# Getting Started with Julia on HPC Clusters

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# Julia Setup

# Julia binaries: Keep it simple.

- Use the regular binaries
  - **juliaup** or **julialang.org**
- Generally, no need to compile from source.
- A system module might help you with packages
  - `module avail` or `module spider julia`
  - **On Perlmutter:** `module load julia`

# Put the Julia depot on the parallel file system (PFS).

- PFS is often called “`scratch`”
  - High quotas
  - Writable (also from within compute jobs)
  - No backup of redundant data
- Set **JULIA_DEPOT_PATH** environment variable
- Watch out for automatic deletion
  - Workaround: `touch` files periodically

# On heterogeneous clusters, use multiversioning.

- Nodes with different CPU kinds
  - re-triggering of package precompilation

- Set **JULIA_CPU_TARGET** environment variable
  - `export JULIA_CPU_TARGET="znver3;skylake,clone_all"`
  - `julia -C help`

# Workflow:
# Visual Studio Code

# Challenges

- Running VS Code on cluster nodes
- Making the Julia extension work

# VS Code on a cluster node via SSH

## Login node

- Press F1 and run the Remote-SSH: Open SSH Host... command.
  - `accountname@perlmutter.nersc.gov`

## Compute node

- SSH `ProxyJump`
  - might not be possible at all
  - (requires full accounts at NERSC 😔)

# Use a Julia wrapper for the Julia extension

- Julia: Executable Path should point to a wrapper script. For Perlmutter:

```
#!/bin/bash

# Make julia available
module use /global/common/software/nersc/n9/julia/modules
module julia

# Pass on all arguments to julia
exec julia "${@}"
```

(`julia_wrapper.sh` in the workshop repository)

# VS Code on a cluster node via “remote tunnel”

## On the target node

- Download the **code** CLI and run
  - ```
    code tunnel --verbose \
    --cli-data-dir=$SCRATCH/.code_cli_data_dir
    ```

## Locally

- Press F1 and run the Remote Tunnels: Connect to Tunnel command.

(also works with NERSC training accounts 😄)
    ```

# Workflow: Jupyter

# NERSC Jupyter

- https://jupyter.nersc.gov/