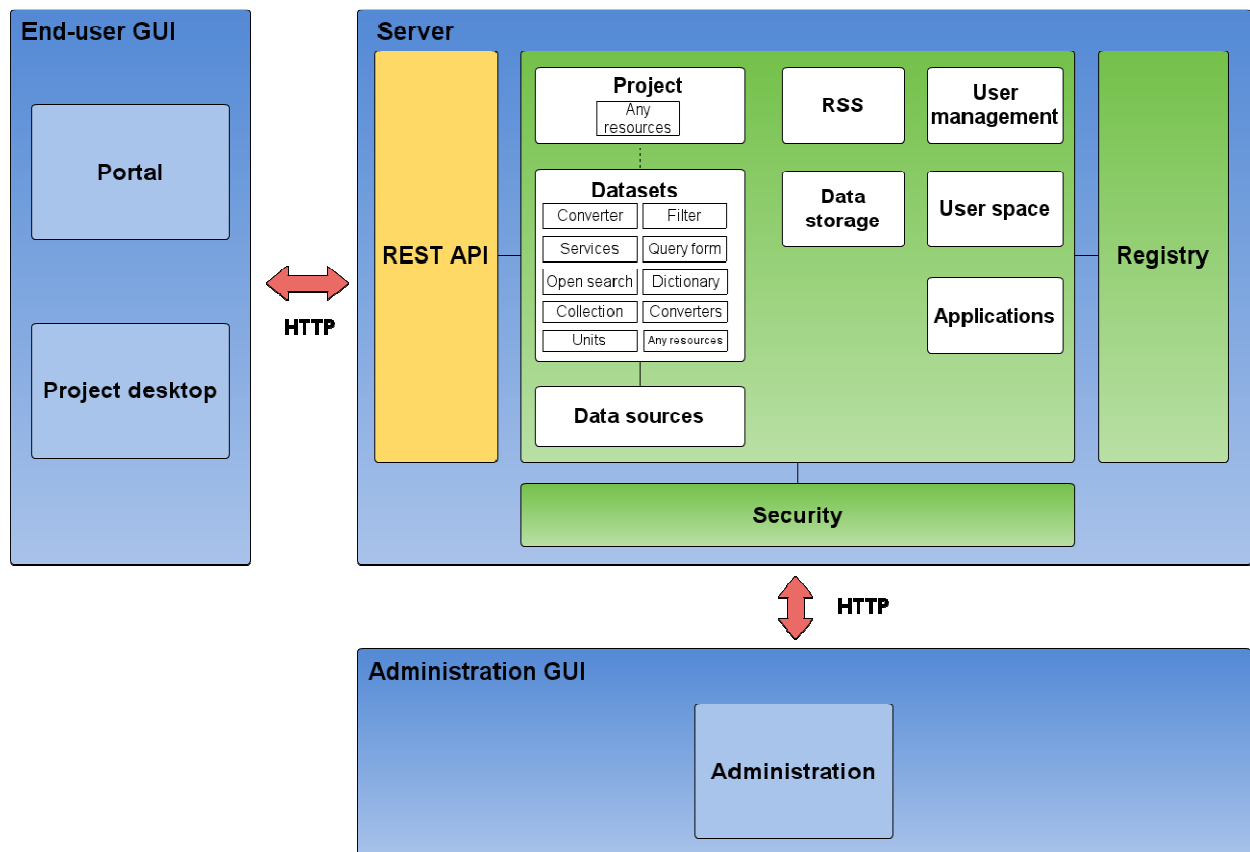


Figure 1: Platform architecture

SITools2 is a client/server architecture. The client is composed of three web interfaces:

- a portal that provides the list of projects hosted by the archive facility,
- a project web interface that provides datasets and services to users,

- and finally an administration web page that provides all functionalities to administrate the system, including plug-in deployment and configuration.

By default, SITools2 provides a set of configurable applications as illustrated in figure 1 in order to use it as is. The main applications included in the server are presented in the following table 1.

Application name	Description
Data source	source Application that connects to a database.
Datasets	Application that exposes data through datasets in according with data policy
Projects	Application that exposes datasets and services through a project.
RSS	Application that exposes RSS stream coming from datasets and archive facility.
Data storage	Application that exposes files according to data policy.
User management	Application that handles user accounts.
User space	Application that handles user space for each user account.
Applications	Plug-in that adds new applications.
Resources	Plug-in that extends application initial services.
Security	Application that handles security access according to data policy.
Registry	Application that registers each application of the system in order to use it.

Table 1: Server applications description

When new features are needed in SITools2, developers must develop new applications using the SITools2 framework as presented in the next section.

Architecture extension points

Server side

The framework at the server side is composed of a SITools2 core and a set of SITools2 extensions. The SITools2 core is distributed as a standalone JAR that contains the main SITools2 API. SITools2 developers typically write extensions according to this SITools2 API for adding new features to the core API. Then, the different JAR extensions are copied in a specific directory and then each JAR file is added in the CLASSPATH after the server has been restarted. As illustrated in figure 2, developers can write different kind of extensions when data access layer capability does not satisfy their needs. These extensions are pluggable and automatically discovered by SITools2.

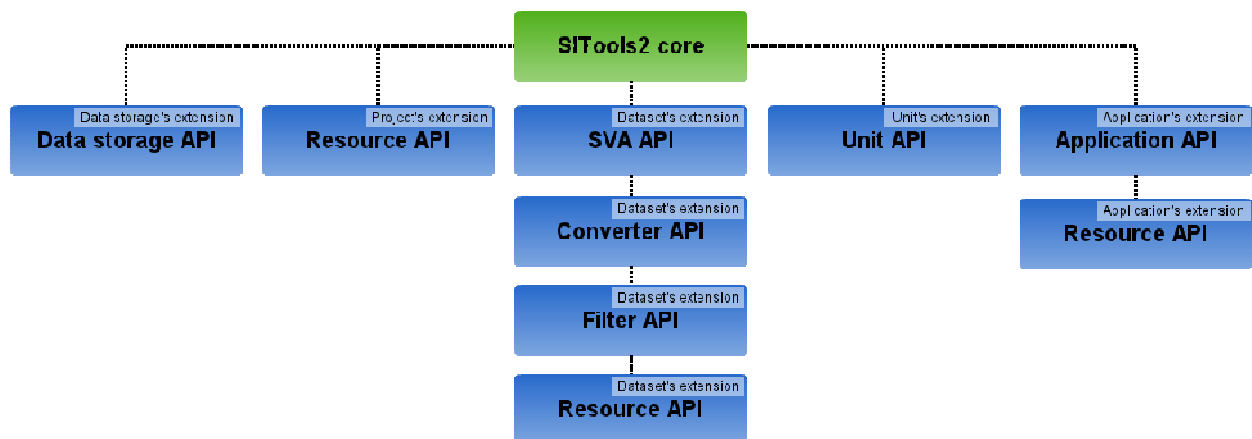


Figure 2: Server API

The following table 2 shows the list of plug-in extension.

Extension name	Description
Data storage	Provides an implementation API to check the access part of files using a business mechanism.
Resource	Provides an API to expose a resource attached to projects, datasets or applications.
Projects	Application that exposes datasets and services through a project.
SVA	Provides an implementation API to process data in a synchronous or asynchronous way.
Converter	Provides an implementation API to apply a transfer function on data.
Filter	Provides an implementation API to add new search capability to the core API.
Unit	Provides an implementation API to convert units.
Application	Provides an API to expose new applications.

Table 2: Server plug-ins description

Server side

The framework at the client side, written in JavaScript (using the ExtJS-3.0 library), is composed of a core part and extensions as application modules. Each module can be removed or added thanks to the module manager. At first, the user reaches a portal exposing available projects, news, full-text search and RSS feeds. Credentials associated to users allow them to access some of the projects, others being blocked or fully hidden. Accessing a project opens a dedicated desktop where the user can browse, search, filter, command, treat, access or plot numeric data.

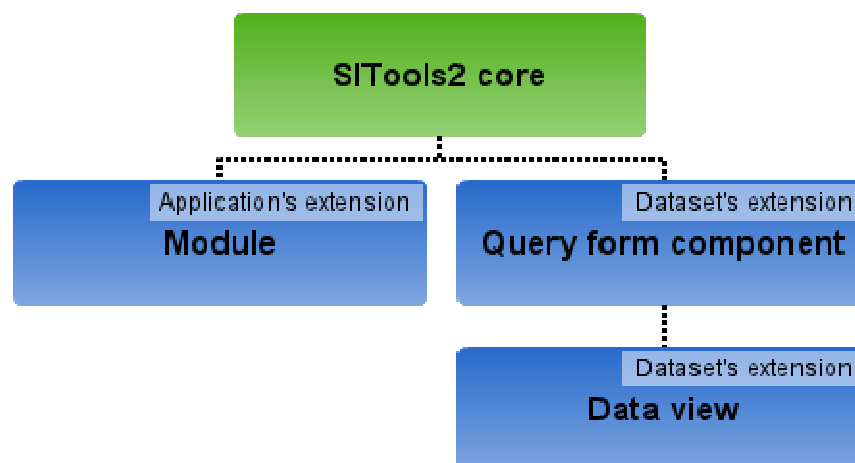


Figure 3: Client API

FORGE AND USE

As illustrated in **Erreur ! Source du renvoi introuvable.**, SITools2 has been deployed this year on sourceforge and is available at <http://sitools2.sourceforge.net>

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SI TOOLS 2
INFORMATION SYSTEM TOOL

SITools2 is a new CNES generic tool performed by a joint effort between CNES and scientific laboratories.

The aim of SITools is to provide a self-manageable data access layer deployed on already existing scientific laboratory databases.

- SITools Packager
- Extensions (soon)
- Documentation (soon)
- Javadoc

Screenshots

- User Portal: View of the different projects within the archive
- Project web page: Data discovery and download
- Administration web page: Data access layer configuration and user management

Project Mailing Lists

- sitools2-developers - (archive)
List for developers only
- sitools2-users - (archive)
End-user mailing list

Project Trackers

- Bugs
Bug Tracking System
- Support Requests
Tech Support Tracking System
- Patches
Patch Tracking System
- Feature Requests
Feature Request Tracking System

Figure 4: SITools2 on Sourceforge

Some online tutorials are also available for getting started at the following URL <http://sitools2.sourceforge.net/tuto/tuto.html>. The first version (0.8 in July 2011) has been downloaded 96 times. Through these downloads, SITools2 is used in various thematic: astronomy, medicine, Earth observation.