

# Setup for Lab Session

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[Lab System Specs](#)

[Preparation](#)

[WinSCP - edit and transfer files](#)

[Putty - ssh connection](#)

[Intel parallel-studio-xe](#)

## Lab System Specs

Cluster:

- The 'Tornado' supercomputer of the South Ural State University  
<http://supercomputer.susu.ac.ru/computers/tornado/>
- Queues configuration: <http://supercomputer.susu.ac.ru/users/support/>
- Support (request tracker): <https://rt.hpc.susu.ac.ru>
- Some hardware details in table below:

The number of computing nodes / processor / coprocessor / processor cores:	480/960/384/29184
Type of processors	Intel Xeon X5680 (Gulftown, 6 cores by 3.33 GHz) — 960 units.
Type of coprocessors	Intel Xeon Phi SE10X (61 core by 1.1 GHz) — 384 units.
RAM	16.9 TB
SSD	300 TB
Interconnect	InfiniBand QDR (40 Gbit/s)
Control network	Gigabit Ethernet
Peak performance	473.6 TFlops

LINPACK performance	288.2 TFlops
OS	Linux CentOS 6.2

- Intel® Composer XE 2013
- Intel® VTune™ Amplifier XE 2013

## Preparation

Get username and password from the teacher. Connect to the cluster by ssh:

```
# ssh username@tornado.hpc.susu.ac.ru
```

Type your login and password.

You login on the master node of the cluster. From this node you should connect to node where you will be compile and run programs. Allocate node with Xeon Phi™:

```
# salloc -N 1 --reservation=sca
salloc: Granted job allocation 83350
```

Check which node with Xeon Phi™ was allocated:

```
# squeue
```

Output of command contains a host name and its status, for example:

```
# squeue
#
```

This means that node with name 'hostname' was allocated, and Xeon Phi™ hostname 'hostname-mic0'.

Note that you can freely connect to host and Xeon Phi™ via ssh, but you can't build programs on Xeon Phi™. Therefore firstly you should connect to host:

```
# ssh hostname
```

For connect to Xeon Phi type this command:

```
# ssh hostname-mic0
```

or

```
# ssh mic0
```

Before finish job on the cluster you should cancel job allocation by `scancel` command, for example:

```
# scancel 83350
```

Where `83350` is job id returned by `squeue` command.

The current working directory should be `~`, your home directory. Home directory on the host is mounted with NFS onto the identical path on the Intel® Xeon Phi™ and all hosts of the cluster.

Before starting any lab exercises do the following. This must be done each time a new terminal window is opened:

- **\$ source /opt/software/intel/composerxe/bin/compilervars.sh intel64**  
(adds Intel compilers to **\$PATH** – just call `icc` or `icpc` or `ifort`)
- **\$ source /opt/intel/vtune\_amplifier\_xe/amplxe-vars.sh**  
(adds Intel® VTune™ Amplifier XE to **\$PATH** – just call `amplxe-gui`)
- **\$ export PATH=\$PATH:/opt/intel/mic/bin**  
(adds MPSS tools to **\$PATH**)

The other important assumption for this lab is that the host directory `/opt/software/intel` is mounted with NFS onto the identical path `/opt/software/intel` on the Intel® Xeon Phi™ coprocessor.

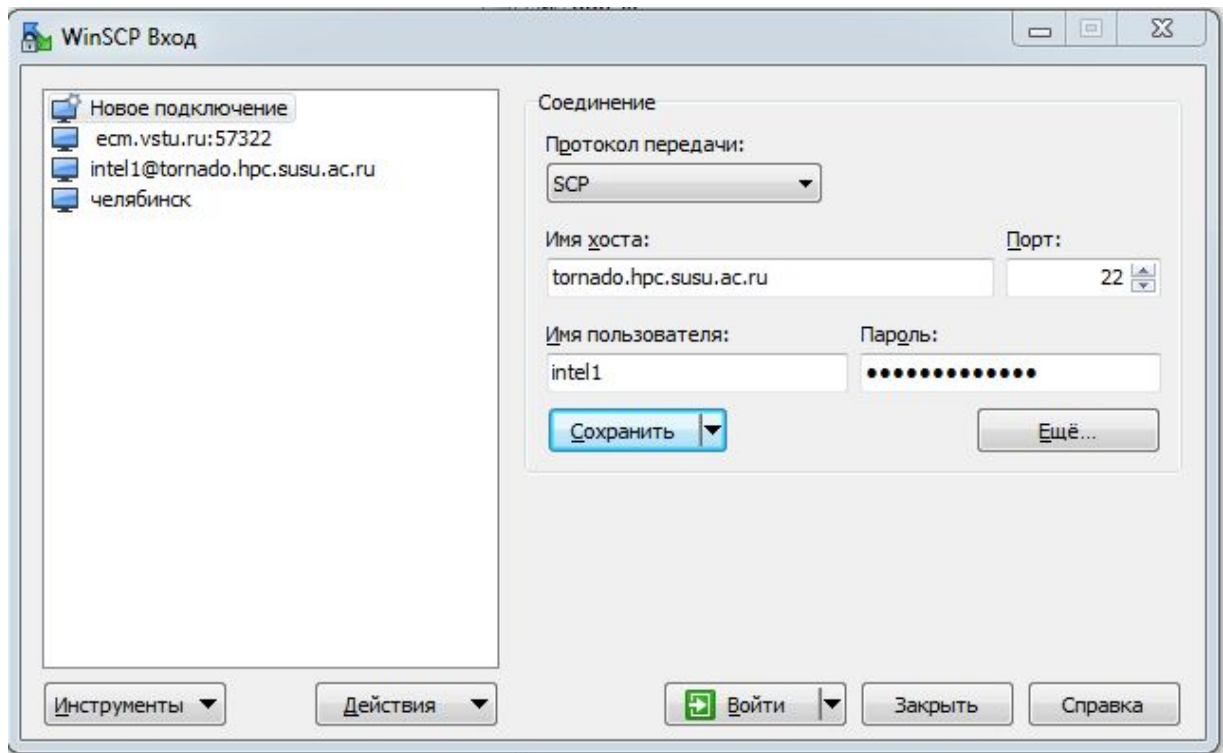
## WinSCP - edit and transfer files

If you are not experienced user in Linux, we strongly recommend use WinSCP tool for observe home folder on cluster and transfer files to cluster.

Download WinSCP from home page <http://winscp.net/eng/download.php>

Add new connection **Connetction -> New connection....** :

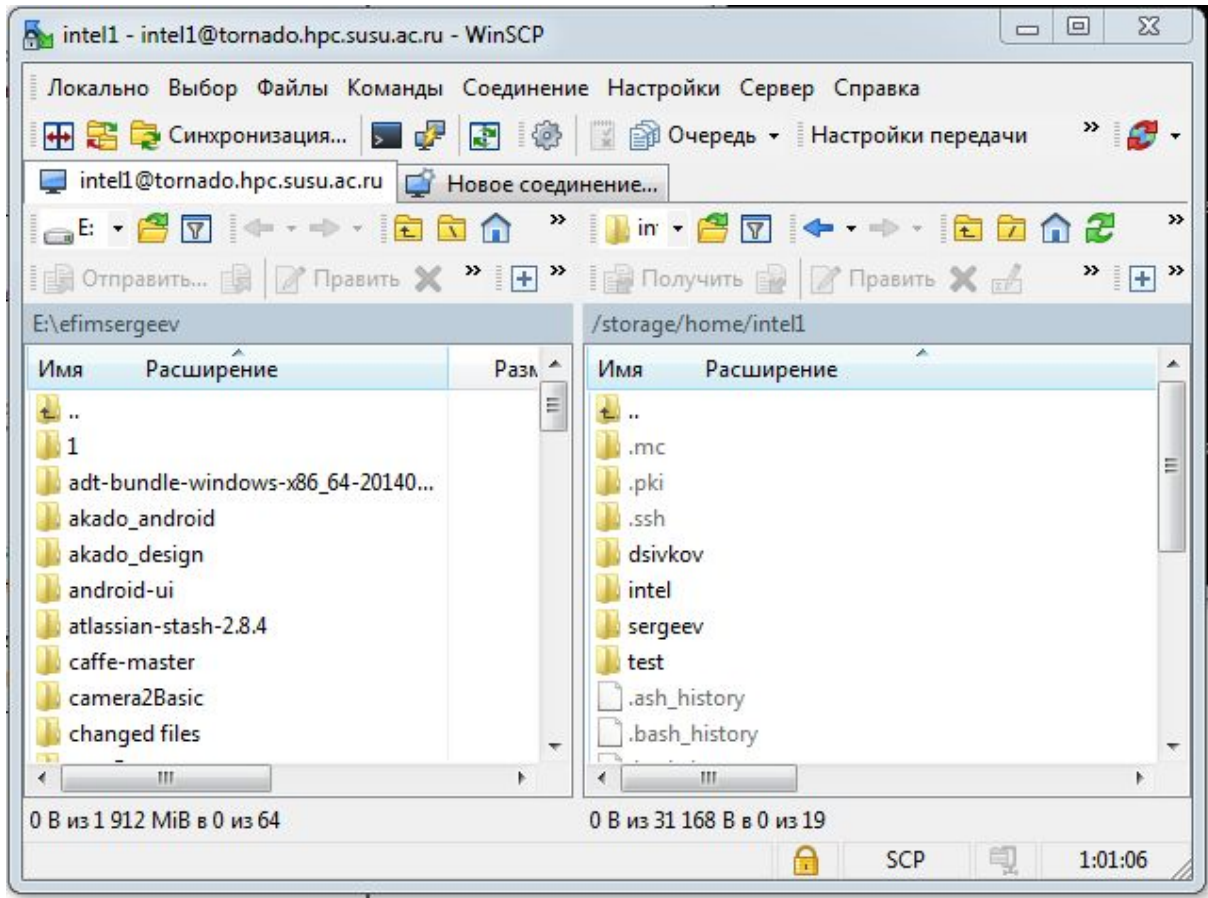
- Use host name **tornado.hpc.susu.ac.ru**
- Use protocol **SCP**
- Use port **22**
- Use your own user name and password



Connect to your new conection, and input your password if required.

After a successful connection to one of the panels appear user's home directory on a cluster. You can copy files between any directory on your machine, and home directory on a cluster.

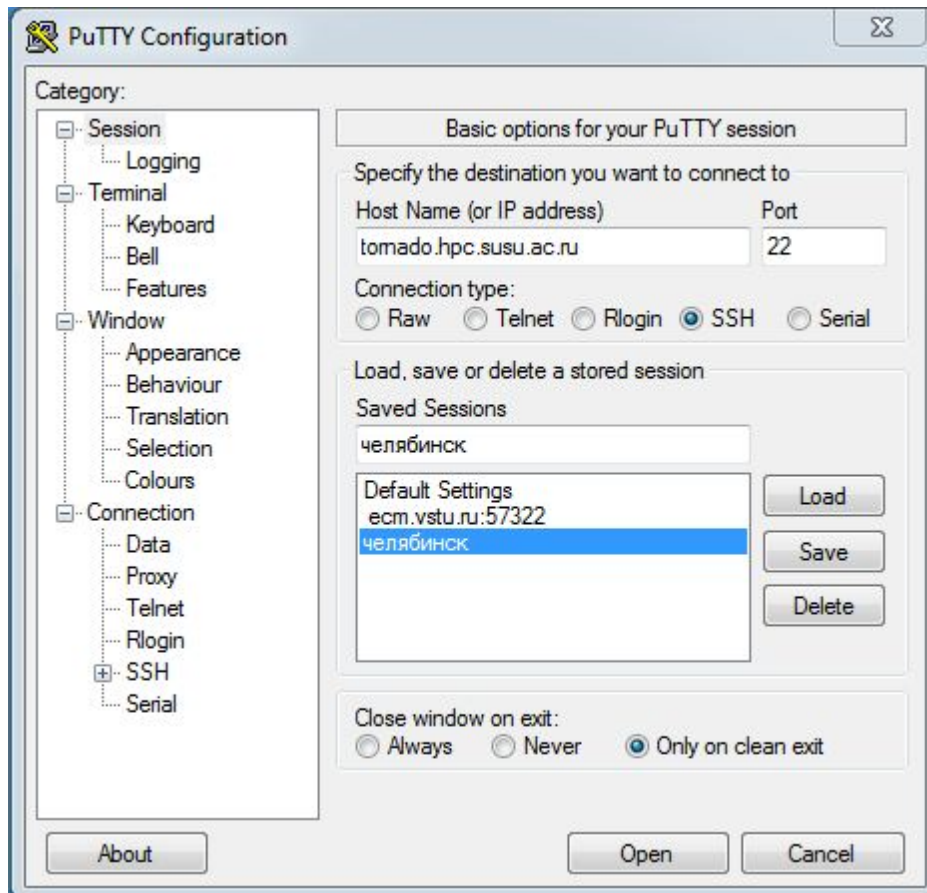
Any file in the home directory can be edited by F4 command, be sure that favorite editor selected.



## Putty - ssh connection

You can use any ssh program for connection to cluster. But if you don't have one we strongly recommend use Putty.

1. Download Putty from <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>
2. Run putty.exe
3. Enter the ip address, port and connection name. Click "Save" button



4. Click "Open" button and run ssh session

## Intel parallel-studio-xe

- 1) You should setup tools on your Windows machine:
  - a) Intel® C++ Composer XE 2013 or higher.
  - b) Intel® Vtune™ Amplifier XE 2013 or higher.
- 2) Go to the <https://software.intel.com/en-us/intel-parallel-studio-xe>
- 3) Select Try&Buy options
- 4) Click by FREE 30-DAY EVALUATION Intel® Parallel Studio XE Cluster Edition for Windows
- 5) Follow instructions for download evaluation copy
- 6) During educations we will use following tools:
  - a) **C:\Program Files (x86)\Intel\Composer XE\bin\loopprofileviewer.jar**

**b) C:\Program Files (x86)\Intel\VTune Amplifier XE\bin32\amplxe-gui.exe**