



CONNECTING TO CURIOSITY CLUSTER

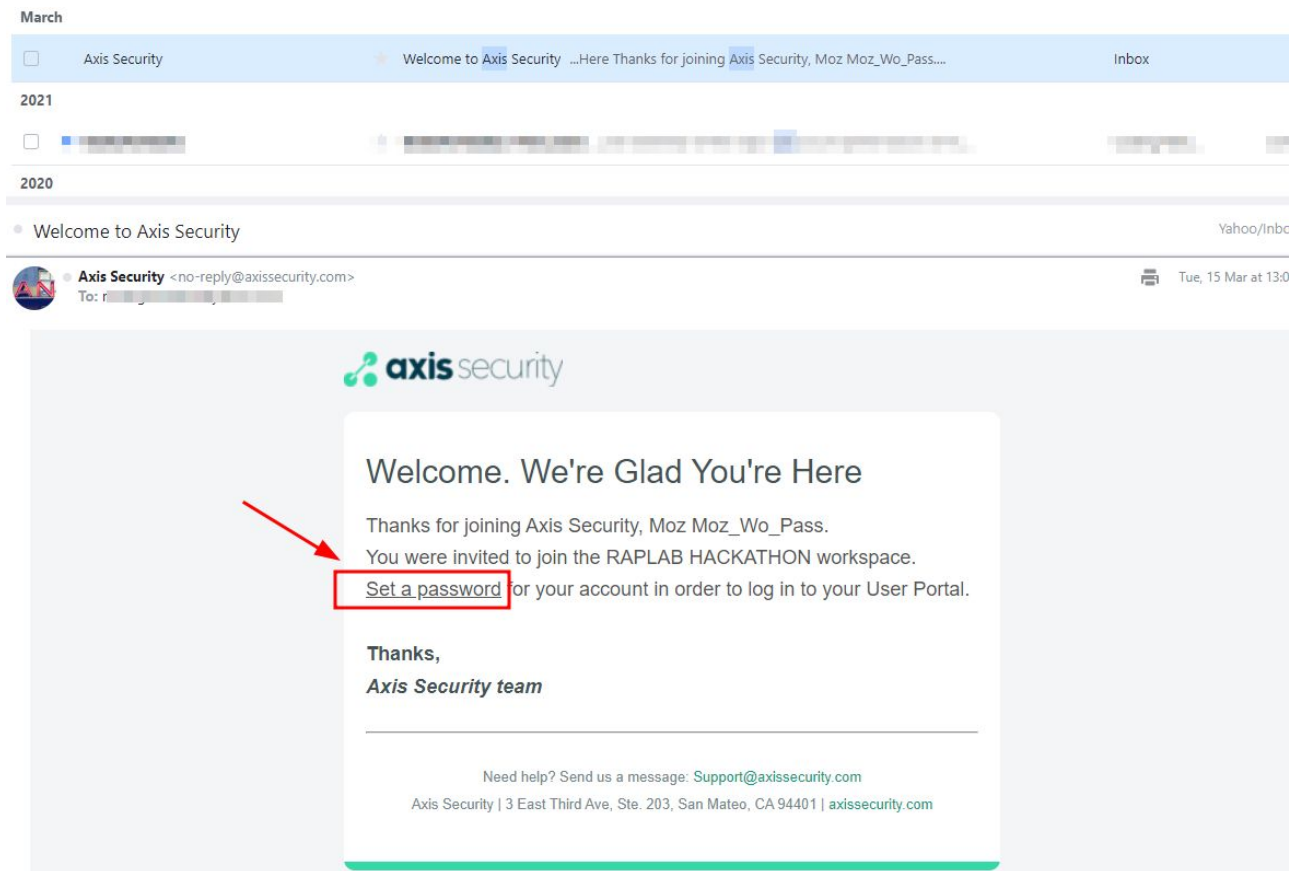
Bootcamps user instructions - last update: June 7 2023



**Activate your Axis
account**

Activate your Axis account

Activate your account using the email you received from Axis. All you need to do is to set a password via the link inside the email.



The background is a dark, almost black, field filled with a complex network of thin, glowing green lines. These lines intersect at various points, creating a web-like structure. At many of these intersection points, there are small, bright green circular dots or nodes. The lines and dots vary in brightness, with some appearing more vibrant than others. The overall effect is one of a dynamic, interconnected system, possibly representing a network or a data structure.

Connect to Axis, Copy the
“hash number”

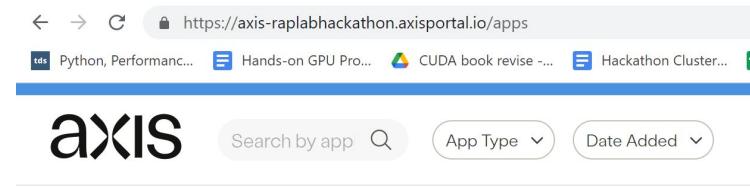
Connecting to the Cluster

→ Login to Axis with your credentials

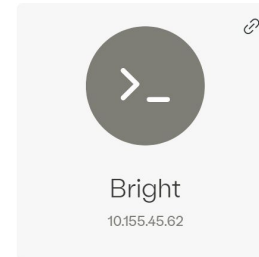
- ◆ Link : <https://axis-raplabhackathon.axisportal.io/apps>
- ◆ Use Chrome browser or make sure your browser does not block pop ups

Connect to CURIOSITY via Terminal

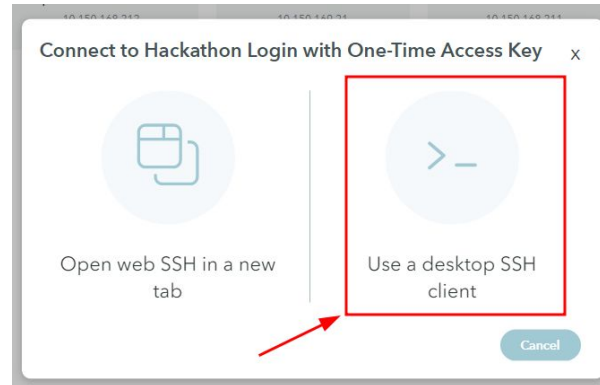
STEP 1) Go back to [Axis login page](#).



→ Click on the “Bright” app



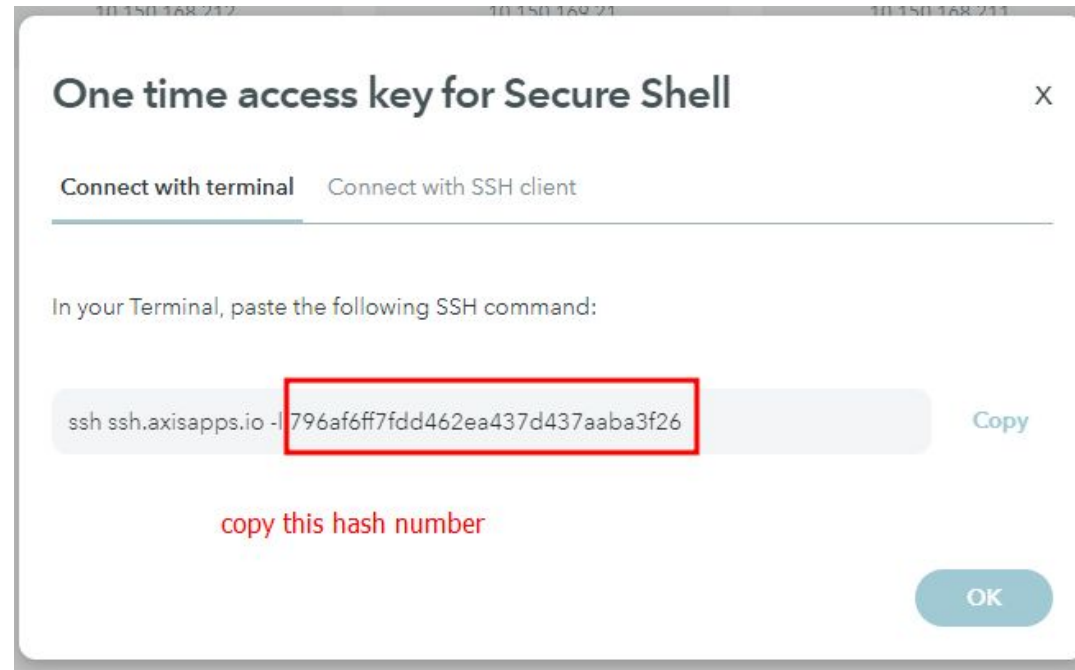
→ Click on “Use a desktop SSH client”



Connect to CURIOSITY via Terminal

Copy AXIS Hash Number

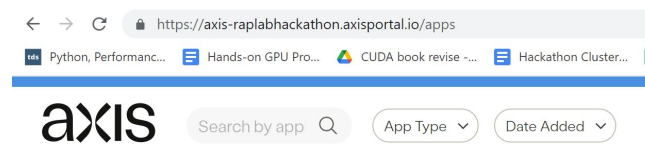
→ Now, make a copy of the hash number (notepad, text etc.) for the next step:



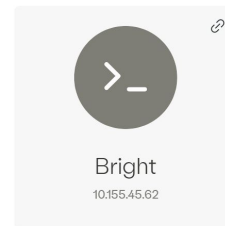
An abstract network diagram with a dark background. It features several bright green nodes of varying sizes, some of which are slightly blurred. These nodes are interconnected by a dense web of thin, light green lines that crisscross the frame. The overall effect is one of a complex, interconnected system, possibly representing a data network or a biological structure.

**Connect to the cluster &
launch the labs**

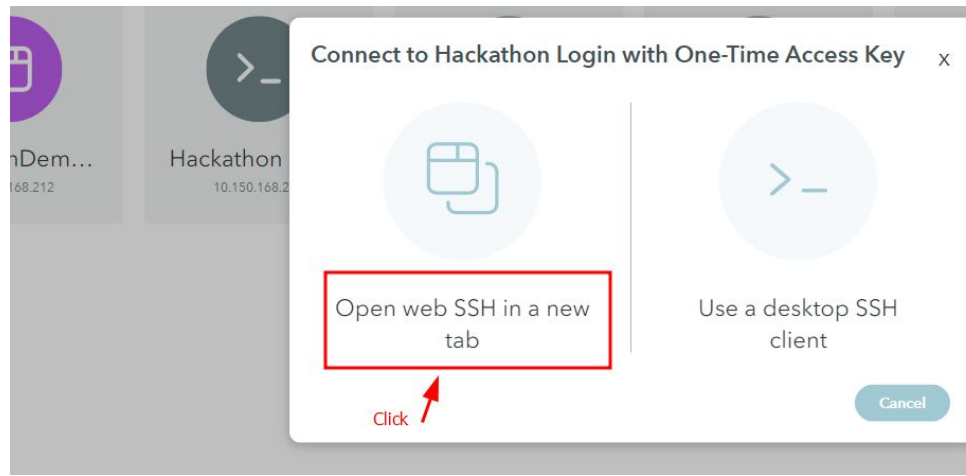
Connecting to the Cluster



→ Click on the “Bright” app



→ Click on the “Open web SSH in a new tab”



Be patient ..

Connecting 10.150.168.212:22

Connected to Axis. Waiting for response...



```
axis-raplabhackathon.axisportal.io/SshClient
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-71-generic x86_64)

* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage

Expanded Security Maintenance for Applications is not enabled.

21 updates can be applied immediately.
20 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

24 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Your Hardware Enablement Stack (HWE) is supported until April 2025.

Welcome to Bright Cluster Manager 9.2

Based on Ubuntu Focal Fossa 20.04
Cluster Manager ID: #00000

Use the following commands to adjust your environment:

'module avail'           - show available modules
'module add <module>'    - adds a module to your environment for this session
'module initadd <module>' - configure module to be loaded at every login
                          (Note: initadd is available only for Tcl modules)

-----
Last login: Thu Jun  1 08:16:49 2023 from 10.155.45.9
mozhgank@curiosity:~$
```

The background is a dark, almost black, field with a complex network of thin, glowing green lines. These lines intersect at various points, creating a web-like structure. At many of these intersection points, there are small, bright green circular dots or nodes. Some of these dots are slightly larger and more intense than others. The overall effect is reminiscent of a digital network, a molecular structure, or a star map. The text 'Launch the lab' is positioned in the lower right quadrant, in a clean, white, sans-serif font.

Launch the lab

Launch the lab via the script

STEP 1

In the web terminal window, use the below command for the bootcamp, replacing <Axis Hash> with the hash from slide 7 (labs availability depends on a type of a bootcamp).

- FourCastNet: `sbatch /bootcamp_scripts/FCN/fourcastnet <Axis Hash>`

STEP 2

Wait for about 1-2 minutes then copy the following command into the same web terminal window as you ran the previous command: `cat port_forwarding_command`

The output:

```
mozhgank@curiosity:~$ cat port_forwarding_command
ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454831a3e7f3db9597717f
```

STEP 3

Highlight the printed result in the web terminal (and if using chrome right click to copy, or Ctrl + Insert for copy and Ctrl+Shift+V to paste)

```
mozhgank@curiosity:~$ cat port_forwarding_command  
ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454831a3e7f3db9597717f
```

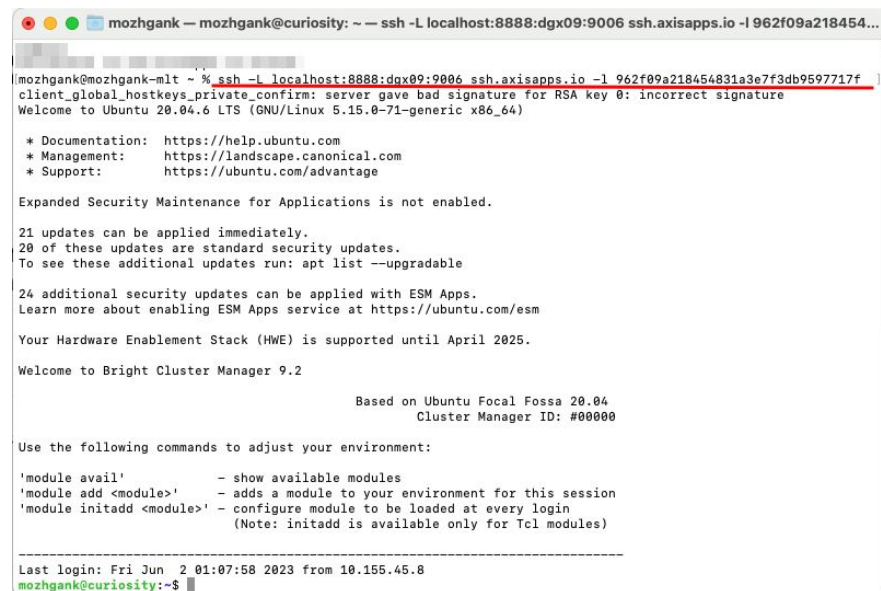
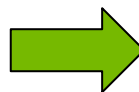
STEP 4

Open a **NEW** local terminal (Not through Axis or the web terminal **this has to be your local computer**) using Powershell, command prompt, Linux terminal, mac terminal, etc. Paste the result that was copied from Step 3 and hit enter to log back into the cluster in the local window.



```
mozhgank — mozhgank@curiosity: ~ — ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454...  
mozhgank@mozhgank-mlt ~ % ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454831a3e7f3db9597717f
```

The output



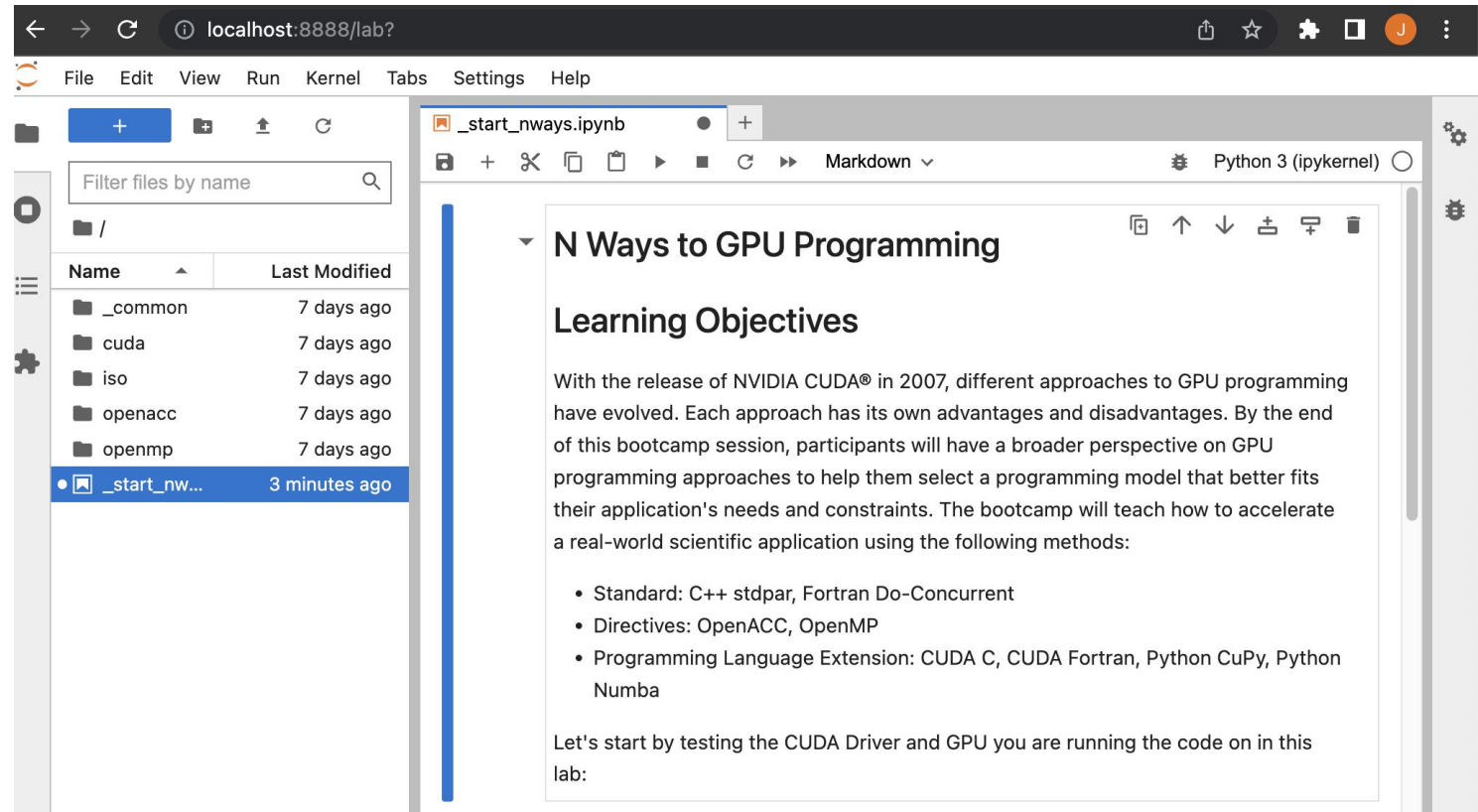
```
mozhgank — mozhgank@curiosity: ~ — ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454...  
mozhgank@mozhgank-mlt ~ % ssh -L localhost:8888:dgx09:9006 ssh.axisapps.io -l 962f09a218454831a3e7f3db9597717f  
client_global_hostkeys_private_confirm: server gave bad signature for RSA key 0: incorrect signature  
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-71-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/advantage  
  
Expanded Security Maintenance for Applications is not enabled.  
  
21 updates can be applied immediately.  
20 of these updates are standard security updates.  
To see these additional updates run: apt list --upgradable  
  
24 additional security updates can be applied with ESM Apps.  
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Your Hardware Enablement Stack (HWE) is supported until April 2025.  
  
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Cluster Manager ID: #00000  
  
Use the following commands to adjust your environment:  
  
'module avail' - show available modules  
'module add <module>' - adds a module to your environment for this session  
'module initadd <module>' - configure module to be loaded at every login  
                      (Note: initadd is available only for Tcl modules)  
  
-----  
Last login: Fri Jun  2 01:07:58 2023 from 10.155.45.8  
mozhgank@curiosity:~$
```


STEP 5

Open your web browser (we recommend Chrome with pop blocker disabled) and enter:

<http://localhost:8888>

Jupyter Lab will start



The screenshot shows the Jupyter Lab web interface. The browser address bar displays `localhost:8888/lab?`. The interface includes a top menu bar with options: File, Edit, View, Run, Kernel, Tabs, Settings, and Help. On the left, a file browser sidebar shows a search bar and a table of files and folders.

Name	Last Modified
/	
_common	7 days ago
cuda	7 days ago
iso	7 days ago
openacc	7 days ago
openmp	7 days ago
• _start_nw...	3 minutes ago

The main workspace displays a notebook titled `_start_nways.ipynb`. The notebook content includes a section titled **N Ways to GPU Programming** and a subsection titled **Learning Objectives**.

With the release of NVIDIA CUDA® in 2007, different approaches to GPU programming have evolved. Each approach has its own advantages and disadvantages. By the end of this bootcamp session, participants will have a broader perspective on GPU programming approaches to help them select a programming model that better fits their application's needs and constraints. The bootcamp will teach how to accelerate a real-world scientific application using the following methods:

- Standard: C++ stdpar, Fortran Do-Concurrent
- Directives: OpenACC, OpenMP
- Programming Language Extension: CUDA C, CUDA Fortran, Python CuPy, Python Numba

Let's start by testing the CUDA Driver and GPU you are running the code on in this lab:

Troubleshooting

- Session per the bootcamp is 4hrs
- Hash keys are good for 24hrs
- To close the job use the file menu in jupyter and choose shutdown, then close the ssh terminal
- Make sure that a VPN is not being utilized
- If you get the following error in the final Step 6 :

```
bind [127.0.0.1]:8888: Address already in use
channel_setup_fwd_listener_tcpip: cannot listen to port: 8888
Could not request local forwarding.
```

You will need to change the port 8888 in your ssh command to some other port, examples would be 8890, 8900 etc.

For example: `ssh -L localhost:8890:dgx05:9538 ssh.axisapps.io -l 7aab57129c95450cb80c4df5c13836bd`