

Scalable Processor for Altimetry

New CNES processing center for Altimetry missions

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Introduction

SPA (Scalable Processor for Altimetry) is a processing center dedicated to Altimetry missions data management and science processing activation. SPA is part of CNES Altimetry and Orbitography multi-missions data ground segment (SSALTO). Initially, SPA has been developed in the frame of Jason-2 mission by CNES SSALTO team (with THALES Services subcontractor). SPA concept was driven by the will and need to create a high configurable software, with advanced processing capabilities to reduce development and operations costs of future Altimetry missions processing center.

SPA concept

- **High configurable and generic software:** Each SPA function uses a dedicated configuration table to perform each tasks. New tasks can be created just using configuration.
- **Multi-missions system:** SPA can host several missions in a unique instance.
- **Scalable processor:** Using SPA configuration capabilities, operators can increase easily the system processing performances by installing new Science Processing Units (to fulfill reprocessing campaign delay requirements for example)

SPA design

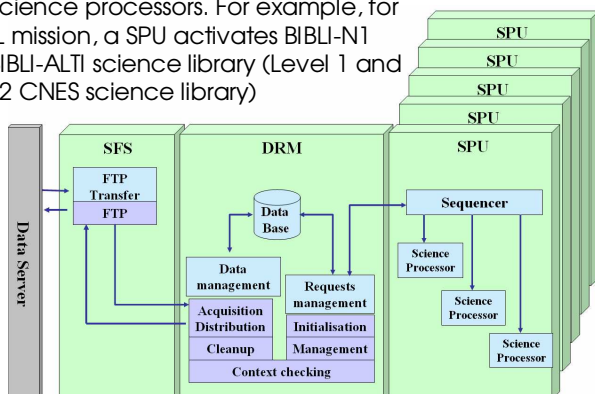
The basic principle of the SPA consists in separating the management of the data from the management of the scientific processing. It leads to identify the following entities:

DATA MANAGEMENT:

- **SFS (SPA Ftp Server):** The SFS is responsible for ftp transferring mission input data (TM and auxiliary files) from an external data server to the SPA server. The SFS can also manage output products broadcast.
- **DRM (Data and Requests Manager):** The DRM manages the data and the processing requests. The main DRM functions consist in ingesting the mission input files. Files are saved in a reference repository and registered in a database. The DRM is also responsible for creating science processing requests in the database (creation triggered by configurable events: file ingestion, operator GUI activation, periodic events...).

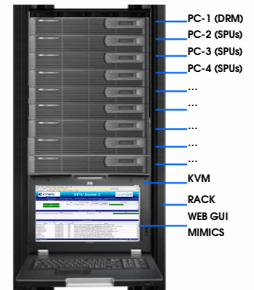
SCIENCE PROCESSING:

- **n SPUs (Science Processing Unit):** the SPA is composed by several SPUs. Each SPU is associated with one or several type of requests. Detecting a new request in the database, the SPU activates the associated science processors. The SPU provides with generic interface principles to be able to integrate easily new science processors. For example, for SARAL mission, a SPU activates BIBLI-N1 and BIBLI-ALTI science library (Level 1 and Level 2 CNES science library)



SPA architecture

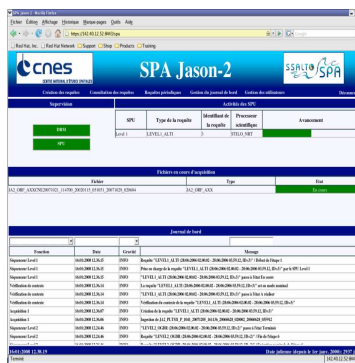
SPA is developed in Java on a Linux platform. SPA can be installed on one or several computers (depending of the processing capabilities required i.e. number of SPUs installed). Hardware architecture is so based on a cluster of several PCs. All SPA components use a unique mysql database to have access to tasks configuration and to store activities reports. The schema presents a generic SPA hardware architecture.



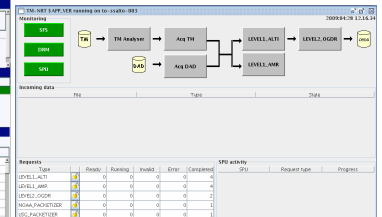
SPA monitoring tools

The SPA software offers the following list of means to monitor the application:

Web GUI: Application monitoring and user interface to manage data and science processing requests.



MIMICS:
Only application monitoring



Missions using the SPA

Mission	Name	Locations	Role
Jason-2	TM-NRT	NOAA EUMETSAT	to generate near-real time products (OGDR) from instrument telemetry.
	SPA SSALTO	CNES	to generate offline products (IGDR/GDR) and to perform POS3 long term calibration from instrument telemetry.
SARAL/ AltiKa	TM-NRT	EUMETSAT ISRO	to generate near-real time products (OGDR) from instrument telemetry.
	SPA SSALTO	CNES	to generate offline products (IGDR/GDR) and to perform AltiKa long term calibration from instrument telemetry.
	SPA ISRO	ISRO	to generate offline products (GDR) from instrument telemetry.

The science processors activated by the SPA are listed below:

Mission	Science processors integrated
Jason-2	TM-Analyser (CNES) for frame to packet TM conversion STILO (CNES) for Level1 ALTI/AMR Processing BIBLI-ALTI (CNES) for Level2 Processing
SARAL/ AltiKa	BIBLI-N1 (CNES) for Level1 ALTI/AMR Processing BIBLI-ALTI (CNES) for Level2 Processing

