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Grid enabled Service Support Environment for multi-mission EO Processing

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The Grid Enabled Service Support Environment (SSEGrid) project is an ESA/ESRIN project which is executed by Spacebel, VITO and Terradue. The general objectives of the SSEGrid project are:
• To analyse the state of the art in the area of Grid-based architectures and standards.
• To propose new or amended versions of "Processing Service" protocols that may be able to bridge geospatial Service Oriented Architectures and Open Grid Services Architectures.
• To introduce a Grid Processing on Demand model at VITO to be integrated with current and future Vegetation processing chains.
• To upgrade the Service Support Environment (SSE) to integrate multi-Grid processing services to be used by the Principal Investigator (PI) for the systematic processing or re-processing of EO data in a single or multi-mission environment.

The Grid-based processing on demand infrastructure is meant to provide processing power close to the EO-data at the processing and archiving centres and allow the user (also called Principal Investigator (PI)) to upload his own algorithm and his own auxiliary data from the SSE Portal and use them in an earth observation workflow on the SSEGrid Infrastructure. The PI can design and submit workflows (EO processing chains) using his own processes, processes made available by VITO/ESA and possibly processes from other users that are available on the Grid. This avoids copying huge volumes of EO data to the user's facility and eliminates the need for the PI to deploy his own processing infrastructure. In addition, the SSEGrid Infrastructure also allows the PI to design and execute multi-sensor EO applications combining data located in geographically dispersed data/processing centres (e.g. VITO and ESA).

The processing of EO data is structured according to the following processing hierarchy:
• Grid processes that access local EO data and user supplied auxiliary data.
• Mission workflows that combine the above Grid processes.
• Multi-mission workflows that combine the above mission workflows.

To provide a standard processing interface, all forms of processing (i.e. grid processes, grid processing workflows) are encapsulated in a Processing on-Demand WPS (WPS-G) service based on the open source 52° North WPS implementation of the OGC WPS 1.0 specification. The WPS-G service is proposed by the project consortium as an extension on the OGC WPS-T standard.

For the design of the mission and multi-mission workflows invoking the WPS-G services, the COTS workflow design tool 'Intalio BPMN designer' (Eclipse plug-in) is used to create BPMN workflows. This tool generates BPEL 2.0 code that can be executed on the open source Apache ODE BPEL engine which is embedded in the Intalio BPMS server.

A demo will show the features of SSEGrid and the multi-mission fAPAR workflow which was designed and implemented as a demonstrator during the project. The multi-mission fAPAR workflow processes SPOT-VGT and/or TERRA-MODIS data (both hosted at VITO) and/or ENVISAT-MERIS data (hosted at ESA).