Connecting to NERSC
1. Options for connecting

2. MFA (Multi-Factor Authentication)

3. Password resets and login failures (NIM)

4. NX

5. SSH
Connecting to NERSC

Access via web browser
- NIM

Access via terminal or desktop client
- My NERSC

Use Globus to move large amounts of data
- Data Transfer Nodes
dtn01.nersc.gov
dtn02.nersc.gov
dtn03.nersc.gov
dtn04.nersc.gov

Cori login nodes
- cori01
- cori02

Can scp small volumes of data
- SSH

Cori.nersc.gov

$SCRATCH (NGF, GPFS)

$HOME /project

$SCRATCH (Lustre)

Burst Buffer (Datawhirlpool)

HPSS
archive.nersc.gov
hpss.nersc.gov

U.S. DEPARTMENT OF ENERGY
Office of Science
Agenda

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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/](https://authy.com/)
  – Much harder for someone to hack your account

• **Mandatory**
  – except in special circumstances
MFA on NERSC services

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

Jupyter-dev, RStudio
MFA on NERSC services

• **MyNERSC**
  – similar to Jupyter, Rstudio

• **SSH, NX, etc:**
  – details below ...
Agenda

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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

- Access via web browser
  - NIM
  - globus online
- Access via terminal or desktop client
  - My NERSC
  - jupyter
- Can scp small volumes of data
- Use Globus to move large amounts of data
  - Data Transfer Nodes
dtn01.nersc.gov
dtn02.nersc.gov
dtn03.nersc.gov
dtn04.nersc.gov
- HPSS
archive.nersc.gov
hpss.nersc.gov
- $SCSCRATCH
  - (Lustre)
- Cori login nodes
cori01
cori02...
- cori.nersc.gov
- Burst Buffer (Datastore)
Next exercise: MyNERSC

https://my.nersc.gov
Agenda

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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.
NX@NERSC - Accelerated X

X Server

Internet (slow)

NERSC internal network (fast)

fragile!

GUI Application (X Client)

X protocol

NX protocol

X protocol
Reasons for NX

• **Long Lasting Desktop:** NX gives you a desktop, so you can connect to NERSC resources (eg, cori) 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)
  
  [link](http://www.nersc.gov/users/connecting-to-nersc/using-nx/download-tested-nx-player/)
  
  [link](http://www.nersc.gov/users/connecting-to-nersc/using-nx/nxconfig-2/)

- Search for "NX" on [docs.nersc.gov](http://docs.nersc.gov)
Login to NX

- don't save the password (it changes every login!)
- MFA OTP immediately after password (no spaces)
Agenda

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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/](https://www.iterm2.com/))
  – Windows: PuTTY (or XWin32 or Git BASH) ([https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html](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/](https://www.xquartz.org/))
  – 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:

```
localhost% ssh -l elvis -Y cori.nersc.gov
...
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
sshproxy.sh

- 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
Thank you.
Setting up MFA

1. Install Google Authenticator (on phone)
2. Enrol OTP Token
   - from "MFA Tokens" tab in NIM, hit "Add Token"
   - Give it a name, hit "Submit" then scan the QR code with Google Authenticator
3. Login
   - Use your NIM password followed by the numbers provided by Google Authenticator