Connecting to NERSC
Agenda

1. Options for connecting
2. MFA (Multi-Factor Authentication)
3. Password resets and login failures (NIM)
4. NX
5. SSH
Connecting to NERSC

Data Transfer Nodes
dtn01.nersc.gov
dtn02.nersc.gov
dtn03.nersc.gov
dtn04.nersc.gov

Cori login nodes
cori01
cori02...

Edison login nodes
edison01
edison02...

denovo.nersc.gov
pdfs.nersc.gov

cori.nersc.gov

edison.nersc.gov

$SCRATCH (NGF)
SHOME
i/project
NGF (GPFS)

$SCRATCH (Lustre)

$SCRATCH (Lustre)

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Multi-Factor Authentication

- NIM password + OTP ("One-Time Password")
- OTP obtained via Google Authenticator on your smartphone

- Alternative/backup option: Authy on desktop
  https://authy.com/

- Much harder for someone to hack your account

Mandatory in 2019

- except in special circumstances
MFA on NERSC services

Shibboleth (help.nersc.gov, some science gateways)
MFA on NERSC services

Jupyter-dev, RStudio
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First exercise: NIM

https://nim.nersc.gov

If you have no MFA tokens (first time logging in, or logging in after clicking "Lost your tokens"), then leave this empty.
Connecting to NERSC
Next exercise: MyNERSC

https://my.nersc.gov
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NX@NERSC - Accelerated X

Diagram showing the communication between the X Server and the GUI Application. The diagram illustrates the flow of data between the Internet (slow) and the NERSC internal network (fast) using the X protocol. The NX protocol is also shown to connect the X Server to the GUI Application.
Reasons for NX (aka NoMachine)

• **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.
NX@NERSC - Accelerated X
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)
- Search for "NX" on [www.nersc.gov](http://www.nersc.gov) or [docs.nersc.gov](http://docs.nersc.gov)
Login to NX

- MFA OTP immediately after password (no spaces)
- Don't save the password (it changes every login!)
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5. SSH
• All NERSC computational systems are accessible via ssh
• **First**: you need a terminal program on your desktop/laptop
  – Mac: "terminal" (built-in) or "iTerm2"
    (https://www.iterm2.com/)
  – Windows: PuTTY (or XWin32 or Git BASH)
    (https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html)
  – Linux: Your own favorite :)
• **If you will use X-forwarding (coming up) (Note: NX is better!)**
  then you also need an X server
  – Mac: XQuartz (https://www.xquartz.org/)
  – Windows: Cygwin/X (http://x.cygwin.com/)
  – Linux: built in
Example Session (terminal only)

Prompt on local system

Notification of acceptable use.

Password prompt
Type password then OTP (nothing between) then hit enter
NERSC Message of the Day

• After you type the password and logged in to a system, you will see NERSC MOTD before your session prompt appears

Last login: Wed Feb 22 16:07:29 2017 from 198.128.212.1

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 2017-02-22 14:35 PST

Compute Resources:
Cori: Available.
Edison: Available.
Genepool: Available.
PDSF: Available.

Global Filesystems:
DNA: Available.
Global Common: Available.
Global Homes: Available.
Project: Available.
ProjectA: Available.
ProjectB: Available.

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

Service Status as of 2017-02-22 14:35 PST

All services are available.

Planned Outages

Cori: 02/28/17 6:00-03/01/17 6:00 PST, Scheduled maintenance.
Cori will be degraded due to cabinet additions. Datawarp nodes will be reduced during this time.

Cori: 03/01/17 6:00-03/03/17 17:00 PST, Scheduled maintenance.
Cori will be down for adding cabinets and HSN (high-speed network) maintenance. Logins will not be available.

Data Transfer Nodes: 03/01/17 9:00-12:00 PST, Scheduled maintenance.

Past Outages

Cori: 02/21/17 8:00-21:15 PST, Scheduled maintenance.
Cori will be unavailable while updates are applied. Logins will be available, however no jobs will run.

Cori: 02/21/17 21:15-22:15 PST, System in degraded mode.
The majority of the system’s compute nodes are currently unavailable. Engineers are investigating the issue

For past outages, see: http://my.nersc.gov/outagelog-cs.php
Example with X-forwarding

- Allows you to access Visualization programs remotely at NERSC

Example:
```bash
localhost% ssh -l elvis -Y cori.nersc.gov
```

```bash
e/elvis> module load matlab
e/elvis> matlab
<MATLAB starts up>
```

NERSC Recommends using NX instead of X-forwarding (faster, more reliable)
Logging in with MFA
• Tired of repeatedly typing password + OTP?
• sshproxy creates a short-term (24 hours) certificate

• Run sshproxy.sh once, then you can ssh to NERSC systems for the next 24 hours before being asked for password+OTP again
sshproxy.sh
Connecting to NERSC
Thank you.
Example with MFA

• Detailed help:
  – http://www.nersc.gov/users/connecting-to-nersc/mfa/

1. Install Google Authenticator (on phone)

2. Enable in NIM
Example with MFA

1. Install Google Authenticator (on phone)
2. Enable in NIM

3. **Enrol OTP Token**
   - from MFA Opt-in/out page in NIM
   - Give it a name, hit "Submit" then scan the QR code with Google Authenticator

4. **Login**
   - Use your NIM password followed by the numbers provided by Google Authenticator

```
$ ssh corsi.nersc.gov
  ****************************************
  *                                  *
  *                                  *
  * NOTICE TO USERS                 *
  *                                  *
  *                                  *
  *                                  *
  *                                  *
  Password + OTP:
```
MFA Advanced setup

• You can set "ControlMaster" in your .ssh/config file to multiplex SSH connections, saving you from re-typing your password+OTP

  — See http://www.nersc.gov/users/connecting-to-nersc/mfa/#toc-anchor-5
SSH Keys

- If you are not using MFA, you can reduce the number of times you type a password by creating an SSH key pair, and saving the public key in NIM
  - Note: please always set a passphrase on your SSH key! (No unencrypted keys)
SSH Keys

• Instructions for SSH-agent and SSH keys:

http://www.nersc.gov/users/connecting-to-nersc/connecting-with-ssh/

(Note that most of this happens on your workstation!)