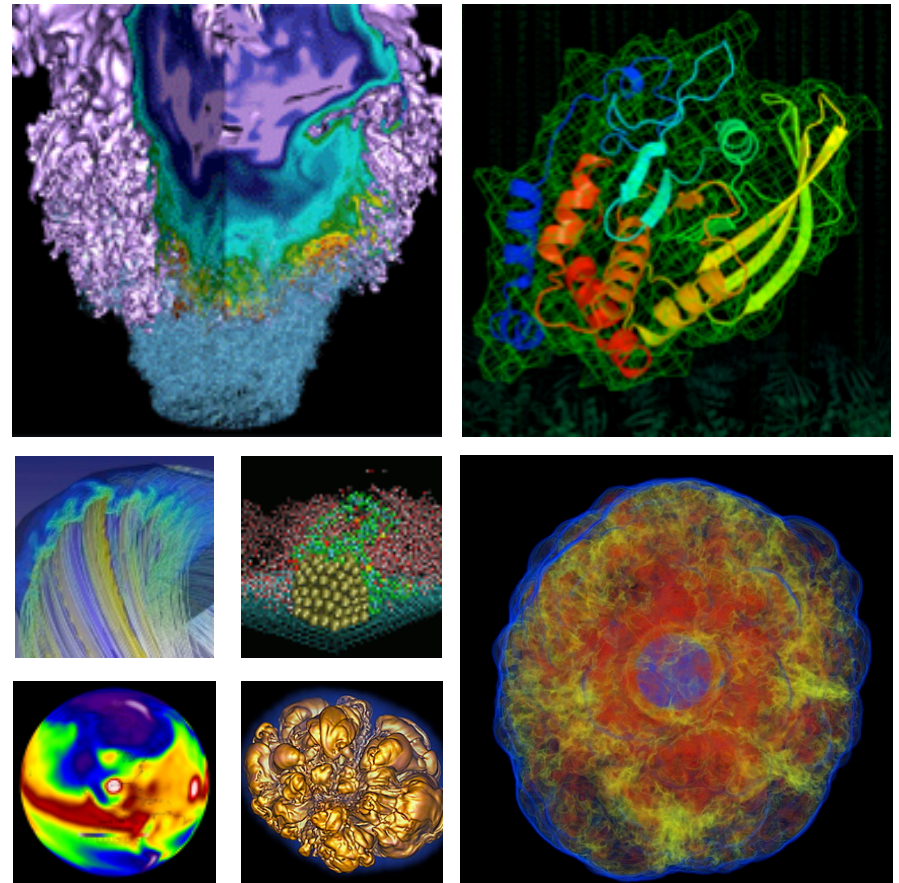


Connecting to NERSC



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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>
 - 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>
```

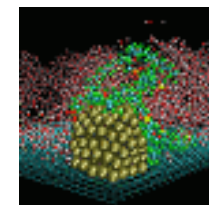
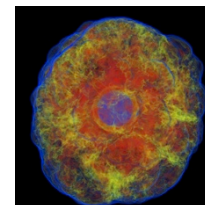
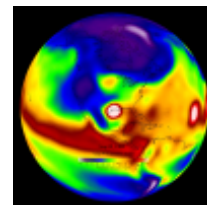
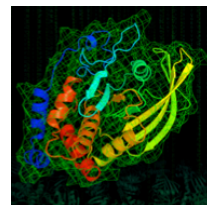
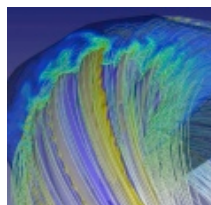
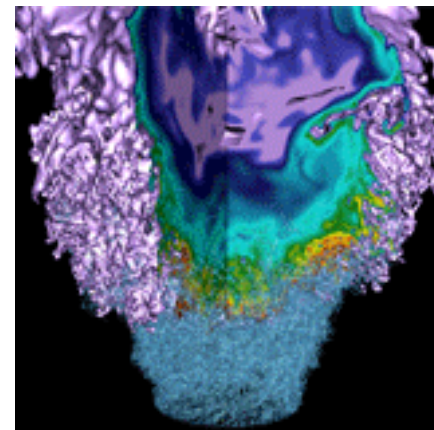
← Password prompt

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
```

...

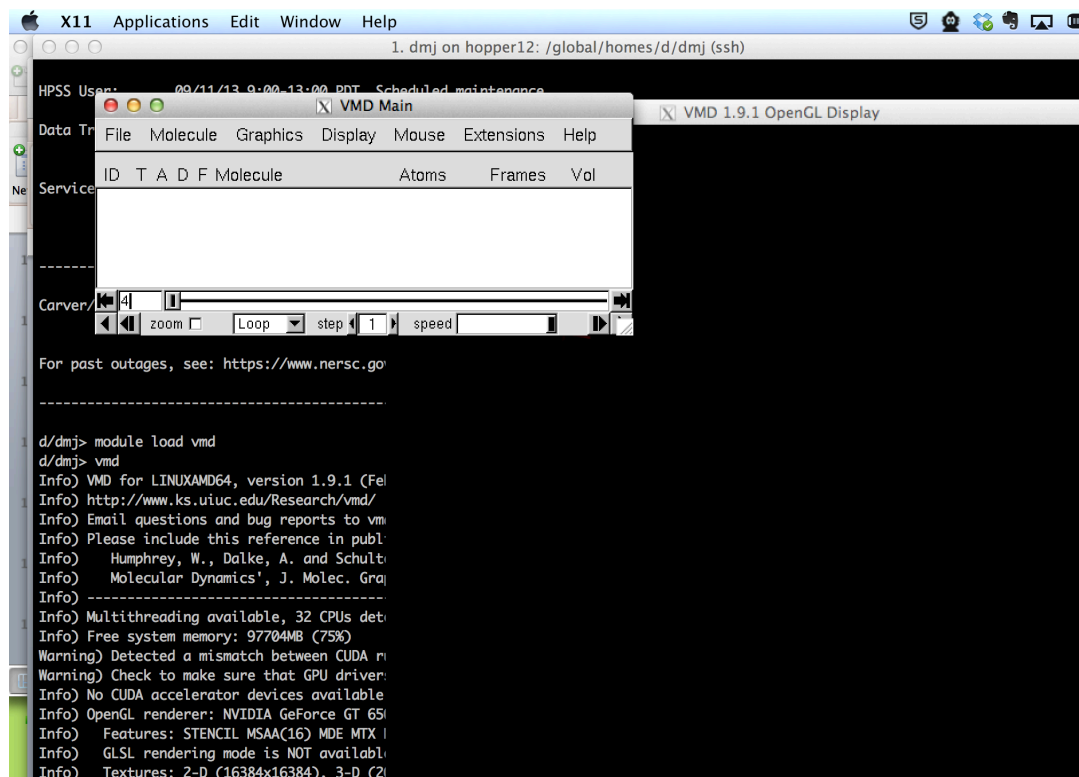
```
e/elvis> module load vmd
```

```
e/elvis> vmd
```

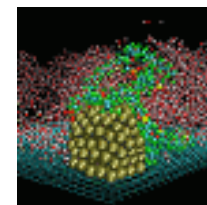
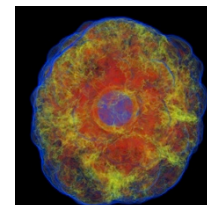
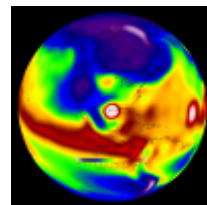
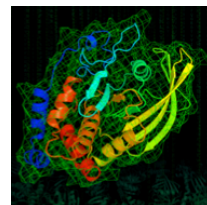
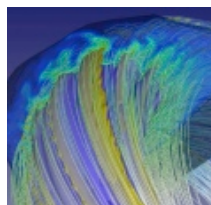
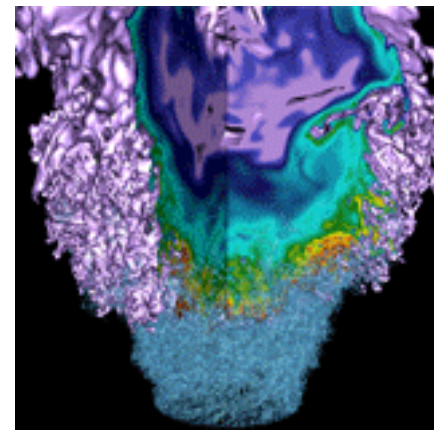
```
<vmd starts up>
```

**NERSC Recommends using NX
instead of X-forwarding.**

Next section!



NX@NERSC – Accelerated X

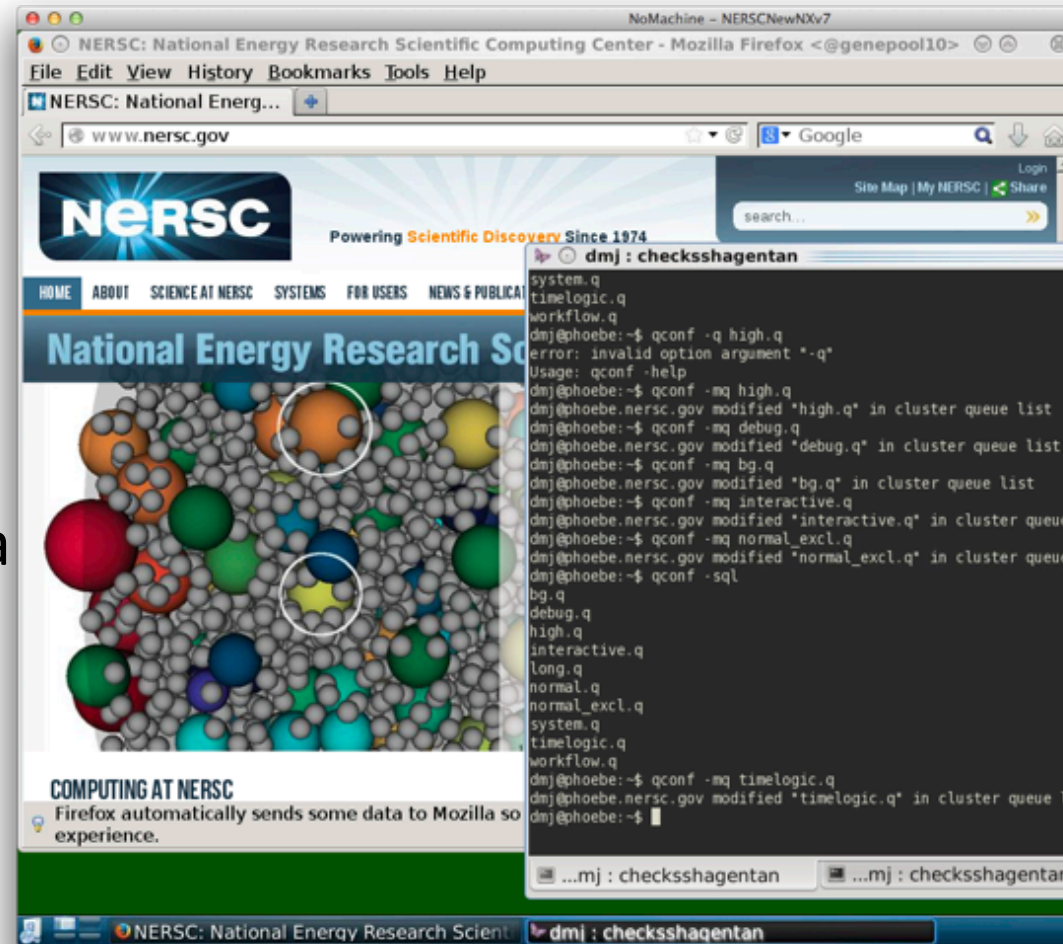


Reasons for NX



Desktop:

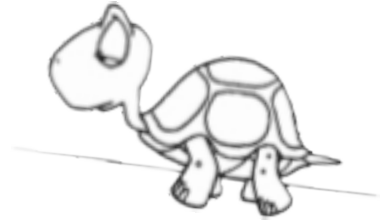
- **The Pain:** I'm used to starting my workflow on my windows machine and let it run for a week, where is my desktop now?
- **Solution:** NX gives you a desktop, so you can connect to NERSC resources (such as hopper or carver) and start your GUI applications.





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.*



Speed:

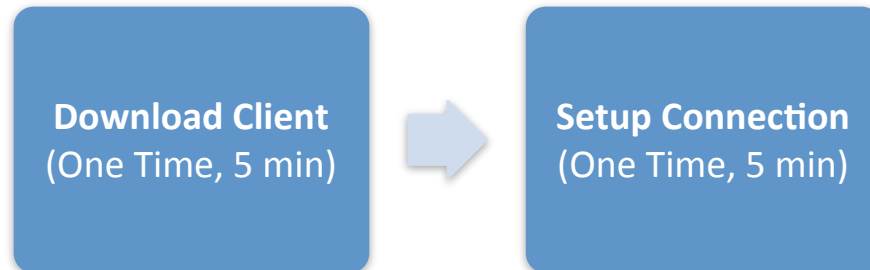
- **The Pain:** X-Windows is slow over network. Tried starting emacs with a slow network connection? It might take minutes to get the window open.
- **Solution:** NX Buffers/Compresses X messages, giving much better X experience

What you need for NX



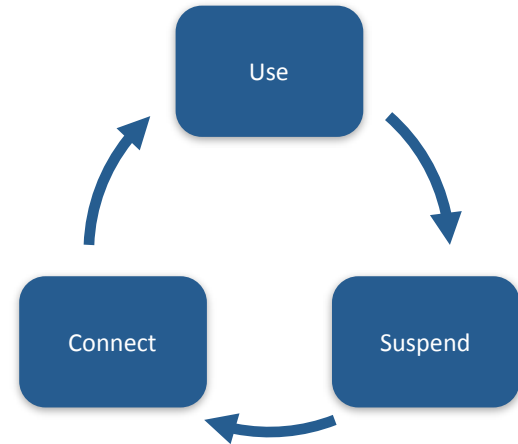
- **Any Desktop/Laptop**
 - Windows/Linux/Mac
- **NX Client Software (Free)**

- **10 Minute Start-up Guide**



Documentation:

Go to www.nersc.gov, search for “NX”





National Energy Research Scientific Computing Center