



Deployment of Earth Observation Applications on Testbed1.2

5th Datagrid Project Conference

WP6 Meeting Monday 2nd September

Work Package 9 - EO Applications



EO GOME Data Processing and Validation by KNMI, IPSL and ESA

- A collaborative effort involving 3 geographically distributed EO sites
- Level1 data is raw satellite data which has to be analysed to retrieve actual physical quantities : Level2 data
- L2 data consists of measurements of OZONE, actual physical quantities for the ozone gas concentration at different pressure levels within a column of atmosphere at a given location (lat, lon) above the Earth's surface
- we use 2 different methods to process L1 GOME data to produce L2 data
- The L2 product is then validated by IPSL. L2 quantities are compared with quantities measured from ground-based (LIDAR) in coincident area and time. The result shows the difference between the two types of measurements. This is used to estimate the accuracy of the L2 product

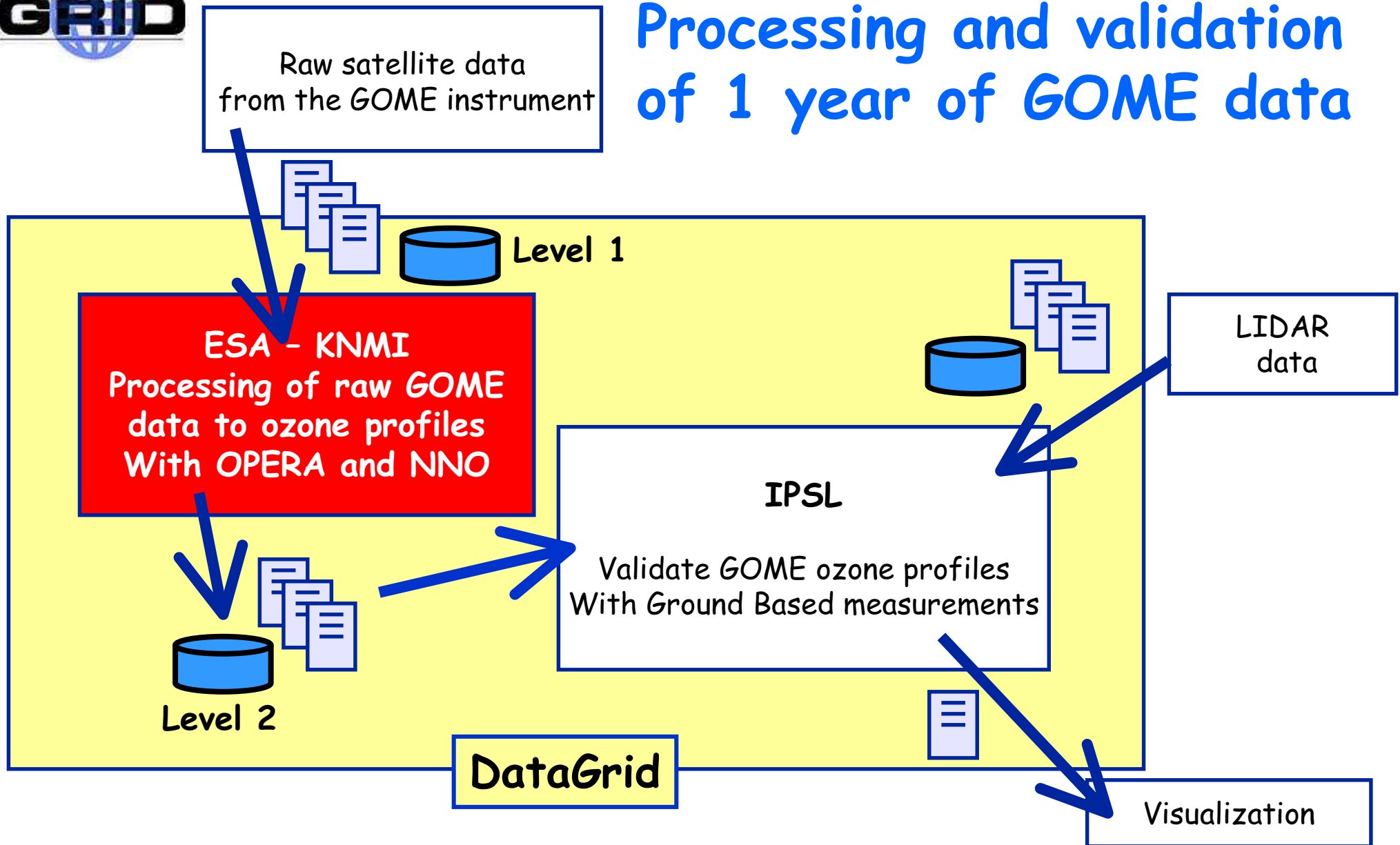


Executables and Data Files

- The KNMI executable processes L1 data and produces L2 data. It is written in C++, it is called OPERA
- The ESA executable processes L1 data and produces L2 data. It is written in IDL, it is called NNO
- The IPSL executable compares the L2 data with LIDAR data. It is written in FORTRAN, C and IDL.
- Typical input/output file sizes:
 - Level 1 data, a 15 Mb file contains the measurements taken during a full orbit of the satellite/sensor
 - Level 2 data (produced by L1-L2 processing), a 10-12 kb file containing the results of the L1 data analysis (as described above)
 - Lidar data, a 60 Mb data file containing one month of Local ground-based measurements around Haute-Provence observatory
 - Validation result, a 10 kb file



Processing and validation of 1 year of GOME data





EO Use Case File Numbers

1 Year of GOME data

Data	Number of files to be stored and replicated	Size
Level 1	4,724	15 Mb
Level 2 NNO (ESA)	9,448,000	10 kb
Level 2 Opera (KNMI)	9,448,000	12 kb
Validation Lidar (IPSL)	12	2.5 Mb
Total:	18,900,736	267 Gbyte

GOME has a data set of 5 years

GOME is relatively large in both size and number of files



Processing Steps

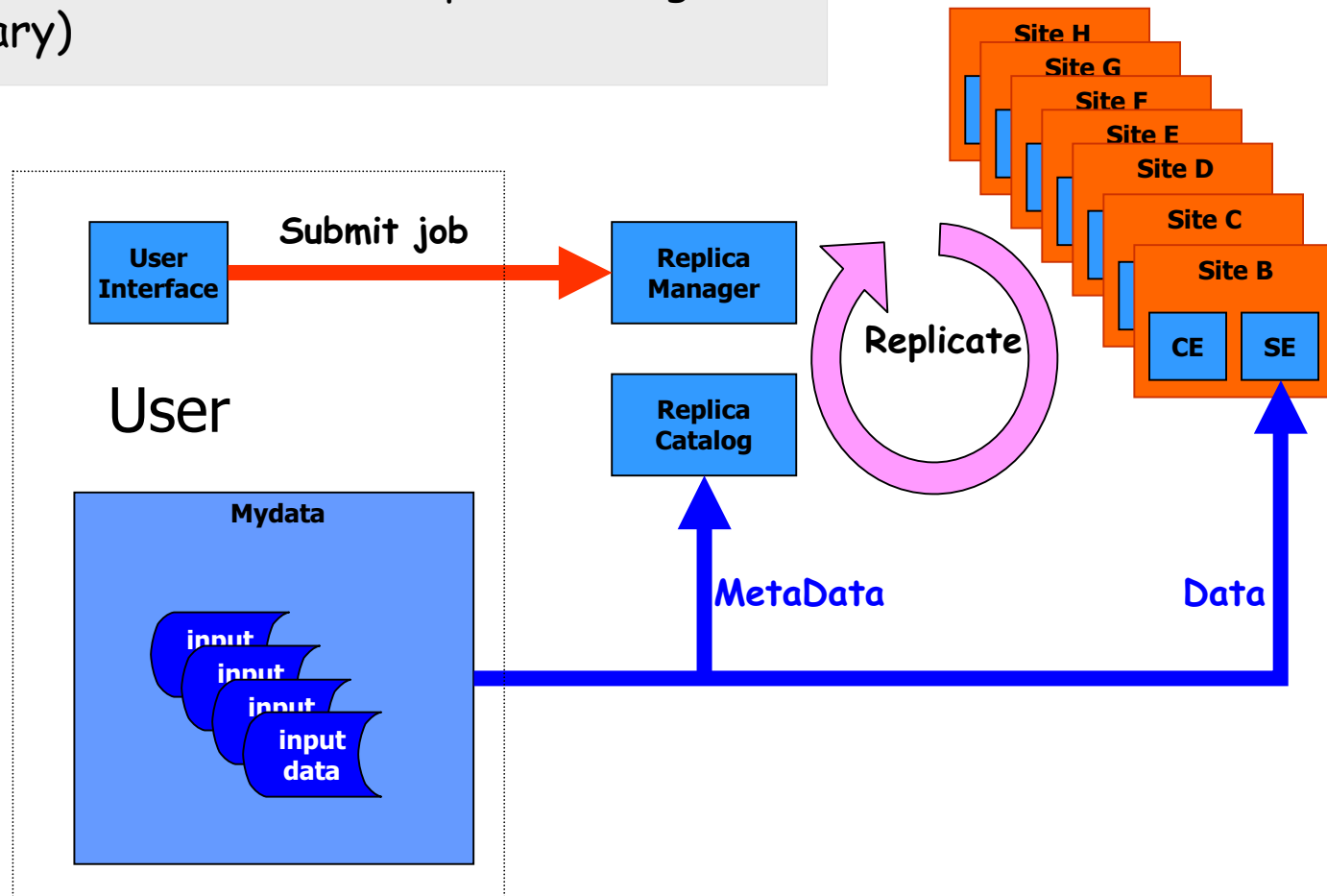
1. Transfer **Level1** (raw) data to the Grid Storage Element
2. Register **Level1** data with the Replica Manager
3. Submit jobs to process the **Level1** data, produce **Level2** data products
 - Jobs running on the CEs locate **Level1** data by using the BrokerInfoAPI
4. Repeat step 1-3 for level 2 products
 1. Transfer **Level2** data products to the Storage Element
 2. Register **Level2** data products with the Replica Manager
 3. Submit jobs to the Grid to validate **Level2** data products
5. Retrieve validation results and visualize on the User Interface



GOME data processing and validation steps

Step 1: Transfer **Level1** data to the Grid Storage Element

Step 2: Register **Level1** data with the Replica Manager (replicate if necessary)

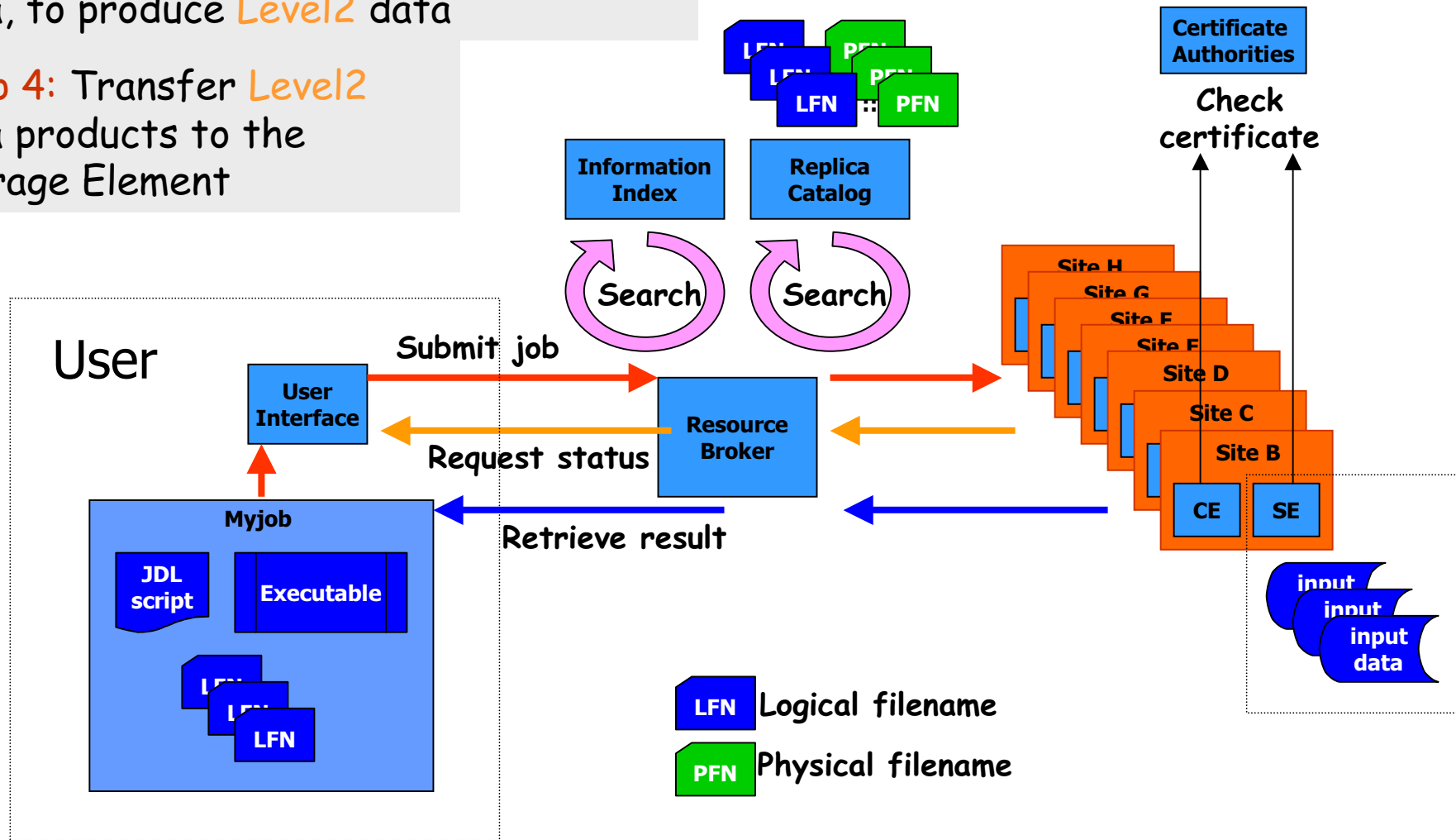




GOME data processing and validation steps

Step 3: Submit jobs to process **Level1** data, to produce **Level2** data

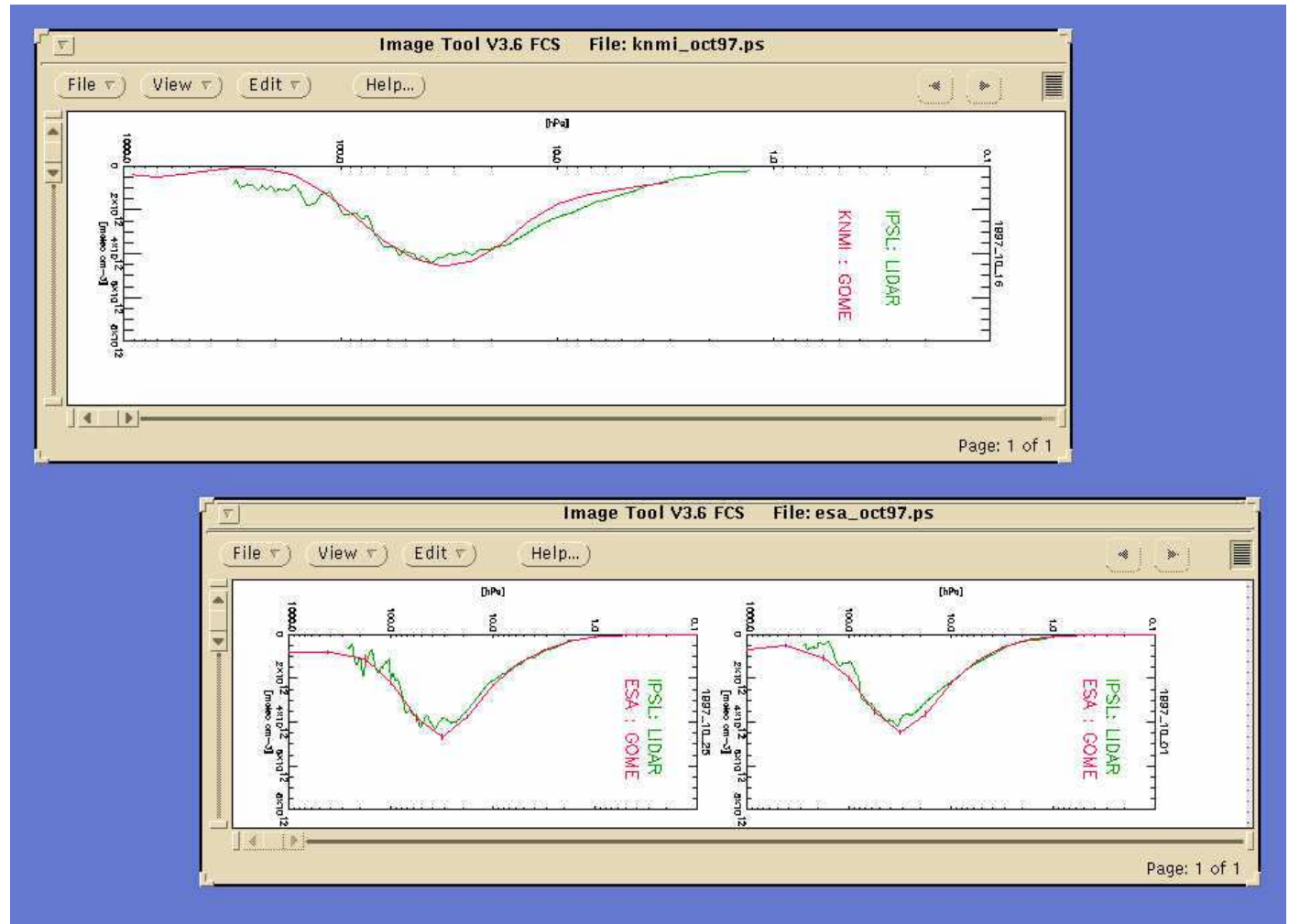
Step 4: Transfer **Level2** data products to the Storage Element





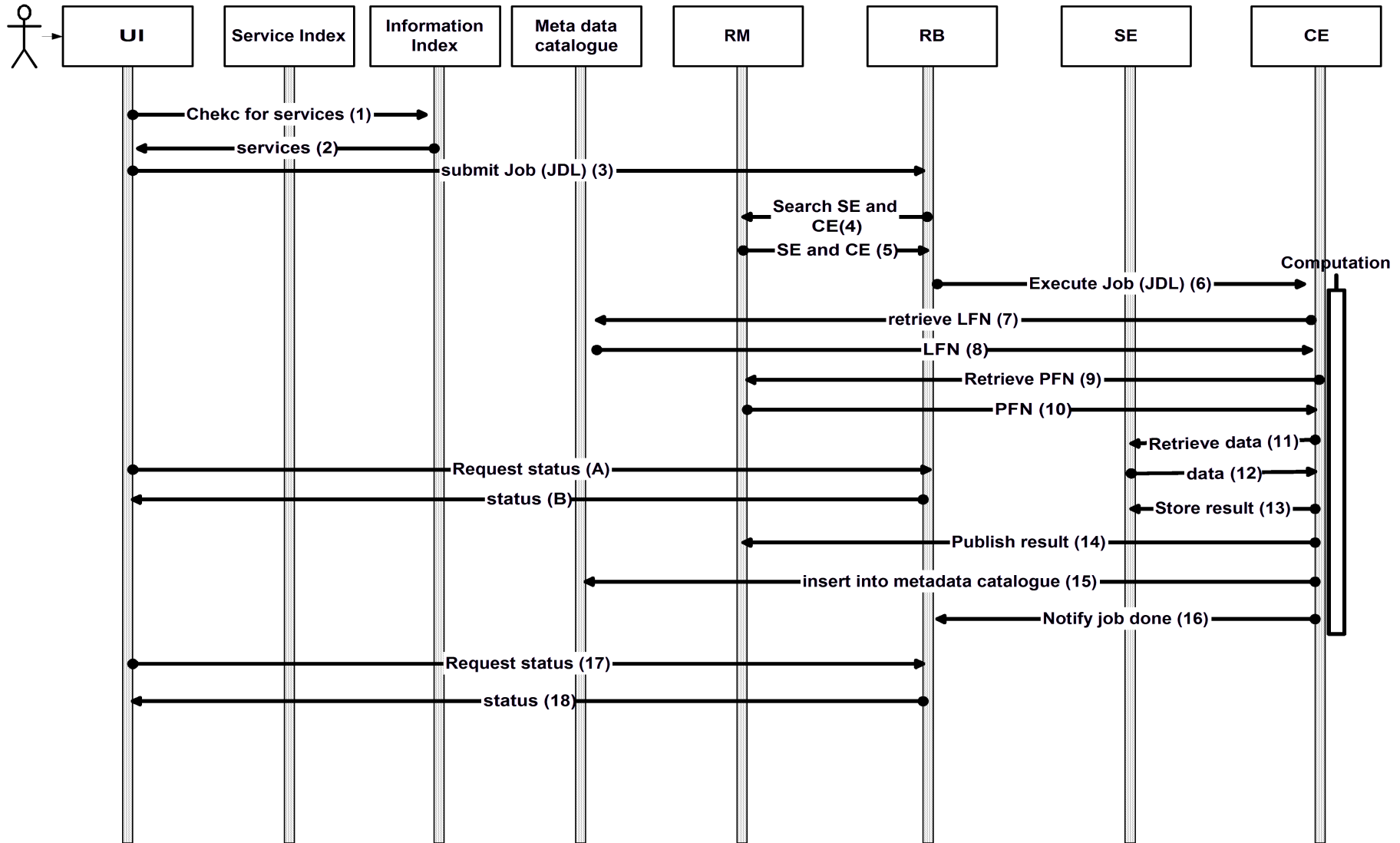
Validation of two different Ozone processing algorithms vs Lidar profiles using the testbed

Step 5: Retrieve and visualise results





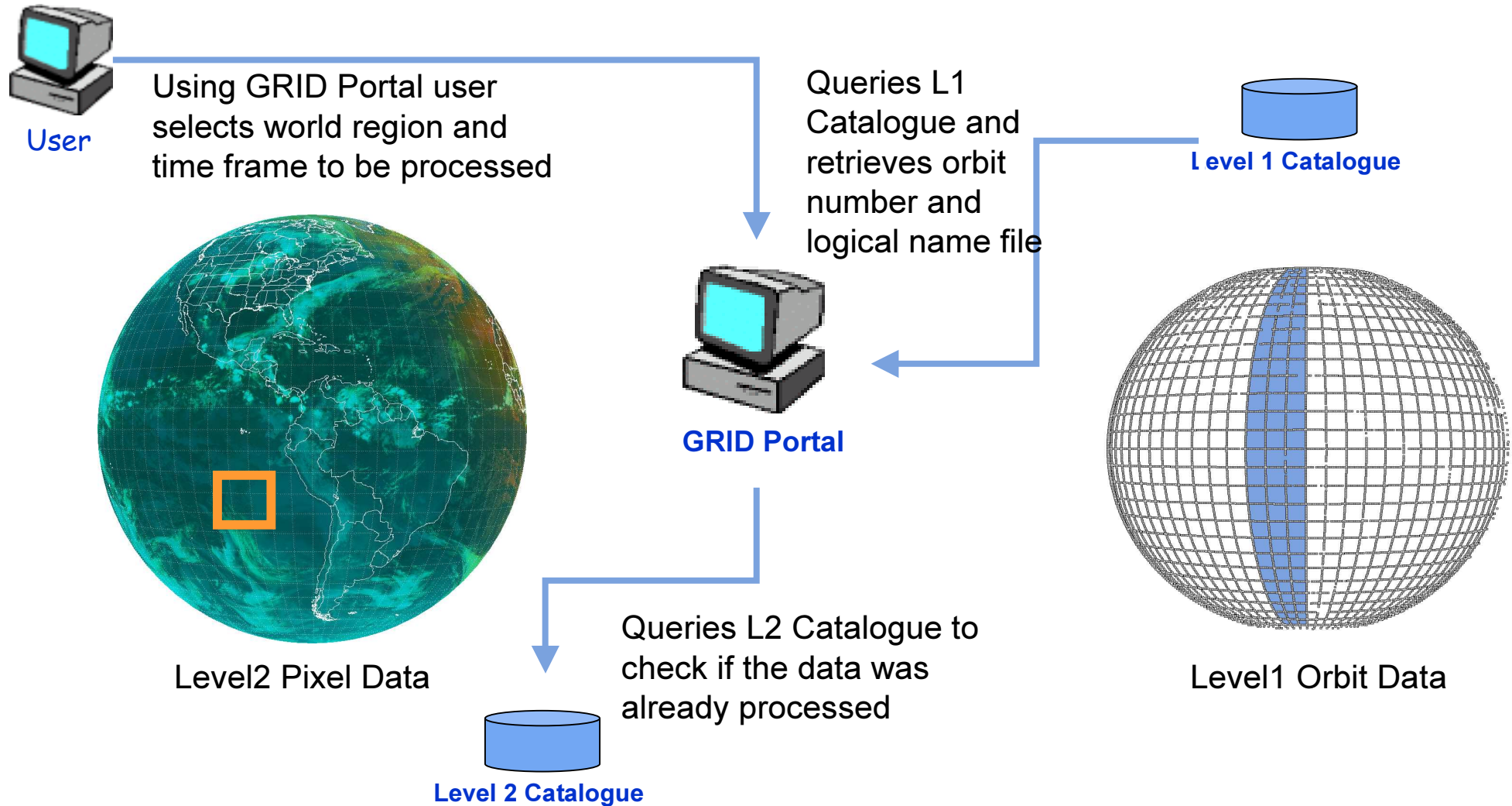
Detailed Use Case for L1-L2 processing





EO Web Portal Prototype

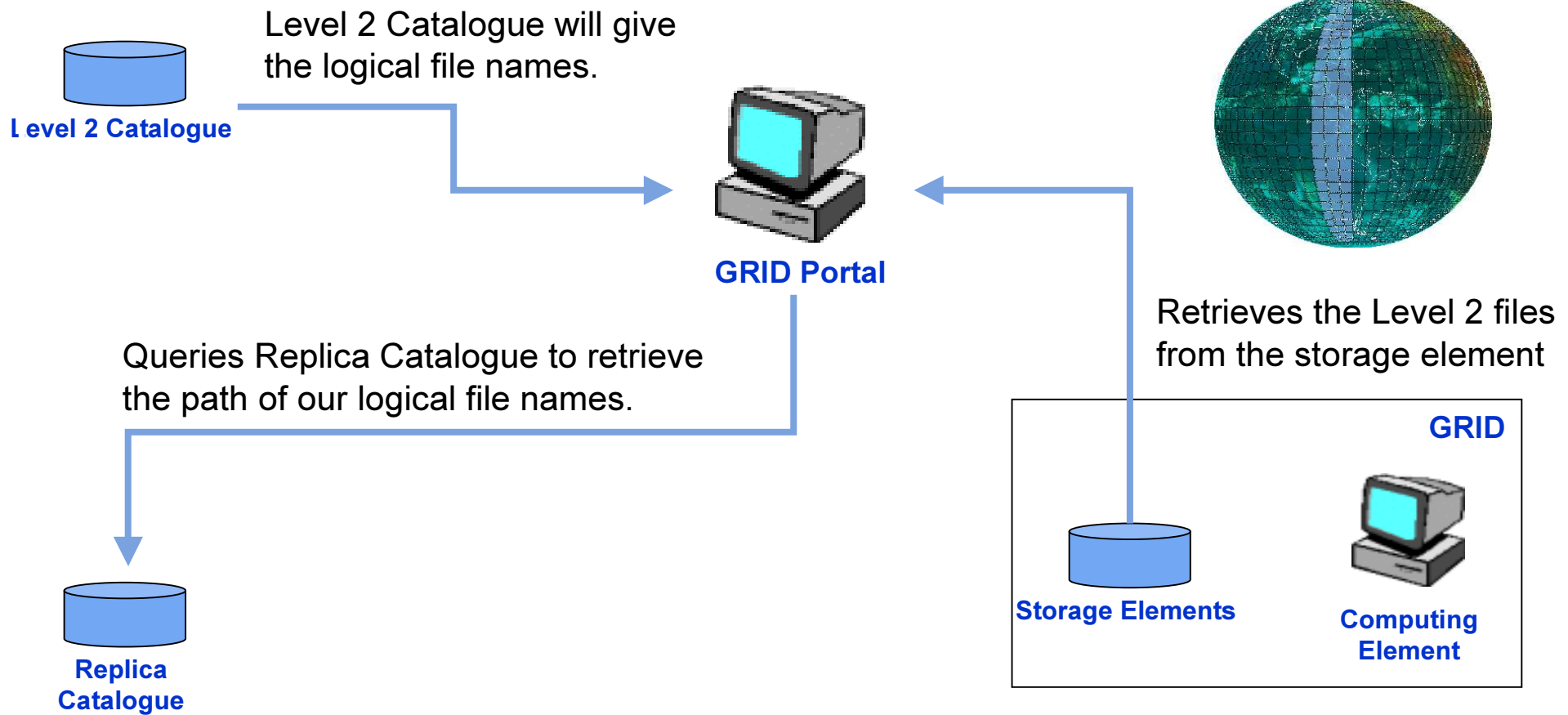
Querying metadata





EO Web Portal Prototype

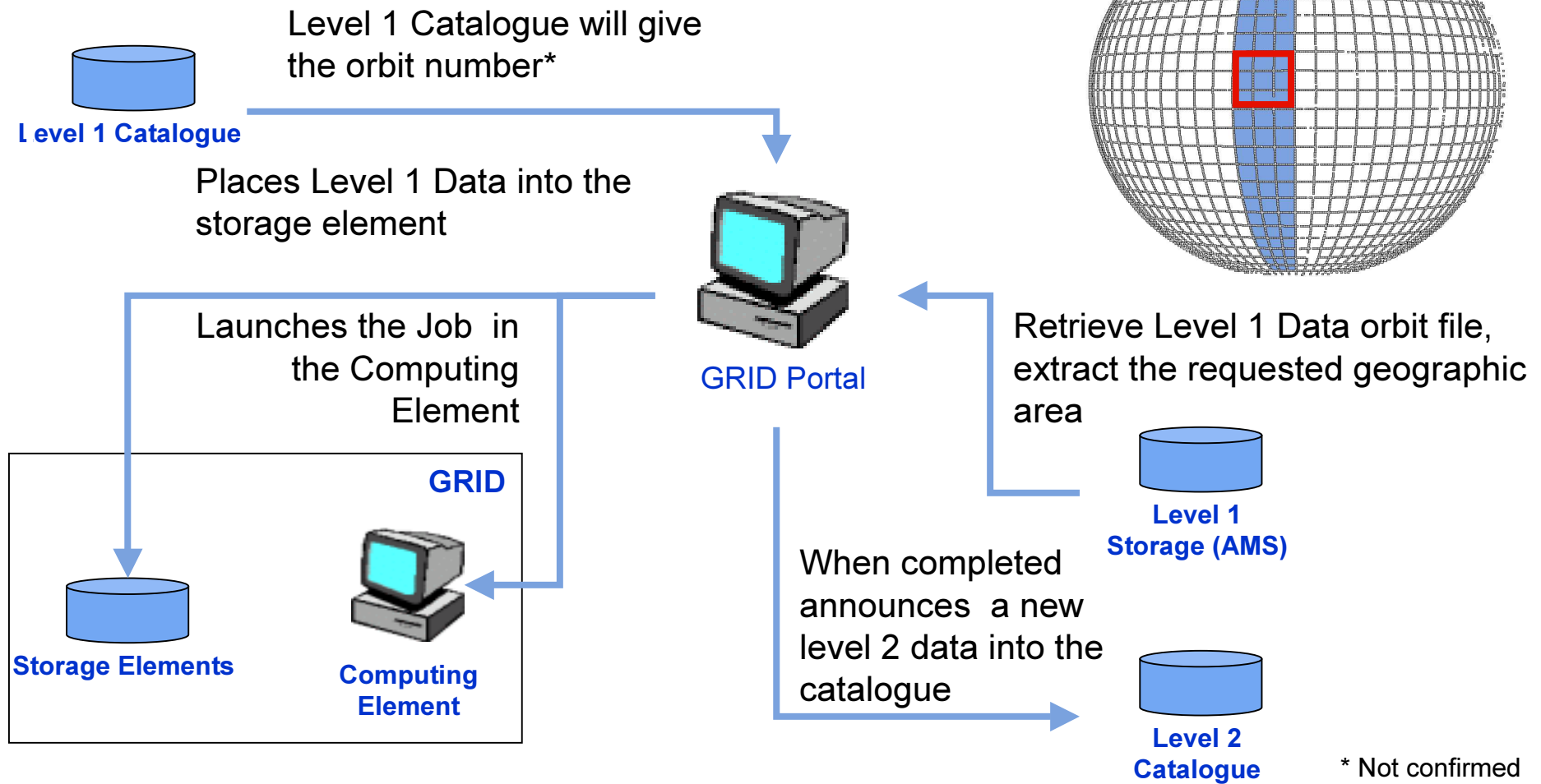
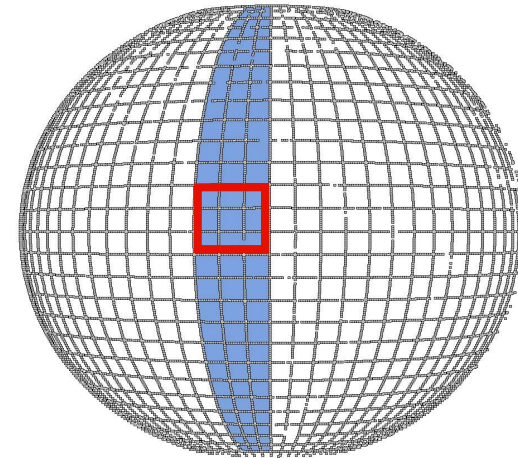
If the data already exists ...





EO Web Portal Prototype

If data was not yet processed...





WP9 Plans for using TB1.2

- New dedicated EO Graphical User Interface will investigate use of multi processing and SE distributed datasets
 - multi-job submission capability
 - data transfer & replication interface
 - job / data partitioning capability
- ESRIN CE installation will interface EDG to ENEA Grid (AFS/LSF)
 - first case of single CE to manage two different batch queuing systems
- ESRIN SE will Interface to ESA archive system
 - investigate use of GDMP_STAGE_TO/FROM_MSS
- IPSL CE, SE and graphical user interface installation
- EO Applications will interface to the Grid using EO Web-services
 - integration of Grid services and GIS web-mapping services
- Several demonstrations planned in 4th quarter of 2002
 - Re-run of previous demonstrations using 1.2
 - WP9.4 Use Case - processing and validation chain for 1 year of GOME data
 - EO Application User Interface will be used to submit & monitor execution of hundreds of jobs simultaneously
 - Web-based GOME processing on-demand via access to dedicated EO SOAP services