ESA DREAM
Data Quality Web Services

Innovation Development

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OVERVIEW

DREAM Project

- Decision Support and Real Time EO Data Management (DREAM) project ID G511-024GR/ GSTP-5 Element 1 WorkPlan
- Participation from A, B, CZ, F, I , NL
- Duration 24 months, 2 Phases
- Focuses on two institutional users needs EMSA & EUSC (EDA presence/involvement welcome)
- DREAM shall address the issues which arise when a decision process needs to exploit information based on EO data
- DREAM shall address both long term planned scenarios as well as the need to act on specific events.

Objectives

- Implement prototype that
  - Supports EUSC and EMSA business scenarios
  - Demonstrates dynamic data transfer of EO data from PDGS to institutions decision support systems
  - Defines technical interfaces between components
  - Proposes interface to be exposed by the Sentinel 1 and 2 mission planning components to ensure future compatibility and “pluggability”
  - Ensures data integrity and traceability of quality and accuracy metadata throughout data transfer process
  - Takes into account available infrastructure and its future evolution including
    - Sentinel PDGS-related projects
    - ngEO and
    - PDGS Evolution Framecontract
  - Includes candidate multi-mission PDGS services

Use of Take 5 data

- Scenario A – “Reference and Background Map”
  - shall populate the Online Data Access Server @EUSC according to the following criteria:
    - Geographical coverage: global
    - Temporal coverage: continuous update.
    - Data type (input): ortho-rectified, Sentinel-2
    - Update frequency: 1 or 2 times per year

- Scenario B – “AOI Monitoring”
  - shall populate the Online Data Access Server @EUSC according to the following criteria:
    - Geographical coverage: local (size up to size of a country).
    - Temporal coverage: on-demand update between given start date and end-date.
    - Data type (input): ortho-rectified, Sentinel-2),
    - Update frequency: configurable up to best Sentinel-2 acquisition capacity (at least monthly).

DREAM Data Quality Web Services

- Features: On-demand service to
  - Assess the quality of an ortho-image
  - Improve the positional accuracy

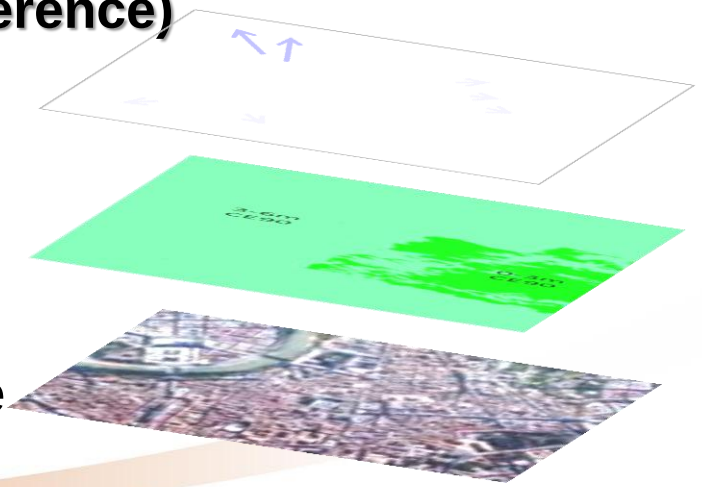
  In the context of multi-mission supports: multiple sensors

- Use Cases
  - Quality Assessment: user is currently viewing an orhtoimage and request an assessment of the quality. Quality assessment is visually represented as a layer
  - Quality Improvment: user is currently viewing an orthoimage and request an improvement of the positional accuracy. Portrayal view of the orthoimage is updated.

Functional – Quality Assessment

- Workflow
  - User selects an orthoimage and ask for an assessment.
  - Results are displayed as numerical measures and WMS layers.

- Results
  - Measure **(comparable - same reference)**
    - Geometric Positional Accuracy
    - Completness
    - Ground Sampling Distance
  - Layers
    - Shifts - vector layer
    - Quality Mask – raster coverage



Functional – Quality Improvement

- Workflow
  - User selects an orthoimage and ask for an improvement.
  - Results are displayed as WMS layers.
- Results
  - Portrayal view of the new ortho-image

Remote and multiple sensors datasets

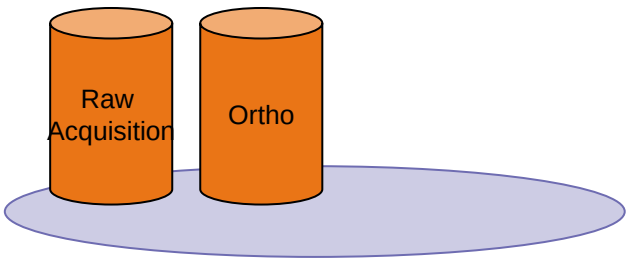
DATA QUALITY WEB SERVICES CHALLENGE

The issue

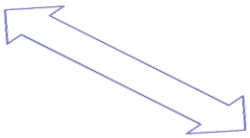
Data to process are here

Reference Data are here

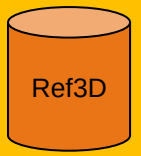
Processes are here



ESA/EUSC Cloud



On-line Photogrammetry Web Services
- Ortho-rectification
- Ortho-image quality assessment



ASV GEO Infrastructure

Typical Approach

According EO dataset size
Download time is in hour
(Pléiades scene up to 33 Gb)

Assess or Improve

Quality of my dataset

Raw Acquisition

Ortho

WCS

Download dataset

Upload result

Gb

ESA/EUSC Cloud

Too big and/or forbidden

to transfer

On-line Photogrammetry Web Services
- Ortho-rectification
- Ortho-image quality assessment

Ref3D

ASV GEO Infrastructure

All the space you need

ASTRIUM
AN EADS COMPANY

Innovative Approach
Process at data location

Raw Acquisition

Ortho

Cloud Processing Proxy

ESA/EUSC Cloud

1%

Data Transfer

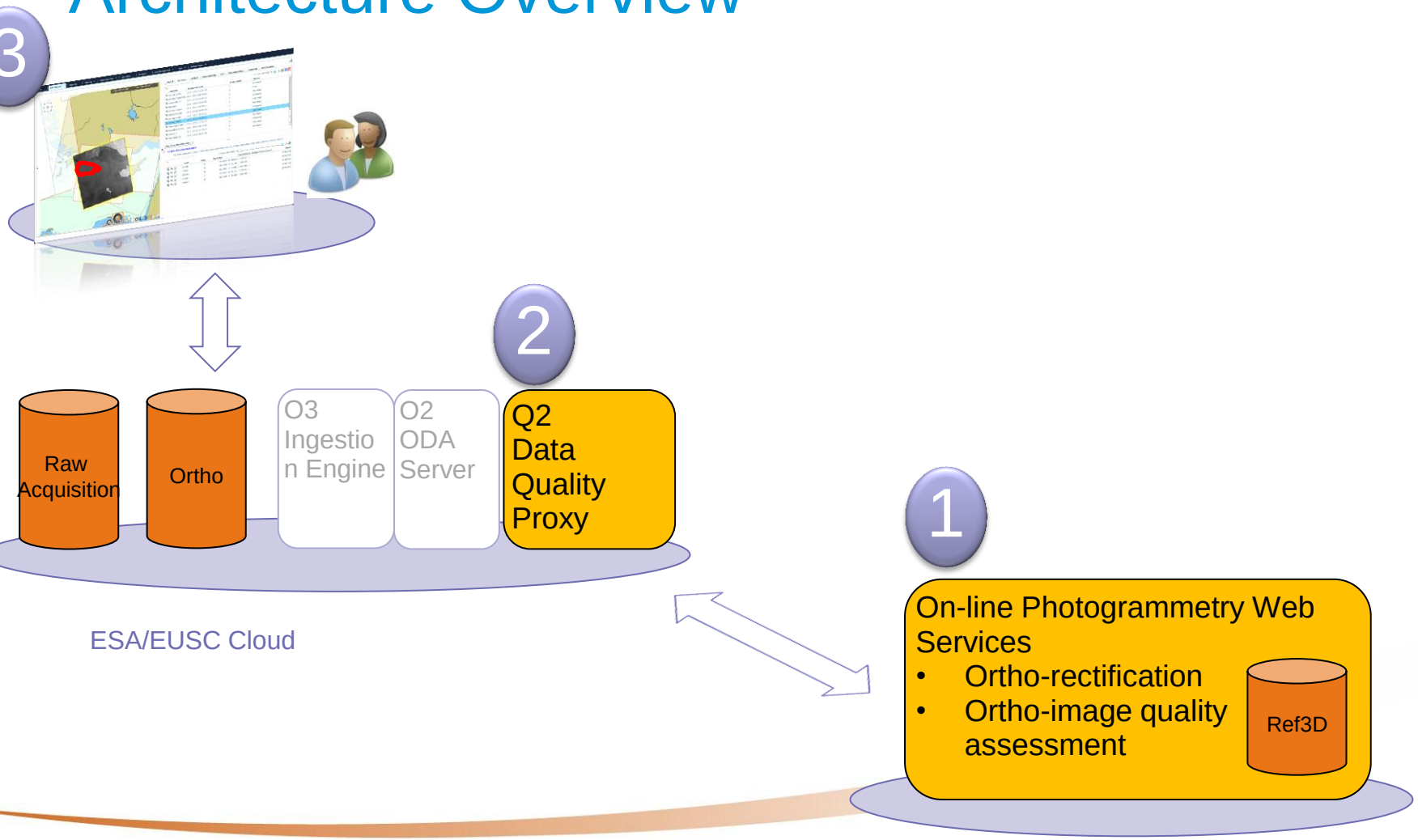
On-line Photogrammetry Web Services
- Ortho-rectification
- Ortho-image quality assessment

Ref3D

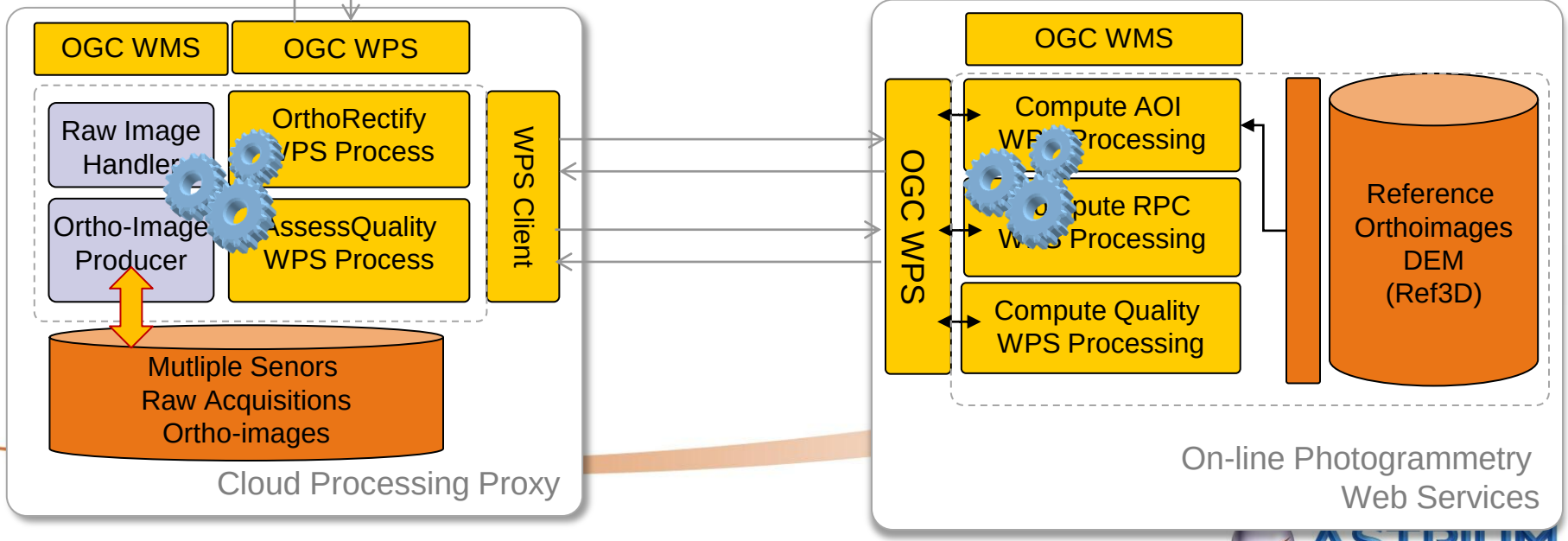
ASV GEO Infrastructure

DATA QUALITY WEB SERVICES ARCHITECTURE

Data Quality Web Service Architecture Overview



Data Quality Web Service – in motion



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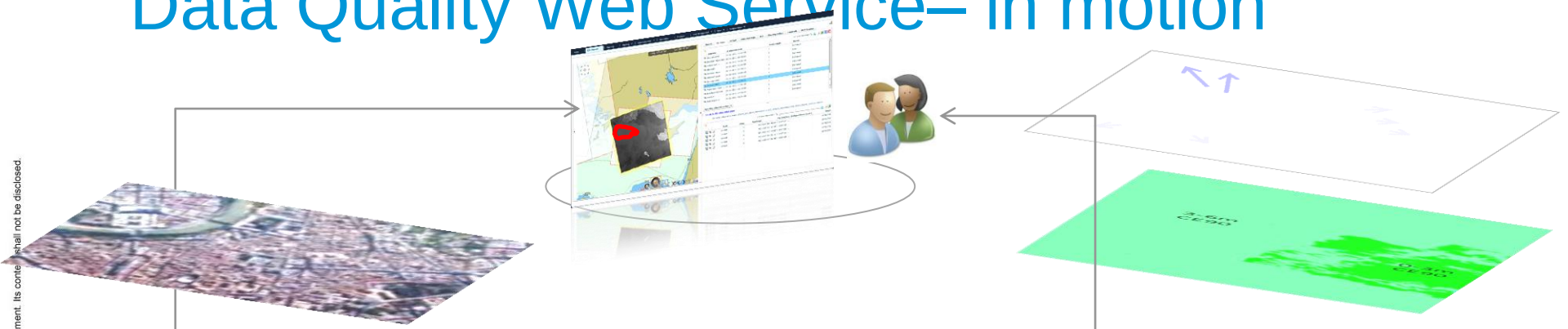

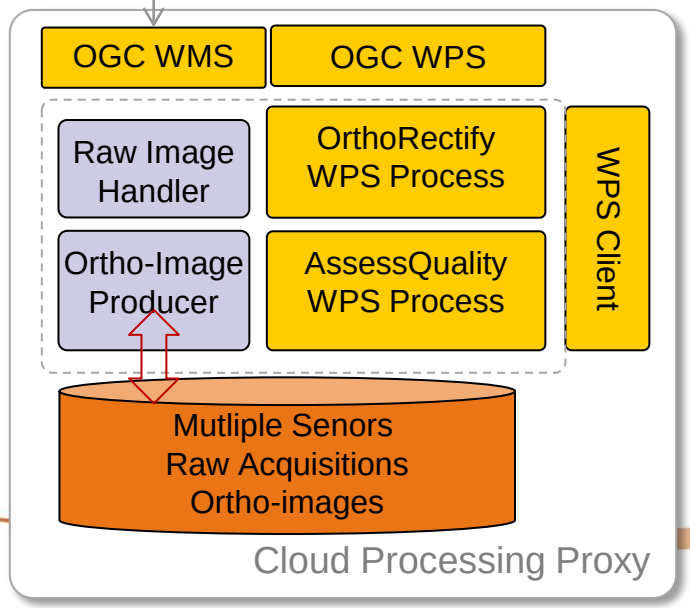

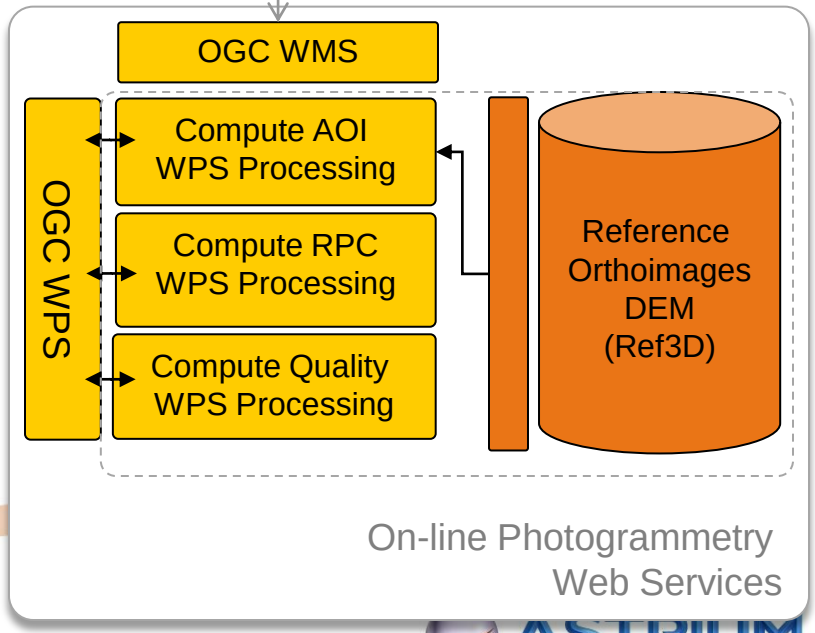

CONCLUSION

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- ESA GSTP DREAM Project enables innovative Data Quality Web Service
  Solution is based on:
  - Principle of mobile code

  and
  - Collaborative processing

  with
  - WxS chaining for retrieving lightweight form of the result.

- Quality assessment are comparable between different sensors - same reference data