Connecting to NERSC

Douglas Jacobsen, Yushu Yao
NERSC User Services Group

September 10, 2013
Outline: Connecting to NERSC

• **ssh – the Secure Shell**
  – The *lingua franca* of contacting NERSC

• **ssh with X-forwarding (Graphical User Interface)**

• **NX - Accelerated X** (also uses ssh)
  – Persistent sessions, Accelerated Graphics, KDE Desktop
• All of the computational systems at NERSC are accessible via ssh
• Each system has a set of load-balanced login nodes which offer ssh service
• Use your NIM username & password
• Addresses for NERSC systems:

**Large-scale Systems**
- edison.nersc.gov
- hopper.nersc.gov

**Mid-range Systems**
- carver.nersc.gov
- genepool.nersc.gov
- pdsf.nersc.gov

http://www.nersc.gov/users/network-connections/connecting-to-nersc/
Basic SSH use from Mac/Linux/cygwin

• If you have a UNIX-like computer, you can directly contact NERSC with your built-in ssh client
  1. Open a new terminal
  2. Enter: `ssh -l <NIM username> edison.nersc.gov`

• Depending on your preferences you might want additional ssh flags:
  • `ssh -Y` performs robust X-forwarding over ssh
  • `ssh -A` forwards ssh-agent information (if you use ssh-keys)

• Advanced Topic: ssh keys
  – If you choose to setup an ssh key to access NERSC systems, please use a passphrase on the key (no unencrypted ssh keys!)
SSH from a Windows System

• Many ssh clients exist for Windows
  – A very popular one is **putty**
    • [http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html](http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html)
  – Advanced users might prefer to use ssh directly within **mintty** (from cygwin distribution)

• Both of these options support all ssh features (that I’ve ever tried to use)
  – For X-forwarding to work, you’ll need to find X-server software
    • Cygwin/X
    • Exceed
  – Consider using NX instead of X-forwarding
Example Session

doe6933093:~ dmj$ ssh -l <NIM username> hopper.nersc.gov

Password: <enter your NIM password here>
Password: <enter your NIM password here>
Last login: Mon Aug  5 10:56:43 2013 from 128.55.19.61

-------------------------------- Contact Information --------------------------------
NERSC Contacts  http://www.nersc.gov/about/contact-us/
NERSC Status    http://www.nersc.gov/users/live-status/
NERSC: 800-66-NERSC (USA)  510-486-8600 (outside continental USA)

---------------------------- Current Status as of 2013-09-09 14:35 PDT -------------------

Compute Resources:
Carver:          Available.
Dirac:           Available.
Edison:          Available.
   Notes: (09/09/13 14:35 PDT) - Edison is reserved for dedicated science runs on 9/12 Thursday 18:00 PDT - 9/13 Friday 6:00 PDT.
Genepool:        Available.
Hopper:          Available.
Hopper:          Available.
   Notes: (09/09/13 8:51 PDT) - /scratch access issues are affecting some batch jobs. Engineers are investigating.
PDSF:            Available.

Global Filesystems:
Global Homes:    Available.
Global Scratch:  Available.
Project:         Available.
ProjectB:        Available.

Mass Storage Systems:
HPSS Backup:     Available.
HPSS User:       Available.

---------------------------- Service Status as of 2013-09-09 14:35 PDT ---------------------
All services are available.

----------------------------- Planned Outages ---------------------------------------------
HPSS User:       09/11/13 9:00-13:00 PDT, Scheduled maintenance.
Data Transfer Nodes: 09/18/13 8:00-16:00 PDT, Scheduled maintenance.
   Maintenance on DTN01 thru DTN04.
Service:         09/22/13 22:00-09/23/13 2:00 PDT, Scheduled maintenance.
   The NERSC production instance of Service Now (Ticket System) will be down for an upgrade.

-------------------------------- Past Outages ---------------------------------------------
Carver/Dirac:    09/09/13 13:00-13:11 PDT, System in degraded mode.
                      Restarted Moab.

For past outages, see: https://www.nersc.gov/users/live-status/outage-log/

----------------------------------- MOTD: Message of the Day -----------------------------------
NERSC will post
• system-status messages
• Upcoming maintenance
• Past outages

Make sure to look at the MOTD to see if something is going on or will happen which may affect your calculations

---------------------------------- Prompt at NERSC --------------------------------------
<NIM Username>@hopper12:~>
Login Node Auto-Logout

• Some NERSC Systems won’t give you unlimited time on the login nodes
  – After 8 hours idle, hopper login nodes will terminate your session
X-forwarding through SSH
X-forwarding

• Allows you to access Visualization programs remotely at NERSC

Example:
localhost% ssh -l elvis -Y hopper.nersc.gov

... 

e/elvis> module load vmd
e/elvis> vmd
<vmd starts up>

NERSC Recommends using NX instead of X-forwarding.

Next section!
Reasons for NX

Desktop:

- **The Pain:** I’m used to starting my workflow on my windows machine and let it run for a week, where is my desktop now?
- **Solution:** NX gives you a desktop, so you can connect to NERSC resources (such as hopper or carver) and start your GUI applications.
Reasons for NX

Sessions:

• **The Pain:** If I lose internet connection, I might lose all running processes.

• **Solution:** NX provides sessions. You can suspend the session without terminating the running processes.
  
  – And get back to the same point when reconnected, *even from a different location or computer.*
Reasons for NX

Speed:

• **The Pain:** X-Windows is slow over network. Tried starting emacs with a slow network connection? It might take minutes to get the window open.

• **Solution:** NX Buffers/Compresses X messages, giving much better X experience
What you need for NX

- Any Desktop/Laptop
  - Windows/Linux/Mac
- NX Client Software (Free)
NERSC NX Service

• 10 Minute Start-up Guide

Documentation:

Go to [www.nersc.gov](http://www.nersc.gov), search for “NX”

Map of Current Users
National Energy Research Scientific Computing Center