

Tesla-CMC User Guide

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Requirements



- User account to Tesla-CMC
- Unix
 - Shell: sh, csh, bash...
 - OpenSSH client (with SSH-2 protocol support)
 - Optional X-server
- Windows
 - SSH client: PuTTY, WinSCP, Cygwin, TTSSH2...
 - Optional X-server: Xming

Tesla-CMC Cluster



Tesla-CMC Cluster





- 2 x Intel(R) Xeon(R) CPU E5620 @ 2.40GHz
- 36GB Host Memory
- 8 x Tesla C1060 @ 1.44GHz (4GB Memory)
- SSH port: 65028
- Hostname: cuda.cs.msu.su

Connecting to Tesla-CMC



- 🌐 **ssh** - OpenSSH SSH client (remote login program)

ssh connects and logs into the specified **hostname** (with optional **username**)

ssh [-X] [-i identity_file] [-p port] [username@]hostname

- 🌐 **-X** - Enables X11 forwarding
- 🌐 **-p port** - Port to connect to on the remote host
- 🌐 **-i identity_file** - Selects a file from which the identity (private key) for RSA or DSA authentication is read



```
bsd-air:~ conqueror$ ssh -X -p 65028 conqueror@cuda.cs.msu.su  
The authenticity of host '[cuda.cs.msu.su]:65028 ([158.250.10.158]:65028)'  
can't be established.  
RSA key fingerprint is 96:34:a4:06:72:9d:e3:05:a1:f1:11:82:e5:07:0b:c9.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '[cuda.cs.msu.su]:65028,[158.250.10.158]:  
65028' (RSA) to the list of known hosts.  
conqueror@cuda.cs.msu.su's password:  
Last login: Thu Jun 21 14:38:40 2012 from bsd-book.socio.msu.ru  
[conqueror@tesla-cmc ~]$
```



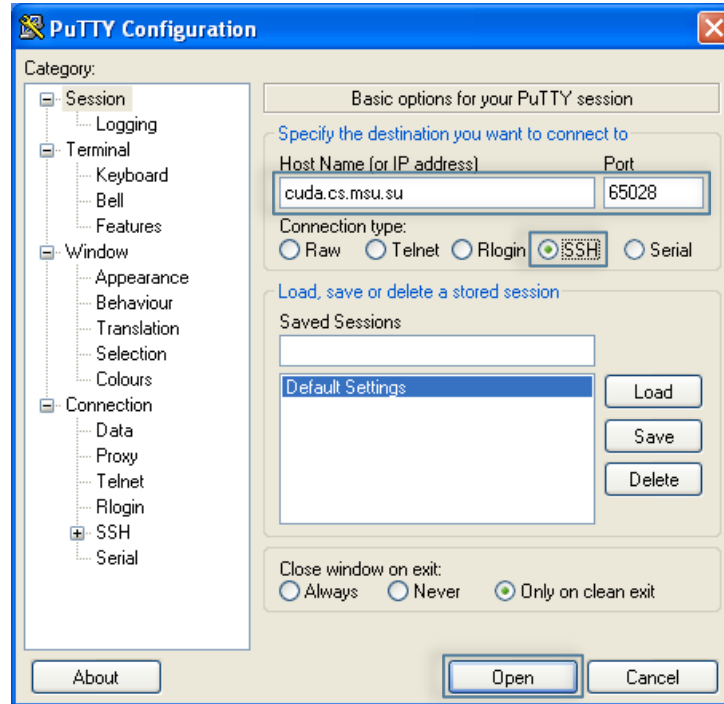
Connecting from Windows

- **PuTTY** is a free (MIT-licensed) Win32 Telnet and SSH client
- Download link:

<http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe>

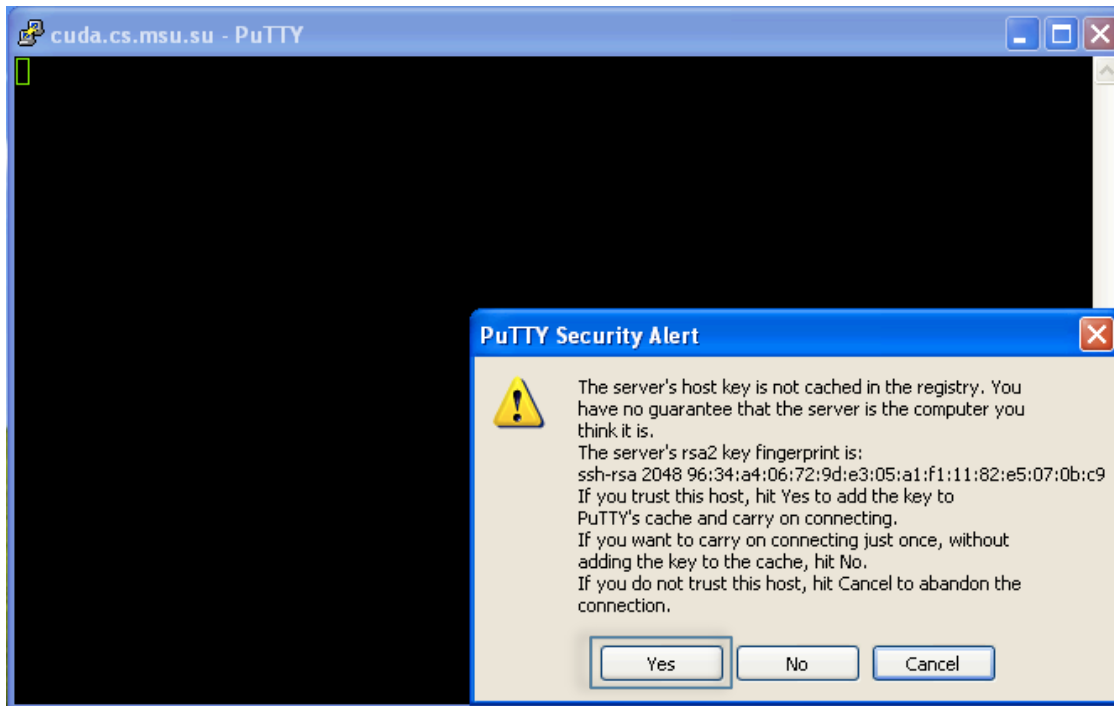


Windows - PuTTY





Windows - PuTTY





Windows - PuTTY

```
conqueror@tesla-cmc:~  
login as: conqueror  
conqueror@cuda.cs.msu.su's password:  
Last login: Thu Jun 21 14:43:32 2012 from bsd-book.socio.msu.ru  
[conqueror@tesla-cmc ~]$
```

Data Transfers



Transferring Data in Unix

- **scp** – secure copy (remote file copy program)
scp copies files between hosts on a network. It uses ssh for data transfer, and uses the same authentication and provides the same security as ssh.

```
scp [-r] [-i identity_file] [-P port] [[user@]host1]:file1  
[[user@]host2]:file2
```

- -r - Recursively copy entire directories
- file1 and file2 can be **absolute paths or relative paths with filenames or directories' names**



🔗 Copying a file from localhost to Tesla-CMC

```
me:~ conqueror$ scp -P 65028 Downloads/test.txt cuda.cs.msu.su:~/
```

🔗 Copying a file from Tesla-CMC to localhost

```
me:~ conqueror$ scp -P 65028 cuda.cs.msu.su:~/test.cpp test.cpp
```

🔗 Copying a directory to Tesla-CMC

```
me:~ conqueror$ scp -r -P 65028 Downloads/test_dir cuda.cs.msu.su:~/
```



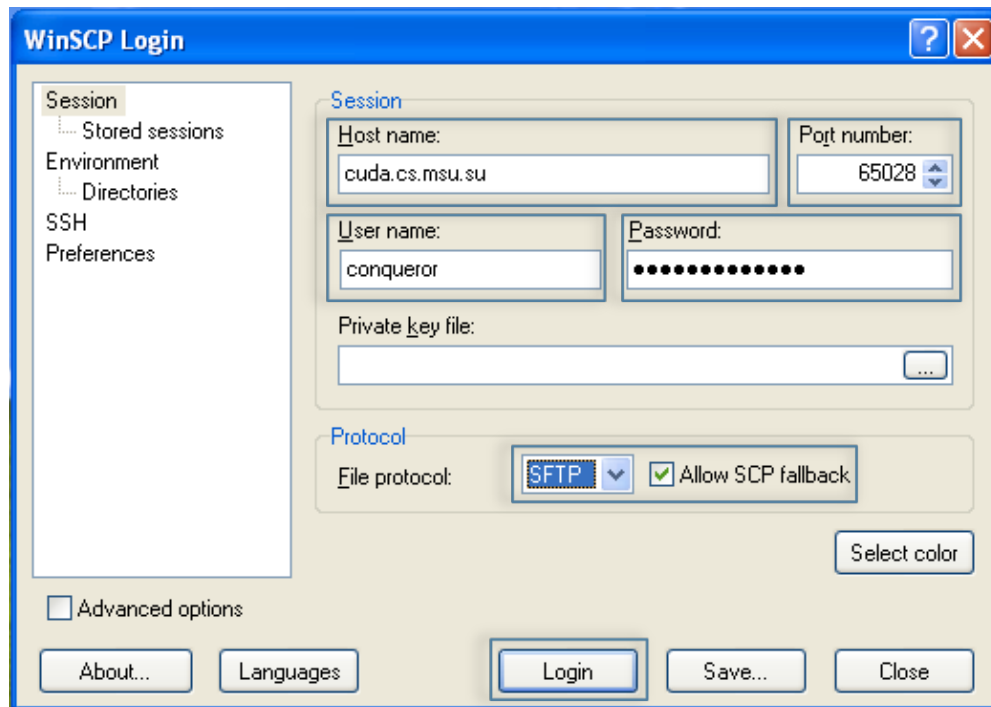
Transferring Data in Windows

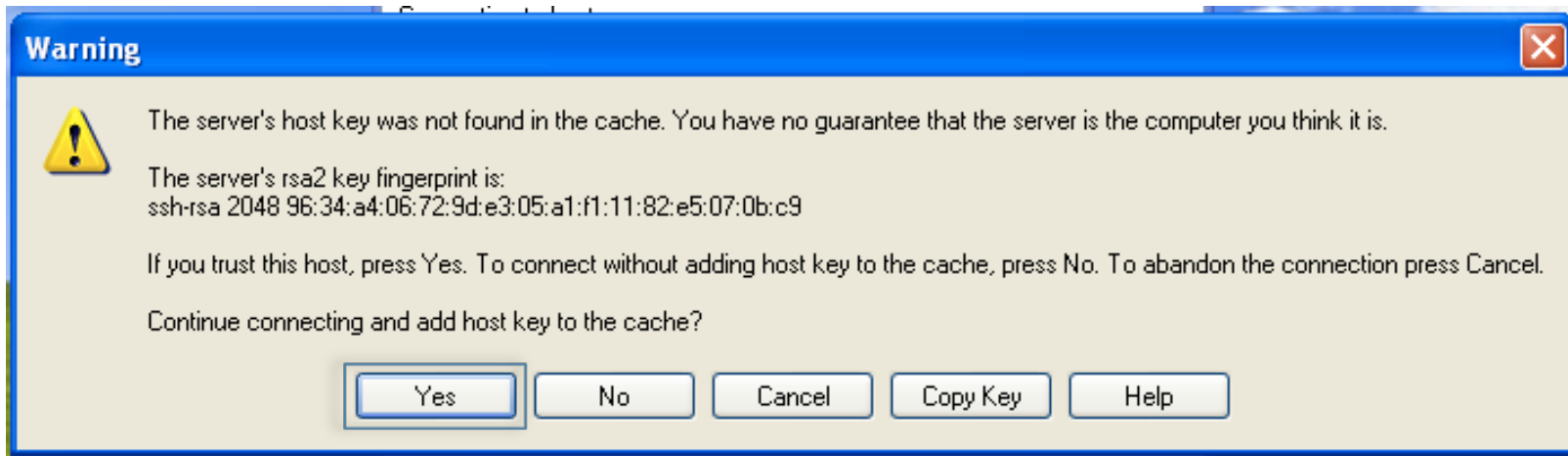
- 🌐 **WinSCP** is an open source free SFTP client, SCP client, FTPS client and FTP client for Windows.
- 🌐 Download link:

<http://winscp.net/download/winscp438.zip>



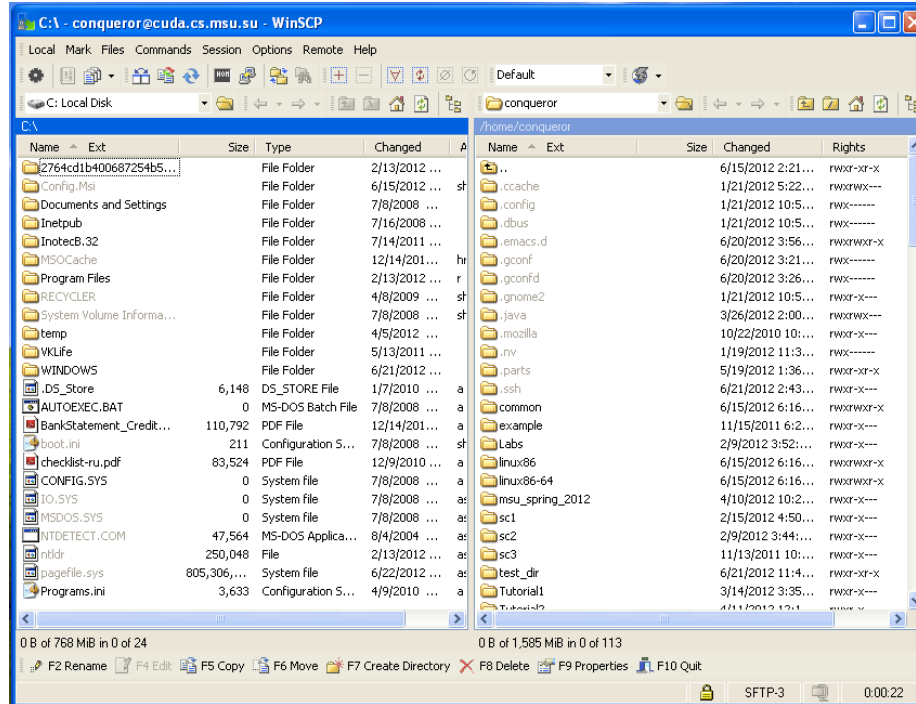
Windows - WinSCP







Windows - WinSCP



Text Editors



Vim – Vi IMproved

- **vim - Vi IMproved**, a programmers text editor
- **Enhancements:**
 - multi level undo
 - multi windows and buffers
 - syntax highlighting
 - command line editing
 - filename completion
 - on-line help
 - visual selection
- **Vim on-line help system** can be started
 - by typing **":help"** command,
 - or by pressing **<HELP>** key or **<F1>** key instead.



Vim – General Modes

- **Normal** – For navigation and manipulation of text.
 - This is the default mode.
 - **To switch to Normal mode** – type **<ESC>**
- **Insert** - For inserting new text.

From the Normal mode

 - **To append after cursor** – type **<a>**
 - **To insert before cursor** – type **<i>**
 - **To append at end of line** – type **<A>**
 - **To insert at beginning of line** – type **<I>**
- **Visual** - For navigation and manipulation of text selections, this mode allows you to perform most normal commands, and a few extra commands, on selected text.
 - **To switch to Visual mode** - from Normal mode type **<v>**
- **Command-line** - For entering editor commands.
 - **To switch to Command-line mode** - from Normal mode type **<:>**
 - **To exit saving changes** – type **<wq!> <Enter>**
 - **To exit without saving changes** - type **<q!> <Enter>**



Vim – Basic Commands

⦿ Moving around:

- ⦿ `<h>` moves the cursor one character left
- ⦿ `<j>` moves the cursor one character down
- ⦿ `<k>` moves the cursor one character up
- ⦿ `<l>` moves the cursor one character right

⦿ Deleting (Normal mode):

- ⦿ `<x>` deletes one character
- ⦿ `<dw>` deletes one word
- ⦿ `<dd>` deletes one line

⦿ Selecting, Cutting, Copying and Pasting (Visual mode):

- ⦿ **To select a text** - enter Normal mode, move the cursor to the first position of the text, enter Visual mode, and move the cursor to the last position of the text
- ⦿ **To cut selected text** – type `<x>`
- ⦿ **To copy selected text** – type `<c>`
- ⦿ **To paste selected text** after the position of the cursor – type `<p>`

⦿ Undo and Redo (Normal mode):

- ⦿ **To undo last change** – type `<u>`
- ⦿ **To redo last undone change** – type `<.>`



MC – Midnight Commander

- If Vim is too complicated, use **MC** instead!
- **The Midnight Commander (MC)** is a directory browser/file manager for Unix-like operating systems with built-in text editor.

Basic functional keys:

- <F1> - help
- <F2> - user menu
- <F3> - view
- <F4> - edit
- <F5> - copy
- <F6> - move
- <F7> - new dir
- <F8> - delete
- <F9> - MC menu
- <F10> - quit

Compiling and Running



The following compilers are installed on Tesla-CMC:

- GCC 4.5.1
- OpenMPI 1.4.3 and 1.5.3
- NVCC CUDA Toolkit 4.0 and 4.1
- PGI 12.5

Compiling programs: `compiler_name [options] filename`

`compiler_name ::= gcc | gfortran | mpicc | mpic++ | mpif90 | nvcc
| pgcc | pgc++ | pgfortran`



- OpenMP programs:
 - `./openmp_pr [arguments]`
 - `$OMP_NUM_THREADS` must be set first!
- MPI programs:
 - `mpirun -np number_of_MPI_processes mpi_pr [arguments]`
- CUDA programs:
 - `./cuda_pr [arguments]`



<http://www.parallel-computing.pro>

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Thank you! 😊