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Forge hands-on

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Cheat Sheet

Training material

/global/cfs/cdirs/training/2025/linaro-forge-training

Training slides

linaro-forge-training (presenter slides)
linaro-handson (hands-on slides)
Download these from google-drive

Forge Client (On local machine)

Install Forge client *https://www.linaroforge.com/downloadForge*

Running with a batch script

```
sbatch $FORGE_TRAINING/scripts/submit-job.sh
```

Forge commands

```
ddt --connect     # Reverse connect
ddt --offline     # Run DDT without GUI
map --profile     # Profile without GUI
perf-report       # Generate Performance Report
```

Guides

Forge userguide
Perlmutter architecture
Running jobs on Perlmutter

Interactive session

```
salloc -C cpu -A ntrain7 --reservation=forge_cpu -n 1 -c 32 -q shared -t 30
```

```
salloc -C gpu -A ntrain7 --reservation=forge_gpu -N 1 -G 1 -q interactive -t 30
```

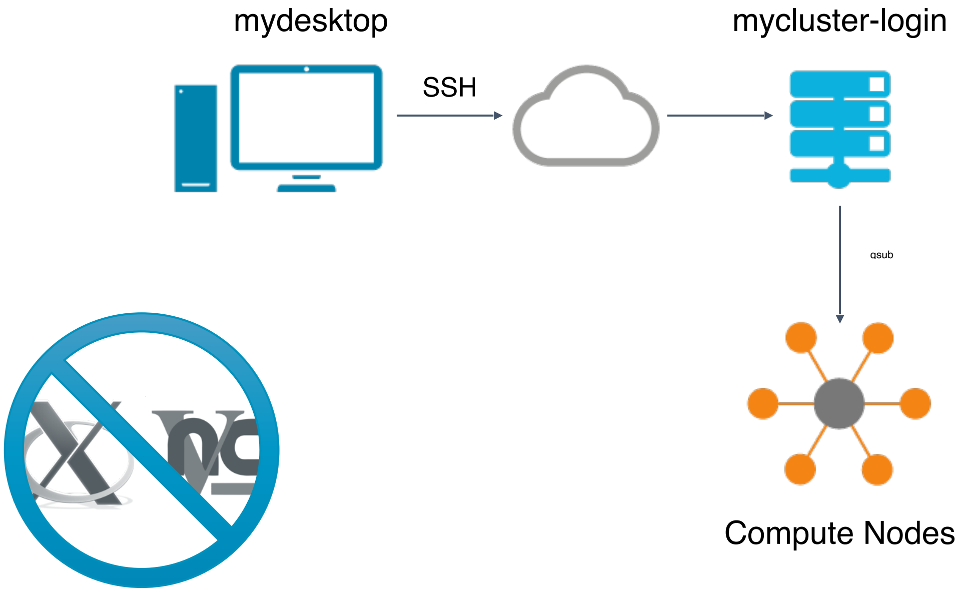
(to use the node exclusively)

```
salloc -C gpu -A ntrain7 --reservation=forge_gpu -n 1 -c 32 -G 1 -q shared -t 30
```

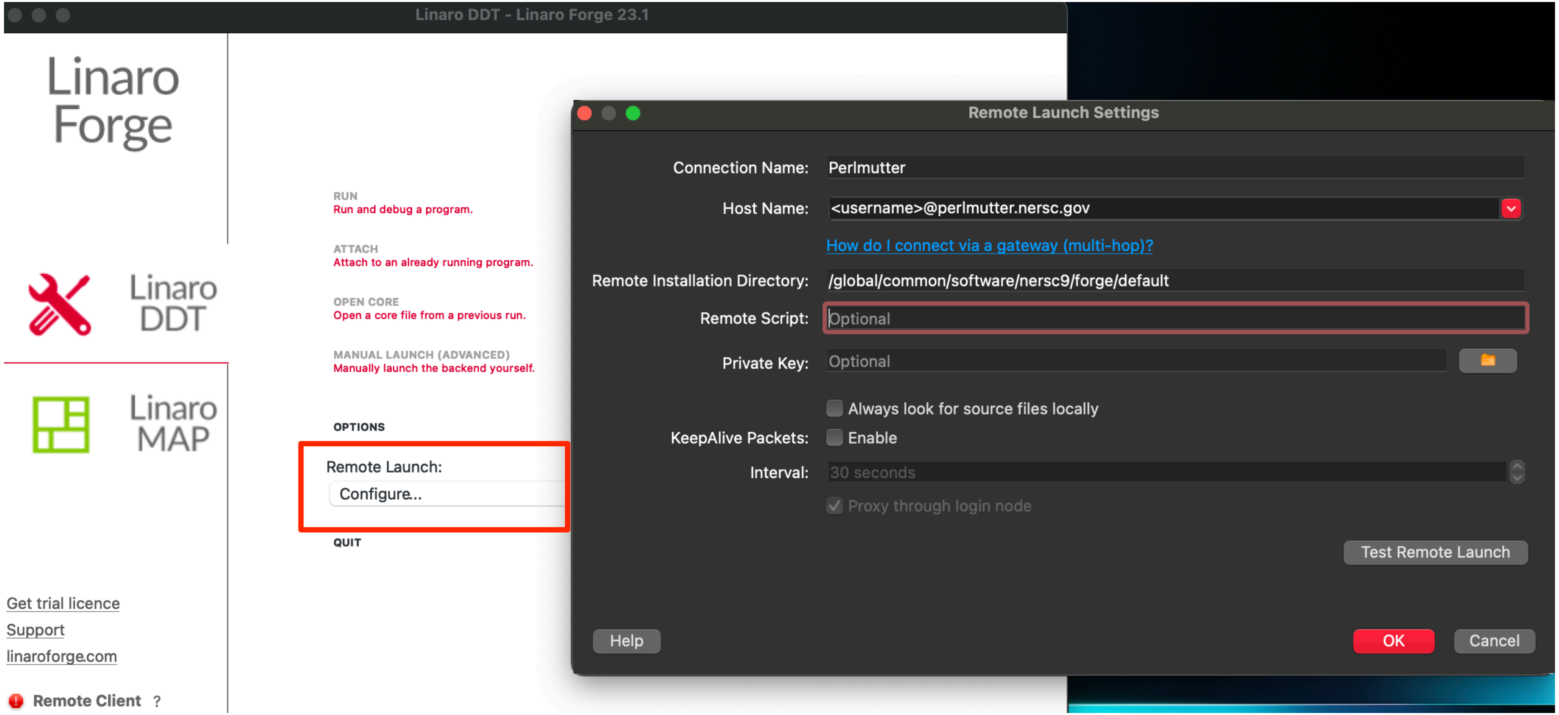
(to get 1 GPU and 1/4 of the CPU and the node is to be shared with other jobs)

The Forge GUI and where to run it

DDT provides a powerful GUI that can be run in a variety of configurations.



Remote connection to AWS



Linaro DDT - Linaro Forge 23.1

Linaro Forge

Linaro DDT

Linaro MAP

RUN
Run and debug a program.

ATTACH
Attach to an already running program.

OPEN CORE
Open a core file from a previous run.

MANUAL LAUNCH (ADVANCED)
Manually launch the backend yourself.

OPTIONS

Remote Launch: Configure...

QUIT

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Remote Client ?

Remote Launch Settings

Connection Name: Perlmutter

Host Name: <username>@perlmutter.nersc.gov

How do I connect via a gateway (multi-hop)?

Remote Installation Directory: /global/common/software/nersc9/forge/default

Remote Script: Optional

Private Key: Optional

□ Always look for source files locally

KeepAlive Packets: □ Enable

Interval: 30 seconds

☑ Proxy through login node

Setting up the environment

1. *Copy the linaro-forge-examples*

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

2. *Set the path to the forge training folder*

   ```
   export FORGE_TRAINING=<path_to_training_folder>
   ```

3. *Load the forge module*

   ```
   module load forge
   ```

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Post-mortem debugging with a core file

1. *Make the example, which creates core files*

   cd $FORGE_TRAINING/correctness/core-files

   make -f core.makefile

2. *Hook up the Forge client*

   Select the appropriate remote launch option in the Forge client

3. *Open the core files*

   Linaro DDT —> OPEN CORE

   Select div-by-zero as the application

   Select both core files

   DDT GUI enables post-mortem debugging

DDT debug examples

1. *build memory_debugging and split examples*

```
cd $FORGE_TRAINING/debug
 make
```

2. *Get an interactive allocation*

```
salloc -C cpu -A ntrain7 --reservation=forge_cpu -n 1 -c 32 -q shared -t 30
```

3. *Launch applications using DDT*

```
ddt --connect srun -n 4 ./simple
```

4. *split*

```
srun -n 16 ./split
```

5. deadlock

```
srun -n 16 ./deadlock
```

6. m*emory_debugging*

```
srun -n 1 ./memory_debugging
srun -n 4 ./memory_debugging
```

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GPU Debugging

1. *Build GPU example*

```
cd $FORGE_TRAINING/correctness/gpu-nvidia-mmult
make
```

2. *Note that Makefile compiles the application with -g and -G flags to debug cpu and gpu simultaneously*

3. *Launch the nvidia gpu example using the DDT client*

```
salloc -C gpu -A ntrain7 --reservation=forge_gpu -n 1 -c 32 -G 1 -q shared -t 30
ddt --connect ./matrixMul -device=0 -wA=512 -hA=512 -wB=512 -hB=512
```

Accept the connection within the DDT client

Press connect

Optimising: Matrix Multiplication

https://docs.linaroforge.com/latest/html/forge/worked_examples_appendix/mmult/analyze.html

1. Build Python Examples

```
module load python
make -f mmult_py.makefile
```

2. Generate offline Profiles

```
sbatch $FORGE_TRAINING/scripts/submit-job.sh
```

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Thank you

Go to www.linaroforge.com