



Agenzia Spaziale Italiana



SDC-IT-PROD: Architettura e attività del centro verso la fase operativa

R. Messineo



Agenda

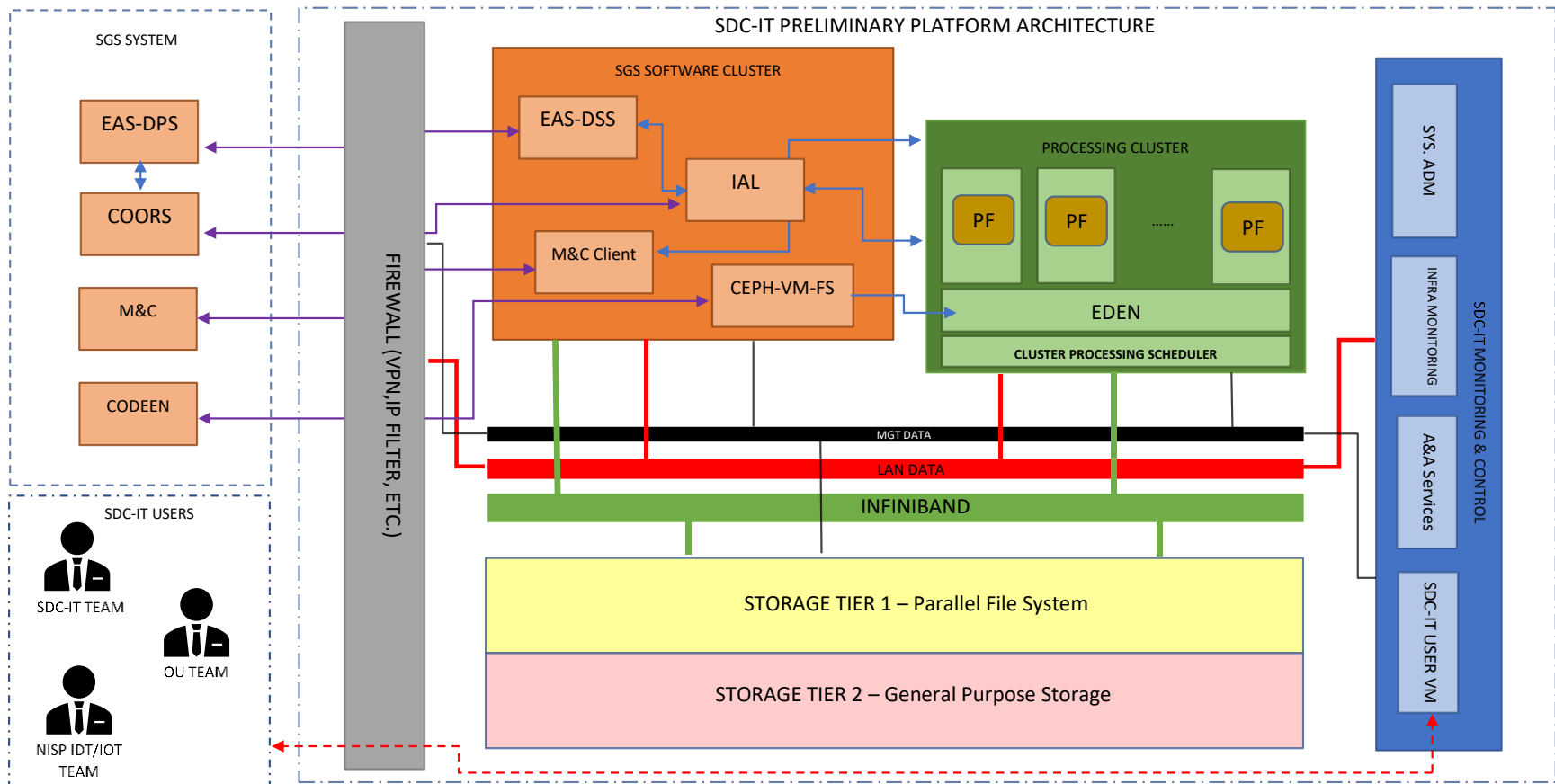
- SDC-IT-PROD - Definition
- SDC-IT-PROD - Architecture
- SDC-IT-INT – Status
- SDC-IT-PROD – Procurement & Integration Plan
- PF Validation Activities
- LE1 Processing Function
- Operations Preparations

SDC-IT-PROD - Definition

- SDC-IT-PROD is the platform provided by ASI for :
 - the validation of the SGS data system and Processing Functions before the launch
 - the execution of the scientific mission operations after the launch and in the post flight phase.
- ALTEC is the contractor awarded by ASI to define and implement the SDC-IT-PROD platform.
- It consists two parts both located in Turin at the ALTEC premises :
 - SDC-IT-INT: Its purpose is to integrate and test SGS data systems and verify and validate PF release (NIR, SIR or MER) before delivering it for production purposes
 - SDC-IT-PROD: It will be the operational SDC-IT infrastructure dedicated to the SGS mission data processing.

SDC-IT-PROD Architecture

- The SDC-IT-PROD architecture is designed to have a HPC and HTC platform providing services and performance suitable for the Euclid SGS.



SDC-IT-INT - Status

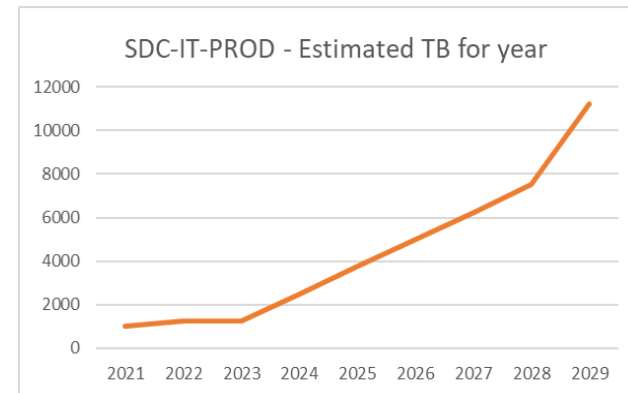
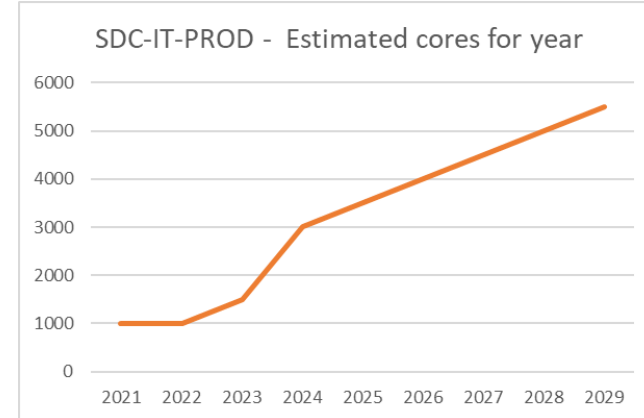


- SDC-IT-INT installed and configured in 2021 and upgraded in 2022.
 - **384 physical cores**
 - **Storage Tier 1 : 700 TB** high performance provided by Lustre Appliance
 - **Storage Tier 2: 1.5 PB** high capacity provided by the HPE ZeroWatt and managed with HPE DMF
 - **InfiniBand up to 200 Gbps**
 - **Internet link up to 1Gbps**
- SGS Infra-System Tests execution to support IAL, DSS and M&C systems evolution.
- PFs execution to verify and validate new scientific software release and the whole SGS data processing.
- It will be used in operations to verify any software upgrades before moving to production.



SDC-IT-PROD – Proc. & Int. Plan

- SDC-IT-PROD will be procured (Q3) and configured (Q4) in 2022.
- The first configuration consists of:
 - **750 physical cores**
 - **Storage Tier 1 : 700 TB** high performance provided by Lustre Appliance
 - **Storage Tier 2: 2 PB** high capacity provided by the HPE ZeroWatt and managed with HPE DMF
 - **InfiniBand up to 200 Gbps**
 - **Internet link up to 10 Gbps**
- Integration and test campaign to verify the platform before the launch.
- The infrastructure will scale up along the operations phases (see charts for cores and storage estimations).
- The Procurement Plan is available and maintained by the ALTEC Team.



PF Validation Activities



- Objectives are the following:
 - continuous integration and validation of PF before scientific software release;
 - standard validation approach based on understandable pass/fail criteria addressing result evaluation.
- PF_Validation is the SW developed to support the validation of SIR and NIR PF.
- PF_Validation project contains a set of libraries which allows to:
 - handle the execution of one or more scripts.
 - archive on local filesystem the data produced
 - create and publish report
- The validation of the SIR PF is the first use case in which PF_Validation has been successfully involved.
- The validation of the NIR PF using in the PF_Validation is ongoing.
- Integration of the Integrated Document Tool for STR automatic generation.
- Merge request mechanism has been implemented as software change control process.
- Several telecon to collect scientists needs and perform training on the common validation approach for SIR and NIR

SIR_Validation_TC_execution_with_PF_Validation_CVMFS

Test Campaign Overview

Motivation: SIR 2.7.3 validation using PF_Validation on CVMFS

SW version tested: 2.7.3

Execution date: 2021-10-14 12:57:57.709447

Test cases executed:

| Test case Id | Requirements | Result |
|---|--|--------|
| TC-SIR-000002-zeroth-orders | [R-SIR-CAL-F-020', R-SIR-CAL-F-210'] | NA |
| TC-SIR-000003-zeroth-first-order-distance | [R-SIR-CAL-F-020', R-SIR-CAL-F-030', R-SIR-CAL-F-210'] | NA |
| TC-SIR-000015-flatfield-pixels | [R-SIR-CAL-F-110', R-SIR-PRD-F-120'] | NA |
| TC-SIR-000018-extracted-spectra | [R-SIR-PRD-F-040', R-SIR-PRD-F-050', R-SIR-PRD-F-060'] | True |
| TC-SIR-000021-background | [R-SIR-PRD-F-130'] | NA |
| TC-SIR-000023-saturated-stars | [R-SIR-PRD-F-170'] | NA |
| TC-SIR-000006-lambdacal-infield-stability | [R-SIR-CAL-F-040', R-SIR-CAL-F-210'] | NA |
| TC-SIR-000024-extraction-details | [R-SIR-CAL-F-090', R-SIR-PRD-F-040'] | False |

TC-SIR-000002-zeroth-orders

> Open Test Case View

TC-SIR-000003-zeroth-first-order-distance

> Open Test Case View

TC-SIR-000015-flatfield-pixels

> Open Test Case View

TC-SIR-000018-extracted-spectra

> Open Test Case View

TC-SIR-000021-background

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TC-SIR-000023-saturated-stars

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TC-SIR-000006-lambdacal-infield-stability

> Open Test Case View

TC-SIR-000024-extraction-details

> Open Test Case View

> Files (340)

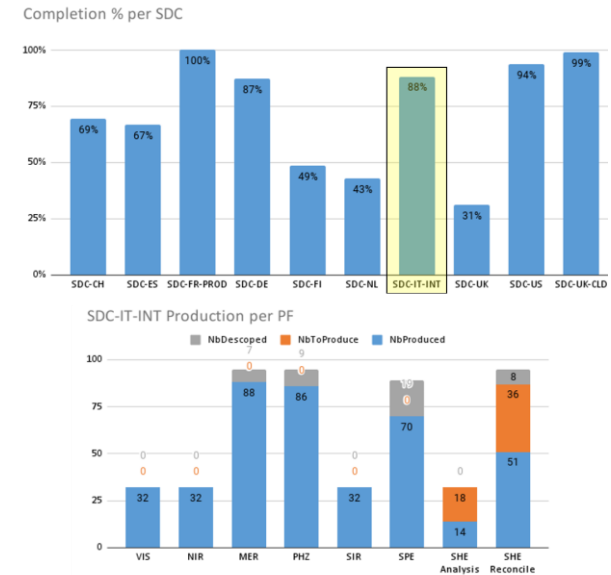


LE1 Processing Function

- The LE1 NISP Processor aims to generate level 1 products starting from the raw data of NISP instrument. It will be run as a Docker container. The output products are compliant with the Common Data Model and consist of three different FITS products, referenced by an XML file:
 - SCI FITS file: containing the scientific image and quality data
 - HK FITS file: containing the housekeeping data such as rawlines, digital TLM, analog TLM, and errors data
 - ENG FITS (depending on the instrument mode): containing engineering data
- The latest version is 2.0.2, which is compliant with the Data Model 8.0.5 and allows the processing of all NISP instrument modes.
- Version 3.0.0 is currently under development, scheduled for release in March (SVT 1-3) and it will include the following updates:
 - EDEN 3.0 compatible
 - Data Model 9 compliant
 - OBT conversion minor bugfix
- LE1 NISP Processor validated by INAF-OATs exploiting dataset acquired on instrument ground test campaign.
- LE1 NISP Processor was successfully exercised in SOVT1. NISP LE1 data products ingested into the Euclid Archive and analysed through IODA.
- Software maintenance and evolution to prepare operations. Few issues on the side of the SOC processor.

Operations Preparations

- Execution of the SC8 Wide Production and Deep Field in 2021 and subsequent result analysis.
- Execution of the first Operational Rehearsal(OR).
- Participation to all SGS System Test Campaigns and ORs before the launch.
- Define, procure and configure the environment to operate NISP IOT data systems : IODA e ICR
- Evolve the platform to enable remote access and resources utilisation for supporting SDC-IT Development Team in scientific software integration and troubleshooting.
- Operations Team composition and training.
- Operations products preparation in terms of procedure and operations tools configuration.
- Industrial Contract renewal.



SC8 SDCs completion percentage ; Credit SC Coordination Team



Thanks to the SDC-IT-PROD Team :

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