Get Help! @ rdhpcs.zeus.help@noaa.gov
rdhpcs.hpss.help@noaa.gov

NESCC HPC Group A End User Training

Dan Schornak (CSC)
Shawn Hoopes (Adaptive Computing)

TRAINING AGENDA – Group A

0800-0810 Training Process

- Introduce instructors
- General information
- Define training roles and responsibilities
- Review training agenda

0810-0815 Training Objectives

- Review the objectives of the NESCC HPC Environment overview

0815-0845 Introduction to NESCC HPC Design/Architecture and Environment

- Describe the overall architecture major components, functions, and features

0845-0900 Available On-line Documentation

0900-0915 **BREAK**

TRAINING AGENDA – Group A

0915-0945 Introduction to User Environment, Policies, Quotas, and Environmental Variables

0945-1045 Introduction to Programming Environment
- Introduce tools – shells, applications, compilers, and libraries

1045-1145 Introduction to NESCC Storage and Data Management

1145-1245 **LUNCH BREAK**

1245-1415 Introduction to Job Scheduling using Moab (Adaptive Computing)
- Efficient job submission techniques
- Installed NESCC version compared to other NOAA installations
- Moab/Torque end-user commands and tools

1415-1500 Questions/Answers
1500 Session Wrap up

Need Help? – *Where to go…*

Zeus User Support and Problem Reporting (Help Desk for NESCC)

rdhpcs.zeus.help@noaa.gov

HPSS User Support and Problem Reporting (Help Desk for NESCC)

rdhpcs.hpss.help@noaa.gov

NESCC FAQ and Documentation Wiki Site – "How to…"

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Main_Page

End User Experience

EMC Model Transition Team (Provides updates for porting to TDS and Zeus)

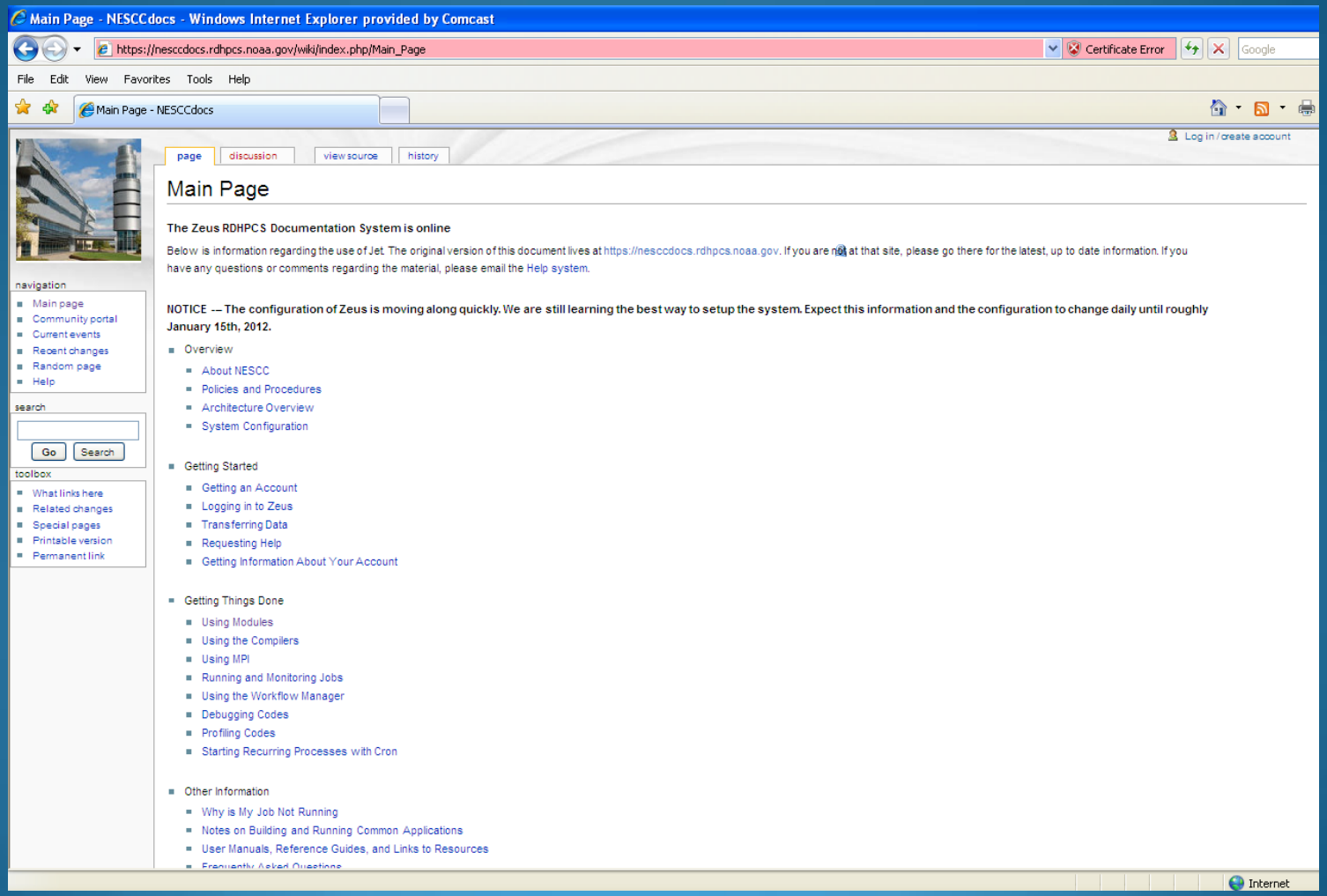
http://www.emc.ncep.noaa.gov/mtt

NESCC Factoid…

"Documentation will continue to be updated on NesccDocs."

Need Help? – *Where to go…*

NESCC Documentation Wiki Site – "How to…"
https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Main_Page



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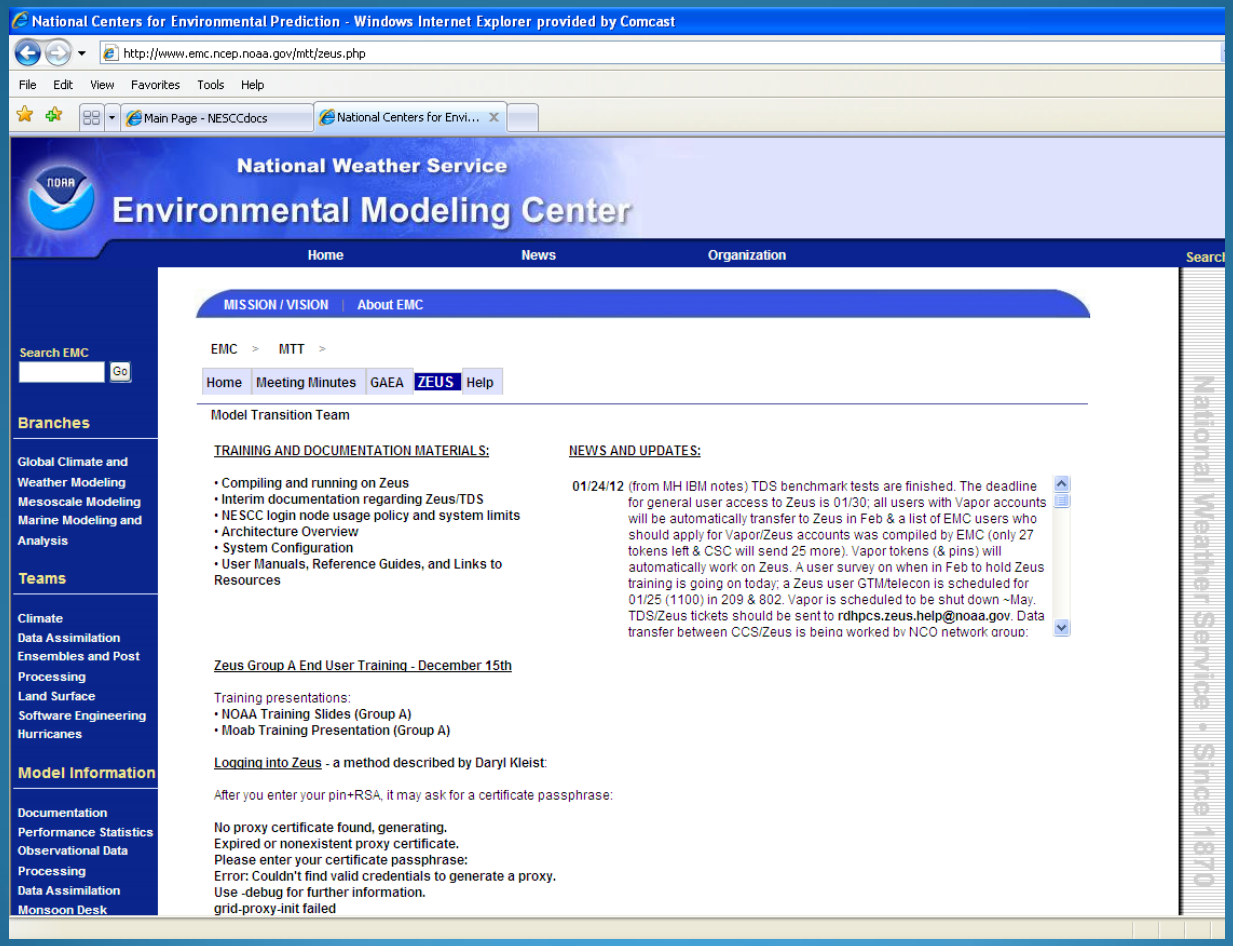


TRAINING OBJECTIVES (Group A)

What it is…	*What it isn't…*
Introduction to NESCC HPC Environment	System Administrator–level Training
User Environment Overview	Unix scripting Overview
Programming Environment Overview	Application/System Tuning Overview
Introduction to Moab Workload Manager/Torque Resource Manager	Moab Administrator-level Training

Disclaimer: As Zeus moves through its acceptance period, some training content may become obsolete. For the latest guidance on how to use these NESCC HPC resources, please visit the following site regularly:

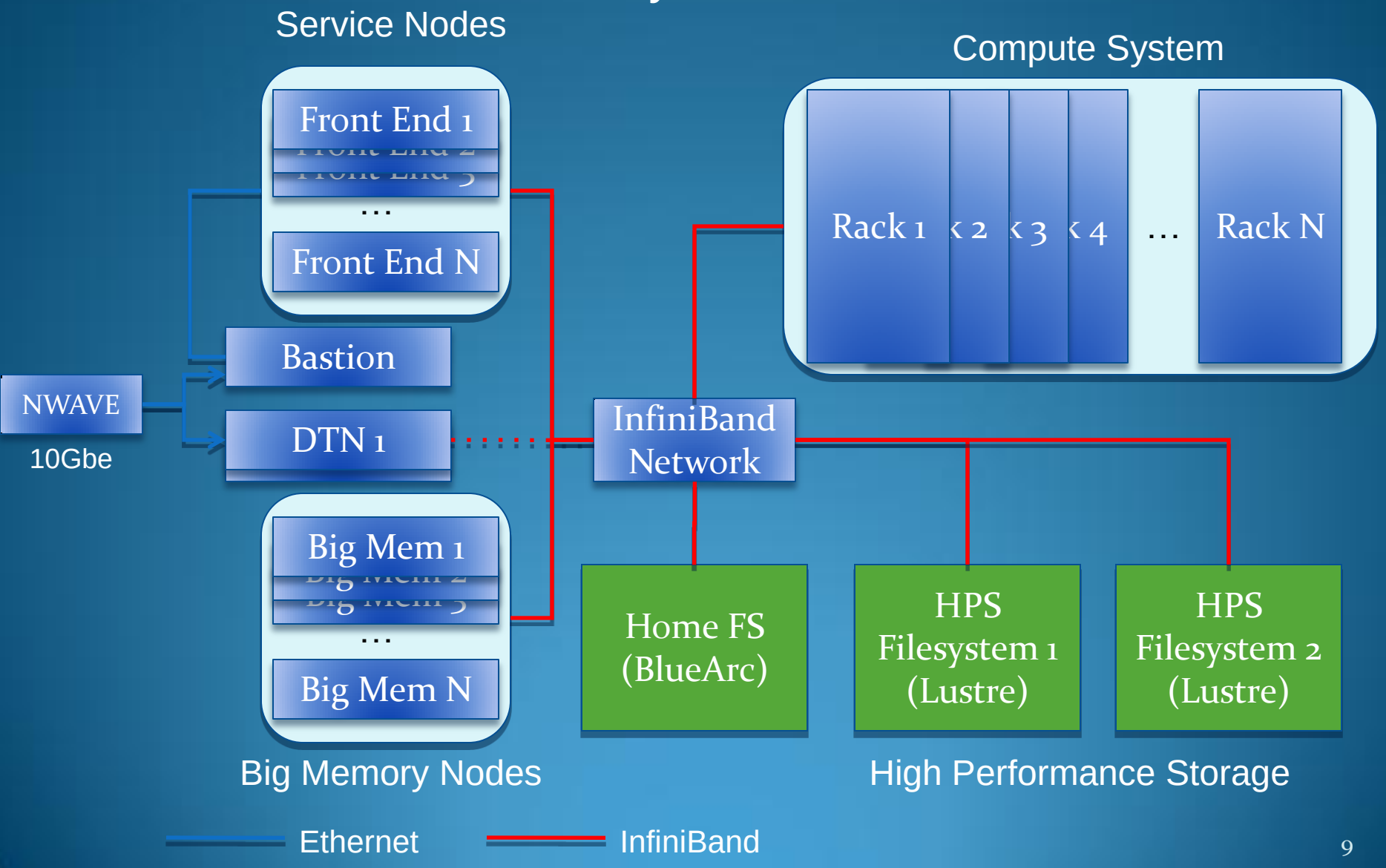
https://nesccdocs.rdhpcs.noaa.gov

NESCC HPC Design/Architecture and Environment

Type	Purpose
Bastion	All login sessions are routed through these hosts. They provide additional security to protect NOAA assets.
Service Nodes	Where initial login sessions are created. They are for general interactive use for operations such as editing and compiling code, managing files, initiating actions on external network including data transfer and accessing software repository.
Data Transfer Nodes (DTN)	Provide high speed Inbound and outbound data transfers. - FOR EXTERNALLY INITIATED TRANSFERS -
Compute System	Major compute resources for parallel jobs. Accessible through the batch system.
Big Memory Nodes	Large memory set for applications that require more memory than a single compute node. Accessible through the batch system.
High Performance Storage	High speed filesystems
Home Filesystem	Storage system optimized for editing and compiling code.

NESCC HPC Design/Architecture and Environment

Zeus/Herc System Architecture



NESCC HPC Design/Architecture and Environment

Zeus System Configuration

Subsystem	Size
Service Nodes	8 (48 GB/node)
Big Memory Nodes	6 (96 GB/node)
Compute Nodes	2304
Compute Cores	27648
Total Flops	383 TF
Total Data Transfer Nodes	2+
HPS Capacity	5.6 PB
HPS Performance	> 70 GB/s

- There will be several DTN types depending on location of originating connection. Policy is being finalized by NOAA management.

General System Information

Node Type	Total Cores	Core Speed	Memory	Local Storage
Service	12	3.46GHz	48 GB	Yes
Compute	12	3.46GHz	24 GB	No
Big Memory	12	3.46GHz	96 GB	No

Notes:

- There are no CRON Nodes. CRON Services will be provided on Zeus through a NOAA developed system that unifies the crontab across all login nodes.

NESCC HPC Design/Architecture and Environment

Test and Development System (TDS)

Login Node: tfe1

Test LSC System Components (Herc)
- HPC System: SGI Altix ICE 8400 EX
- Filesystem: Lustre

TDS (a.k.a Herc) - SGI ICE
- 48 nodes, 3.46 GHz Intel Westmere
  - 12 cores per node
  - 2GB per core (24GB per node)
  - QDR dual-rail InfiniBand
- Lustre

The fast parallel filesystem mount points are /tds_scratch1 and /tds_scratch2. You can create directories for your use under the *users* directory.

~source: https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Access_and_Use_of_TDS

NESCC Factoid…
"TDS is for testing new software components, debugging system problems, and testing applications as necessary. Users will only have access when granted to solve specific problems. This is not a generally accessible resource."

NESCC HPC Design/Architecture and Environment

Zeus Production System

Production LSC System Components (Zeus)
- SGI Altix ICE 8400 EX
- Filesystem: Lustre

Login Nodes: fe1
fe2
fe3
fe4
fe5
fe6
fe7
fe8

SGI ICE – Zeus Compute Nodes
- 2304 IP-105 blades
- 4608 CPUs, X5690 e.46GHz 6-Core
- 24 GB DDR3 1333MHz2 cores per node
- 4GB per core (48GB per node)
- QDR dual-rail InfiniBand
- Lustre

The fast parallel filesystem mount points are /scratch1 and /scratch2. Users are assigned projects, and those projects have preexisting storage in directories in /scratch1 and /scratch2.

NESCC HPC Design/Architecture and Environment

Data Storage

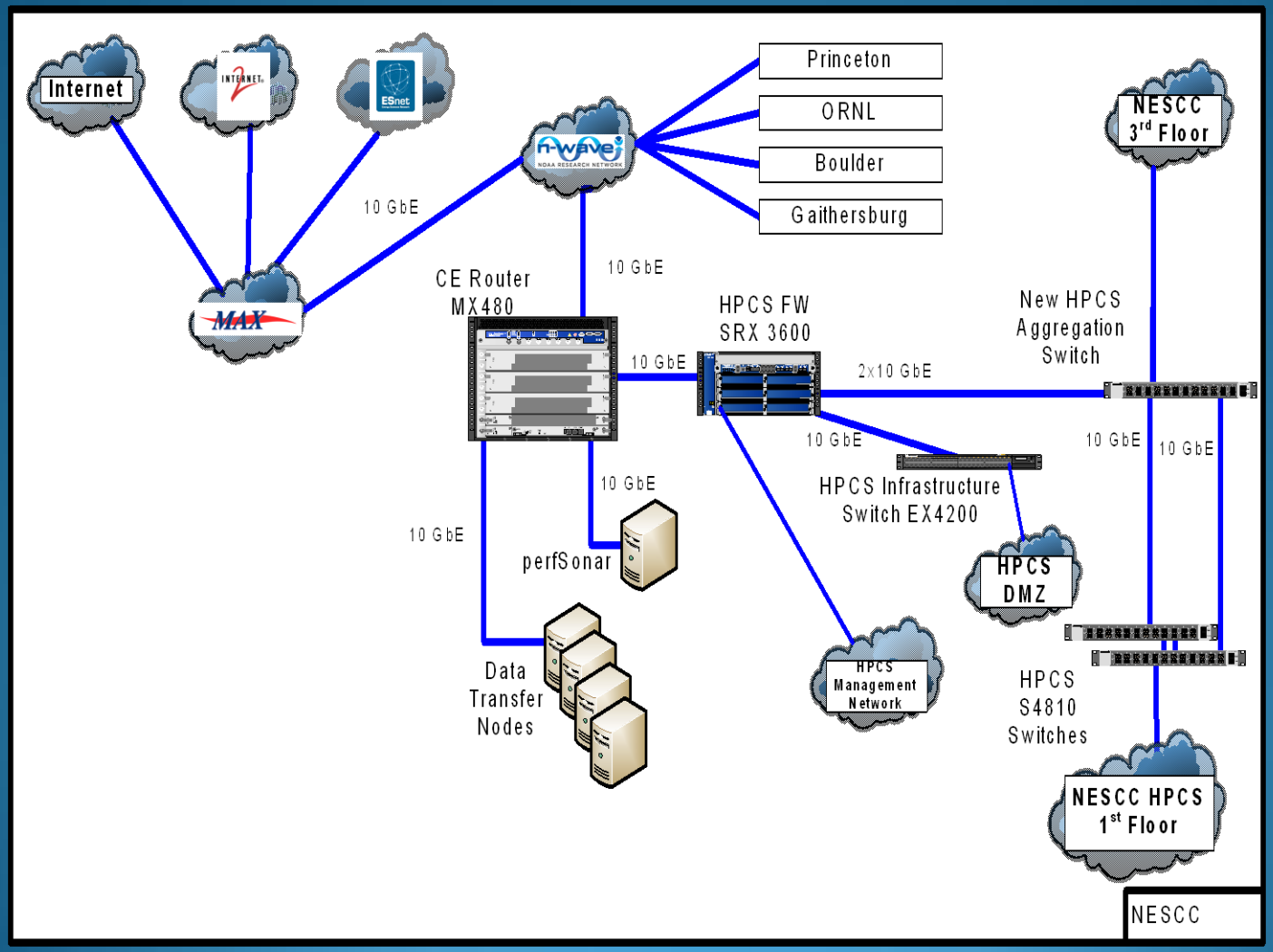
Production LSC System Components (Zeus)

- SGI Altix ICE 8400 EX
- Filesystem: Lustre

HPSS production system has a 1 PB disk cache
Oracle SL8500 Modular Library with 32 T10Kc drives.
The library has slots for 10000 tapes (50 PB) max capacity, but only 7500 tapes are in the silo at this time (37.5PB).

NESCC HPC Design/Architecture and Environment

Wide Area Network



Available *Online Documentation – Good to Know*

NESCC Documentation Wikisite: https://nesccdocs.rdhpcs.noaa.gov/
NESCC TDS Wikisite: https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Access_and_Use_of_TDS
EMC Model Transition Team Website: http://www.emc.ncep.noaa.gov/mtt

Compilers

- Intel Fortran Users' Guide:
  http://software.intel.com/sites/products/documentation/hpc/composerxe/en-us/2011Update/fortran/lin/index.htm

- Intel C/C++ Users' Guide:
  http://software.intel.com/sites/products/documentation/hpc/composerxe/en-us/2011Update/cpp/lin/index.htm

- Intel Math Kernel Library Users' Guide:
  http://software.intel.com/sites/products/documentation/hpc/composerxe/en-us/2011Update/mklxe/mkl_userguide_lnx/index.htm

- Intel Compiler Optimization Guide:
  http://software.intel.com/sites/products/collateral/hpc/compilers/compiler_qrg12.pdf

- PGI Compiler User's Guide for Parallel Fortran, C and C++: http://www.pgroup.com/doc/pgiug.pdf
- PGI Compiler Reference Manual for Parallel Fortran, C and C++: http://www.pgroup.com/doc/pgiref.pdf
- PGI Fortran Reference: http://www.pgroup.com/doc/pgifortref.pdf

Available *Online Documentation – Good to Know*

MPI Libraries

- Message Passing Toolkit (MPT) User's Guide:
  http://techpubs.sgi.com/library/tpl/cgi-bin/browse.cgi?coll=linux&db=bks&cmd=toc&pth=/SGI_Developer/MPT_UG

SGI

- Linux® Application Tuning guide for SGI® X86-64 Based Systems:
  http://techpubs.sgi.com/library/tpl/cgi-bin/browse.cgi?coll=linux&db=bks&cmd=toc&pth=/SGI_Developer/LX_86_AppTune

IBM Documentation

- HPSS User Guides: http://www.hpss-collaboration.org/user_doc.shtml

Archival Documentation

- HTAR Man Page: http://www.mgleicher.us/GEL/htar/htar_man_page.html
- HTAR User Guide: http://www.mgleicher.us/GEL/htar/htar_user_guide.html
- HSI Commands (Alphabetical List): http://www.mgleicher.us/GEL/hsi/hsi_reference_manual_2/hsi_commands_-_alphabetical.html

Administrative Book – *Nice to Know*

- SGI® Performance Suite 1.3 Start Here:
  http://techpubs.sgi.com/library/tpl/cgi-bin/browse.cgi?coll=linux&db=bks&cmd=toc&pth=/SGI_Admin/PS_Start_Here

Available *Online Documentation – Nice to Know*

Administrative Books

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1415-1500 Questions/Answers

1500 Session Wrap up

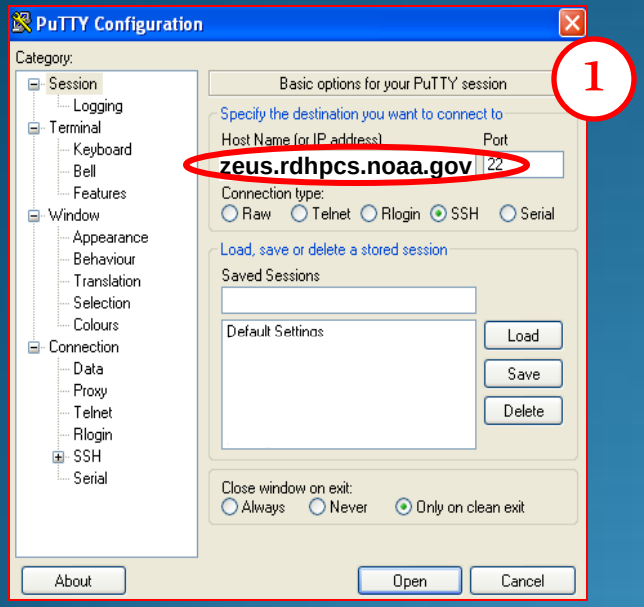
Introduction to User Environment, Policies, Quotas, and Environmental Variables

Section Objectives

1. Investigate various login approaches to TDS/Zeus
2. Review and explore the User Environment
3. Learn how to establish an SSH Tunnel
4. Knowing the Limitations – Established Policies and Quotas

LOGGING IN – *Getting from here to there*

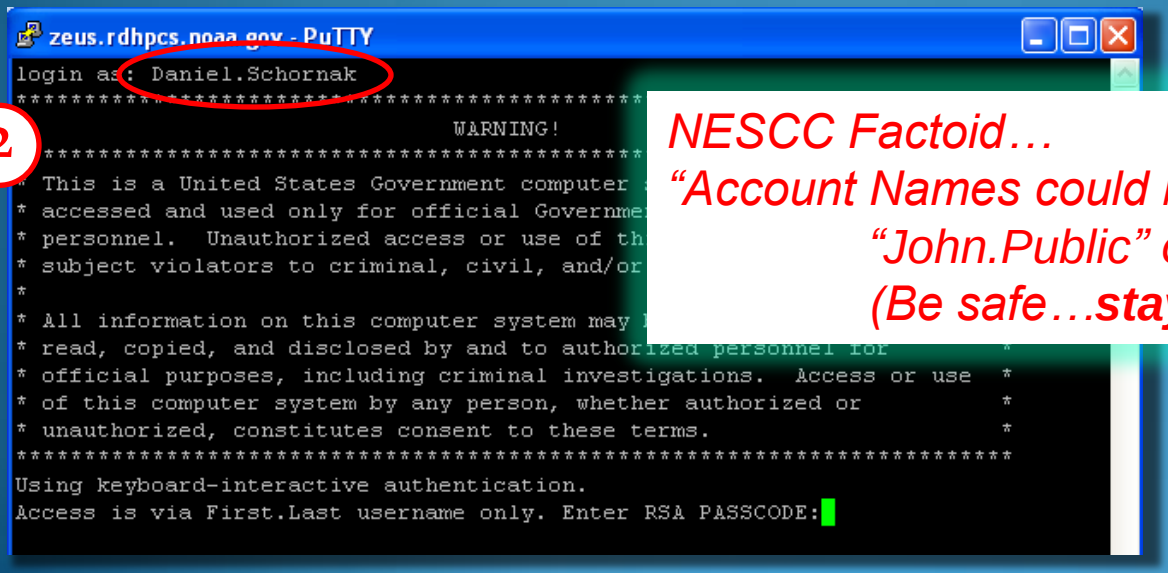
PuTTY Example to TDS



1. Start PuTTY (***Host Name: zeus.rdhpcs.noaa.gov***)
2. Log into zeus
3. Hit ^C within 5 seconds
4. Enter "tfe1"
5. You're now on the TDS!

If password-less login has not yet been established

1. Enter the default password: Pa$$w0rd (that's zero!)
2. Upon entry, please change your password (*passwd*)



NESCC Factoid…

"Account Names could be in the form of…

"John.Public" or "John.Q.Public"

*(Be safe…**stay case sensitive**)*

LOGGING IN – *Getting from here to there*

PuTTY Example to TDS (continued)

1. ~~Start PuTTY (***Host Name: zeus.rdhpcs.noaa.gov***)~~
2. ~~Log into zeus~~
3. Hit ^C within 5 seconds
4. Enter "tfe1"
5. You're now on the TDS!

If password-less login has not yet to be established

1. Enter the default password: Pa$$w0rd (that's zero!)
2. Upon entry, please change your password (*passwd*)

3

zeus.rdhpcs.noaa.gov - PuTTY

```
login as: Daniel.Schornak
*****************************************************************************
*                                  WARNING!
*****************************
* This is a United States
* accessed and used only f
* personnel.  Unauthorized
* subject violators to cri
*
* All information on this
* read, copied, and discld
* official purposes, inclu
* of this computer system
* unauthorized, constitute
*****************************
Using keyboard-interactive
Access is via First.Last u
Last login: Fri Nov 11 21:
Welcome to the NOAA RDHPCS


Certificate unavailable, f
CSR not found in LDAP, and
You will now be connected
Hit ^C within 5 seconds to
```

zeus.rdhpcs.noaa.gov - PuTTY

```
*****************************************************************
Using keyboard-interactive authentication.
Access is via First.Last username only. Enter RSA PASSCODE
Last login: Tue Nov 15 00:49:33 2011 from 206.173.46.196.
Welcome to the NOAA RDHPCS.


Certificate unavailable, falling back to token access.
CSR not found in LDAP, and problems uploading CSR. Will try again on next login.
You will now be connected to OneNOAA RDHPCS: Zeus system
Hit ^C within 5 seconds to select another host.
Menu:
=====
Select a host.  Enter the hostname, or a unique portion of a hostname:
Hostname        IP Address
bmem1    140.90.206.42
bmem2    140.90.206.43
bmem3    140.90.206.44
bmem4    140.90.206.45
bmem5    140.90.206.46
bmem6    140.90.206.47
bqs1     140.90.206.48
bqs2     140.90.206.49
dtn1     140.90.206.57
dtn2     140.90.206.58
fe1      140.90.206.33
fe2      140.90.206.34
fe3      140.90.206.35
fe4      140.90.206.36
fe5      140.90.206.37
fe6      140.90.206.38
fe7      140.90.206.39
fe8      140.90.206.40
gw1      140.90.206.55
gw2      140.90.206.56
tbqs1    140.90.206.50
tfe1     140.90.206.41

Enter hostname here: tfe1
```

4

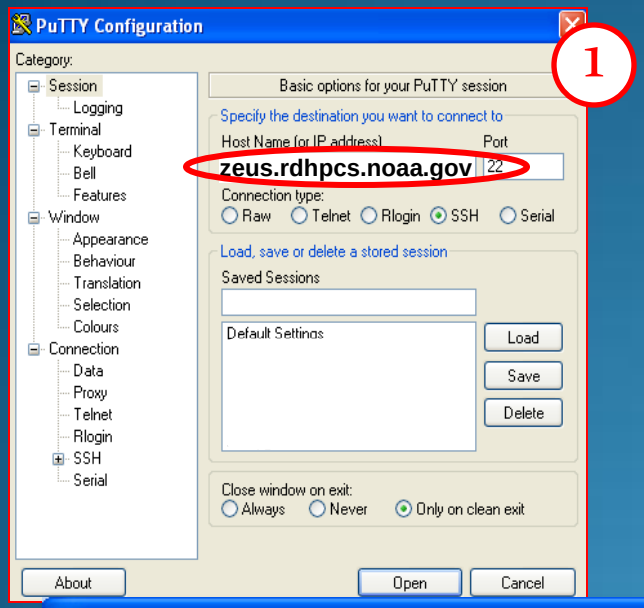
Daniel.Schornak@tfe1:~

```
 * 06-Sep-2011
   -> Ugraded Moab to Moab 6.1.1 w/o ODBC

 * 02-Sep-2011
   -> Updated MOAB to use NODECFG Features,
      type 'mdiag -n' or 'mdiag -n -t' for
      node properties.

 * 31-Aug-2011
   -> Enabled dynamic overclocking (aka Intel TurboBoost)
      and set the scaling governor in Linux to "performance"
   -> Added kernel boot options recommended by SGI benchmarking

 * Before 31-Aug-2011
   -> MOAB is now running 6.1
   -> Compiler Licenses are restored

type:
module avail
for various Available Modules
_____________________________

[Daniel.Schornak@tfe1 ~]$
```

5

LOGGING IN – *Getting from here to there*

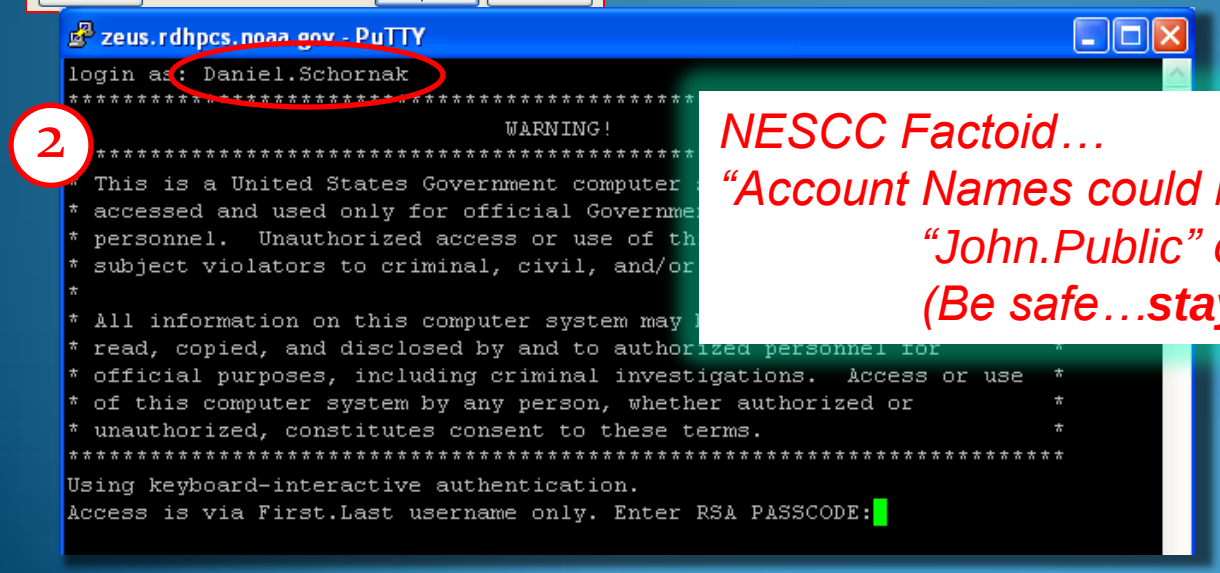
PuTTY Example to Zeus



1. Start PuTTY (***Host Name: zeus.rdhpcs.noaa.gov***)
2. Log into zeus
3. Ignore the ^C prompting - allow 5 seconds to pass
4. You're now on Zeus!

If you require to be on a specific log in node:

1. Enter ^C instead in step 3 above
2. Select your specific login node (fe1 through fe8) – see TDS example



NESCC Factoid…
"Account Names could be in the form of…
"John.Public" or "John.Q.Public"
*(Be safe…**stay case sensitive**)*

LOGGING IN – *Getting from here to there*

PuTTY Example to Zeus (continued)

3

```
zeus.rdhpcs.noaa.gov - PuTTY
login as: Daniel.Schornak
*****************************************************************
*                              WARNING!
*****************************************************************
* This is a United States Governm
* accessed and used only for offi
* personnel.  Unauthorized access
* subject violators to criminal,
*
* All information on this compute
* read, copied, and disclosed by
* official purposes, including cr
* of this computer system by any
* unauthorized, constitutes conse
*********************************
Using keyboard-interactive authen
Access is via First.Last username
Last login: Fri Nov 11 21:33:44 2
Welcome to the NOAA RDHPCS.


Certificate unavailable, falling
CSR not found in LDAP, and proble
You will now be connected to OneN
Hit ^C within 5 seconds to select
```

4

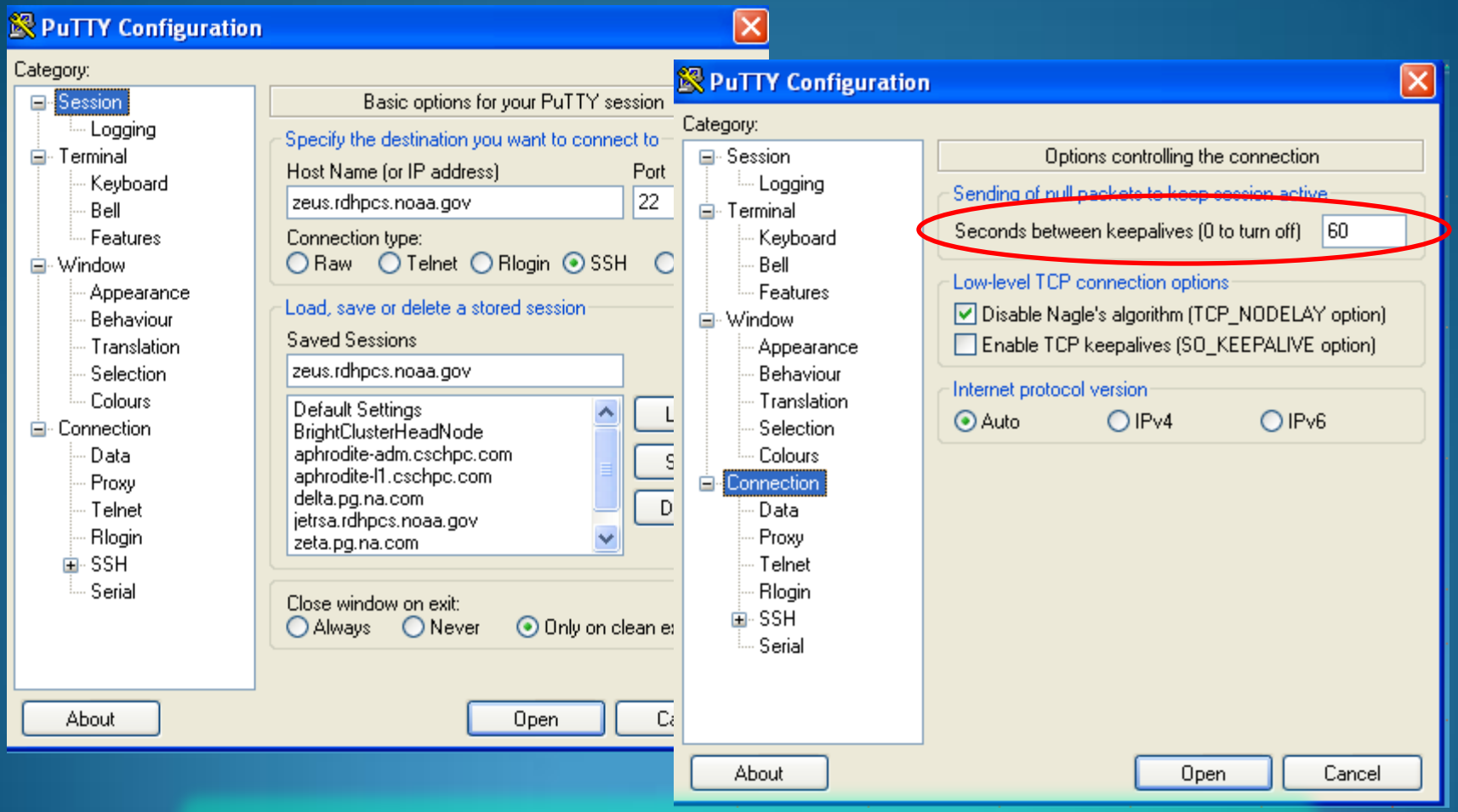
```
Daniel.Schornak@fe6:~
   ssh -L21796:localhost:21796

To use the port tunnel for SCP
----------------------------------------------
   scp -P 21796 /local/path/to/file Daniel.Schornak@localhost:/remote/path/to/fi
le
 or
   scp -P 21796 Daniel.Schornak@localhost:/remote/path/to/file /local/path/to/fi
le

   (Windows PUTTY users will use pscp instead of scp)

IMPORTANT NOTE:
===============
ALWAYS USE 'localhost' for the SCP commands so the port tunnel is used.

Last login: Wed Feb  8 19:19:51 2012 from zeus.rdhpcs.noaa.gov
 ____________________________________________________________
|                                                            |
|                                                            |
| Welcome to the zeus High Perfomance Computing system       |
|                                                            |
|       This system is located in Fairmont, WV               |
|                                                            |
|         Please Submit Helpdesk Request to:                 |
|                                                            |
|            rdhpcs.zeus.help@noaa.gov                       |
|                                                            |
|                                                            |
|                                                            |
|                                                            |
|                                                            |
|____________________________________________________________|

[Daniel.Schornak@fe6 ~]$
```

~~1. Start PuTTY (***Host Name: zeus.rdhpcs.noaa.gov***)~~
~~2. Log into zeus~~
3. Ignore the ^C prompting - allow 5 seconds to pass
4. You're now on Zeus!

If you require to be on a specific log in node:
1. Enter ^C instead in step 3 above
2. Select your specific login node (fe1 through fe8) – see TDS example

Keepalive Packets

PuTTY Example (continued)



NESCC Factoid…
"Avoid connection timeouts by sending 'keepalive' packets"

Getting data from here to there

Data Transfer Approaches

SSH Port Tunnelling - *Outside noaa.gov*

1. PuTTY Example
2. WinSCP Example

Data Transfer Host *(Preferred Approach)* – *Inside noaa.gov*

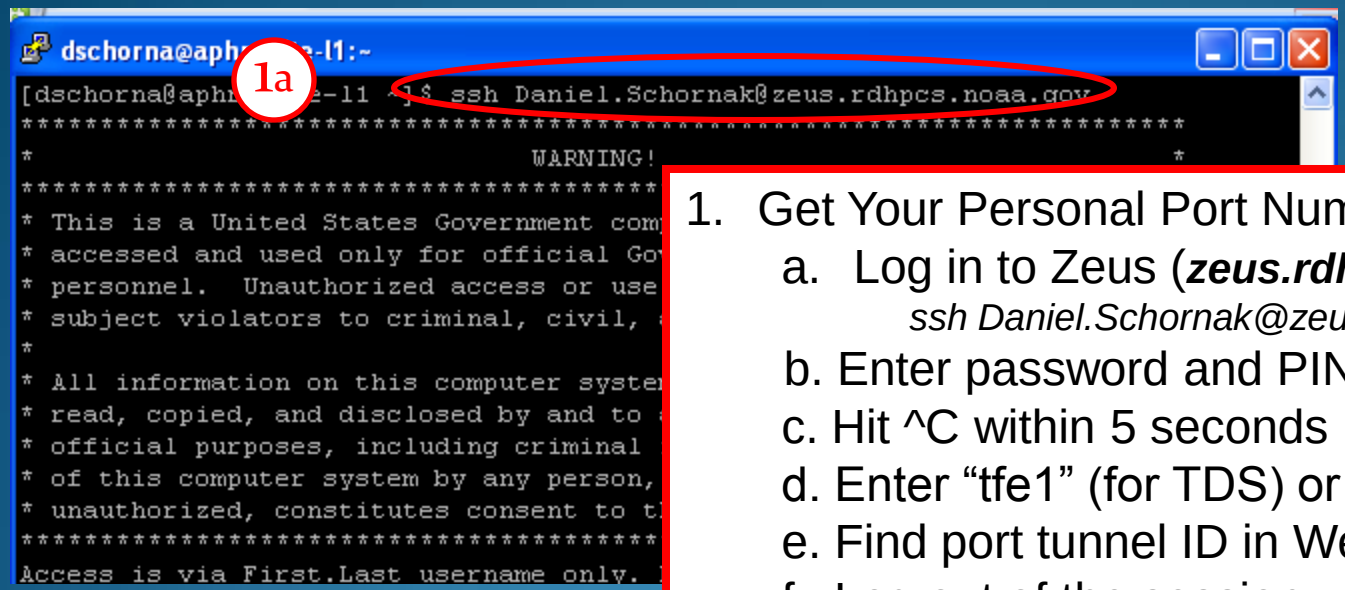
Unattended Data Transfer – *Inside noaa.gov*

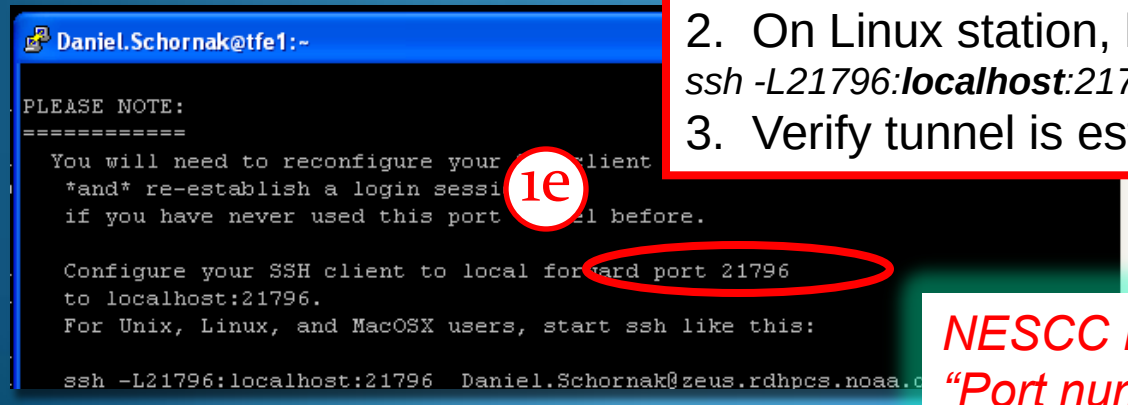
NESCC Factoid…
"DTN support is currently available from NCEP, GFDL, DSRC (Boulder), AOML and NSSL. If your laboratory is not listed and needs DTN access or if a current site cannot access the DTN, send a help request."

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Transferring_Data

TUNNELLING – *Getting data from here to there*

Linux Example





1. Get Your Personal Port Number:
   a. Log in to Zeus (***zeus.rdhpcs.noaa.gov***)
      ssh Daniel.Schornak@zeus.rdhpcs.noaa.gov
   b. Enter password and PIN
   c. Hit ^C within 5 seconds *(optional)*
   d. Enter "tfe1" (for TDS) or "fall through" (For Zeus)
   e. Find port tunnel ID in Welcome Message
   f. Log out of the session
2. On Linux station, log in with tunnel attributes:
   *ssh -L21796:**localhost**:21796 Daniel.Schornak@zeus.rdhpcs.noaa.gov*
3. Verify tunnel is established in Welcome Message

NESCC Factoid…
"Port number is unique for each user.
Only 1 login session can tunnel

TUNNELLING – *Getting data from here to there*

Linux Example (continued)

dschorna@aphrodite-l1:~

```
[dschorna@aphrodite-l1 ~]$ ssh -L21796:localhost:21796  Daniel.Schornak@zeus.rdhpcs.noaa.gov
**********************************************************************
*                              WARNING!                              *
**********************************************************************
* This is a United States Government
* accessed and used only for officia
* personnel.  Unauthorized access or
* subject violators to criminal, civ
*
* All information on this computer s
* read, copied, and disclosed by and
* official purposes, including crimi
* of this computer system by any per
* unauthorized, constitutes consent
**********************************************************************
Access is via First.Last username or
```

Daniel.Schornak@fe8:~

```
Hit ^C within 5 seconds to

Attention user:

A port-tunnel has been established for SCP data transfers
on port 21796 to host zeus.rdhpcs.noaa.gov.

PLEASE NOTE:
============
  You will need to reconfigure your SSH client
```

1. ~~Get Your Personal Port Number:~~
   a. ~~Log in through Zeus (***zeus.rdhpcs.noaa.gov***)~~
      ~~*ssh Daniel.Schornak@zeus.rdhpcs.noaa.gov*~~
   b. ~~Hit ^C within 5 seconds *(Optional)*~~
   c. ~~Enter "tfe1" (for TDS) or "fe1" (For Zeus)~~
   d. ~~Find port tunnel ID in Welcome Message~~
   e. ~~Log out of the session~~
2. On Linux station, log in with tunnel attributes:
   *ssh -L21796:**localhost**:21796 Daniel.Schornak@zeus.rdhpcs.noaa.gov*
3. Verify tunnel is established in Welcome Message

TUNNELLING – *Getting data from here to there*

Linux Example (continued)

Copying Data

To use the port tunnel for SCP from your host:

Template:

scp -P 21796 /local/path/to/file Daniel.Schornak@localhost:/remote/path/to/file

or

scp -P 21796 Daniel.Schornak@localhost:/remote/path/to/file /local/path/to/file

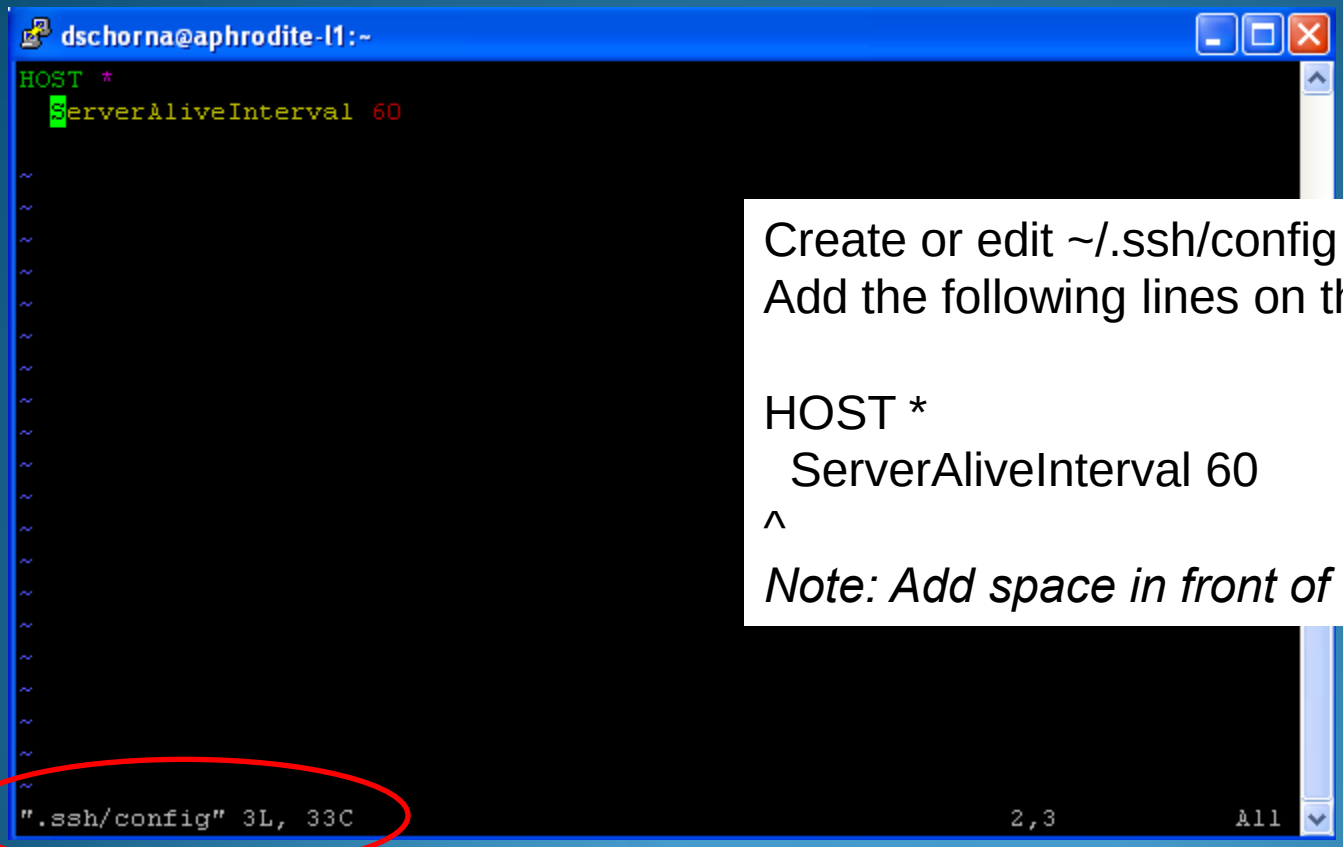
(Windows PUTTY users will use pscp instead of scp)

IMPORTANT NOTE:
==========
ALWAYS USE '**localhost**' for the SCP commands so the port tunnel is used.

NESCC Factoid…
"localhost" <> "hostname"

TUNNELLING – *Getting data from here to there*

Linux Example (continued)



Create or edit ~/.ssh/config
Add the following lines on the client:

```
HOST *
  ServerAliveInterval 60
```

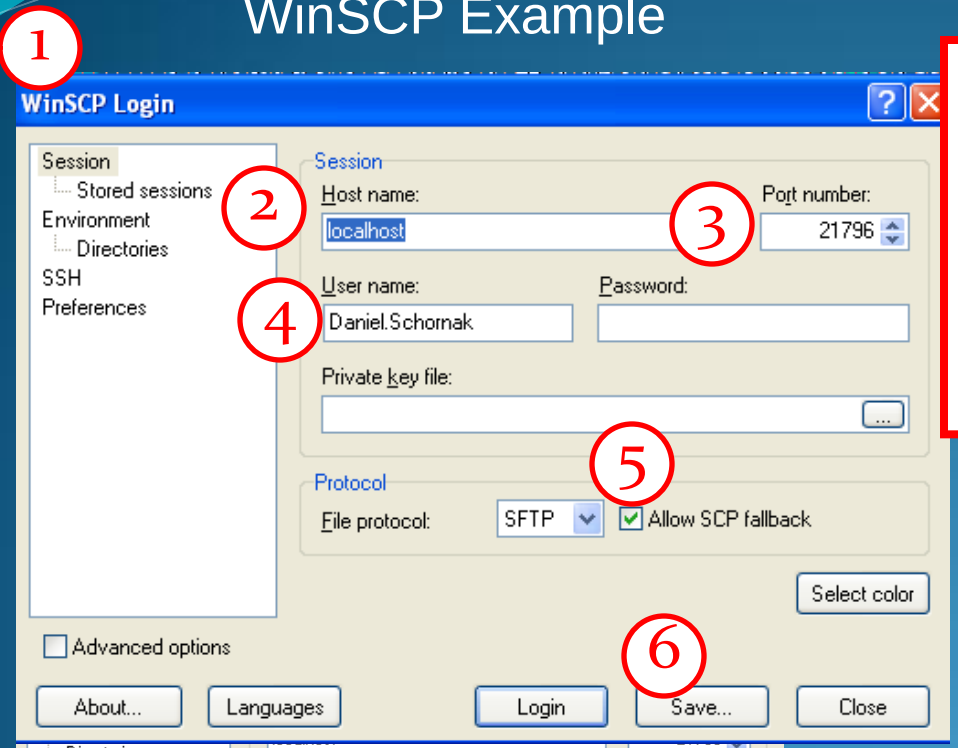
^

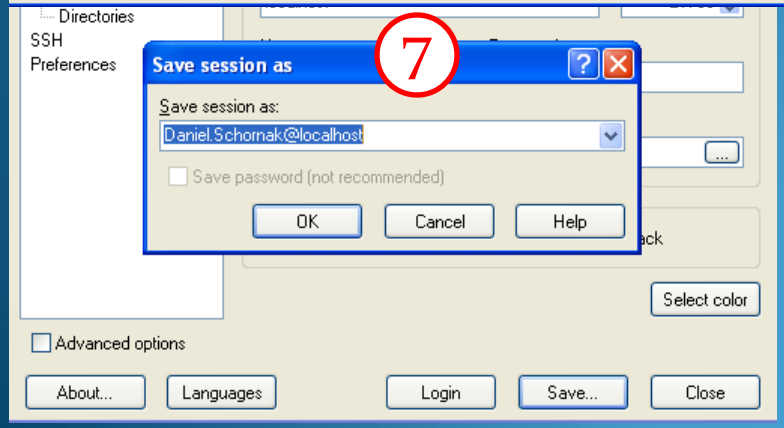
Note: Add space in front of "ServerAliveInterval"

NESCC Factoid…
"Avoid connection timeouts by sending 'keepalive' packets"

TUNNELLING – *Getting data from here to there*

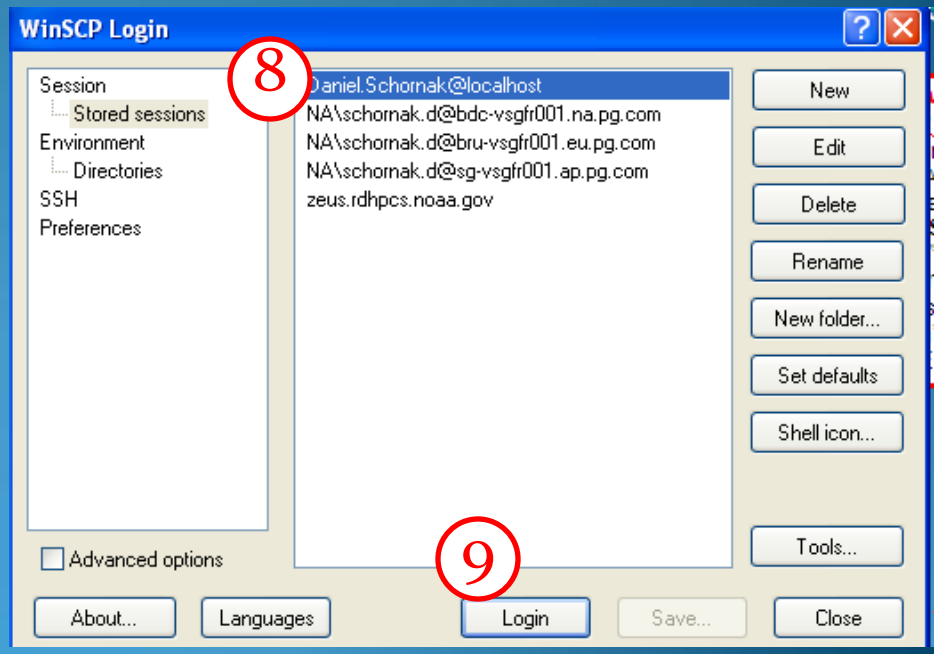
WinSCP Example





Prerequisite: Active PuTTY session on must be running

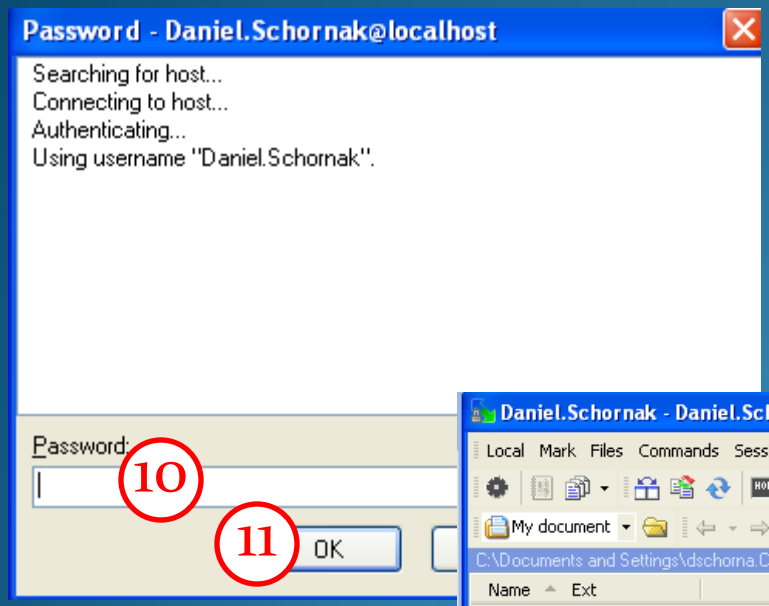
1. Start WinSCP
2. In Session Window Host name type: ***localhost***
3. Enter your NESCC-provided Local tunnel port number
4. Enter your "**User name**"
5. Select: "**Allow SCP fallback**"
6. Select: **"Save"**
7. Provide a name for your session
8. Select the session name
9. Select "**Login**"

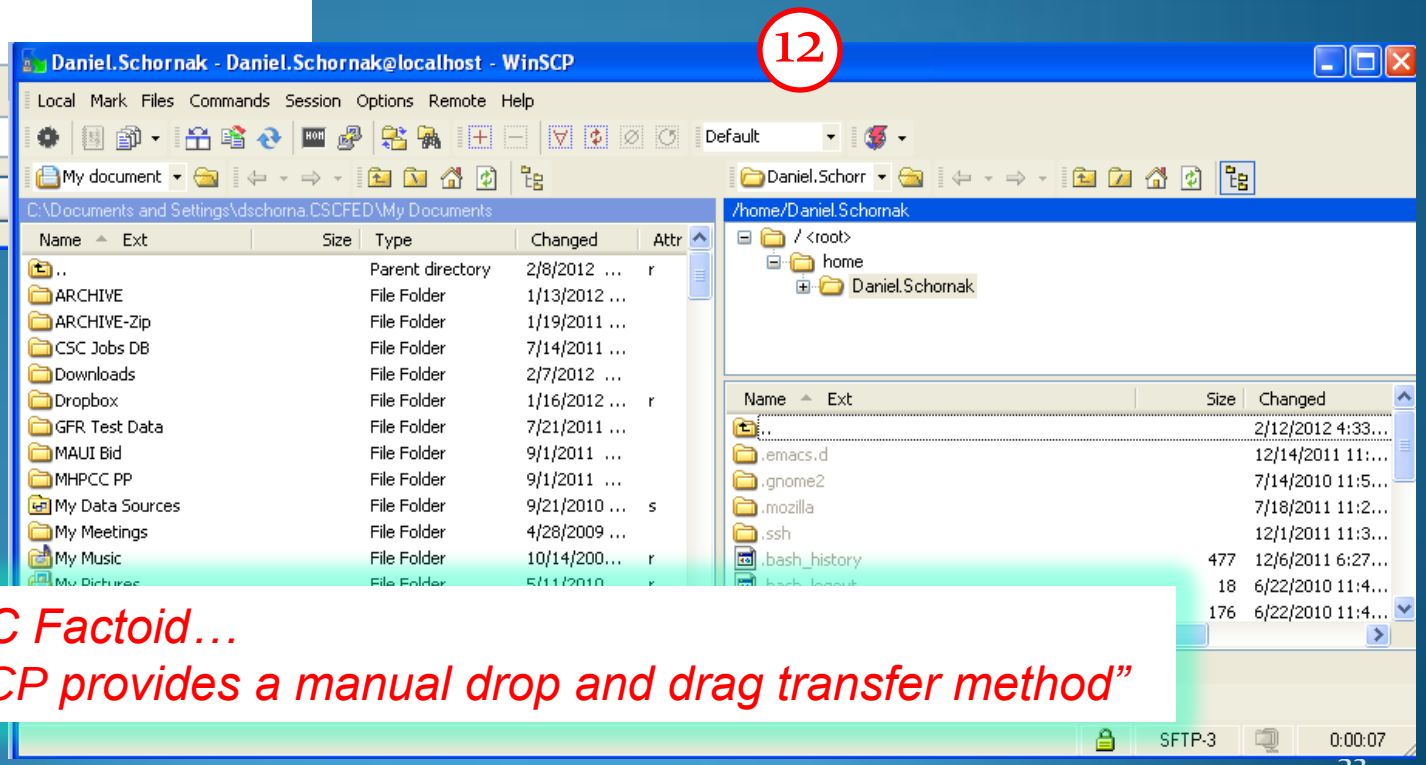


TUNNELLING – *Getting data from here to there*

WinSCP Example (continued)

10. Enter local NESCC passwd
11. Select "**OK**"
12. Upon successful login, WinSCP window appears





NESCC Factoid…
"WinSCP provides a manual drop and drag transfer method"

Data Movers – *Getting data from here to there*

DTN node: dtn1

Data Transfer Host *(Preferred Approach) – Inside noaa.gov*

Note: Requires Token Authentication

Prerequisite (on Zeus)

- Create your subdirectory in the appropriate /scratchX/portfolios/<portfolio>/< project>

Hint: Use "account_params" command to help determine the <portfolio> and <project>

Example Transfer

scp filex Daniel.Schornak@dtn1.fairmont.rdhpcs.noaa.gov:/scratch2/portfolios/BMC/nesccmgmt/Daniel.Schornak

#Daniel Schornak will see the following prompt:

'Daniel.Schornak@dtn1.fairmont.rdhpcs.noaa.gov's password: <PIN+RSA token>

#Upon successful password entry, the DTN node is added to the "known hosts"

Warning: Permanently added 'dtn1.fairmont.rdhpcs.noaa.gov,140.90.206.58' (RSA) to the list of known hosts.

The file then transfers and reports the following:

```
filex                                    100%   128MB   32.0MB/s    00:04
```

Jet account users

You can still access jetscp where Zeus is just another remote host.

https://jetdocs.rdhpcs.noaa.gov/wiki/index.php/Transferring_Files#Option_2:_jetscp

Data Movers – *Getting data from here to there*

Unattended Data Transfer – *inside .noaa.gov*

- Set up upon special request
- Transfers from known specific hosts inside .noaa.gov
- Transfers to known specific user names on Zeus
- Send a request to the help system explaining your requirements and the list of IP addresses from which the transfers will occur

Outbound transfers

- No special hosts, all front end nodes have been designed to support transfers
- If you need to transfer data as part of your workflow, submit those pieces of workflow to the service queue

"What if I need better transfers to Zeus from outside .noaa.gov?"
Please email the help system and let us know what you are trying to do. This will help to determine the best solution and course of action.
rdhpcs.zeus.help@noaa.gov

User Environment – *Environment Variables*

Environment Variable	Example Output (echo <Environment Variable>)	Description
$HOME	/home/daniel.schornak	Typically , the initial directory after logging in
$PATH	/usr/local/bin:/usr/local/X11/bin:/etc:/usr/etc:/usr/local/etc:.	Provides search path for shell commands. (User modifiable)
$SHELL	/bin/tcsh	Current active UNIX shell for session (User modifiable) Available shells include: **sh** (bourne SHell); **bash** (Bourne-Again SHell); **csh** (C SHell); **ksh** (Korn SHell); **tcsh** (TC SHell); **zsh** – Z SHell
$PWD	/home/daniel.schornak	Print Working Directory. Changing directory locations updates this environment variable
$LOGNAME	daniel.schornak	Name of the user
$MAIL	/var/spool/mail/daniel.schornak	Location of incoming mail
$USER		Name of the user

User Environment – *Environment Variables*

NCEP

```
AUTHSTATE=files
MANPATH=/opt/c
sr/sbin/rsct/man:
TERM=xterm
SHELL=/usr/bin/k
SSH_CLIENT=140.
OBJECT_MODE=6
MP_SHARED_ME
SSH_TTY=/dev/pt
LOCPATH=/usr/lib
USER=wx15rrl
ODMDIR=/etc/ob
TVDSVRLAUNCHC
A__z=! LOGNAME
MAIL=/usr/spool/
PATH=/usrx/local/
6.2/src:/usr/lpp/
1/bin:/u/wx15rrl/
3.5.0/lib:/usrx/lo
XLFRTEOPTS=intr
LOGIN=wx15rrl
PWD=/u/wx15rrl
HPSS_PFTPC_PO
MP_BINDPROC=y
LANG=en_US
TZ=EST5EDT
PS1=\[\e[30;1m\
LM_LICENSE_FILE
SHLVL=1
HOME=/u/wx15r
LC__FASTMSG=tr
NSORDER=local,b
MAILMSG=[YOU
LOGNAME=wx15
SSH_CONNECTIO
MP_SYNC_QP=ye
MEMORY_AFFINI
LDR_CNTRL=TEXT
G_BROKEN_FILEN
_=/usr/opt/freew
NLSPATH=/usr/lib
```

ESRL

```
USER=daniel.schornak
LOGNAME=daniel.schor
HOME=/home/daniel.sc
PATH=/usr/local/bin:/us
/usr/local/etc:.
MAIL=/var/spool/mail/d
SHELL=/bin/tcsh
SSH_CLIENT=140.172.21
SSH_CONNECTION=140.
SSH_TTY=/dev/pts/43
TERM=xterm
HOSTTYPE=x86_64-linux
VENDOR=unknown
OSTYPE=linux
MACHTYPE=x86_64
SHLVL=1
PWD=/home/daniel.sch
GROUP=csc
HOST=fe5
REMOTEHOST=bastion-j
LS_COLORS=no=00:fi=00
G_BROKEN_FILENAMES=
LESSOPEN=|/usr/bin/les
QTDIR=/usr/lib64/qt-3.3
QTINC=/usr/lib64/qt-3.3
QTLIB=/usr/lib64/qt-3.3/
MANPATH=/opt/toolwor
INFOPATH=/usr/info:/us
C_INCLUDE_PATH=/usr/i
CPLUS_INCLUDE_PATH=/
LIBRARY_PATH=/lib64:/u
LD_LIBRARY_PATH=/opt/
LD_RUN_PATH=/lib64:/u
XAPPLRESDIR=/usr/lib/X
MODULE_VERSION=3.2.
MODULE_VERSION_STA
MODULESHOME=/opt/m
MODULEPATH=versions:
SGE_ROOT=/opt/sge/de
TVDSVRLAUNCHCMD=ss
UDUNITS=/opt/udunits/
_LMFILES_=/opt/module
ENV=/home/daniel.scho
HOSTNAME=fe5
INPUTRC=/etc/inputrc
```

GFDL

```
TERM=xterm
HOME=/home/Ph
SHELL=/bin/tcsh
USER=Philip.Holle
LOGNAME=Philip.
PATH=/home/gfdl
HOSTTYPE=x86_6
VENDOR=unknow
OSTYPE=linux
MACHTYPE=x86_6
SHLVL=1
PWD=/home/Phil
GROUP=y
HOST=pp054
REMOTEHOST=pp
LANG=en_US
LC_TIME=C
HOSTNAME=pp05
LD_LIBRARY_PATH
MANPATH=/usr/lo
MODULE_VERSIO
MODULE_VERSIO
MODULESHOME=
MODULEPATH=/u
LOADEDMODULES
OMP_NUM_THRE
TMPDIR=/vftmp/
TMP=/vftmp/Phil
FTMPDIR=/vftmp/
ARCHIVE=/archive
XENVIRONMENT=
XAUTHORITY=/ho
XAPPLRESDIR=/us
```

NESCC

```
LANG=en_US.UTF-8
USER=Daniel.Schornak
LOGNAME=Daniel.Schornak
HOME=/home/Daniel.Schornak
PATH=/usr/bin:/bin:/usr/sbin:/sbin:/usr/local/globus/5.0.4/bin:/usr/local/globus/5.0.4/bin:/opt/c3/bin:/
:/usr/local/bin:/opt/sgi/sbin:/opt/sgi/bin
MAIL=/var/spool/mail/Daniel.Schornak
SHELL=/bin/tcsh
LD_LIBRARY_PATH=/usr/local/globus/5.0.4/lib:/apps/torque/lib
LIBPATH=/usr/local/globus/5.0.4/lib:/usr/lib:/lib
SHLIB_PATH=/usr/local/globus/5.0.4/lib
GLOBUS_LOCATION=/usr/local/globus/5.0.4
SSH_CLIENT=140.90.206.41 33889 22
SSH_CONNECTION=140.90.206.41 33889 140.90.206.33 22
SSH_TTY=/dev/pts/5
TERM=xterm
HOSTTYPE=x86_64-linux
VENDOR=unknown
OSTYPE=linux
MACHTYPE=x86_64
SHLVL=1
PWD=/home/Daniel.Schornak
GROUP=zeusgrp18100
HOST=fe1
REMOTEHOST=tfe1.fairmont.rdhpcs.noaa.gov
HOSTNAME=fe1
MANPATH=/opt/c3/man:/usr/local/man:/opt/sgi/share/man
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=4
05;37;41:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*
G_BROKEN_FILENAMES=1
LESSOPEN=|/usr/bin/lesspipe.sh %s
MOABHOMEDIR=/var/spool/moab
TORQUEHOMEDIR=/var/spool/torque
MODULESHOME=/usr/share/Modules
MODULEPATH=/usr/share/Modules/modulefiles:/etc/modulefiles:/etc/modulefiles:/apps/modulefiles
LOADEDMODULES=
OSCAR_HOME=/opt/oscar
C3_RSH=ssh -oConnectTimeout=10 -oForwardX11=no
```

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Drafted Policies

- Login Node Usage Policy
- Cron Usage Policy
- Home File System Usage Policy
- High Performance Storage Usage Policy
- Filesystem Backup and Data Retention Policy
- Maximum Job Length Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – Login Node Usage Policy (Draft)

Policy Name – Login Node Usage Policy (Draft)

The Zeus login ("frontend") nodes provide access to the rest of the cluster. They are intended for code and batch job management tasks, not for computation.
Login nodes should ONLY be used for tasks similar to the following:

- Editing and compiling code
- [illegible]
- [illegible]
- Perf[illegible]
- Run[illegible]

Only perform simple tasks on login nodes

NO Compute jobs

Tasks that do not fit into the above categories should be run via the batch system. Processes that use a significant amo[illegible]larly if they execute regularly, are be[illegible]There are two ways the user can do this:

- Create a batch script and submit it as a compute or serial job
- Use a dedicated node or nodes in an interactive job session

Use the batch nodes for the "heavy lifting" work

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Login_Node_Usage_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – Cron Usage Policy (Draft)

Policy Name – Cron Usage Policy (Draft)

The Cron service is provided for users to launch time sensitive jobs. Any cron jobs will be started on the service/login nodes. Therefore any policies that exist on the service nodes should be applied to the cron jobs.

Users manage and run their own crontabs

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Cron_Usage_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – Home File System Usage Policy (Draft)

Policy Name – Home File System Usage Policy (Draft)

The home filessystem is designed for the following operations:

- Ed
- St
- Storing user environment configuration files

/home is intended for source code and critical components that cannot be easily replicated

The home file has a snapshot capability to ensure rapid retrieval of accidentally deleted files.

/home is backed up regularly

Operations that should NOT be performed on the home filesystem:

- Storing
- Parallel IO of any kind.

/home NOT intended for model input/output data or parallel I/O

Please use the high performance storage filesystems for these types of operations.

The default quota space will be considered on a case-by-case basis.

Default quota for user's /home directory is 5GB

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Home_File_System_Usage_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – High Performance Storage Usage Policy (Draft)

Policy Name – High Performance Storage Usage Policy (Draft)

The high performance storage (HPS) filesystems (/scratch1 and /scratch2) are fast, parallel, and scalable. /scratch intended for model input/output data and parallel I/O ribes how these filesystems are maintained.

- The H /scratch allocated on a project basis
- Quotas /scratch quotas enforced on a per project basis
- These file /scratch is NOT backed up or purged
  - Us
- The HPS fil /scratch cleanup is the responsibility of the project
  - If pro

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/High_Performance_Storage_Usage_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – Filesystem Backup and Data Retention Policy (Draft)

Policy Name – Filesystem Backup and Data Retention Policy (Draft)

All of the file systems with the exception of /home and the HSMS are considered scratch file systems. We want users to be aware of the risks with Scratch filesystems are NOT backed up in any way. While we do our best to ensure the reliability of those file systems. They are not perfect and there is a small risk that data could be lost without any possibility of recovery.

Much of the data generated on the scratch filesystems may be difficult, labor-intensive, or resource-intensive to recreate. In this case, we strongly reco Save your important results to the HSMS regularly easonable frequency based on your work structure. But you should save data to the MSS at a frequency of no less than weekly.

Please do not sa HSMS is a finite storage resource and will have quotas applied. Don't save multiple versions of the same data. Bundle your data with tar, cpio or htar limited resource You should not feasible using tools such as tar or cpio.

Finally, labor intensive files Don't leave important single copy data on Scratch filesystems d to build executable programs can be put on the scratch filesystems but THEY SHOULD NOT BE THE ONLY COPY.

Snapshots are created on the /home file system nightly and are kept for two weeks back. Within the two week period, files on /home may be restored from the snapshot dir /home snapshots good for two weeks; backups good for 6 months approximately 6 months. Requests to recover data from a Disaster Recovery backup will be evaluated on a case by case basis.

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/High_Performance_Storage_Usage_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Policy – Maximum Job Length Policy (Draft)

Policy Name – Maximum Job Length Policy (Draft)

The maximum job length for jobs on the NESCC systems is 8 hours. This policy has been developed after assessi
system, and reducing risk of losing toom many CPUhours from failed jobs or system interruptions.

Default queue wallclock time is 30 minutes; Maximum wallclock time is 8 hours

If you re
your mo

If you need to run longer than 8 hours, checkpoint your application and resubmit the job to the batch system.

For further details visit:

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Maximum_Job_Length_Policy

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Proposed Zeus Frontend Limits		Description
memlock(soft)	4194304 (KB) [0.5GB]	max locked-in-memory address space (KB)
memlock(hard)	8388608 (KB) [1GB]	max locked-in-memory address space (KB)
nofile (soft/hard)	6400/64000	max number of open files
locks (soft/hard)	64/1024	max number of file locks the user can hold
nproc (soft/hard)	64/512	max number of processes
cpu (soft/hard):	100/2000	max CPU time (MIN)
maxlogins (soft/hard):	20/20	max number of logins for this user

Introduction to User Environment, Policies, Quotas, and Environmental Variables

In Practice – Tape Storage Access

Tape Storage

The tape storage assets will not be directly mounted to the login or compute nodes. Access is provided through custom scripts (htar and hsi) that will permit the transfer of data to and from the tape storage server.

NESCC Factoid…
"Current methods to use the tape storage are hsi and htar. Other methods will be provided prior to Zeus going into production."

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Command location: /apps/hpss/bin/hsi.ksh
alias hsi /apps/hpss/bin/hsi.ksh

Daniel.Schornak@fe4:~

```
[Daniel.Schornak@fe4 ~]$ hsi
[connecting to hpsscore1.fairmont.rdhpcs.noaa.gov/1217]
*******************************************************************
*   Welcome to the NESCC High Performance Storage System          *
*                                                                 *
*   Current HPSS version: 7.3.2 Patch 2                           *
*                                                                 *
*  Contact Information:                                           *
*                                                                 *
*     Skylar Nelson <snelson@ebi-llc.com>                         *
*     John Moffatt <jmoffatt@ebi-llc.com>                         *
*                                                                 *
*           Please Submit Helpdesk Request to                     *
*              rdhpcs.hpss.help@noaa.gov                          *
*                                                                 *
*  Announcements:                                                 *
*******************************************************************

Username: Daniel.Schornak  UID: 10496  Acct: 10496(10496) Copies: 1
[hpsscore1]/NCEPDEV/hpssuser/g01/Daniel.Schornak->
[Daniel.Schornak@fe4 ~]$
```

Daniel.Schornak@tfe1:~

```
[Daniel.Schornak@tfe1 ~]$ hsi -h
[connecting to hpsscore1.fairmont.rdhpcs.noaa.gov/1217]
hsi: missing hostname parameter
Usage: hsi -help (or -?)
  hsi [-a acct_id|acct_name] [-A authmethod] [-c krb_cred_file] [-d level] [-e] [-G globus proxy path]
      [-h  host[/port]  [-k keytabfile] [-l loginname] [-O listingFile] [-o] [-P] [-p port] [-s site]
      [-q] [-v] [cmds]
 Parameters:
  -a acct_id | acct_name - specifies the HPSS account ID or account name to set
     after login completes. This will be used for all new file creations
  -A authmethod   - authentication method. Case-insensitive legal method names are:
     "combo","keytab","ident","gsi","local"
  -c krb_cred_file  - pathname to use for Kerberos credentials cache file
  -d debug_level - debug message level (0-5) default is 0
  -e             - command echo flag. Echos lines read from <IN> file(s) to the listable output file
  -h host - specifies host name or IP address of the HPSS server, and optionally,
     the port on which to connect
  -k keytabfile - specifies pathname to DCE keytab file
  -l loginname - specifies login name to use.
    For kerberos, this is usually of the form "name@realm"
  -O listingFile - specifies filename to contain all listable output, error messages,etc
       This option is intended for use by programs that run hsi as a child process
       and internally disables verbose (-v) mode, and sets quiet (-q) mode. (This can
       be overridden by specifying the -v or -q parameters after the -O parameter)
  -o  (root only) - override <no-login> setting
  -P  ("popen" flag) - specifies that HSI is being run via popen (as a child process).
       All messages (listable output,error message) are written to stdout.
       HSI may not be used to pipe output to stdout if this flag is specified
  -p port - specifies the port number to use when connecting to the HPSS server
       If -p is specified, then the optional port should be omitted from the -h
       option, if -h is specified
  -q - specifies "quiet" mode. Suppresses login message,file transfer progress messages, etc.
                                                                    name must match one of
                                                                    's private .hsirc file
```

NESCC Factoid…

"Similar to ftp commands…the hsi command is used to move files to and from the HPSS."

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Daniel.Schornak@fe2:~

```
[Daniel.Schornak@fe2 ~]$ htar -h
Using fe2-10 for data hostname
[connecting to hpsscore1.fairmont.rdhpcs.noaa.gov/1217]
ERROR: No action specified (-c, -K, -t ,-x, -X).
Usage:

htar  -{c|D|K|t|U|x|X} -f Archive [-?] [-B] [-E] [-h] [-H opt[:opt...]
      [-d debuglevel] [-I {IndexFile | .suffix}] [-L inputlist]
      [-M maxfiles] [-m] [-n days[:hours]] [-O] [-o] [-p] [-q]
      [-v] [-V [-w  [-Y auto | [Archive COS ID][:Index File COS ID]]
      [-S Bufsize] [-T Max Threads] [Filespec | Directory ...]
HTAR: HTAR FAILED
[Daniel.Schornak@fe2 ~]$
```

NESCC Factoid…

"Similar to tar commands…the htar command is used to compress and package files into one file in order to minimize storage requirements – But then moves this file to HPSS storage."

Introduction to User Environment, Policies, Quotas, and Environmental Variables

Exercise!

Recommended Exercises

1. Log into TDS or Zeus
    a. Try using PuTTY (Windows Environment)
    b. Try using SSH (Linux Environment)

2. Get to know your session environmental variables *("printenv")*

3. Review and Explore the User Environment

4. Set up an SSH Tunnel between your system and TDS or Zeus

5. Copy files to the /scratch1 or /scratch2 volumes via DTNs

6. Knowing the Limitations – Established Policies and Quotas
    a. Determine available files systems *("df")*
    b. Locate posted policies and quotas

Programming Environment – *Environment Variables*

Environment Variable	Example Output (echo <Environment Variable>)	Description
$LD_LIBRARY_PATH	/opt/java/jdk1.6.0_04//lib:/opt/udunits/2.1.15/lib:/opt/papi/4.1.0/lib:/opt/ncl/5.2.0_bin/lib:/opt/hdf5/1.8.3-intel/lib:/opt/netcdf/3.6.3-intel/lib:/opt/intel/Compiler/11.1/072//idb/lib/intel64:/opt/intel/Compiler/11.1/072//mkl/lib/em64t:/opt/intel/Compiler/11.1/072//lib/intel64:/lib:64/usr/lib:64/usr/X11R6/lib64:/usr/local/lib64:/opt/sge/default/lib/lx26-amd64:/usr/local/lib64	Base path for resolving library paths for applications using Shared Objects and linkers
$LIBRARY_PATH	/lib64:/usr/lib64:/usr/X11R6/lib64:/usr/local/lib64:/usr/local/lib64	Provides search locations for resolving interactive and script command entries. (User modifiable)
$SHELL	/bin/tcsh	Current active UNIX shell for session (User modifiable) Available shells include: **sh** (bourne SHell); **bash** (Bourne-Again SHell); **csh** (C SHell); **ksh** (Korn SHell); **tcsh** (TC SHell); **zsh** (Z SHell)
$PWD	/home/Daniel.Schornak	Print Working Directory. Changing directory locations updates this environment variable
$LOGNAME	daniel.schornak	Name of the user
$MAIL	/var/spool/mail/daniel.schornak	Location of incoming mail
$USER	Daniel.Schornak	Name of the user

Programming Environment – *Alias command*

Alias command provides a simplified way of performing compound commands

Daniel.Schornak@fe1:~

```
[Daniel.Schornak@fe1 ~]$ alias
l.      ls -d .* --color=auto
ll      ls -l --color=auto
ls      ls --color=auto
module  (set _prompt="$prompt";set prompt="'
h !*`; set _exit=$status; set prompt="$_pron
$_exit;)
vi      vim
which   alias | /usr/bin/which --tty-only --
tilde
[Daniel.Schornak@fe1 ~]$
```

Daniel.Schornak@fe1:~

```
[Daniel.Schornak@fe1 ~]$ /
     2  20:57   qmgr
     3  21:01   showq
     5  21:01   showq -v -v
     6  21:01   man showq
     7  21:03   mshow
     8  21:04   pbsnodes
     9  21:04   showbf
    10  21:04   showbf -v -v
    11  21:06   qstat
    12  21:06   qstat -v -v
    14  21:06   qstat -f
    15  21:06   man qstat
    16  22:10   ssh fte1
    18  22:10   ssh tfe1
    19  22:10   ping tfe1
    20  22:11   alias
    23  22:11   vi .cshrc
    24  22:12   vi .bashrc
    25  22:12   chmod 644 .cshrc
    26  22:12   . .cshrc
    27  22:12   source .cshrc
    28  22:12   /
[Daniel.Schornak@fe1 ~]$
```

Example:
At command line type: alias / history
Now display shell history by typing: /

Note:
Add the above entry to .cshrc and it will be available at shell instantiation

Result from using new aliased command

Programming Environment – *Editors*

Available Editors	Learn More	Description
ed (a.k.a. red)	ed –help red --help	Line editor
vi	vi --help	Visual Interface (Note: vi is aliased to vim at NESCC)
emacs	emacs --help	Emacs is the extensible, customizable, self-documenting real-time display editor. This Info file describes how to edit with Emacs and some of how to customize it; it corresponds to GNU Emacs version 23.1.
rvi (a.k.a. vim; rview)	rvi --help vim --help rview --help	Vi IMproved, a programmer's editor
ex	ex --help	Line editor or VIM editor capability

Introduction to Programming Environment

General Compiler Discussion

Compilers	**Intel *** *(module load intel)*	**Portland Group** *(module load pgi)*
CC	icc	pgcc
F77	ifort	pgf77
F90	ifort	pgf90
C++	icpc	pgCC

*Intel compilers are the primary compilers on Zeus

Introduction to Programming Environment

Numerical Libraries Discussion

Source	Package	Associated Libraries
Intel	Math Kernel Library (MKL)	BLAS, LAPACK, PARDISO, FFT, FFTW, ScaLAPACK, Vector Math Library (VML), Vector Statistical Library (VSL), Summary Statistics Library (SSL)
PGI	PGI Math libraries	LAPACK, BLAS, FFT, Cluster FFT
SGI	Message Passing Toolkit (MPT)	Message Passing Toolkit (MPT) is a software package that supports interprocess data exchange for applications that use concurrent, cooperating processes on a single host or on multiple hosts. Data exchange is done through message passing, which is the use of library calls to request data delivery from one process to another or between groups of processes.

Many codes may use IBM's ESSL and, in particular, FFT routines.
ESSL is not available for the x86_64 platform.

Module Commands

- *module help*
- *module avail*
- *module whatis*
- *module load*
- *module list*
- *module unload*
- *module switch*
- *module show*

NESCC Factoid…
"Modules will continue to be refined during the Zeus acceptance period (through March 1st). After that period, defaults will be finalized. Alternate versions will be accessible over time as needed through different module titles."

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Using_Modules

Module Command - *"module --help"*

```
[daniel.schornak@fe2 ~]$ module --help

  Modules Release 3.2.6 2007-02-14 (Copyright GNU GPL v2 1991):

  Usage: module [ switches ] [ subcommand ] [subcommand-args ]

Switches:
        -H|--help                   this usage info
        -V|--version                modules version & configuration options
        -f|--force                  force active dependency resolution
        -t|--terse                  terse    format avail and list format
        -l|--long                   long     format avail and list format
        -h|--human                  readable format avail and list format
        -v|--verbose                enable  verbose messages
        -s|--silent                 disable verbose messages
        -c|--create                 create caches for avail and apropos
        -i|--icase                  case insensitive
        -u|--userlvl <lvl>          set user level to (nov[ice],exp[ert],adv[anced])
  Available SubCommands and Args:
        + add|load                  modulefile [modulefile ...]
        + rm|unload                 modulefile [modulefile ...]
        + switch|swap               [modulefile1] modulefile2
        + display|show              modulefile [modulefile ...]
        + avail                     [modulefile [modulefile ...]]
        + use [-a|--append]         dir [dir ...]
        + unuse                     dir [dir ...]
        + update
        + refresh
        + purge
        + list
        + clear
        + help                      [modulefile [modulefile ...]]
        + whatis                    [modulefile [modulefile ...]]
        + apropos|keyword           string
        + initadd                   modulefile [modulefile ...]
        + initprepend               modulefile [modulefile ...]
        + initrm                    modulefile [modulefile ...]
        + initswitch                modulefile1 modulefile2
        + initlist
        + initclear
```

Sample Output "module –help"

Module Commands – *"module avail"*

```
Daniel.Schornak@fe6:~
[Daniel.Schornak@fe6 ~]$ module avail

------------------ /usr/share/Modules/modulefiles ------------------
chkfeature  module-cvs  modules     null        perfcatcher
dot         module-info mpt/2.05    perfboost   use.own

------------------------- /apps/modulefiles -------------------------
adaptive/6.1.0                  intel/12-12.0.4.191(default)
adaptive/6.1.3(default)         intel/12-12.1.0_sp1.6.233
bbcp/10.08.29.00.0(default)     matlab/r2011b
bbftp/client/3.2.0              mcidas/1.01(default)
bbftp/server/3.2.0              ncl/6.0.0(default)
cnvgrib/1.2.2(default)          nco/4.0.8(default)
esmf/4.0.0rp2(default)          netcdf/3.6.3(default)
g2clib/1.2.2(default)           netcdf/4.1.3
g2lib/1.2.2(default)            netcdf/4.1.3-gnu
grads/2.0.1(default)            netcdf/4.1.3-intel
grads/2.0.a9                    netcdf/4.1.3-pgi
gt/5.0.4(default)               netcdf/test
hdf/4.2.6(default)              netcdf4/python-0.9.7(default)
hdf5/1.8.7(default)             numpy/1.6.1(default)
heirloom/cpio(default)          petsc/3.1-p8(default)
hpss/hpss                       pgi/11.10(default)
i7z/0.27(default)               pgi/11.6
icc/12-12.0.4.191               pgi/11.6.orig
icc/12-12.1.0_sp1.6.233         scipy/0.9.0(default)
icc/12.1.0.233                  tau/2.20.2(default)
idl/idl/8.1                     test/1
ifc/12-12.0.4.191               test/test
ifc/12-12.1.0_sp1.6.233         totalview/8.9.1(default)
imkl/12-12.0.4.191              udunits/1.12.11(default)
imkl/12-12.1.0_sp1.6.233        w3lib/2.0(default)
impi/4.0.3.008                  workflowmgr/0.99.152(default)
[Daniel.Schornak@fe6 ~]$
```

Sample Output "module avail"

```
Daniel.Schornak@fe1:~
[Daniel.Schornak@fe1 ~]$ module -l avail
- Package ----------------------------+- Versions -+- Last mod. ------
/usr/share/Modules/modulefiles:
chkfeature                                          2011/10/09  5:25:57
dot                                                 2009/12/09 16:22:52
module-cvs                                          2009/12/09 16:22:52
module-info                                         2009/12/09 16:22:52
modules                                             2009/12/09 16:22:52
mpt/2.05                                            2011/10/20 10:08:29
null                                                2009/12/09 16:22:52
perfboost                                           2011/10/20 10:58:17
perfcatcher                                         2011/10/20 10:46:04
use.own                                             2009/12/09 16:22:52

/etc/modulefiles:

/etc/modulefiles:

/apps/modulefiles:
adaptive/6.1.0                                      2011/12/01 13:01:34
adaptive/6.1.3                          default     2012/01/13 17:03:52
bbcp/10.08.29.00.0                      default     2011/12/01 13:01:34
bbftp/client/3.2.0                                  2011/12/01 13:01:34
bbftp/server/3.2.0                                  2011/12/01 13:01:34
cnvgrib/1.2.2                           default     2011/12/01 13:01:34
esmf/4.0.0rp2                           default     2011/12/01 13:01:34
g2clib/1.2.2                            default     2011/12/01 13:01:34
g2lib/1.2.2                             default     2011/12/01 13:01:34
grads/2.0.1                             default     2012/02/06 21:17:38
grads/2.0.a9                                        2011/12/01 13:01:34
gt/5.0.4                                default     2011/12/01 13:01:34
hdf/4.2.6                               default     2011/12/01 13:01:34
hdf5/1.8.7                              default     2011/12/01 13:01:34
heirloom/cpio                           default     2011/12/01 13:01:34
hpss/hpss                                           2012/01/30 13:12:01
i7z/0.27                                default     2011/12/01 13:01:34
icc/12-12.0.4.191                                   2012/02/14 17:28:47
icc/12-12.1.0_sp1.6.233                             2012/02/14 17:28:47
icc/12.1.0.233                                      2012/02/14 17:28:47
idl/idl/8.1                                         2011/12/01 13:01:34
ifc/12-12.0.4.191                                   2012/02/14 17:29:20
ifc/12-12.1.0_sp1.6.233                             2012/02/14 17:29:20
imkl/12-12.0.4.191                                  2012/02/14 17:30:48
```

Sample Output "module –l avail"

Module Commands – *"module whatis <module>"*

```
cit                 : loads the default CIT management environment
cuda/2.0            : loads the CUDA development environment
cuda/2.1            : loads the CUDA development environment
cuda/2.1beta        : loads the CUDA develop
cuda/2.2            : loads the CUDA develop
cuda/3.1            : loads the CUDA develop
cuda/3.2.16         : loads the CUDA develop
cuda/4.0.17         : loads the CUDA develop
dot                 : adds '.' to your PATH
gams/23.7.1         : loads the path to GAMS
gempak/5.11.4       : loads the Gempak envir
gempak/6.2.0        : loads the Gempak envir
hdf4/4.2.5-intel    : loads the HDF4 4.2.5 l
hdf4/4.2r3-intel    : loads the HDF4 4.2r3 l
hdf4/4.2r3-lahey    : loads the HDF4 4.2r3 l
hdf4/4.2r3-pgi      : loads the HDF4 4.2r3 l
hdf5/1.8.3          : loads the HDF5 library
hmpp/2.4.2          : loads the HMPP Compile
icc/11.1.038        : loads the Intel C/C++
icc/11.1.072        : loads the Intel C/C++
icc/11.1.073        : loads the Intel C/C++
icc/2011.2.137      : loads the Intel C/C++
ifort/11.1.038      : loads the Intel C/C++
impi/4.0.0.017      : loads the MVAPICH2 env
intel/11.1.038      : loads the Intel Compil
intel/11.1.072      : loads the Intel Compil
intel/11.1.073      : loads the Intel Compil
intel/2011.2.137    : loads the Intel Compil
jet-tools           : loads the default wJet
lahey/8.00a         : loads the Lahey Compil
lahey/8.10b         : loads the Lahey Compil
lf95/8.00a          : loads the Lahey Fortan
lf95/8.10a          : loads the Lahey Fortan
lf95/8.10b          : loads the Lahey Fortan
mathlibs/fftw       : loads the FFTW librari
module-cvs          : get most recent module
module-info         : returns all various mo
modules             : loads the modules envi
```

```
mvapich2/1.4.1-intel-11.1: loads the MVAPICH2 environment
mvapich2/1.4.1-lahey : loads the MVAPICH2 environment
mvapich2/1.4.1-pgi   : loads the MVAPICH2 environment
mvapich2/1.5-intel-11.1: loads the MVAPICH2 environment
mvapich2/1.5-test-intel-11.1: loads the MVAPICH2 environment
mvapich2/1.5.1-intel-11.1: loads the MVAPICH2 environment
mvapich2/1.5.1-pgi   : loads the MVAPICH2 environment
mvapich2/1.6-intel-11.1: loads the MVAPICH2 environment
mvapich2/1.6-pgi     : loads the MVAPICH2 environment
ncl/5.2.0            : loads the NCAR Graphics library
ncl/5.2.0-intel      : loads the NCAR Graphics library
ncl/5.2.0-pgi        : loads the NCAR Graphics library
nco/3.9.6            : loads the NCO environment
nco/4.0.1            : loads the NCO environment
netcdf/3.6.3         : loads the NETCDF library
netcdf/3.6.3-shared  : loads the NETCDF shared library
netcdf/4.0.1         : loads the NETCDF library
netcdf/4.1.1         : loads the NETCDF library
netcdf/4.1.1-intel   : loads the NETCDF shared library
netcdf/4.1.1-shared  : loads the NETCDF shared library
null                 : does absolutely nothing
openmpi/1.3.3        : loads the OpenMPI library
openmpi/1.4.1        : loads the OpenMPI library
openmpi/1.4.1-intel-11.1: loads the OpenMPI library
openmpi/1.4.1-lahey  : loads the OpenMPI library
openmpi/1.4.1-pgi    : loads the OpenMPI library
openmpi/1.4.2-intel  : loads the OpenMPI library
openmpi/1.4.2-lahey  : loads the OpenMPI library
openmpi/1.4.2-pgi    : loads the OpenMPI library
openmpi/1.4.3-intel  : loads the OpenMPI library
openmpi/1.4.3-lahey  : loads the OpenMPI library
openmpi/1.4.3-pgi    : loads the OpenMPI library
openmpi/1.7ft_a2-intel: loads the OpenMPI library
papi/4.1.0           : loads PAPI
pgcc/10.6            : loads the PGI compiler environment
pgcc/10.8            : loads the PGI compiler environment
pgcc/10.9            : loads the PGI compiler environment
pgcc/11.1            : loads the PGI compiler environment
pgcc/11.7            : loads the PGI compiler environment
pgcc/9.0-2           : loads the PGI compiler environment
pgi/10.6             : loads the PGI Compiler environment
pgi/10.8             : loads the PGI Compiler environment
pgi/10.9             : loads the PGI Compiler environment
pgi/11.1             : loads the PGI Compiler environment
pgi/11.7             : loads the PGI Compiler environment
pgi/9.0-2            : loads the PGI Compiler environment
sge                  : loads the SGE environment
sms/2.9.0-intel-9.1  : loads the SMS environment for Intel 9.1/MVAPICH2-1.0
sms/2.9.0-pgi-7.1-3-mvapich2-1.0.3: loads the SMS environment for Intel 9.1/MVAPICH2-1.0
torque               : loads the Torque environment
totalview/8.8.0-1    : loads the TotalView debugging environment
uberftp/2.7          : loads the Gempak environment
udunits/2.1.15       : loads the Udunits environment
use.own              : adds your own modulefiles directory to MODULEPATH
wgrib/1.8.1.0d       : loads the path to wgrib
wgrib2/1.9.2c        : loads the path to wgrib2
wjet                 : loads the default wJet environment
```

Sample Output – "module whatis <module>"

Module Commands – *"module load"*

Daniel.Schornak@fe6:~

Basic Environment

```
Before loading modules
LD_LIBRARY_PATH: /usr/local/globus/5.0.4/lib:/usr/local/globus/5.0.4/lib:/apps/moab/default/lib:/apps/torque
/default/lib:/apps/moab/default/lib:/apps/torque/default/lib
LIBPATH: /usr/local/globus/5.0.4/lib:/usr/local/globus/5.0.4/lib:/usr/lib:/lib
PATH: /usr/lib64/qt-3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/globus/5.0.4/bin:/usr/local/globus/5.0.4
/bin:/opt/c3/bin:/apps/moab/default/moab/tools:/apps/moab/default/bin:/apps/torque/default/bin:/apps/gold/de
fault/bin:/apps/gold/default/sbin:/opt/sgi/sbin:/opt/sgi/bin:/opt/c3/bin:/apps/moab/default/moab/tools:/apps
/moab/default/bin:/apps/torque/default/bin:/apps/gold/default/bin:/apps/gold/default/sbin:/opt/sgi/sbin:/opt
/sgi/bin
MANPATH: /opt/c3/man:/apps/moab/default/man:/apps/torque/default/man:/usr/share/man:/opt/sgi/share/man:/opt/
c3/man:/apps/moab/default/man:/apps/torque/default/man:/usr/share/man:/opt/sgi/share/man

Loading module: module load intel

After loading intel module
LD_LIBRARY_PATH: /apps/intel/composerxe-2011.4.191/mkl/lib/intel64:/apps/intel/composerxe-2011.4.191/compose
rxe-2011.4.191/compiler/lib/intel64:/usr/local/globus/5.0.4/lib:/usr/local/globus/5.0.4/lib:/apps/moab/defau
lt/lib:/apps/torque/default/lib:/apps/moab/default/lib:/apps/torque/default/lib
LIBPATH: /usr/local/globus/5.0.4/lib:/usr/local/globus/5.0.4/lib:/usr/lib:/lib
PATH: /apps/intel/composerxe-2011.4.191/composerxe-2011.4.191/bin/intel64:/usr/lib64/qt-3.3/bin:/usr/local/b
in:/bin:/usr/bin:/usr/local/globus/5.0.4/bin:/usr/local/globus/5.0.4/bin:/opt/c3/bin:/apps/moab/default/moab
/tools:/apps/moab/default/bin:/apps/torque/default/bin:/apps/gold/default/bin:/apps/gold/default/sbin:/opt/s
gi/sbin:/opt/sgi/bin:/opt/c3/bin:/apps/moab/default/moab/tools:/apps/moab/default/bin:/apps/torque/default/b
in:/apps/gold/default/bin:/apps/gold/default/sbin:/opt/sgi/sbin:/opt/sgi/bin
MANPATH: /apps/intel/composerxe-2011.4.191/man/en_US:/opt/c3/man:/apps/moab/default/man:/apps/torque/default
/man:/usr/share/man:/opt/sgi/share/man:/opt/c3/man:/apps/moab/default/man:/apps/torque/default/man:/usr/shar
e/man:/opt/sgi/share/man
[Daniel.Schornak@fe6 ~]$
```

Loading intel module

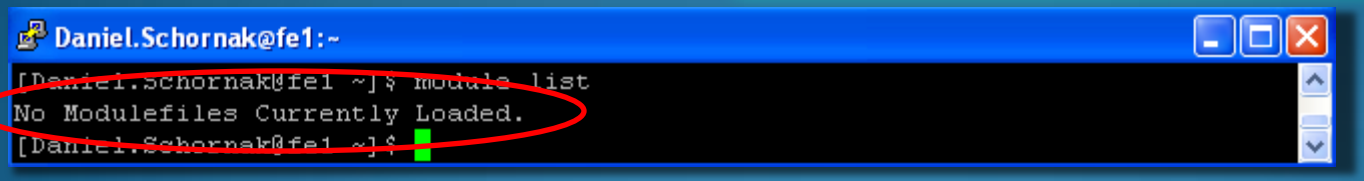
Enhanced Environment

Sample Outputs from "printenv" …Before and After "module load intel"

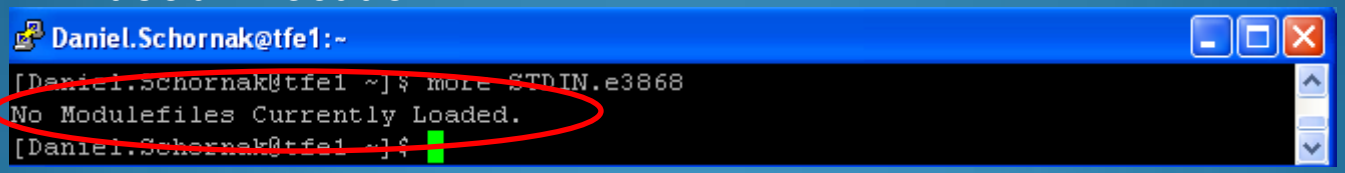
Module Commands

NESCC Factoid…
"Modules are not automatically loaded at user log in or job execution."

At Log in…



At Job Execution…



Related Environmental Variables:

MODULESHOME - The location of the master Modules package file directory containing **module** command initialization scripts, the executable program **modulecmd,** and a directory containing a collection of master *modulefiles.*

MODULEPATH - The path that the **module** command searches when looking for *modulefiles.*

LOADEDMODULES - A colon separated list of all loaded *modulefiles.*

LMFILES - A colon separated list of the full pathname for all loaded *modulefiles..*

NESCC Factoid…
"At a minimum, you will want to:
- module load intel
- module load mpt

} module load intel mpt

Module Commands – *"module list"*

Sample Output "module list"

```
[daniel.schornak@fe2 ~]$ module list
Currently Loaded Modulefiles:
  1) icc/11.1.072                    10) udunits/2.1.15
  2) mvapich2/1.4.1-intel-11.1       11) mathlibs/fftw
  3) netcdf/3.6.3                    12) uberftp/2.7
  4) hdf4/4.2r3-intel                13) gempak/5.11.4
  5) hdf5/1.8.3                      14) jet-tools
  6) ncl/5.2.0-intel                 15) sge
  7) intel/11.1.072                  16) totalview/8.8.0-1
  8) papi/4.1.0                      17) wjet
  9) nco/4.0.1
```

Sample Output "module -l list"

```
jetrsa.rdhpcs.noaa.gov - PuTTY
[daniel.schornak@fe2 ~]$ module -l list
- Package ----------------------------+- Versions -+- Last mod. ------
Currently Loaded Modulefiles:
icc/11.1.072                                        2011/06/08 16:07:40
mvapich2/1.4.1-intel-11.1                           2010/07/01 20:28:22
netcdf/3.6.3                                        2009/07/24 15:22:49
hdf4/4.2r3-intel                                    2010/08/12  2:21:30
hdf5/1.8.3                                          2010/05/30 14:59:42
ncl/5.2.0-intel                                     2011/07/12 22:16:56
intel/11.1.072                                      2011/07/12 23:16:03
papi/4.1.0                                          2010/06/25 20:28:44
nco/4.0.1                                           2011/08/26 15:31:05
udunits/2.1.15                                      2010/07/09 22:37:56
mathlibs/fftw                                       2009/07/22 21:53:31
uberftp/2.7                                         2011/11/01 19:18:11
gempak/5.11.4                                       2011/02/07 17:46:01
jet-tools                                           2011/11/01 19:17:39
sge                                                 2009/07/28 22:24:46
totalview/8.8.0-1                                   2010/05/25 16:08:12
wjet                                                2010/07/09 22:34:55
[daniel.schornak@fe2 ~]$
[daniel.schornak@fe2 ~]$
```

Module Commands – *"module switch <this> <that>"* *"module swap <this> <that>"*

Change to a newer C compiler version (current: intel/intel-cc-12-12.0.4.191; want: intel/intel-cc-12-12.1.0_sp1.6.233)

Before….

```
[Daniel.Schornak@tfe1 ~]$ module list
Currently Loaded Modulefiles:
  1) intel/intel-cc-12-12.0.4.191      3) intel/intel-cmkl-12-12.0.4.191
  2) intel/intel-fc-12-12.0.4.191      4) intel/tools
```

Make the "Switch"…

module switch intel/intel-cc-12-12.0.4.191 intel/intel-cc-12-12.1.0_sp1.6.233

(same as: module swap intel/intel-cc-12-12.0.4.191 intel/intel-cc-12-12.1.0_sp1.6.233)

After…

```
[Daniel.Schornak@tfe1 ~]$ module list
Currently Loaded Modulefiles:
  1) intel/intel-cc-12-12.1.0_sp1.6.233
  2) intel/intel-fc-12-12.0.4.191
  3) intel/intel-cmkl-12-12.0.4.191
  4) intel/tools
[Daniel.Schornak@tfe1 ~]$
```

Module Commands – *"module show"*

Command shows what environmental variables are set and any associated modules

Daniel.Schornak@tfe1:~

```
[Daniel.Schornak@tfe1 ~]$ module show intel
-------------------------------------------------------------------
/apps/modulefiles/intel/12-12.0.4.191:

setenv          MPICC_CC icc
setenv          MPICXX_CXX icpc
setenv          MPIF90_F90 ifort
module          load intelprod/cc/12-12.0.4.191
module          load intelprod/fc/12-12.0.4.191
module          load intelprod/cmkl/12-12.0.4.191
-------------------------------------------------------------------

[Daniel.Schornak@tfe1 ~]$
```

NESCC Factoid…
"Intel modules cannot coexist with PGI modules. Load one or the other, but not both!"

Daniel.Schornak@tfe1:~

```
[Daniel.Schornak@tfe1 ~]$ module show pgi
-------------------------------------------------------------------
/apps/modulefiles/pgi/11.6:

prepend-path     MANPATH /apps/pgi/linux86-64/11.6/man
prepend-path     LM_LICENSE_FILE /apps/pgi/license.dat
prepend-path     PATH /apps/pgi/linux86-64/11.6/bin
setenv           MPICC_CC pgcc
setenv           MPICXX_CXX pgCC
setenv           MPIF90_F90 pgf90
-------------------------------------------------------------------

[Daniel.Schornak@tfe1 ~]$
```

Module Commands – *What to watch out for!*

Version incompatibilities among modules can occur

Solution:

1. Remove all installed modules and build from scratch (*module clear*)

   Note: "clear" is interactive; "purge" in non-interactive – same results

```
Daniel.Schornak@tfe1:~
[Daniel.Schornak@tfe1 ~]$ module clear

Are you sure you want to clear all loaded modules!? [n] y
[Daniel.Schornak@tfe1 ~]$ module list
No Modulefiles Currently Loaded.
[Daniel.Schornak@tfe1 ~]$
```

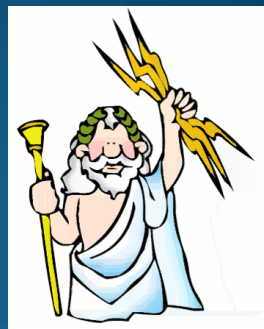
2. Load only the modules that you require *

```
Daniel.Schornak@tfe1:~
[Daniel.Schornak@tfe1 ~]$ module load intel
[Daniel.Schornak@tfe1 ~]$ module list
Currently Loaded Modulefiles:
  1) intelprod/cc/12-12.0.4.191      3) intelprod/cmkl/12-12.0.4.191
  2) intelprod/fc/12-12.0.4.191      4) intel/12-12.0.4.191
[Daniel.Schornak@tfe1 ~]$
```

- *Note: Interdependent/compatible modules will automatically load*

3. Logging out and back in will provide a new session with no modules loaded

Introduction to Programming Environment



Exercise!

Recommended Exercises

1. Module appreciation exercise…
   a. Unload all modules (“*module clear*”)
   b. Verify Intel C compilers not available *(“icc –v; if77 –v”)*
   c. Load and verify Intel compiler modules *(“icc –v; if77 -v”)*
   d. *Load and verify PGI compilers *(“pgcc --version; pgf77 –version”)*

2. Modules for libraries
   - *Check library paths*

3. Ensure modules are loaded at login
   - Edit .profile file and add appropriate “module load” entries

4. Ensure modules are loaded at job execution
   - Include “module load <modulename>” in batch script

** Remember to “module clear” or “module unload intel before loading pgi*

Introduction to Programming Environment

NESCC Software Stack

Operating System	bbcp	gcc	GrADS	libtool	netCDF v4	Python netcdf module
Batch System	bbFTP	gdb	GRIB libraries and utilities	libxml	OpenMP	Python-numpy module
Batch System	Bison	Ghostview	gzip	Linux/UNIX debugger	Optimized BLAS	R (statistical package)
System Monitoring and Accounting	C/C++	Globus Toolkit	HDF4	McIDAS	Optimized FFTW	Ruby
ANTLR	Environment Modules	GNU binutils	HDF5	MP Toolbox, MPI,MPI-21/0	Perl	SVN/CVS
autoconf	ESMF	GNU coreutils	Heirloom cpio	NCAR Graphics	PETSc	Udunits v1.X
automake	FORTRAN 77/90/95	GNU make	ImageMagick	Ncview	Python	UNPACK
bash	gawk	GNU tar	Java	netCDF Operators	Python scipy module	X-11

Introduction to Programming Environment

Preparing for Job Submission – Batch Script Considerations

Use msub. Here is an example batch script:

```
#!/bin/sh --login
# -- Request 12 cores
#PBS -l procs=12
# -- Specify a maximum wallclock of 4
#PBS -l walltime=4:00:00
# -- Specify under which account a job
#PBS -A hpl
# -- Set the name of the job, or moab w
#PBS -N HPL
# change directory to the working direc
# Use the if clause so that this script stays portable
# if [ x$PBS_O_WORKDIR != x ];
then
cd $PBS_O_WORKDIR
fi
np=$PBS_NP
module load intel
module load mpt
mpiexec_mpt -np $np ./xhpl
```

NESCC Factoid…

In order to load module, make sure to use "--login" when declaring the script's shell…such as:

```
#!/bin/bash --login
#!/bin/ksh --login
#!/bin/sh --login
```

All jobs must declare their account identifier

#PBS –A <Project Name>

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Frequently_Asked_Questions#Why_can.27t_I_use_module_commands_inside_of_my_batch_script.3F

Introduction to Programming Environment

Finding your Account Information – *New Tool!*

Use: *account_params*

Daniel.Schornak@fe4:~

```
[Daniel.Schornak@fe4 ~]$ account_params
Account Params -- Information regarding project associations

Processing Unix group file /etc/group
User: Daniel.Schornak
        Project: nesccmgmt
                Allocation: Id Name      Amount       Reserved Balance      CreditLimit Available
                Allocation: -- --------- ------------ -------- ------------ ----------- ------------
                Allocation: 84 nesccmgmt    709127157        0    709127157           0    709127157

                Directory: /scratch1/portfolios/BMC/nesccmgmt   DiskInUse=84173 GB, Quota=211500 GB
                Directory: /scratch2/portfolios/BMC/nesccmgmt   DiskInUse=140185 GB, Quota=211500 GB


[Daniel.Schornak@fe4 ~]$
```

NESCC Factoid…

account_params shows…

- *Project Name*
- *Project Allocation Balances*
- *Shows assigned Scratch Space Locations and Quotas*

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Getting_Information_About_Your_Account

Introduction to Programming Environment

Preparing for Job Submission – Batch Script Considerations (continued)

If you need to change the processor layout, there is a way. Use the nodes option.

#PBS –l nodes=4:ppn=6

Each node has 12 cores. The above syntax will allocate 4 nodes, and schedule 6 tasks per node. This is what you would want to do for an OpenMP job where each MPI process uses 2 threads.

Other examples:

#PBS –l nodes=12:ppn=1

Start job on 12 nodes, with one thread per node (For 12 MPI tasks, OMP_NUM_THREADS=12)

#PBS –l nodes=2:ppn=1+4:ppn=12

Start job with one process on each of the first two nodes, then fill up the last 4 nodes with 48 tasks - This would be for a job that has I/O tasks for the first two MPI ranks.

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Running_and_Monitoring_Jobs

Introduction to Programming Environment

Optimizing performance for MPI applications using MPT

The default buffer settings used by the MPT MPI library are inadequate to provide decent performance for most applications. It is recommend that you set the following variables prior to calling mpiexec_mpt.

```
setenv MPI_BUFS_PER_PROC=128
setenv MPI_BUFS_PER_HOST=128
setenv MPI_GROUP_MAX=128
```

Hint: For more information: run "*man mpi*" after loading the mpt module

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Using_MPI

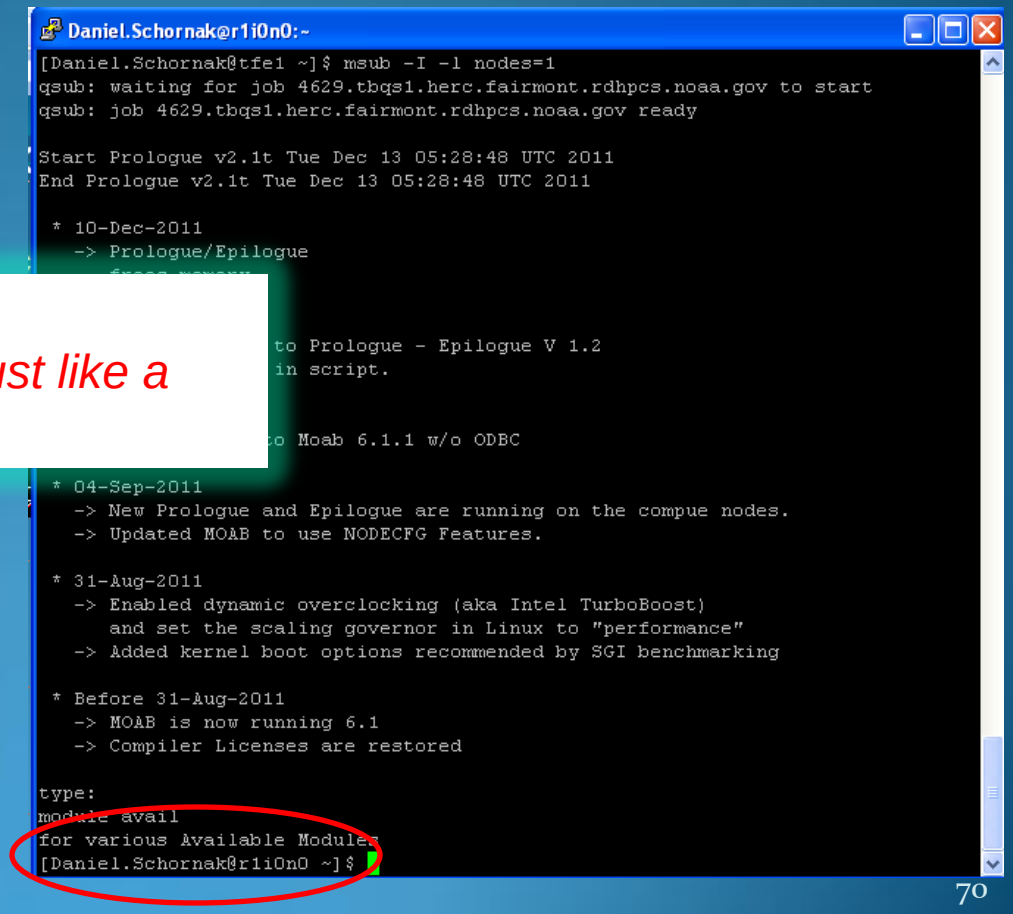
Introduction to Programming Environment

Interactive Job performance for MPI applications using MPT

If you need to do other interactive work, including running, development, or debugging of jobs, an interactive job is a great way to do this.
To create an interactive job, use the -I option to msub:

```
# msub -I –l nodes=1
```

NESCC Factoid…
"Interactive jobs can be any size – just like a normal batch job."



Introduction to Programming Environment

Scheduler Commands Cross Reference Table

The table below reflects similar functions across the various schedulers within the NOAA HPC environments.

NCEP LoadLeveler Commands	ESRL SGE Commands	NESCC (and GFDL) Moab Commands	Function
llcancel	qdel	mjobctl -c	Cancels a submitted job
llclass	TBD	TBD	Returns information about job classes
llcc	TBD	TBD	Returns free cpus about job classes
llhold	qhold qrls	mjobctl –h mjobctl -u	Holds or releases a hold on a job
llq	sgestat qstat	checkjob showq	Queries the status of jobs
llstatus	qhost	showstate	Queries the status of machines
llsubmit	Qsub	msub	Submits a job
share_reporter.ksh	TBD	showstats	Reports the total share and used share for each group and user
TBD	userstat	qstat -Q	Displays node statistics and batch queue for cluster

Introduction to Programming Environment

Running an Openmp/MPI hybrid job

The previous instructions tell you how to request nodes and placement in a way to support OpenMP/MPI hybrid applications. However, it is necessary to include an additional command to get the processes of your job to be allocated correctly. To do this, use the *omplace* program. Example:

```
# mpiexec_mpt -np $NP omplace ./f.applic.x
```

By default, *omplace* will use the value set by $OMP_NUM_THREADS. If that value is not set, it will use 1. You can explicitly set the number of threads to be used by each MPI rank with the -nt option. Ex:

```
# mpiexec_mpt -np $NP omplace -nt 4 ./f.applic.x
```

In this example, each f.applic.x executable could use 4 threads. You still need to set OMP_NUM_THREADS to the correct value for your model run.

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Running_and_Monitoring_Jobs

Online Documentation– *Where to go…*

Website
https://nesccdocs.rdhpcs.noaa.gov

Access and Use of TDS
https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Access_and_Use_of_TDS

PGI Compilers User Guide
http://www.pgroup.com/doc/pgiug.pdf

Optimization with Intel Compilers
http://software.intel.com/sites/products/collateral/hpc/compilers/compiler_qrg12.pdf

NESCC Factoid…
"Documentation, such as listed above, will start to be made available on NesscDocs soon."

Need Help? – *Where to go…*

Zeus User Support and Problem Reporting – Help Desk for NESCC

rdhpcs.zeus.help@noaa.gov

HPSS User Support and Problem Reporting – Help Desk for NESCC

rdhpcs.hpss.help@noaa.gov

NESCC Documentation Wiki Site – "How to…"

https://nesccdocs.rdhpcs.noaa.gov/

End User Experience

EMC Model Transition Team (Provides updates for porting to TDS and Zeus)

http://www.emc.ncep.noaa.gov/mtt

NESCC Factoid…
"Additional documentation will continue to be made available on the NesccDocs Wiki Site."

Group A End User Training

0800-0810 Training Process
- Introduce instructors
- General information
- Define training roles and responsibilities
- Review training agenda

0810-0815 Training Objectives
- Review the objectives of the NESCC HPC Environment overview

0815-0845 Introduction to NESCC HPC Design/Architecture and Environment
- Describe the overall architecture major components, functions, and features

0845-0900 Available On-line Documentation

0900-0915 **BREAK**

0915-0945 Introduction to User Environment, Policies, Quotas, and Environmental Variables

0945-1045 Introduction to Programming Environment
- Introduce tools – shells, applications, compilers, and libraries

1045-1145 Introduction to NESCC Storage and Data Management

1145-1245 **LUNCH BREAK**

1245-1415 Introduction to Job Scheduling using Moab (Adaptive Computing)
- Efficient job submission techniques
- Installed NESCC version compared to other NOAA installations
- Moab/Torque end-user commands and tools

1415-1500 Questions/Answers

1500 Session Wrap up

Introduction to Job Scheduling using Moab (Adaptive Computing)

Shawn Hoopes – Adaptive Computing

https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Running_and_Monitoring_Jobs

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1415-1500 Questions/Answers

1500 Session Wrap up

Group A End User Training – Wrap Up

Reminder: Please complete and return the Post-training Questionnaire

Additional Questions?

Dan Schornak: dschorna@csc.com

Need Help? – *Where to go…*

Help Desk for NESCC

rdhpcs.zeus.help@noaa.gov

HPSS Help Desk for NESCC
rdhpcs.hpss.help@noaa.gov

NESCC FAQ and Documentation Website
https://nesccdocs.rdhpcs.noaa.gov/wiki/index.php/Main_Page

EMC Model Transition Team – Providing updates for porting to TDS and Zeus
http://www.emc.ncep.noaa.gov/mtt