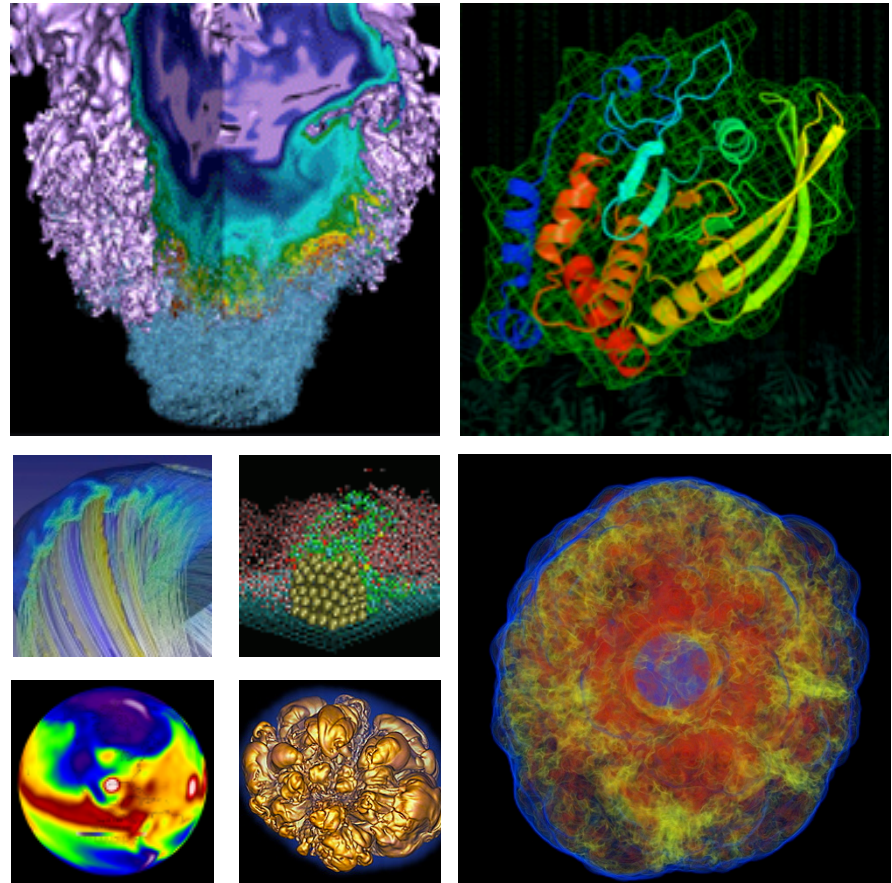


Connecting to NERSC



Douglas Jacobsen, Yushu Yao
NERSC User Services Group

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>
 - 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
```

Prompt on local system

```
*****
*
*          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._*
*
*****
```

Notification of acceptable use.

```
Password: <enter your NIM password here>
```

Password prompt



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 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

```
<NIM Username>@hopper12:~>
```

- 7 -

Prompt at NERSC

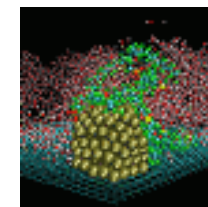
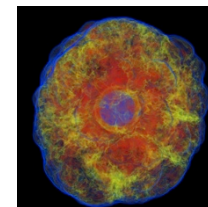
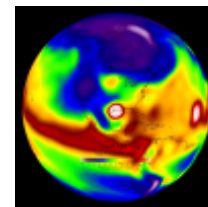
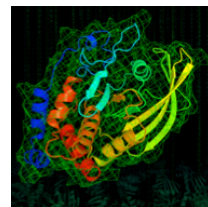
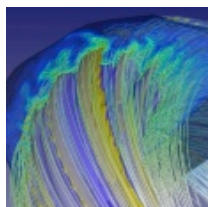
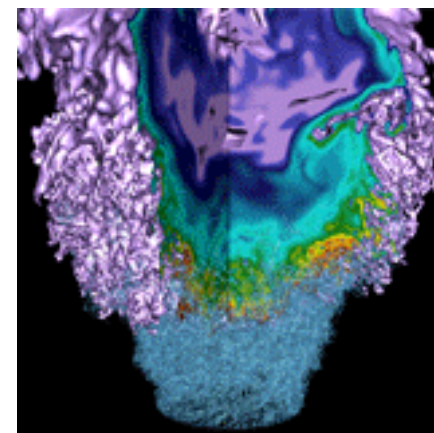


Login Node Auto-Logout



- **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
```

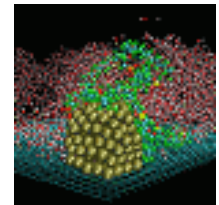
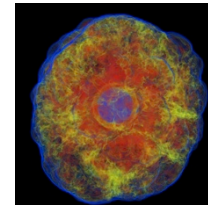
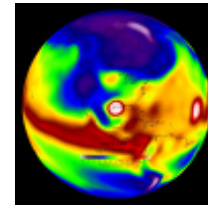
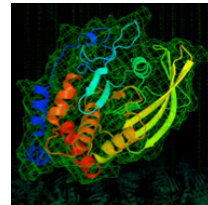
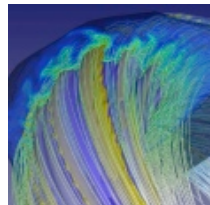
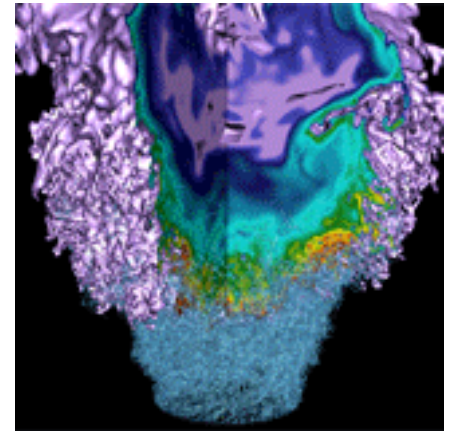
```
...  
e/elvis> module load vmd  
e/elvis> vmd  
<vmd starts up>
```

NERSC Recommends using NX
instead of X-forwarding.

Next section!



NX@NERSC – Accelerated X

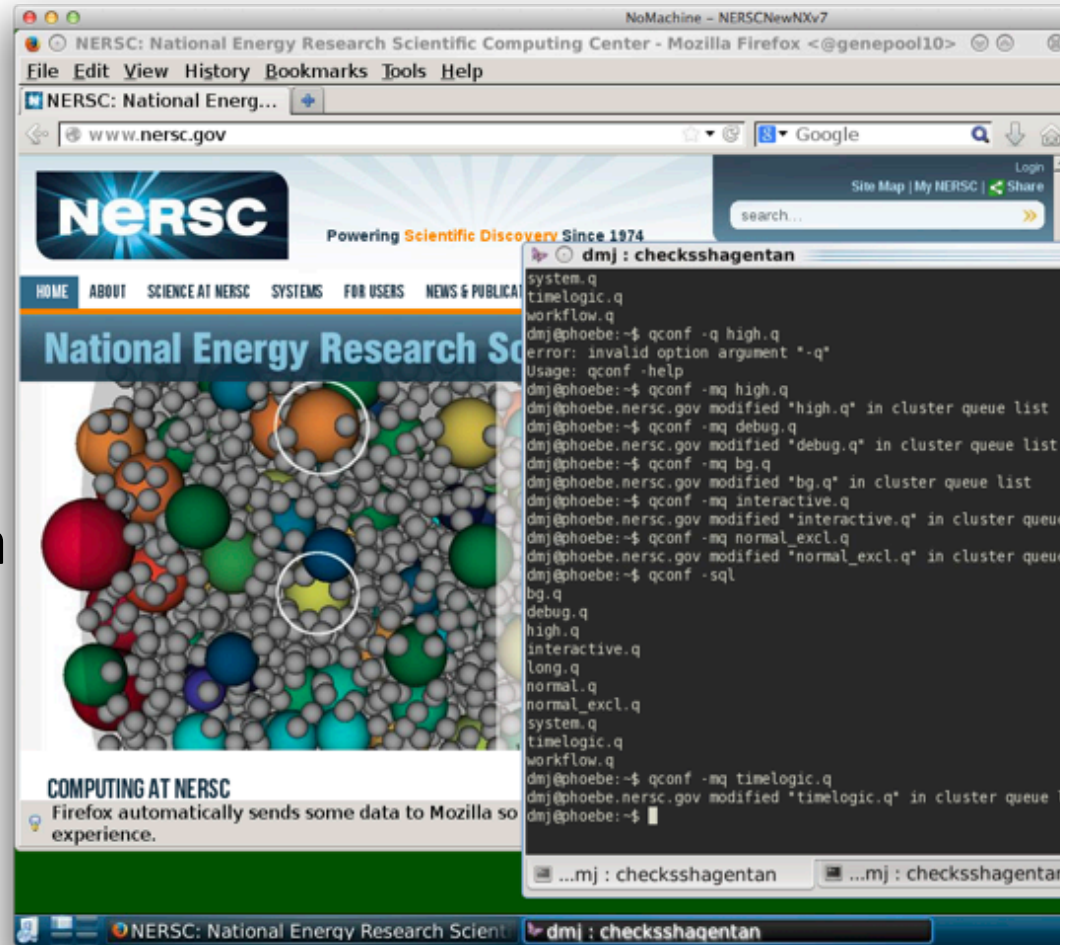


Reasons for NX



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

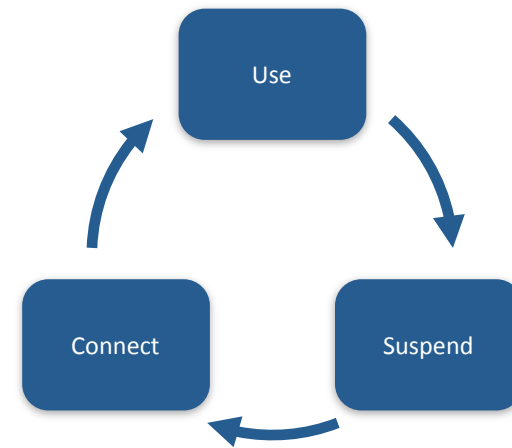
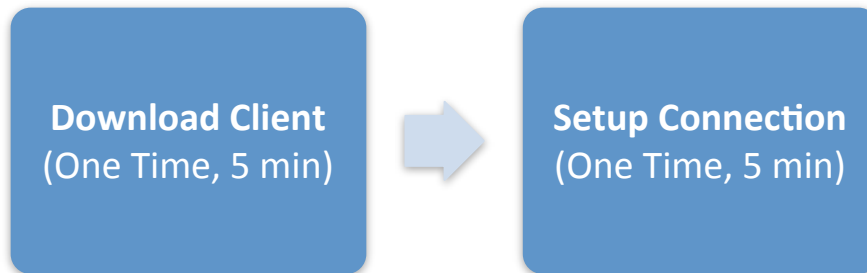


- **Any Desktop/Laptop**
 - Windows/Linux/Mac
- **NX Client Software (Free)**

NERSC NX Service



- **10 Minute Start-up Guide**



Documentation:

Go to www.nersc.gov, search for “NX”





National Energy Research Scientific Computing Center