Copernicus Ground Segment Operations Transformation

Collaborative Ground Segment Meeting – ESRIN 2018-11-04

Context

- A progressive transformation of the Copernicus Ground Segment operations is foreseen from now until the end of the 2021.

- The context of the Copernicus Ground Segment operations transformation is detailed in the “ESA Copernicus Operations Analysis 20180920, ESA-EOPG-CSCOP-TN-73” prepared by ESA in the frame of the Copernicus operations with the COM.

- The transformation activities will be implemented in parallel to the on-going routine operations execution, with a gradual transfer to the new scenario and no impact on the operations continuity and performance.

Operations transformation principles

- Key technical objectives of the operations transformation:
  - Simplification of data flows
  - Streamlining of interfaces across services
  - Transfer to the cloud of operations involving production

- Key technical drivers for the operations transformation:
  - ✓ No impact on the user interfaces and in particular on the data access interfaces
    - ✓ No impact on the collaborative interfaces and generally on Technical Agreements
  - ✓ No impact on operations continuity and performance
  - ✓ No technical lock-in

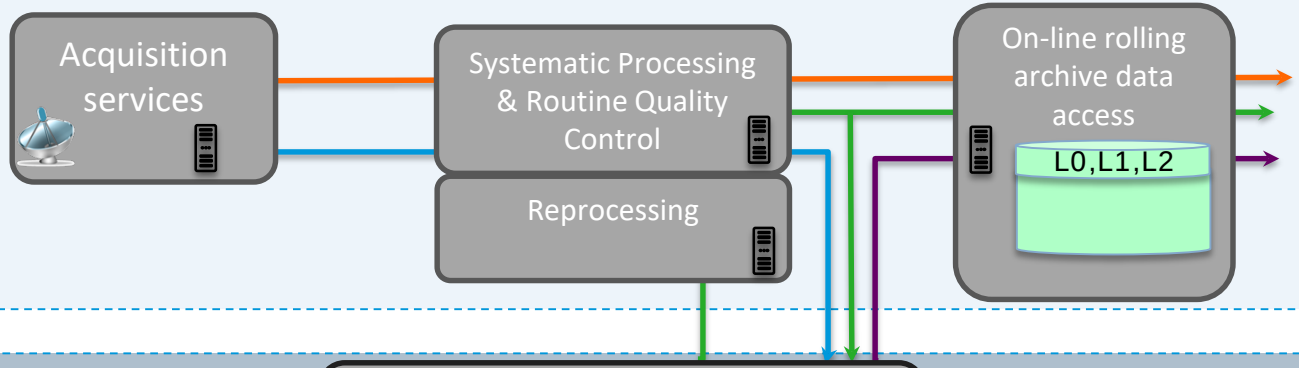
Associated key technical evolutions

- Optimize the access to the long term archived data in order to minimize the LTA size while ensuring that source data required to re-generate any mission product is safeguarded.
  - Review the needs for the long term archiving of Sentinel L1 & L2 products, per product type and mission

- Introduce the user-driven on demand processing, as a transparent mechanism to access any Sentinel product at any time without storing for the long term the complete mission production.

- Reinforce the product traceability and consolidate the process to manage the product life-cycle.

Associated key technical evolutions: current high level scenario



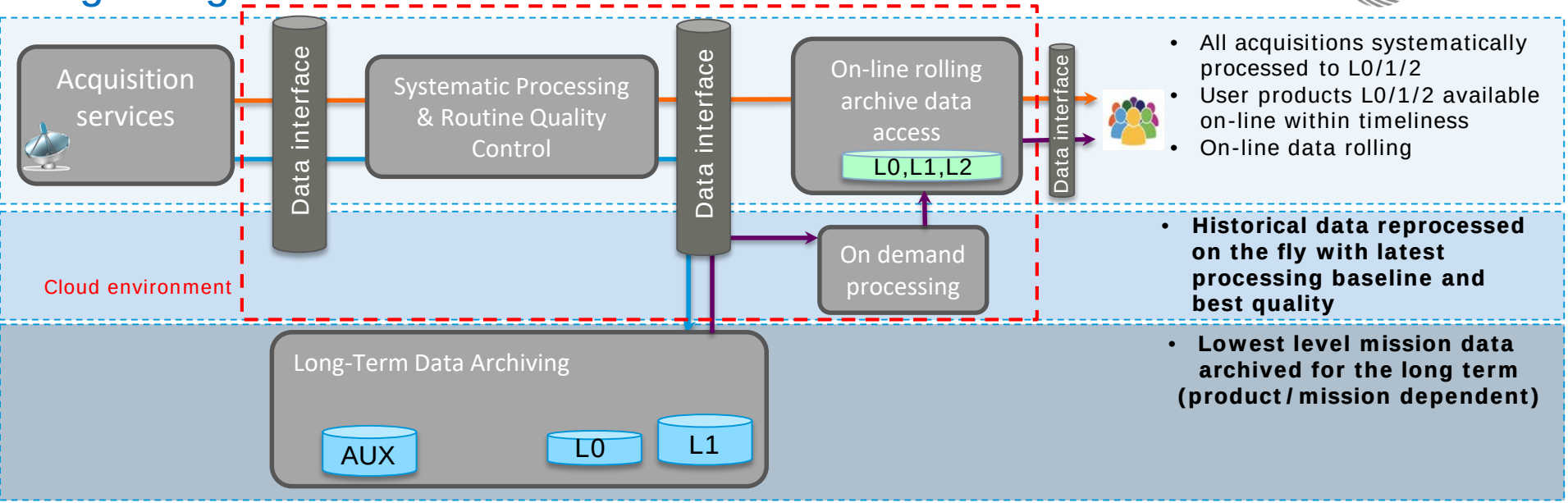
- All acquisitions systematically processed to L0/1/2
- User products L0/1/2 available on-line within timeliness
- On-line data rolling
- Historical data retrieved from LTA
- Dormant bulk reprocessing capability to provide harmonized data time series

- All generated user products archived for the long term

➢ Ever increasing archived volume -> potentially obsolete data quality & potentially never re-used
➢ Fixed processing & reprocessing infrastructure -> performance driven by infrastructure sizing, no elasticity
➢ Dedicated HW deployment hosted at each site -> low flexibility for changing the service provider

Systematic processing of satellite data to user products and on-line data access
Systematic Long Term Archiving of all L0, L1, L2 products
On request retrieval of historical user products from LTA
Reprocessing campaign to align data time series quality

Associated key technical evolutions: target high level scenario



- All acquisitions systematically processed to L0/1/2
- User products L0/1/2 available on-line within timeliness
- On-line data rolling

- **Historical data reprocessed on the fly with latest processing baseline and best quality**

- **Lowest level mission data archived for the long term (product / mission dependent)**

➢ Contained archived data volume -> optimised long terms archiving & data transfer
➢ Use of cloud environment for production and data access -> adjustable performance
➢ **All data available at any time with optimised archiving resources and elastic processing capabilities**

Systematic processing of satellite data to user products and on-line data access
Systematic Long Term Archiving of all L0 products
On request reprocessing of historical products

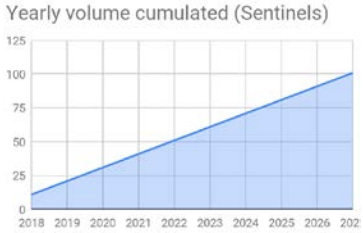
On-demand production

The availability of on-demand production is a major step forward for the ground segment operations, it allows to:

- Provide a reprocessing solution adapted to users needs

  e.g. historical products available any time with the latest processing baseline, requested production aligned with user ingestion and data handling capacity

- Maintain the archive volume growth for the coming 10 years within a reasonable range: *On demand reprocessing from L0 or L1 allows major gains on the LTA*



	2021	2022	2023	2024	2025	2026	2027
Vol. managed for the period (PB)	50	60	70	80	90	100	110
Total managed for the programme	> 500PB						

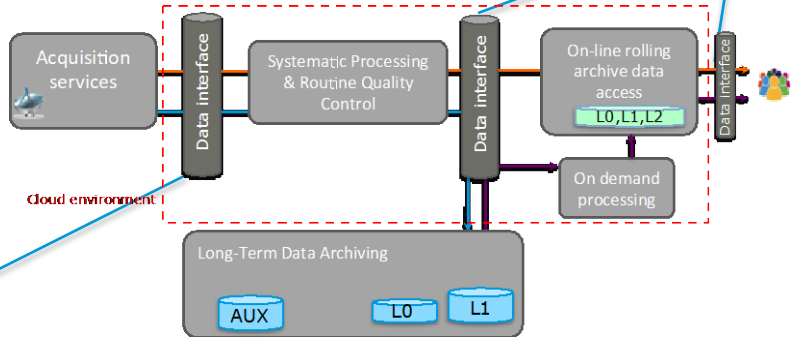
Volume managed: Volume of unique data to be archived, acquired, produced systematically and available for user retrieval. This is not taking into account reprocessing.*

- Stimulate the development of flexible processors and products tailored to user needs (e.g. usage of user parameters, auxiliary data, creation of smaller data units)

Preparatory technical specifications

- LTA access interfaces
- On-demand processing interfaces
- Data access interfaces
- Reporting interfaces for E2E performance monitoring
- Delivery of data at the interface point included in the source service scope

Services specifications adaptation to minimise inter-dependencies and move towards the target scenario



- Standard CADU based interface, with minimum adaptation for Copernicus
- Delivery of acquired data at a data delivery point included in the Acquisition Service scope
- Reporting interfaces for E2E performance monitoring

Programme of Work - Overview