Connecting to NERSC

Douglas Jacobsen, Yushu Yao
NERSC User Services Group

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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

********************************************************************************
*                                                               *
*                      NOTICE TO USERS                          *
*                      ---------------                          *
*                                                               *
*  Lawrence Berkeley National Laboratory operates this computer *
*  system under contract to the U.S. Department of Energy. This  *
*  computer system is the property of the United States  Government  *
*  and is for authorized use only. *Users (authorized or unAuthorized) have no explicit or implicit expectation of privacy.*
*                                                               *
*  Any or all uses of this system and all files on this system  *
*  may be intercepted, monitored, recorded, copied, audited,  *
*  inspected, and disclosed to site, Department of Energy, and  *
*  law enforcement personnel, as well as authorized officials  *
*  of other agencies, both domestic and foreign. *By using this  *
*  system, the user consents to such interception, monitoring,  *
*  recording, copying, auditing, inspection, and disclosure at the  *
*  discretion of authorized site or Department of Energy personnel.*
*                                                               *
*  Unauthorized or improper use of this system may result in  *
*  administrative disciplinary action and civil and criminal  *
*  penalties. *By continuing to use this system you indicate your  *
*  awareness of and consent to these terms and conditions of use. LOG OFF IMMEDIATELY if you do not agree to the conditions stated in this warning.*

Password: <enter your NIM password here>

Prompt on local system
Notification of acceptable use.
Password prompt
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.
  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 DTNO1 thru DTNO4.
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 ----------------------------------------

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

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<NIM Username>@hopper12:~>
• Some NERSC systems won’t give you unlimited time on the login nodes
  – After 8 hours idle, Hopper & Edison 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!
NX@NERSC – Accelerated X
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**

  - Download Client (One Time, 5 min)
  - Setup Connection (One Time, 5 min)

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

Map of Current Users