

Open OnDemand: Interactive HPC via the Web

LSU & LONI

HPC User Services

sys-help@loni.org

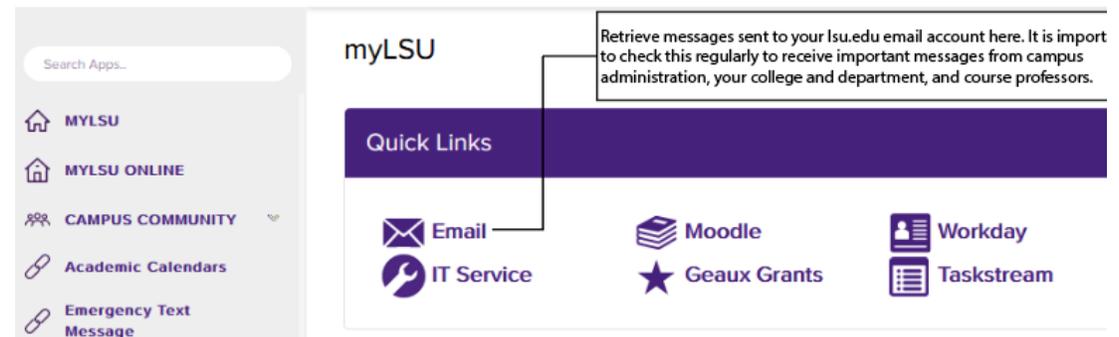
Louisiana State University

Baton Rouge

February 19, 2025

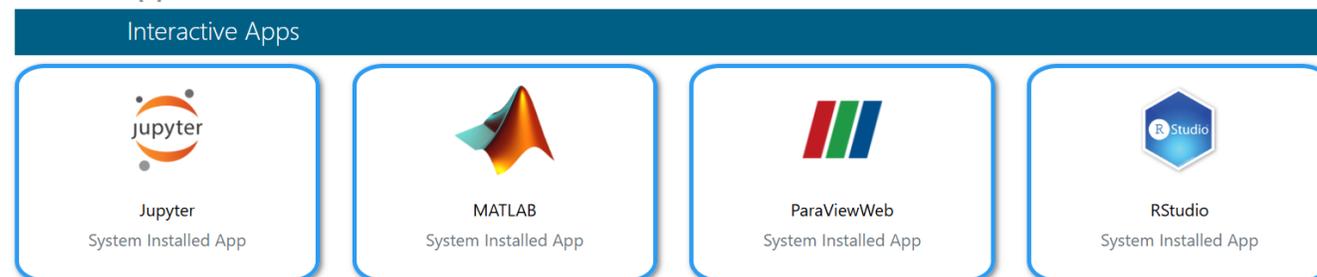
Web Portal access to HPC Services

- What have we learned so far?
 - Introduction to Linux
 - HPC User Environment 1 and 2
 - Basic Shell Scripting
- Web portal?



Outline

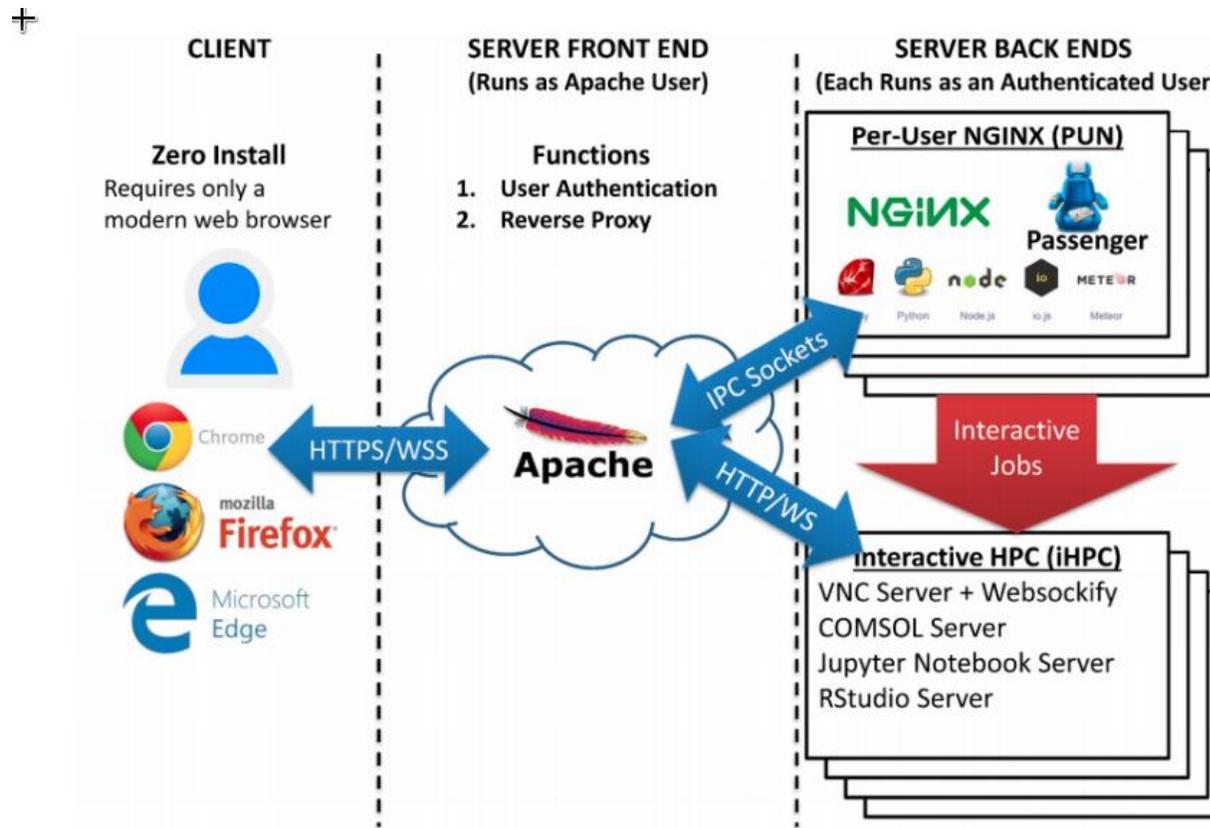
- Introduction
- Open OnDemand at LSU and LONI
- Demo
 - Logging into Open OnDemand
 - File explorer
 - Shell Access
 - Submit and monitor jobs
 - Interactive applications: Jupyter Notebook/Lab, RStudio, Matlab, ParaviewWeb, etc.



What is Open OnDemand

- Interactive HPC via the web
 - Easy to use, plugin-free, web-based access to supercomputers
 - File management
 - Command line shell access
 - Job management and monitoring
 - Interactive applications (e.g. Jupyter, RStudio, Matlab, Paraview)
- Developed by Ohio Supercomputing Center through NSF-funded projects:
 - <https://openondemand.org/>
- Deployed at dozens of universities and supercomputing centers

Open OnDemand Architecture



<https://osc.github.io/ood-documentation/latest/architecture.html>

Getting Started

To access the portal, you need an LSU/LONI HPC account.

To run jobs/apps, you need an LSU/LONI HPC allocation.

LSU and LONI Open OnDemand Access Summary

Network Connection	LSU HPC OpenOnDemand	LONI HPC OpenOnDemand
LSU Baton Rouge Campus including LSU AgCenter (Wired and Wireless)	Yes	Yes
Off LSU Campus	LSU GlobalProtect VPN gp.vpn.lsu.edu	LONI GlobalProtect VPN hpcod.loni.org

Access Open OnDemand – without VPN

If you have a wired or wireless connection on LSU campus (including LSU AgCenter), you can access both LSU and LONI OOD portals without the VPN connect.

Access Open OnDemand - URLs

LONI

QB-3: <https://ondemand.qbc.loni.org>

QB-4: <https://ondemand.qbd.loni.org>

LSU

SM-3: <https://ondemand.mike.hpc.lsu.edu>

Access Open OnDemand – LONI Steps

LONI

Step 1 Download the Global Protect VPN client at <https://hpccod.loni.org>.

After logging in with your **LONI HPC** credentials, you should see this page:



GlobalProtect Portal

[Download Windows 32 bit GlobalProtect agent](#)

[Download Windows 64 bit GlobalProtect agent](#)

[Download Mac 32/64 bit GlobalProtect agent](#)

Windows 32 bit OS needs to download and install Windows 32 bit GlobalProtect agent.

Windows 64 bit OS needs to download and install Windows 64 bit GlobalProtect agent.

Mac OS needs to download and install Mac 32/64 bit GlobalProtect agent.

Please choose one that fits your operating system.

Access Open OnDemand (Off Campus) LONI Steps

LONI

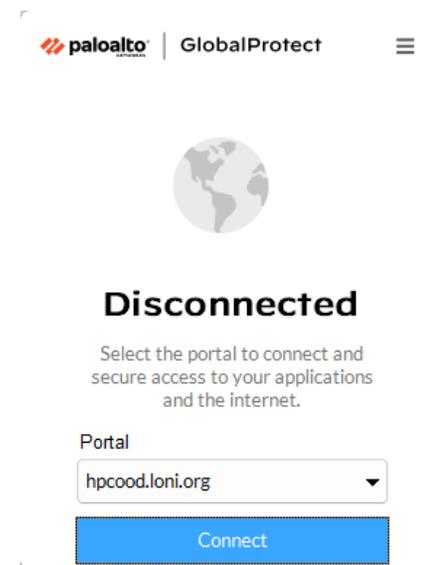
Step 2 Install the Global Protect VPN client you just downloaded.

Access Open OnDemand (Off Campus) LONI Steps

LONI

Step 3 Open the Global Protect VPN client you just installed. If prompted for the Portal Address, enter **hpccod.loni.org**, then click “Connect”.

You may need to enter your **LONI HPC** credentials.



Access Open OnDemand (Off Campus) LONI Steps

LONI

Step 4 Once the Global Protect VPN is connected, you should be able to access the QB-3 and QB-4 OOD portals with any browser of your choice.

Access Open OnDemand (Off Campus) LSU Steps

LSU

Step 1 Download the Global Protect VPN client
at <https://gp.vpn.lsu.edu>.

After logging in with
your **LSU** credentials,
you should see this
page:



GlobalProtect Portal

[Download Windows 32 bit GlobalProtect agent](#)

[Download Windows 64 bit GlobalProtect agent](#)

[Download Mac 32/64 bit GlobalProtect agent](#)

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and install Windows 32 bit GlobalProtect
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Mac 32/64 bit GlobalProtect agent.

Please choose
one that fits your
operating system.

Access Open OnDemand (Off Campus) LSU Steps

LSU

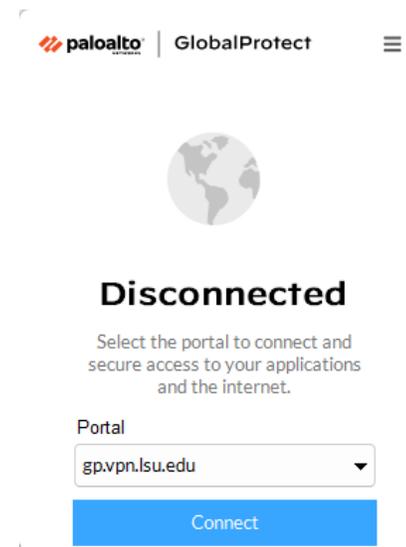
- Step 2 Install the Global Protect VPN client you just downloaded.

Access Open OnDemand (Off Campus) LSU Steps

LSU

- Step 3 Open the Global Protect VPN client you just installed. If prompted for the Portal Address, enter **gp.vpn.lsu.edu**, then click “Connect”.

You may need to enter your **LSU** credentials.



Access Open OnDemand (Off Campus) LSU Steps

LSU

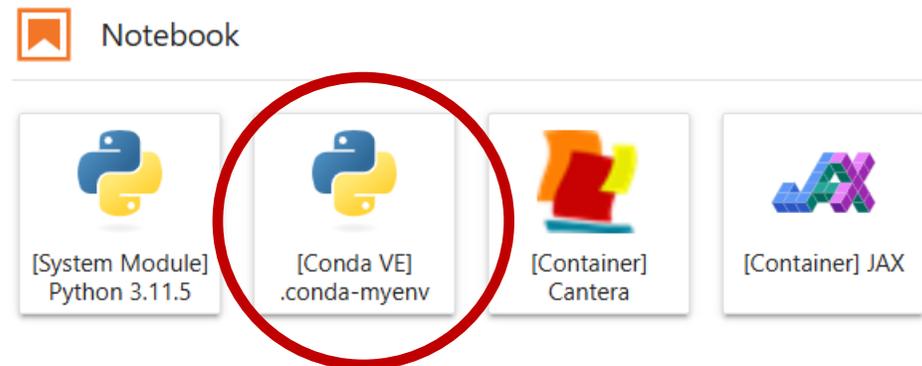
- Step 4 Once the Global Protect VPN is connected, you should be able to access the SM-3 OOD portals with any browser of your choice.

Demo

Add Your Own Jupyter Kernel (using Conda Environment)

- Below steps create a conda environment in $\$HOME/.conda/envs/$

```
conda create -y --name myenv python=3.10
source activate myenv
pip install numpy==2.0.0
# important step to install ipykernel, so OOD can see the kernel
pip install ipykernel
```
- If everything works fine, you should see a new kernel appears on launcher:



- To remove the conda environment

```
conda deactivate
conda env remove --name myenv
```

Add Your Own Jupyter Kernel (using Singularity image)

- To add the singularity image to the OOD launcher, follow below steps:
 1. Build the singularity image and upload the image to the cluster.
 2. Add the image as a jupyter kernel

Add Your Own Jupyter Kernel (using singularity image)

Sample recipe to build "Jupyter-aware" singularity image

BootStrap: docker

From: rockylinux:9

%post

```
dnf -y update && dnf clean all
```

```
dnf -y install python3 python3-pip
```

```
python3 -m pip install --upgrade pip
```

```
# here we specify numpy==1.26.4
```

```
python3 -m pip install numpy==1.26.4 ipykernel
```

%environment

```
export PATH="/usr/bin:$PATH"
```

```
export PYTHONPATH="/usr/lib/python3.9/site-packages:$PYTHONPATH"
```

%runscript

```
exec python3 "$@"
```

Add Your Own Jupyter Kernel (using Singularity image)

- On a computer that you have root access (Not on QB3/4):

```
sudo singularity build ojk.np.sif own.jupyter.kernel.def  
scp ojk.np.sif <user>@qbd.loni.org:/home/<user>/<path_on_cluster>
```
- For the current tutorial, the singularity image is prepared for you in the github repository, use the below script to prepare the image file so you don't need to build the image by yourself:

```
git clone https://github.com/lsuhpchelp/ood-tut.git  
cd ood-tut  
cat ojk.np.sif.part-* > ojk.np.sif  
chgrp singularity ojk.np.sif
```

Add Your Own Jupyter Kernel (using Singularity image)

- Make a directory in `$HOME/.local/share/jupyter/kernels/ojk.singularity`
- Create a file named `kernel.json` inside the folder with the below content:

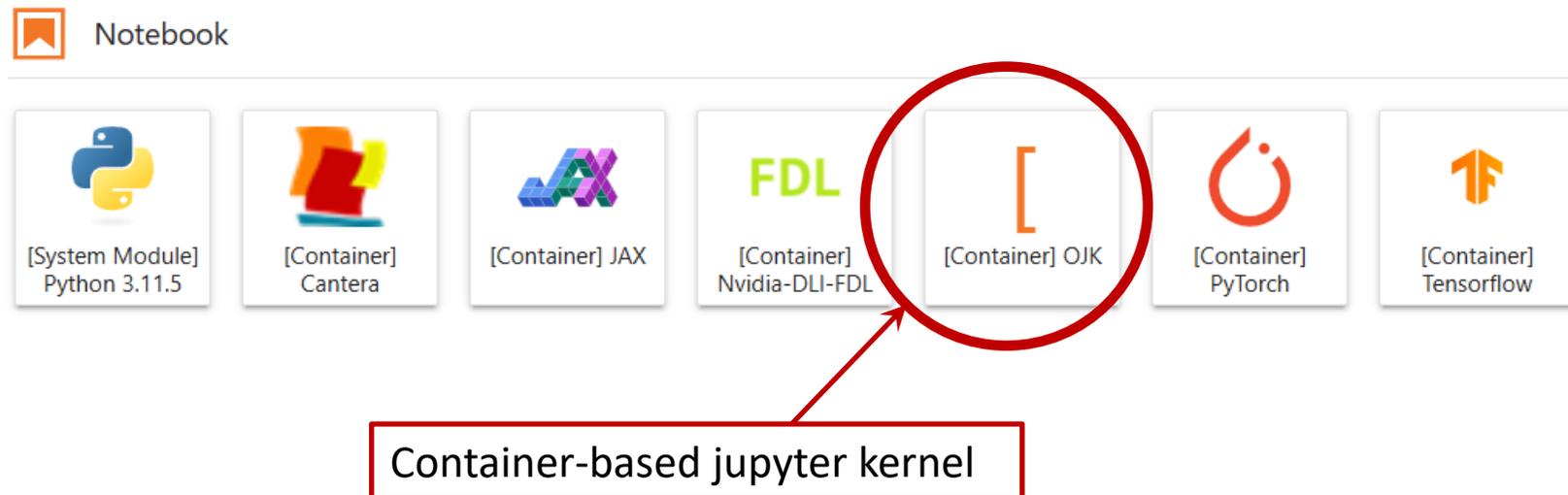
```
{  
  "argv": [  
    "singularity",  
    "exec",  
    "-B",  
    "/work,/project,/usr/local/packages,/var/scratch",  
    "--nv",  
    "/image_dir/ojk.np.sif",  
    "python3",  
    "-m",  
    "ipykernel_launcher",  
    "-f",  
    "{connection_file}"  
  ],  
  "display_name": "[Container] OJK",  
  "language": "python",  
  "metadata": {  
    "debugger": true  
  }  
}
```

The directory under kernels can be changed to your needs

Replace "image_dir" with the directory holding the singularity image ojk.np.sif, e.g.: `/project/<user>/ood-tut`

Add Your Own Jupyter Kernel (using Singularity image)

- Once the `kernel.json` file is added to the correct location, you should see the kernel appear on the launcher:



Questions?