

Julia for High-Performance Computing



Julia Tutorial at ICPP25
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Interactive Materials

github.com/JuliaParallel/julia-hpc-tutorial-icpp25



juliaornl.github.io/TutorialJuliaHPC

> Running Gray-Scott on Perlmutter/NERSC



juliaornl.github.io/TutorialJuliaHPC

github.com/JuliaParallel/julia-hpc-tutorial-icpp25



Please log into your NERSC account now
(if you've never used ssh before, please go to jupyter.nersc.gov)

... or give Sameer's very slick AWS
(next slides)

Hands-On with AWS

Using ParaTools Pro for E4S™ image on AWS with Heidi



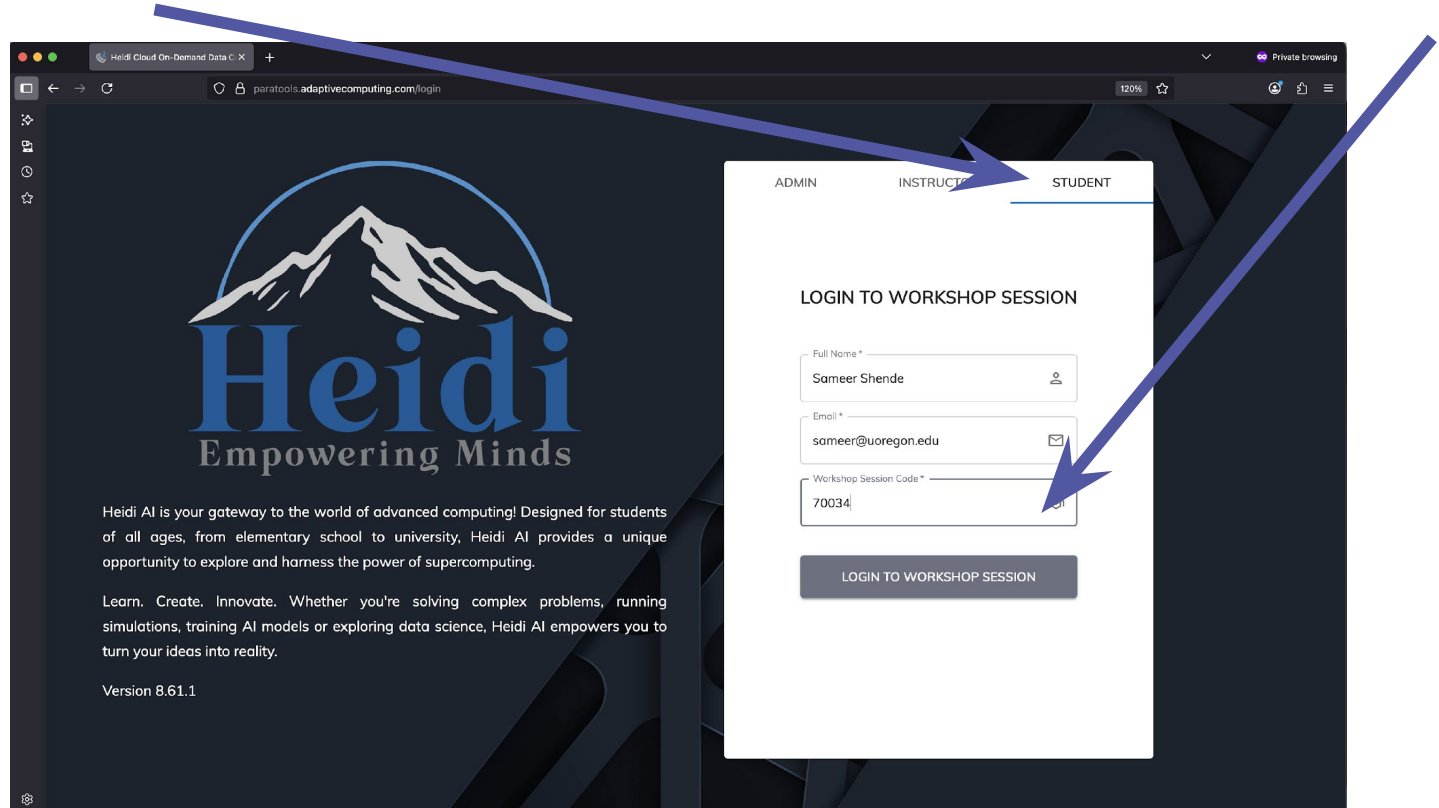
Login to:

<https://paratools.adaptivecomputing.com>

with the credentials. Firefox private window recommended.

Click on Student tab and use code: 70034

Connect to <https://paratools.adaptivecomputing.com>



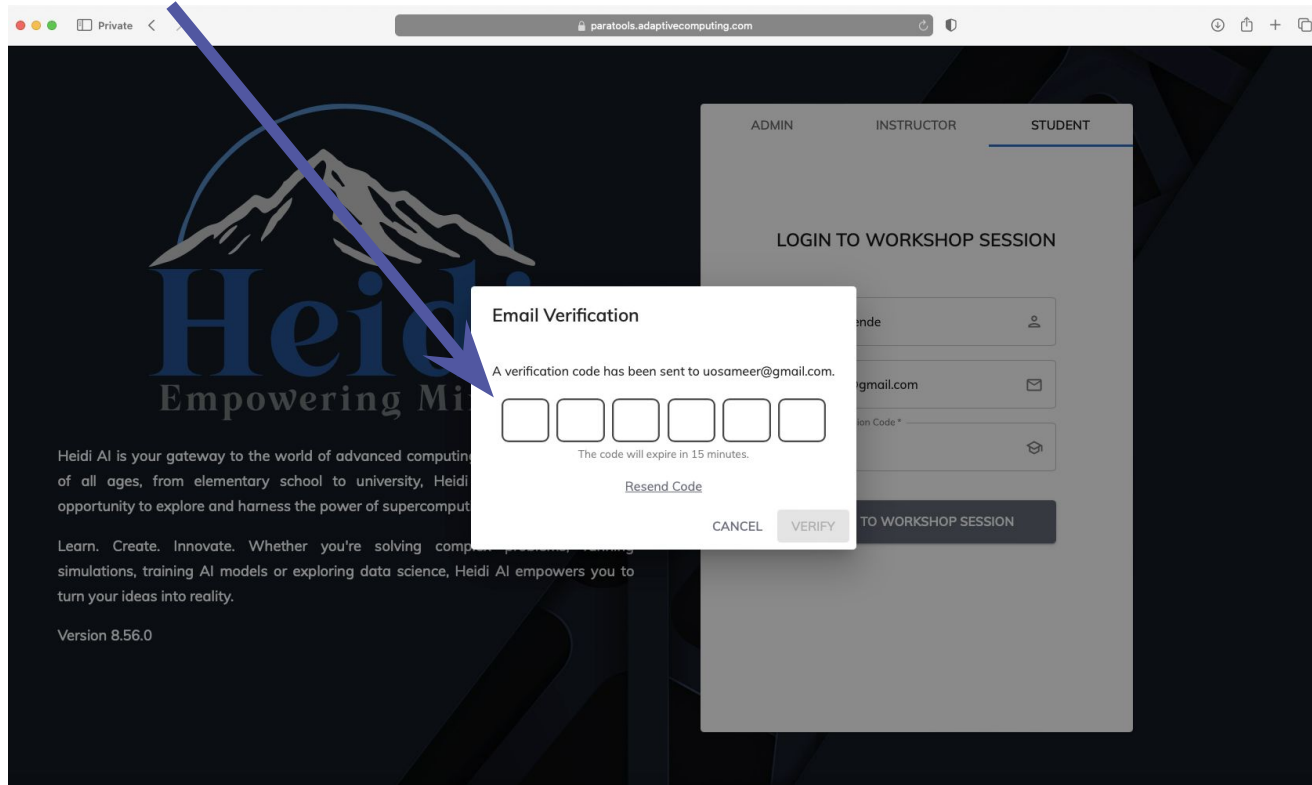
The screenshot shows a web browser window at paratools.adaptivecomputing.com/login. The page features the Heidi AI logo, which includes a mountain silhouette and the text "Heidi Empowering Minds". Below the logo, there is a paragraph about Heidi AI being a gateway to advanced computing for students, followed by the text "Learn. Create. Innovate. Whether you're solving complex problems, running simulations, training AI models or exploring data science, Heidi AI empowers you to turn your ideas into reality." and the version number "Version 8.61.1".

A modal form titled "LOGIN TO WORKSHOP SESSION" is overlaid on the right side of the page. The form has three tabs: "ADMIN", "INSTRUCTOR", and "STUDENT", with "STUDENT" currently selected. The form contains three input fields: "Full Name *" with the value "Sameer Shende", "Email *" with the value "sameer@uoregon.edu", and "Workshop Session Code *" with the value "70034". Each field has a corresponding icon (person, envelope, and code) on the right. Below the input fields is a button labeled "LOGIN TO WORKSHOP SESSION".

Two blue arrows are present: one pointing from the top text to the "STUDENT" tab, and another pointing from the top text to the "Workshop Session Code" input field.

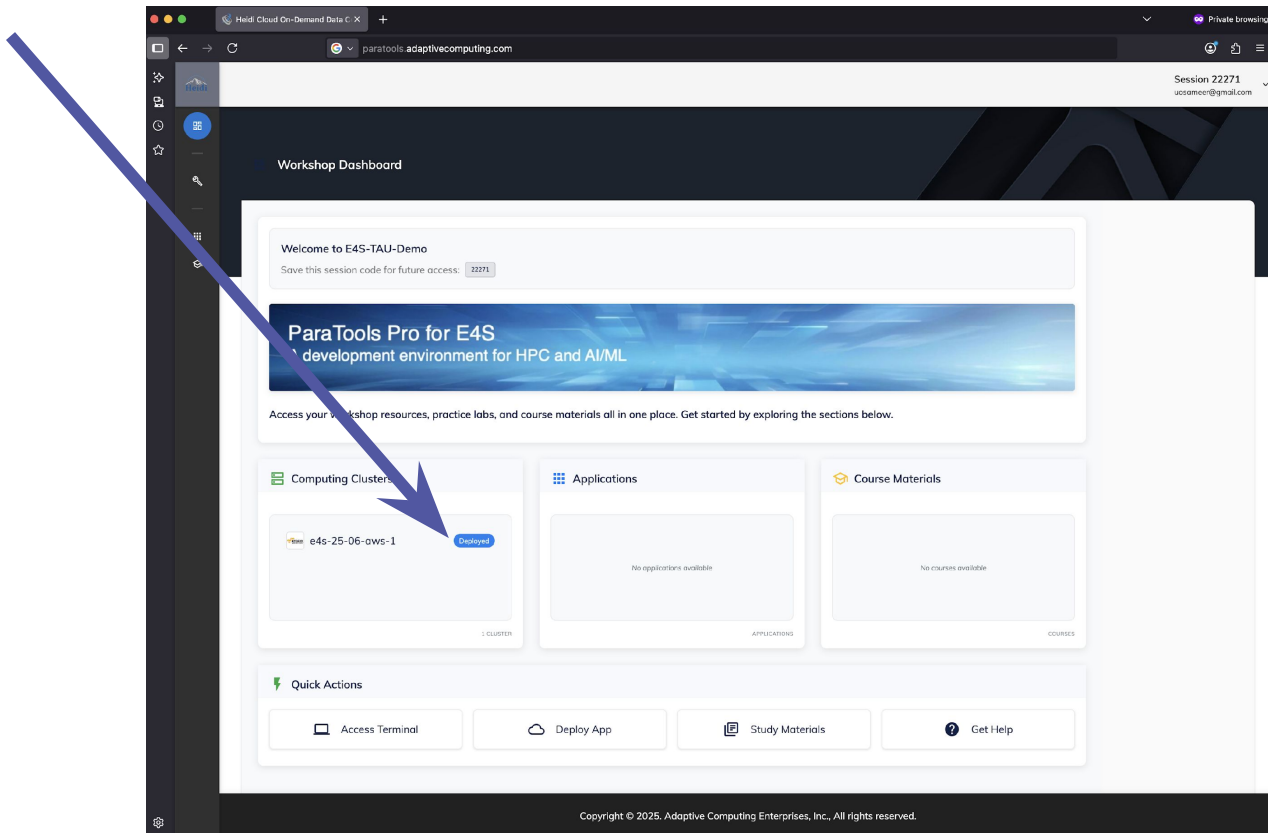
Connect to <https://paratools.adaptivecomputing.com>

- Check your email, enter verification code.



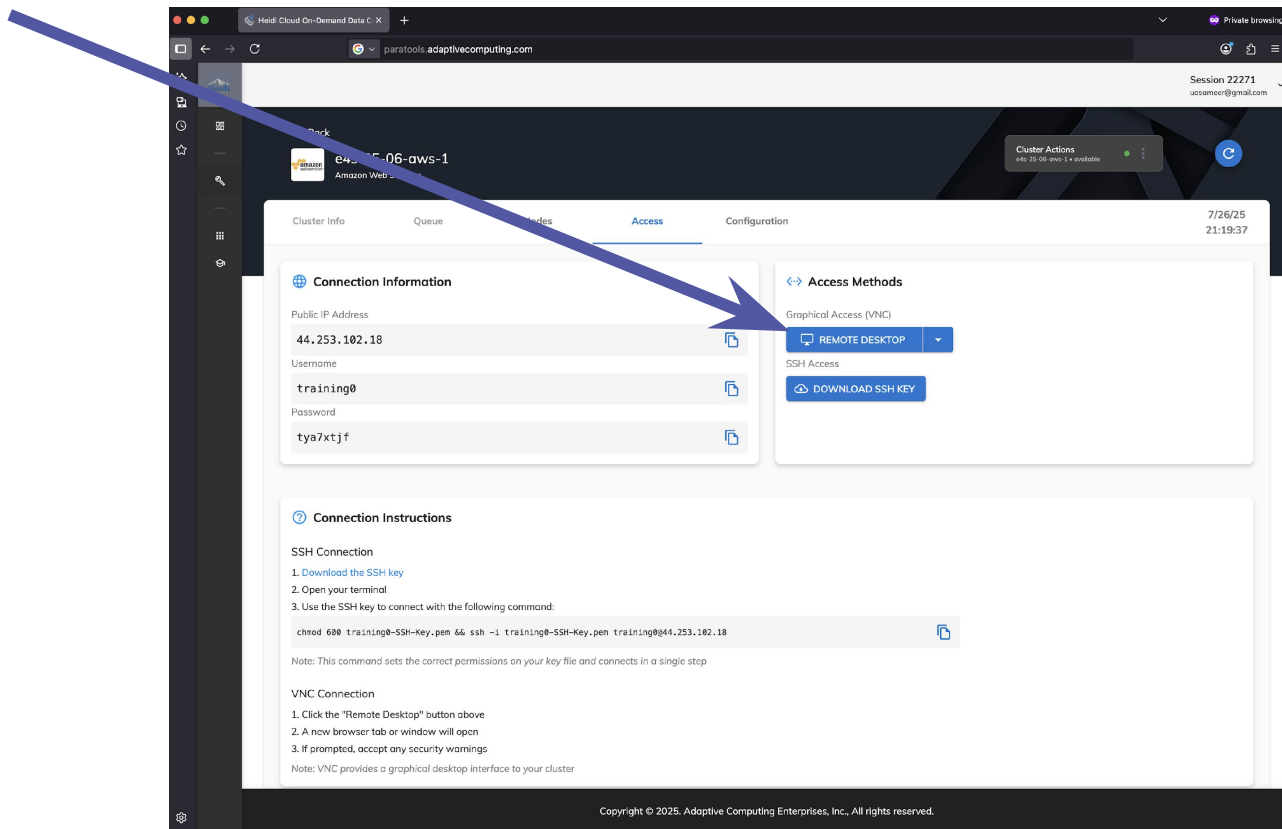
Connect to https://paratools.adaptivecomputing.com

- Click cluster



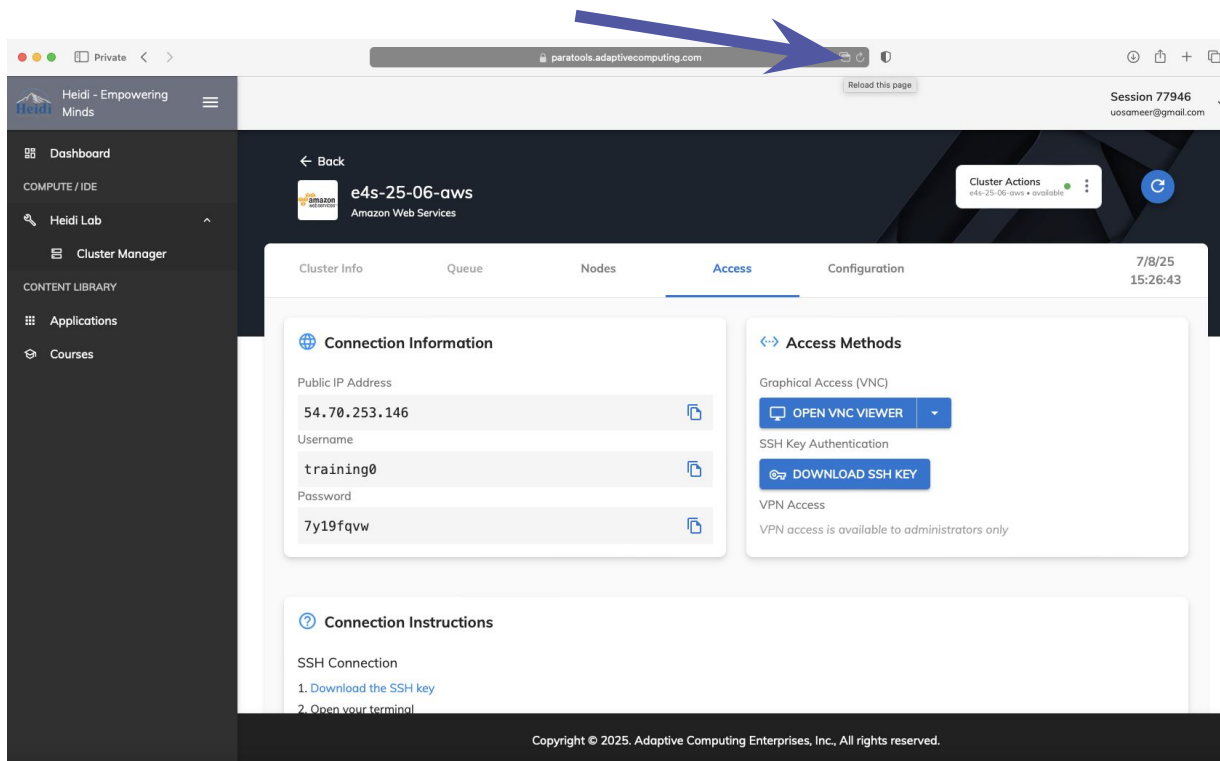
Connect to https://paratools.adaptivecomputing.com

- Click Remote Desktop



Connect to <https://paratools.adaptivecomputing.com>

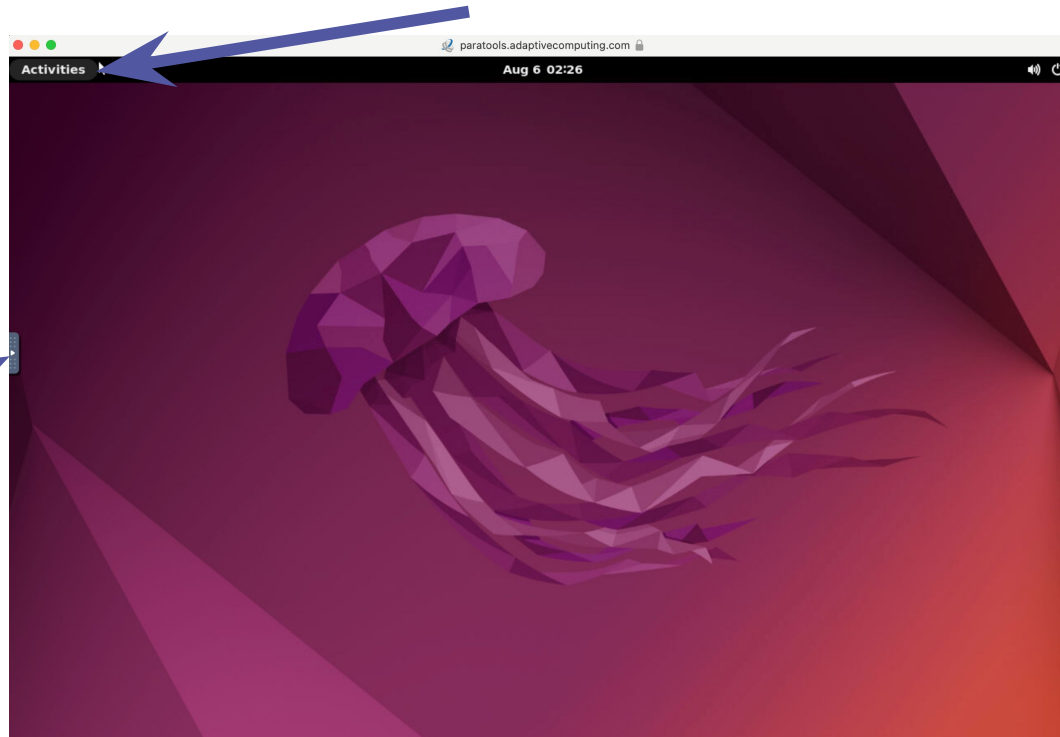
- You may have to enable pop-up windows and accept



Connect to Students tab with code 70034 at <https://paratools.adaptivecomputing.com>

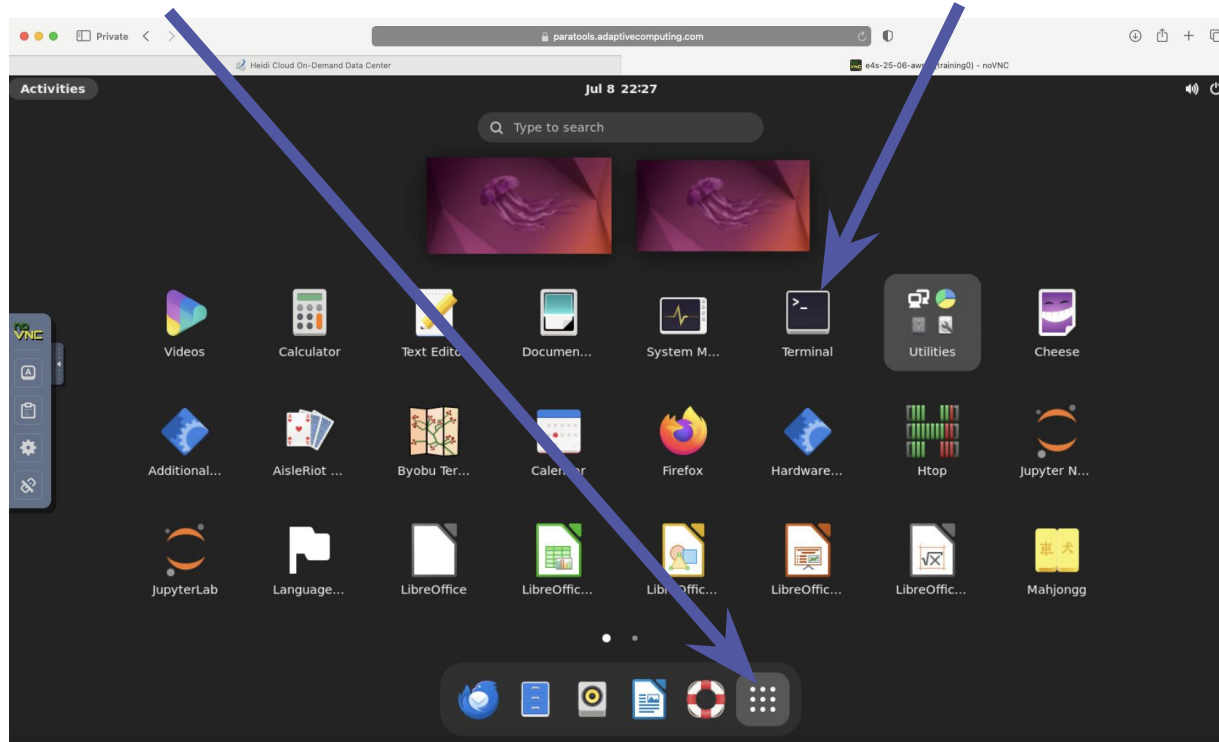
- You should see this jellyfish. Click on Activities.

To copy text from other windows, click on the this button to access the clipboard

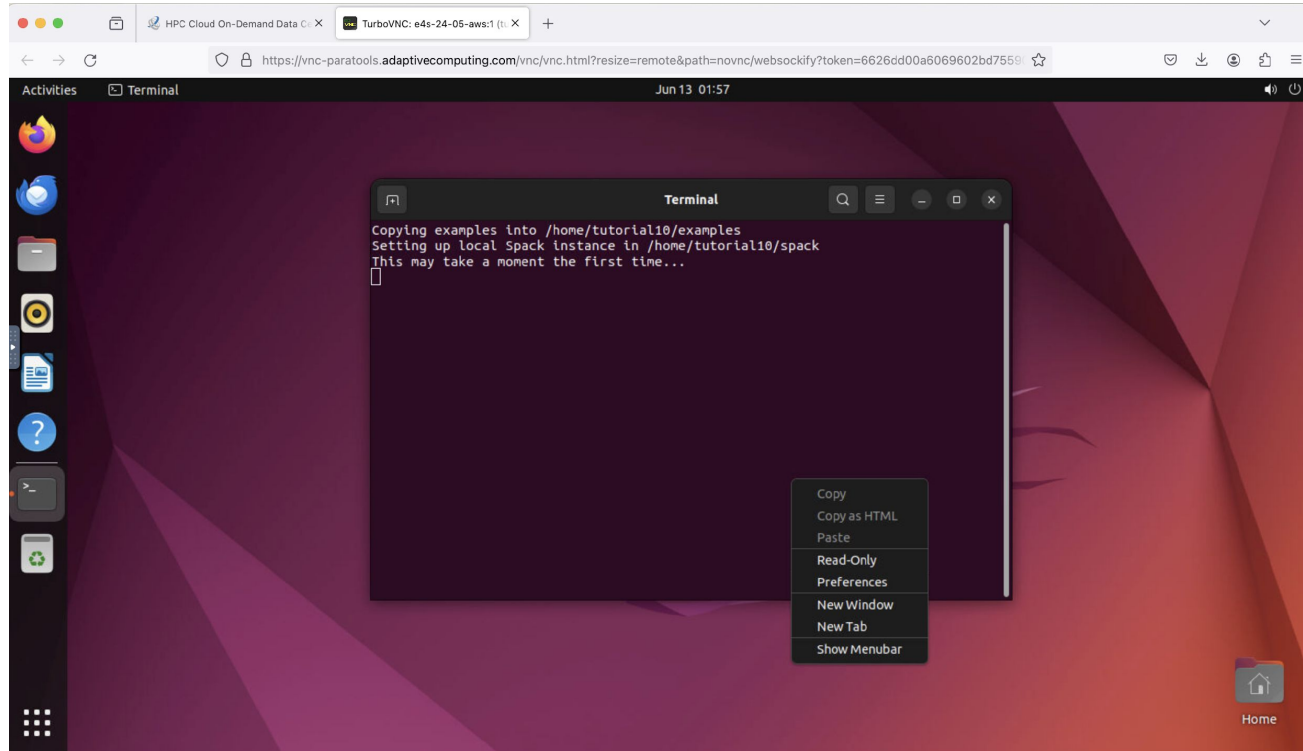


Connect to <https://paratools.adaptivecomputing.com>

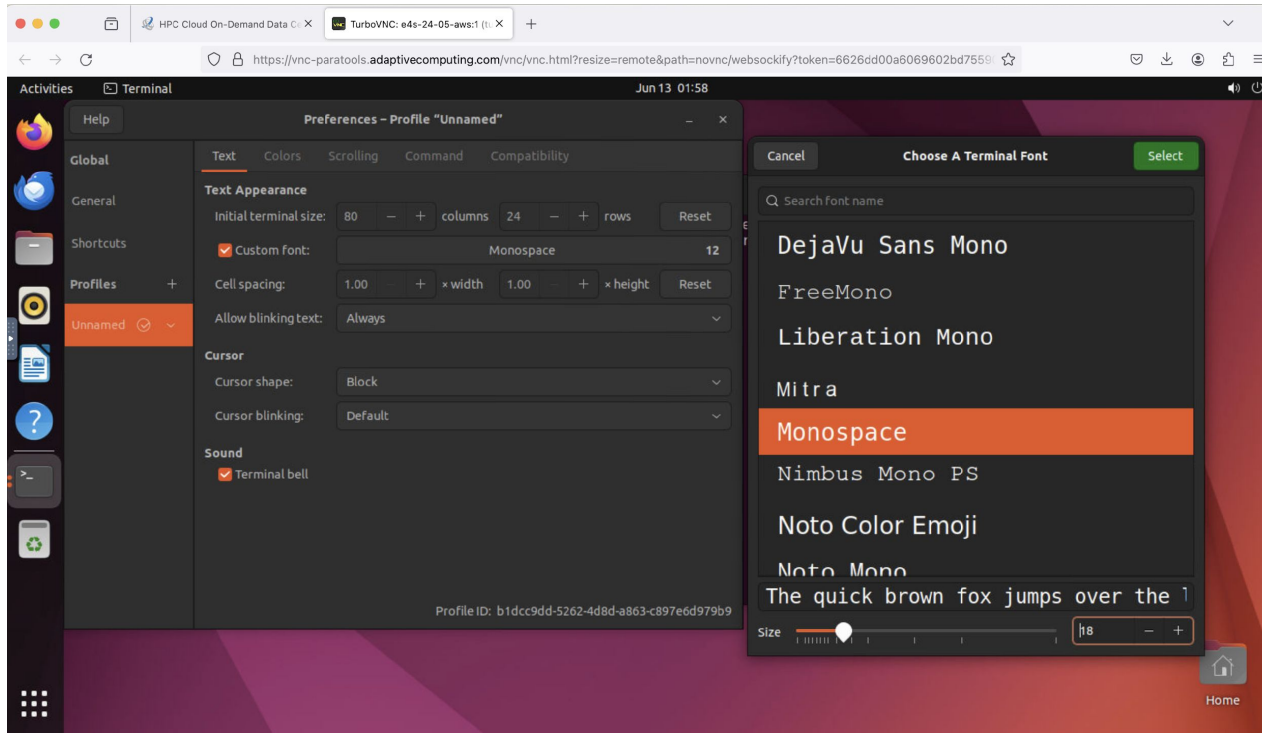
- Click on Activities, nine dots, and then select the Terminal application



To increase font size right click and choose preferences



Choose font size after clicking Custom Font for Terminal



Running your first MPI application on the allocated cluster

```
% cd ~/examples/mpi-procname
% ./compile.sh
% ./run-single-node.sh          # on the login node
% cat mpiprocname.qsub
% qsub mpiprocname.qsub
% qstat -u $USER
% cat mpiprocname.o*

% cd ~/examples/osu-benchmarks
% cat bw.qsub
% qsub bw.qsub
% cat bw.o*                     # How close did you get to 50Gbps? At what message size? Multiply MB/s x 8 ...
```

Running your first Julia application

```
% cd ~/examples/julia-mpi/hello-world;  
% julia  
Julia> import Pkg; Pkg.add("MPI")  
Julia> Pkg.add("CUDA");  
Julia>  
% mpirun -np 4 julia hello-world.jl  
% cd ~/examples/julia-cuda  
% julia cuda-test.jl
```


Acknowledgment

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