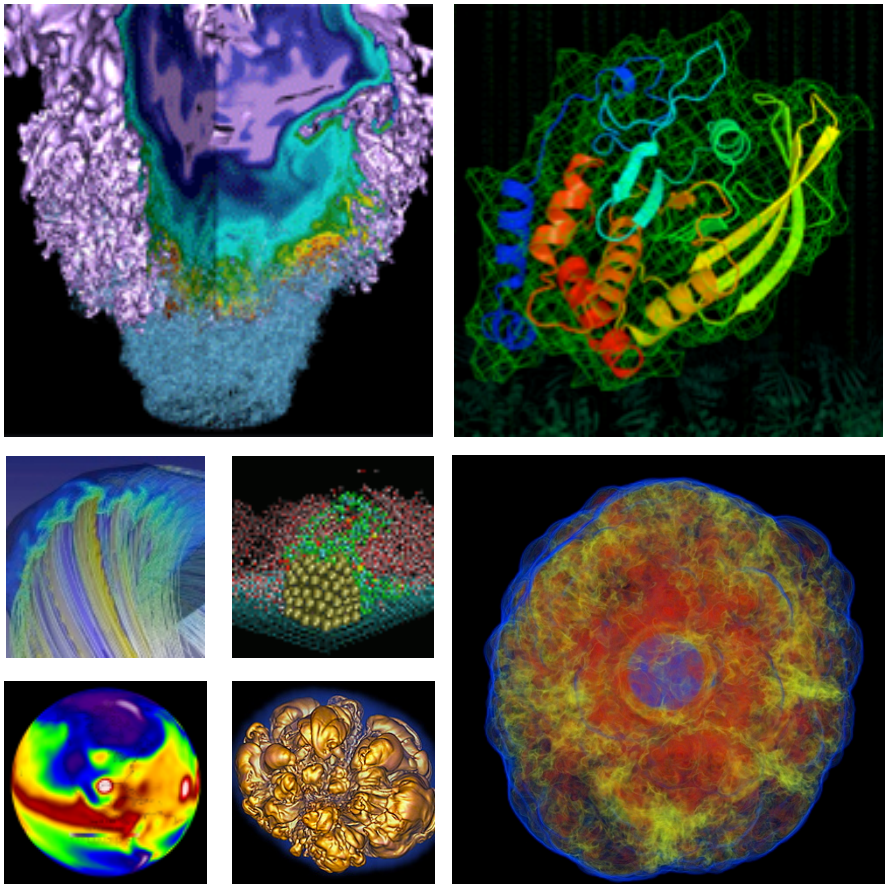
Connecting to NERSC



Lisa Gerhardt

NERSC User Services Group

Outline: Connecting to NERSC

- **ssh – the Secure Shell**
  - The *lingua franca* of contacting NERSC
- **NX - *Accelerated X*** (also uses ssh)
  - Persistent sessions, Accelerated Graphics, KDE Desktop

ssh

- **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

- genepool.nersc.gov
- pdsf.nersc.gov

Data Transfer Nodes

- dtn[1-4].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: <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/

--------------------------------------------------------------------------------

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

Password prompt

MOTD: Message of the Day

NERSC will post

- system-status messages
- Upcoming maintenance
- Past outages

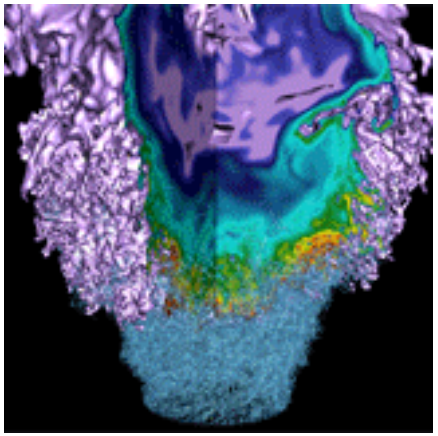
Make sure to look at the MOTD to see if something is going on or will happen which may affect your calculations

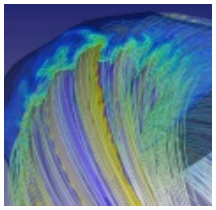
Prompt at NERSC

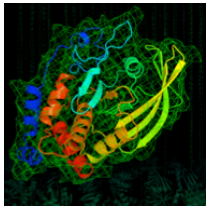
Login Node Auto-Logout

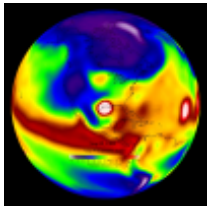
- **Some NERSC systems won't give you unlimited time on the login nodes**
  - After 48 hours idle, Hopper & Edison login nodes will terminate your session
  - PDSF and Genepool session are unlimited

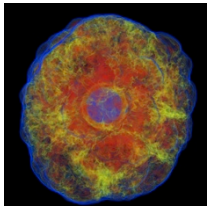
NX@NERSC – Accelerated X

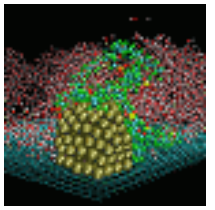




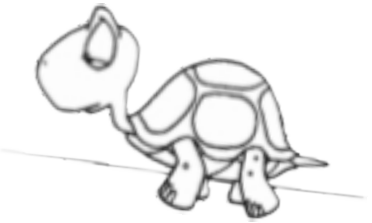








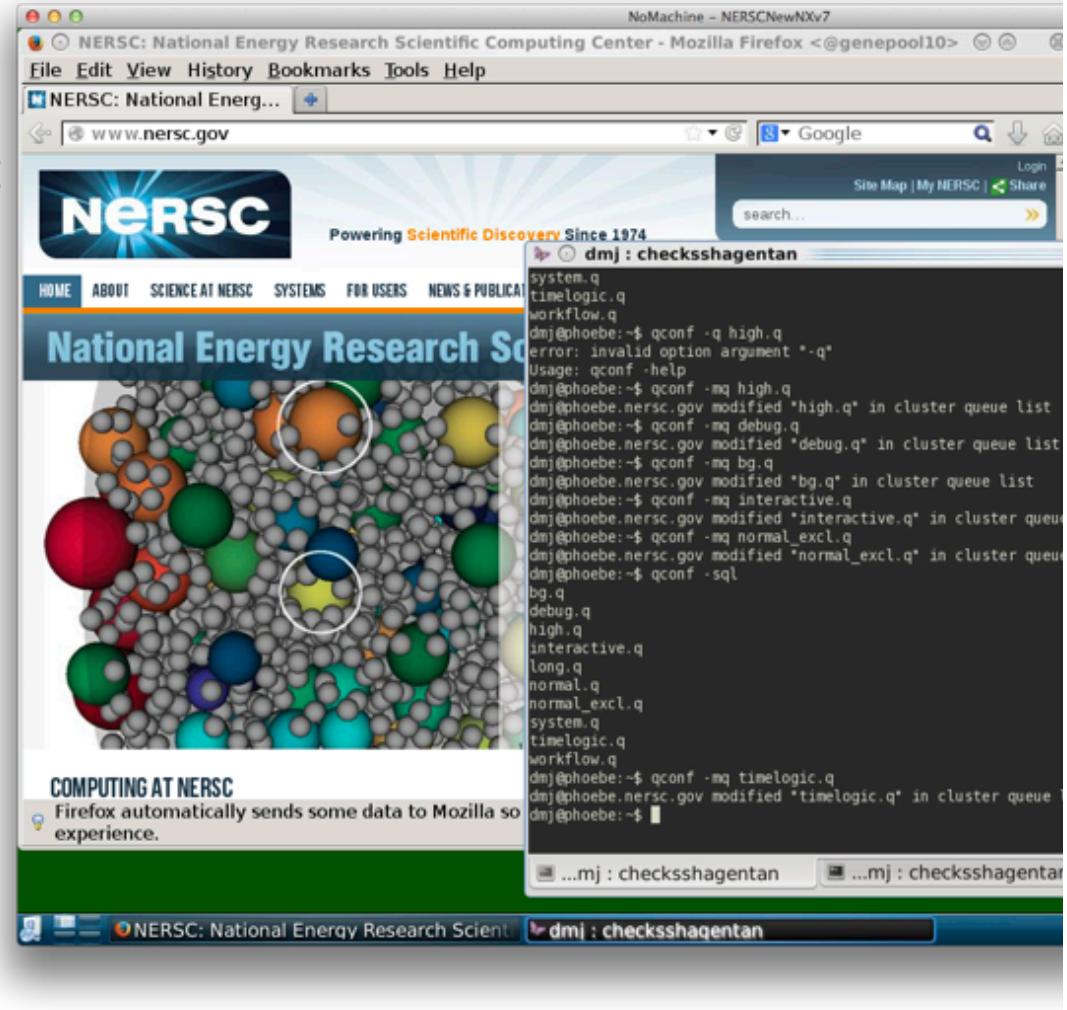
Reasons for NX



- **Slow Speeds:** X-Windows is slow over network. Remote windows from emacs can take minutes to open
- **Solution:** NX Buffers/Compresses X messages, giving much better X experience

Reasons for NX

- **Long Lasting Desktop:** NX gives you a desktop, so you can connect to NERSC resources (such as edison) and start your GUI applications.



Reasons for NX

- **Lost Connections:** 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.*

What you need for NX

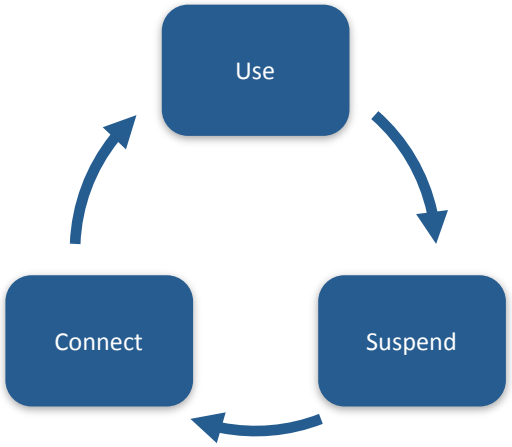
- **Any Desktop/Laptop**
  - Windows/Linux/Mac
- **NX Client Software (Free)**

NERSC NX Service

- **10 Minute Start-up Guide**

Download Client
(One Time, 5 min)

Setup Connection
(One Time, 5 min)

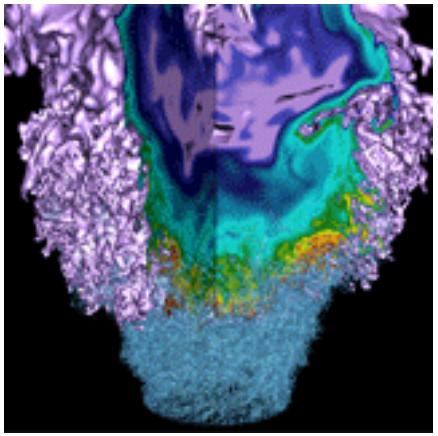


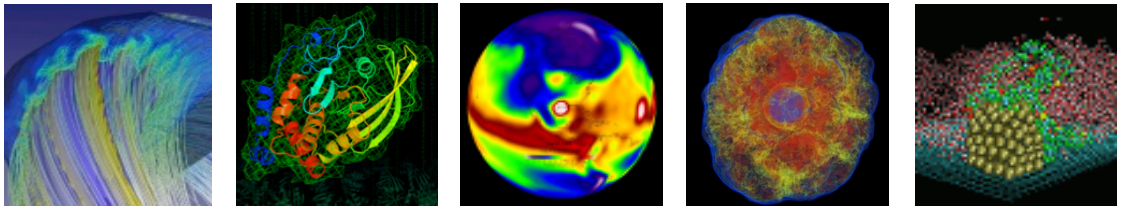
Documentation:

Go to www.nersc.gov, search for "NX"

National Energy Research Scientific Computing Center

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!