Jupyter at OLCF

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Agenda For Today

• What is Slate?
• General, high-level, overview of Jupyter
• General, high-level, overview of Jupyter @ OLCF
• Software environments
• How to get started using Jupyter @ OLCF
• Questions/Discussion
What is Slate?

• Built on Kubernetes and OpenShift
• Provides a container orchestration service for running user-managed, persistent, application services
• Supports all containerized services with Kubernetes
• Consists of two user facing OpenShift clusters in different security enclaves
• OLCF staff provides JupyterHub as a service on Slate

https://docs.olcf.ornl.gov/services_and_applications/slate/index.html
General, high-level, overview of Jupyter

• **JupyterHub** - Brings the power of notebooks to groups of users. Enables computational environments and resources without the burden of installation of and maintenance (for users).

• **JupyterLab** – Next-generation web-based user interface for Jupyter. This is launched by JupyterHub – each user gets a JupyterLab environment.

• **Jupyter Notebooks** - Document within the JupyterLab interface that allows live code, equations, visualizations and narrative text.
General, high-level, overview of Jupyter @ OLCF

- Service is exposed over the web
- Each user gets a JupyterLab environment, running with their OLCF UID
- Jupyter’s local resources are from Slate’s underlying hardware (Not Summit)
- CPU-only or GPU-enabled JupyterLab
- Job submission from users Jupyter environment to Summit and Andes (bsub, bjobs, sbatch, squeue)
- Jupyter’s local resources are still from Slate’s underlying hardware (but job submission is enabled)
- Possible to drive Dask workers, on Summit, from Dask client on Slate’s Jupyter
JupyterLab Software Environments

- Provided “base” conda environments in JupyterLab
  - Pytorch
  - TensorFlow
  - NumPy
  - Pandas
  - JAX
  - GPU lab has CUDA11, CuPy, and CuDNN

(take a look for full package list with "conda list")

- Create your own conda environments on NFS/GPFS, from JupyterLab.
  - "conda env list" will show you all your environments (whether built on Summit, Andes, or JupyterLab)
    - "/opt/conda" path denotes the environments local to your Slate-based JupyterLab
    - "/ccs/* and /gpfs/* are environments built by user (either from Summit, Andes, or JupyterLab)
  - **NOTE:** JupyterLab runs on x86 hardware (underlying Slate hardware). Environments are not directly compatible between Slate, Summit, and Andes.
How to get started with Jupyter @ OLCF

- Login (requires active access to an NCCS project): https://jupyter.olcf.ornl.gov/
- Explore the docs:

https://docs.olcf.ornl.gov/services_and_applications/jupyter/index.html