Los Alamos
NATIONAL LABORATORY
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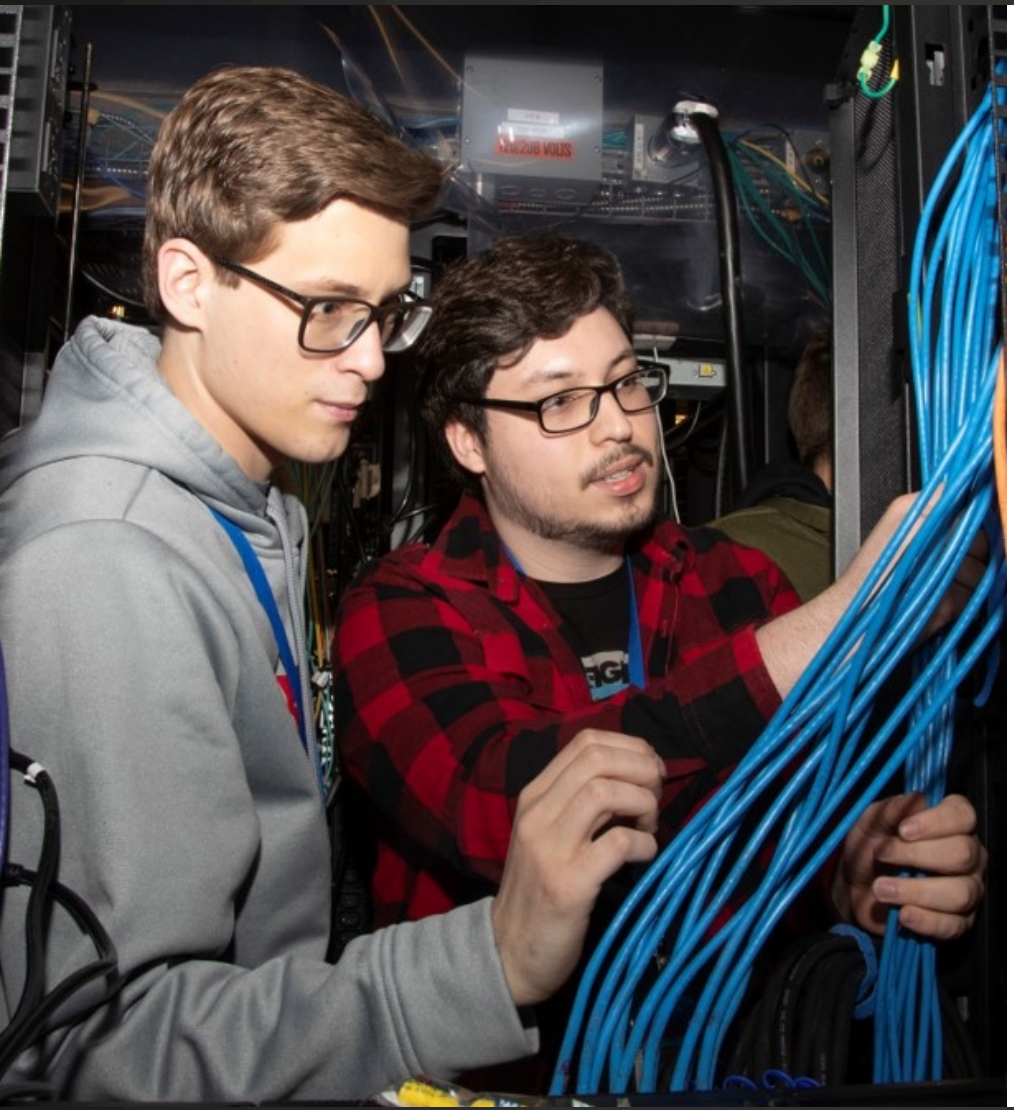
Delivering science and technology
to protect our nation
and promote world stability

Cluster Bootcamp

Course Introduction

Presented by CSCNSI



Agenda

- Introductions
- Course Goals
- Course Layout
- Expectations

Introductions

Instructors		
Lead Instructor	Lowell Wofford	HPC-DES, Futures/Integration
Instructor	Thomas Areba	HPC-SYS, Networking
Instructor	Kierstyn Brandt	HPC-SYS, Platforms
Instructor	Travis Cotton	HPC-SYS, Platforms
Instructor	Francine Lapid	HPC-ENV/CSCNSI Alumnus

Administrative		
Program Lead	Catherine Hinton	HPC-DES, ISSO
Deputy Program Lead	Reid Priedhorsky	HPC-ENV, Simulation & Analysis
Student Coordinator	Julie Wiens	HPC-DO, Intern Recruiter/Liason

About *you*

Tell us:

- Your name
- Where you're from
- A sentence about what brought you here
- A fun thing about yourself (e.g. hobbies, interests, experiences)

Course Layout

1. **Orientation** – *you should be mostly done with this already.*
2. **Bootcamp** – *our project for the next two weeks.*
3. **Research projects** – *work in teams with mentors on exciting research projects.*
4. **Posters & presentations** – *present your work! You should start working on these early.*

Week 1	Orientation
Week 2	Bootcamp
Week 3	
Week 4	Research projects
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	Working on posters
Week 10	Posters & presentations

Course Agenda

1. Intro to HPC
2. HPC Facilities
3. Linux Essentials
4. Networks & Services
5. Stateless Netboot
6. HPC Tools & Provisioning
7. VCS & Configuration Management
8. Monitoring & Benchmarking
9. Using Compute Clusters
10. Intro to Parallel Programming & Visualization
11. Intro to Cluster Programming
12. HPC Futures

Goals: Bootcamp

- Learn the basics of cluster computing including:
  - Linux system administration & installation
  - TCP/IP & high-speed networking concepts
  - Common system services used for HPC
  - Cluster booting & provisioning
  - Monitoring & performance analysis
  - HPC job scheduling and workflows
  - Basics of parallel programming for clusters

Goals: Bootcamp (cont.)

- And, build your team cluster!
  - Physically cable and connect nodes
  - Install your “master” node
  - Learn to provision in 4 phases:
    - By manually installing nodes
    - By manually network booting nodes
    - By using a cluster provisioning tool
    - By using a cluster provisioning tool & configuration management
  - Learn to *use* your cluster
- At the end you should have a fully functional cluster
  - Many of you will use this cluster for your research projects, so this part is *important!*

Goals: Research project

- You'll be working on novel research projects to:
  - Learn HPC through detailed projects in specialty areas
  - Build skills in a specialty area
  - Develop general research skills
  - Learn to work with a team on highly technical projects
  - Learn to communicate and present your work
  - *And... advance an active HPC research question!*
- Attend talks for breadth of knowledge

Other course goals

- Enjoy yourselves; have fun!
- Meet new people with similar interests
- Play with a bunch of cool stuff
- Get to know the area

Course Layout: Bootcamp (weeks 1-2)

Timing may vary based on the day's content, e.g. for guest talks

- Day is ordered in 5 parts:
  1. **Morning lecture** – covering overviews and theory for the day
  2. **Practicum** – a guided lab to learn new skills
  3. **Lunch** – the most important part! (may be with guests)
  4. **Afternoon lecture** – will cover practical skills needed for lab
  5. **Lab** – dedicated time to work on your clusters
  6. *We will have a wrap-up meeting at 4:45 PM*

8 AM	Morning lecture
9 AM	Practicum
10 AM	
11 AM	
12 PM	Lunch
1 PM	Afternoon lecture
2 PM	Lab
3 PM	
4 PM	

Course Layout: Research projects (weeks 3-9)

Timing may vary based on the day's content, e.g. for guest talks

- During the research projects portion, you will spend most of the day working on your projects.
- You will be expected to regularly meet with your mentors and report on project status.
- You will be expected to attend the on-going lecture series (*see calendar*).

8 AM	Project status
9 AM	Research work
10 AM	
11 AM	
12 PM	Lunch
1 PM	Research work
2 PM	
3 PM	
4 PM	

What we expect from you

- Professionalism with
  - Each other
  - NMC/LANL teams
  - The instructors
- Work ethic
  - We have a lot to cover; this will be hard work
  - Show up on time every day
  - Pull your weight in your team
  - Help other teams when you can; this is a collaboration, not a competition

A note about research

- Research can be messy business, with no guarantees
  - Don’t be discouraged if your projects don’t go as planned
    - Look for what you aren’t expecting, that might be your most interesting result.
- These are *real* research projects; it may be that no one knows what the results of your project will be
  - Listen to your mentors
    - They want your project to succeed too.
- These are *genuine* problems that we care about.

Evaluations

- You will be evaluated by:
  - Your instructors
  - Your mentors
  - And, your teammates
- Your posters will give you a chance to showcase your efforts to the entire HPC/LANL/NMC community

Logistics

- Please be here *on time*:
  - Your day begins at **8:00 AM**
  - You are required to vacate the offices by **5:30 PM**
    - *Lock your laptops before you leave!*
- Your time here is short, so days off are strongly discouraged.
- Any time off *must* be coordinated with:
  - Your mentors
  - ***And***, Program leads (Catherine or Reid)
- If you have any issues (including personnel conflicts of any kind), please report them to an *Instructor*, *Mentor* or *Program Lead*.

Safety guidelines

Server rooms have real dangers: high voltage/amperage, heavy equipment & sharp objects, to name a few

- When working in the server room(s), always wear:
  - Closed toed shoes
  - Long pants
  - Earplugs (provided) are a good idea, please wear them if you'll be in the room for more than a few minutes
- If you don't meet this dress code, you won't be allowed in the server room. No exceptions.
- No heavy lifting
  - Server racking should be accompanied by instructors or mentors
- No electrical work
  - Aside from individual server plugs, leave electrical work to instructors or mentors
- Never touch equipment that is not in your rack (including network connections)
- **Stop any activity that appears dangerous!**
- **When in doubt, ask questions!**

Please give us feedback!

- Help us make this a great experience
- We will be providing ways to give both open and anonymous feedback – *please use them*
- If there's something we can do to make your experience better, let us know!

Questions?