



## Implementation of Web Processing Services (WPS) over IPSL Earth System Grid Federation (ESGF) node

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The Earth System Grid Federation (ESGF) is aimed to provide access to climate data for the international climate community. ESGF is a system of distributed and federated nodes that dynamically interact with each other. ESGF user may search and download climatic data, geographically distributed over the world, from one common web interface and through standardized API.

With the continuous development of the climate models and the beginning of the sixth phase of the Coupled Model Intercomparison Project (CMIP6), the amount of data available from ESGF will continuously increase during the next 5 years.

IPSL holds a replication of the different global and regional climate models output, observations and reanalysis data (CMIP5, CORDEX, obs4MIPs, etc) that are available on the IPSL ESGF node.

In order to let scientists perform analysis of the models without downloading vast amount of data the Web Processing Services (WPS) were installed at IPSL compute node. The work is part of the CONVERGENCE project founded by French National Research Agency (ANR).

PyWPS implementation of the Web processing Service standard from Open Geospatial Consortium (OGC) in the framework of *birdhouse* software is used. The processes could be run by user remotely through web-based WPS client or by using command-line tool. All the calculations are performed on the server side close to the data. If the models/observations are not available at IPSL it will be downloaded and cached by WPS process from ESGF network using *synda* tool. The outputs of the WPS processes are available for download as plots, tar-archives or as NetCDF files.

We present the architecture of WPS at IPSL along with the processes for evaluation of the model performance, on-site diagnostics and post-analysis processing of the models output, e.g.:

- regriding/interpolation/aggregation
- *ocgis* (OpenClimateGIS) based polygon subsetting of the data
- average seasonal cycle, multimodel mean, multimodel mean bias
- calculation of the climate indices with *icclim* library (CERFACS)
- atmospheric modes of variability

In order to evaluate performance of any new model, once it became available in ESGF, we implement WPS with several model diagnostics and performance metrics calculated using ESMValTool (Eyring et al., GMDD 2015).

As a further step we are developing new WPS processes and core-functions to be implemented at ISPL ESGF compute node following the scientific community needs.