Compute Working Team Update

State of the Project

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Outline

- Take Home
- Accomplishments
- Things to Come
- Resources
Take Home

- Many Backends Matured
- All compatible via End User API
- COG Integrated Front End
- Ready to be considered as part of installation
Server Side Accomplishments: API

- No changes to Server API!
Server Side Accomplishments: Security

- Authentication added
  - Use OpenID to login
  - Get certificate via
    - OAuth
    - MyProxyClient
Server Side Accomplishments: Server

- **Official Server Implemented:**
  - Code: [https://github.com/ESGF/esgf-compute-wps](https://github.com/ESGF/esgf-compute-wps)
  - Docker-based
  - Re-engineered core
  - Celery queues to manage submitted processes
  - Includes LLNL, NASA/EDAS and Ophidia’s services

- **Deployed at LLNL:** [https://aims2.llnl.gov/wps/home](https://aims2.llnl.gov/wps/home)

Welcome to LLNL's CWT WPS server

To get started, login using OpenID.

To access ESGF data you will need to retrieve a certificate through OAuth2 or MyProxyClient. These options are found on the bottom of the user Profile page.

After requesting a certificate, you will find your API key on the user Profile. You can use this to access the ESGF WPS services through the ESGF CWT End-user API which can be install from Conda. Examples of the API can be found here.
Server Side Accomplishments: LLNL

- Services are CDAT-based
  - Aggregation
  - Average
  - Regrid
  - Min/Max
Server Side Accomplishments: NASA

- NASA EDAS v. 1.1 deployment on DASS goes public:
  - https://edas.nccs.nasa.gov/wps/cwt

- Current Open Source EDAS Distribution:
  - Server: https://github.com/nasa-nccs-cds/EDAS.git
  - Web app: https://github.com/nasa-nccs-cds/CDWPS.git
  - Client: https://github.com/ESGF/esgf-compute-api.git

- Documentation and sample Jupyter Notebooks available at:
  - https://www.nccs.nasa.gov/services/Analytics

- List available canonical operations (kernels):
  - https://edas.nccs.nasa.gov/wps/cwt?request=GetCapabilities
  - 13 available: emul, ediff, min, emin, max,emax, sum, esum, avg, eavg, rms, erms, ediv

- List available data collections (17 available: MERRA, etc...):
  - https://edas.nccs.nasa.gov/wps/cwt?request=GetCapabilities&identifier=coll
Server Side Accomplishments: Ophidia

- ESGF CWT Plugin for Ophidia implemented
- Properly translates WPS requests into Ophidia requests
- Based on PyOphidia (available on Conda)
- Leverages the workflow support of Ophidia (through the PyOphidia wsubmit) to implement a WPS process
- Flexible mechanism since each WPS process can be based on several Ophidia operators (workflow)
- Available functionalities: subsetting along any dimension (space and time), maximum & minimum along a specific dimension
- Deployment of the CWT module in the OphidiaLab environment at CMCC
Server Side Accomplishments: CERFACS

- Interfaced CWT and the IS-ENES Climate4impact platform
- Access CWT WPS from within a EUDAT-GEF Execution on EGI
Server Side Accomplishments: CRIM

- Advanced parallel workflow execution
- Prototyped an authorization mechanism for data and processes
- Advanced WPS hybrid cloud execution to integrate with CWT API
- Communicated ESGF uses cases to OGC (security, server-side API, infrastructure, etc.)
- Started work on common test suite
- Contributed to OpenClimateGIS and Birdhouse

For 2018: more work required to integrate, transfer and harmonize PAVICS and OGC advancements into ESGF software
Server Side Accomplishments: Analytics

- We are already capturing:
  - Files accessed

- Process launched
Work In Progress: Workflow and Provenance
Things to come

- Full support for OAuth
- Integrated in ESGF release cycle
- Workflows finalized
- Helping other teams’ work to be compatible with end-user API
  - Ouranos/Pavics
- Documenting Services
- More Advanced Caching
- Fully distributed
  - Scalability
  - Discovery
- More Services
Resources

- Email:  esgf-cwt@llnl.gov
- Webex:
  - First Monday of the month: General Meeting
  - Third Monday of the month: Implementation Meeting
- Documentation
  - Web (requires login)
  - API
- Code (github)
  - Server:  https://github.com/ESGF/esgf-compute-wps
  - End-user:  https://github.com/ESGF/esgf-compute-apiResources
Questions Suggested on Agenda

- Define a scalable compute resource (clusters and HPCs) for ESGF data analysis
- Data analytical and visualization capabilities and services
- Performance of model execution
- Advanced networks as easy-to-use community resources (i.e., resource management)
- Provenance and workflow
- Automation of steps for the computational work environment
- Resource management, installation and customer support
- Identify key gaps, identify benefitting communities, and prioritize next steps
- Analysis services when multiple data sets are not co-located (future work)