

Debugging and Optimizing Parallel Codes with Linaro Forge - Introduction



Forge training for debugging and
profiling
March 5, 2025

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User Engagement Group

Logistics

- Instructor: Rudy Shand (Linaro)
- Q&A: <https://tinyurl.com/ysxrfswp>
- Slides and video will be available at:
<https://www.nersc.gov/linaro-forge-mar2025/>
- Please participate in survey: <https://tinyurl.com/mtfj9jwc>

Exercises

- Example materials in /global/cfs/cdirs/training/2025/linaro_forge_training

```
$ cp -r /global/cfs/cdirs/training/2025/linaro-forge-training .
```

- Node reservations

- 5 CPU and 4 GPU nodes from 9 am-1 pm
- Name: **forge_cpu** and **forge_gpu**, project account: **ntrain7**
- Use the shared QoS

```
$ salloc -C cpu -c 32 -q shared -t 30 \  
-A ntrain7 --reservation=forge_cpu
```

- If all the reserved nodes are taken, use your own project account or submit a non-interactive batch job

GUI tool over internet can be painfully slow...

- ThinLinc
 - Will replace NoMachine (NX) in March, 2025
 - Improves X window performance - X window “accelerator”
 - Install & configure: <https://docs.nersc.gov/connect/thinlinc/>
- Linaro Forge remote client
 - Download:
<https://www.linaroforge.com/download-documentation/>
 - Configure:
<https://docs.nersc.gov/tools/debug/ddt#reverse-connect-using-remote-client>

Using ThinLinc

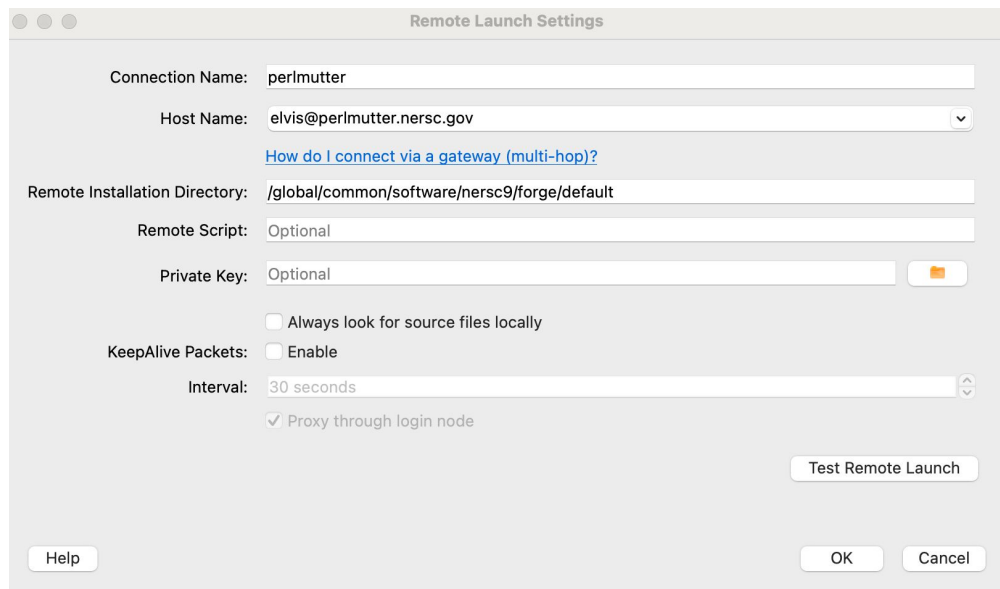
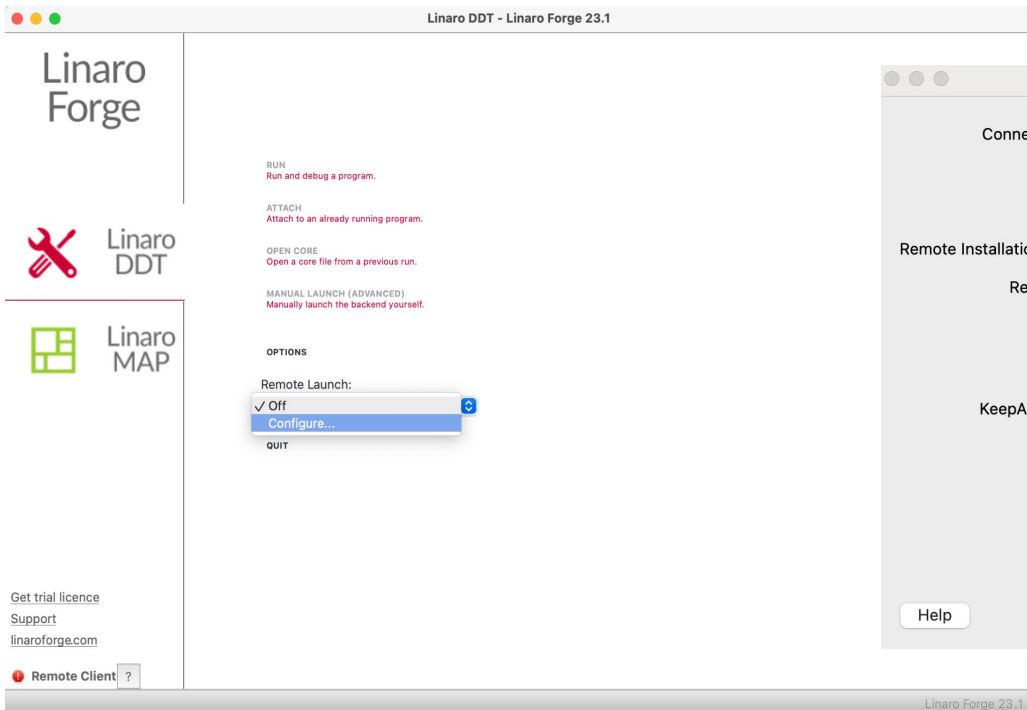
The screenshot shows a ThinLinc session window titled "wyang@tl-prod-agent02 - ThinLinc client". On the left sidebar, there are buttons for "Disconnect ThinLinc Session", "Logout", "Perlmutter" (circled in red), and "DTNs". A red arrow points from the "DTNs" button to a terminal window. The terminal window shows a shell prompt and the command "lmod is aut". The main window displays the Linaro DDT IDE for "Linaro Forge 24.1.1 (on nid20055)". The IDE includes a menu bar, a toolbar, a "Current Group" dropdown, and a "Focus on current" section with radio buttons for "Group", "Process", and "Thread". The "Project Files" pane on the left shows a tree view with "Application Code" expanded to "jacobi_mpi.f90". The "Code" pane shows the source code for "jacobi_mpi.f90", with line 21 highlighted: "call mpi_comm_size(mpi_comm_world,np,ierr)". The "Locals" pane on the right shows the current line's local variables: "mpi_comm_world" with value 1140650, "np" with value 0, and "ierr" with value 0. The "Stacks" pane at the bottom shows the current stack with "jacobi_mpi (jacobi_mpi.f90:21)".

(1) Connect to Perlmutter

(2) Run on Perlmutter

Linaro Forge Remote Client

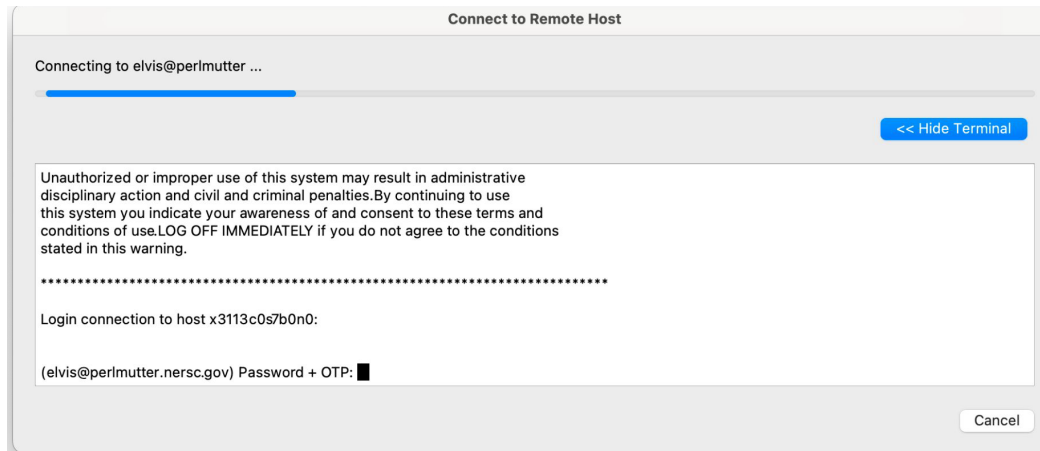
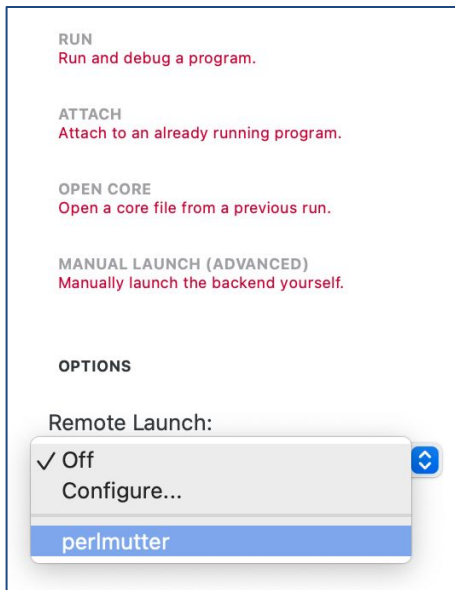
(1) Create a configuration for Perlmutter



Linaro Forge Remote Client (Cont'd)

(2) Select the configuration to login

- **Authenticate with pw+OTP OR**
- **Passwordless ssh with sshproxy keys (see the MFA docs page)**

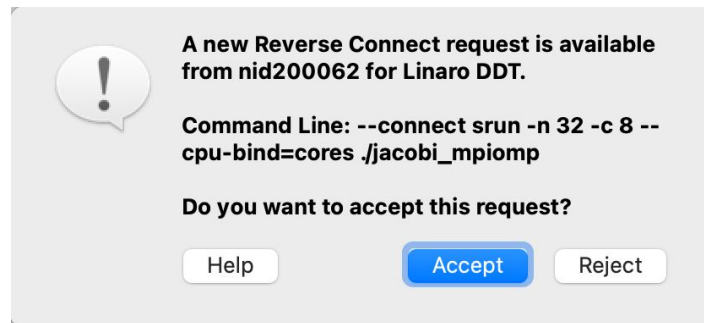


Linaro Forge Remote Client (Cont'd)

**(3) Ssh to Perlmutter in a window;
start an interactive job and start
Forge there**

```
$ salloc -N 1 -C cpu -t 30:00 -q debug  
...  
$ module load forge  
$ ddt --connect srun ... ./jacobi_mpiomp
```

(4) Accept the connection on laptop



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Team Science

Service

Trust

Innovation

Respect



■ We agree to **work together professionally and productively** towards our shared goals while respecting each other's differences and ideas.

■ We should all feel free to speak up to maintain this environment and remember there are resources available to **report violations** to foster an inclusive, collaborative environment.

Email nersc-training@lbl.gov for any concerns

<https://www.nersc.gov/nersc-code-of-conduct> or search “NERSC Code of Conduct”

Thank You!

