

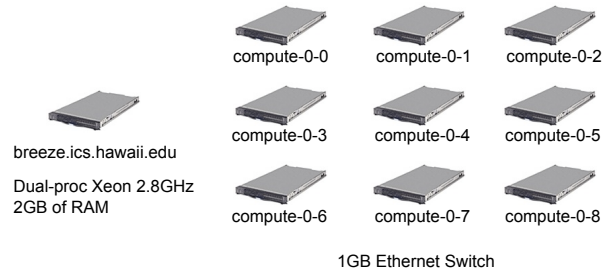
# Introduction

## ICS432 - Fall 2008 Concurrent and High-Performance Programming

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## Our Cluster

- You now all have an account on our cluster
- The cluster is called breeze:



## Our Cluster

- Question: once I am logged in to breeze, what do I do?
- Clusters are always organized as
  - A front end node
    - To compile code (and do minimal testing)
    - To submit jobs
  - Compute nodes
    - To run the code
    - You cannot ssh to these directly
  - There is a file system mounted over all nodes
    - Can be fast, can be slow, depending
  - Each node has a local storage as well
  - For our programming assignment we won't have I/O issues, but perhaps for your projects

## Batch Schedulers

- Most production clusters are managed via a **batch scheduler**:
  - You ask the batch scheduler to give you X nodes for Y minutes to run program Z
  - At some point, the program will be started.
  - Later on you can look at the program output
- This is really different from what you're used to, and honestly is sort of painful
  - No interactive execution
- Necessary because:
  - Since most applications are in this for high performance, they'd better be alone on their compute nodes
  - There are not enough compute nodes for everybody at all times
- The batch scheduler on the cluster is called Torque/Maui

## How to use Torque/Maui?

- You need to learn how to do three things
  - Check the status of the platform (optional)
  - Submit a job
  - Check on job status
  - Cancel a job
- All can be done from the command line
- Let's go through some typical examples

## Checking the status of the platform

- A higher-level command is: showq
- Showq shows the status of the **normal** queue
  - Which jobs are running
  - Which jobs are idle: could be running, but just not enough space on the machine
  - Which jobs are blocked: can't be running on the machine, but perhaps later
    - E.g., too many running/idle jobs from the current user
- Let's try it

## Submitting 1-node Jobs

- I have created a simple script for you all to submit jobs on the cluster
  - Otherwise we'd have to spend quite a bit of time learning about how to create batch submission scripts, etc.
- The script is in:  
`/home/casanova/public/ics432_submit_job`
- Say you wanted to run a program as:  
`% ./my_prog 10 20`
- Instead you need to run it as:  
`% ics432_submit_job ./my_prog 10 20`

## Canceling a job

- This is done with the `qdel` command
- Let us submit a simple job and then delete it....

## WARNING

- It was very difficult to obtain authorization to let a bunch of undergraduates loose on a cluster at UH
- IMPORTANT:
  - when in doubt about doing something dangerous, ask
  - use the cluster exactly as I indicated here
  - make sure your code will not take the machine down!
  - send me e-mail as soon as something off happens
  - do not submit jobs that will last long
    - you're limited to 2 hours anyway