



SOFTWARE DEVELOPMENT
& MAINTENANCE FOR
MISSION CRITICAL SYSTEMS



TAO - Beyond EO Toolboxes



Features

- ✓ EO Toolbox Integration
- ✓ EO Data Search
- ✓ Workflow Design
- ✓ Distributed Execution
- ✓ User Workspaces
- ✓ Results Sharing
- ✓ OGC-compliant Interfaces

Technology stack

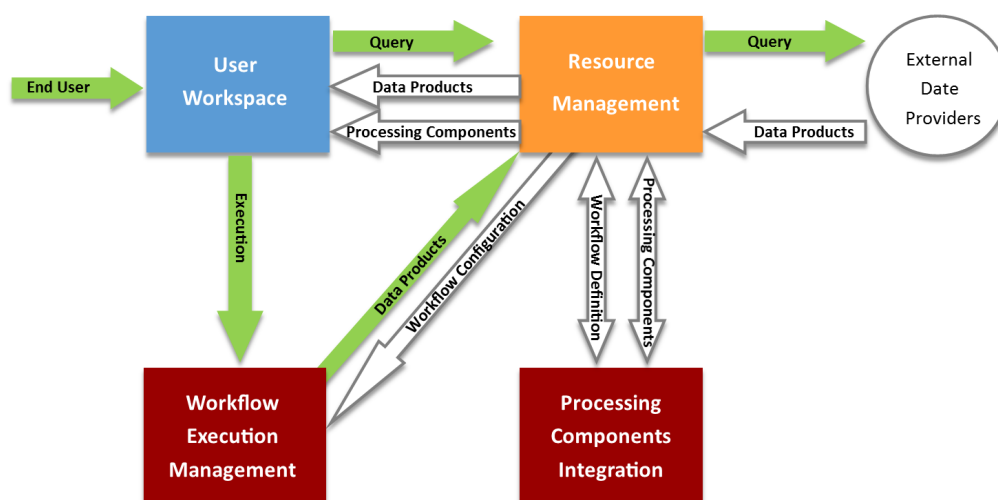
- ✓ Spring Framework
- ✓ Docker
- ✓ PostgreSQL
- ✓ Slurm
- ✓ Torque
- ✓ OpenStack

With the constant increase of available EO data in space and time, more and more users developed the need to not only perform data processing and analysis on single EO data products and individual scenes but instead on mass data covering larger regions or longer time periods. Such activities involve heavy bulk processing of data and users want to exploit bundled resources.

TAO (Tool Augmentation by user enhancements and Orchestration) is a lightweight, generic integration and distributed orchestration framework, that allows the reuse (i.e. integration) of commonly used toolboxes (such as, but not limited to, SNAP, Orfeo Toolbox, GDAL, PolSARPro, etc.).

The framework allows for processing composition and distribution in such a way that end users could define by themselves processing workflows and easily integrate additional processing modules (by processing module it is understood either a standalone executable or a script).

A simple view of the TAO platform model split among four main macro-components.



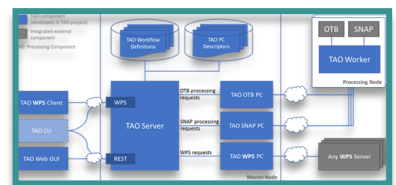
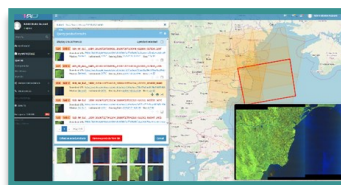
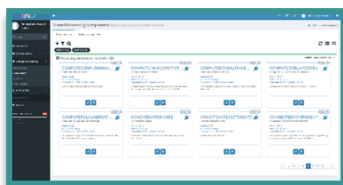
PARTNERS





KEY FEATURES OF THE TAO FRAMEWORK

- ✓ Visual **integration of EO processing toolboxes** (the user can perform such an integration by himself, without programming knowledge)
- ✓ Out-of-the-box **Docker containers** for Orfeo Toolbox 7+, SNAP 8+, GDAL 3+ and Python 3.7+
- ✓ **Visual definition of processing workflows** by simple drag-and-drop operations and easy parametrization of the workflow elements
- ✓ **Integration of user-defined algorithms** in the processing workflows
- ✓ Visual management of **execution topologies** (collection of machines onto which components are executed)
- ✓ **Dynamic allocation** of cloud resources (VMs and storage) on **OpenStack**-powered clouds (AWS, DIAS)
- ✓ Runtime workflow **optimization** for Orfeo Toolbox and SNAP components
- ✓ **Orchestrated execution of workflows**, employing **DRMAA**-compliant Cluster Resource Manager software, such as Torque or SLURM
- ✓ Self-contained execution of module on remote nodes so that they do not interfere with other components
- ✓ Basic visual **monitoring of executions** and topology nodes resources
- ✓ **User and shared workspaces** to allow the visualization of the execution results, but also to allow users to upload various files that can be used in the workflow execution (such as model files, shape files, etc.)
- ✓ **Pluggable EO data repositories abstraction framework** for searching and retrieving EO data from different providers (SciHub, USGS, AWS, NASA Earthdata, ASF, European DIASes, ESA EO-CAT and Fed-EO)
- ✓ **OGC standard interfaces** for exposing workflows as WPS services
- ✓ A rich **RESTful API** to control and manage all the framework services
- ✓ **Plugins** for integration with external platforms (such as Sen2-Agri or Sen4CAP)



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