# Using R on the LSHTM High Performance Computing (HPC)

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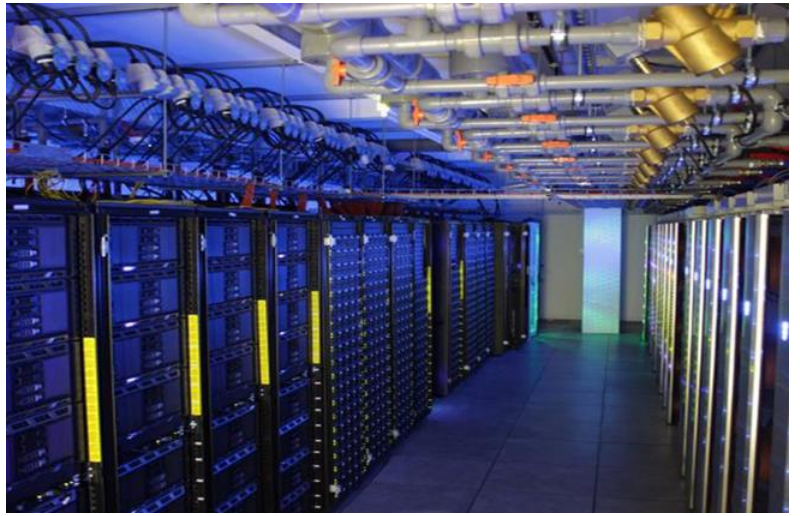
# Objectives

- Brief overview of the LSHTM HPC
  - What is the HPC?
- Getting started
  - LSHTM wiki page
  - Joining
  - Login: WINSCP & PuTTY
- Example using R
- Other issues
- Contacts

# Brief overview of the HPC

- Also know as ‘Cluster’, ‘super computers’ - used interchangeably
- Combined computing power to deliver higher performance
- Performance and processing speed exceeds a typical desktop computer
- Used for computationally intensive tasks
  - Need large memory
  - Large datasets
  - Repetitive tasks
  - Not very useful for small tasks!
- Supports a variety of software (Stata, R, Python)

Accessible memory per user = 8GB



Accessible memory per user = 200 GB

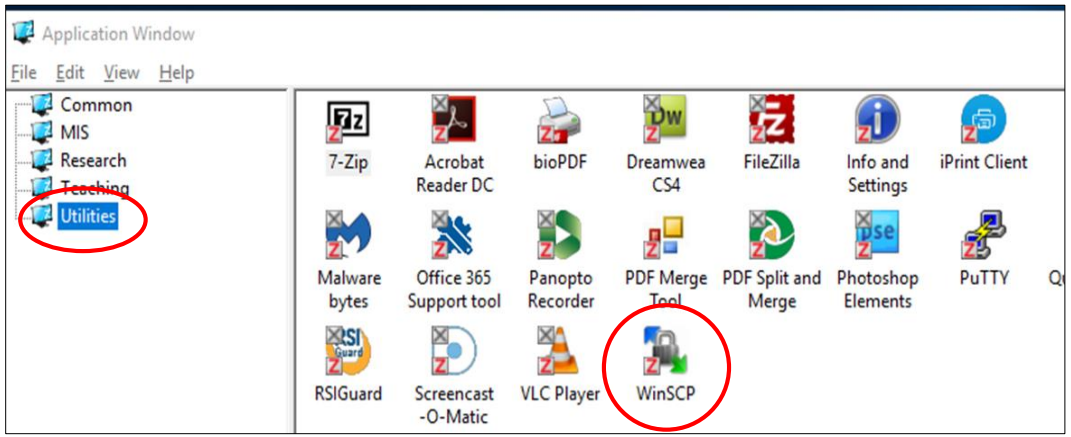
# Getting started – for Windows only

LSHTM HPC wiki page
http://wiki.lshtm.ac.uk/hpc/index.php5/Main_Page

**To join:**
Send an email to the ITS Helpdesk (servicedesk@lshtm.ac.uk) with name, username, department, brief description of proposed work on cluster, software requirements

**To log in:**
A new user account on the HPC + a new home directory
Use your usual LSHTM username and password
Copy files to and from HPC using WinSCP

# Login in to HPC – Windows example

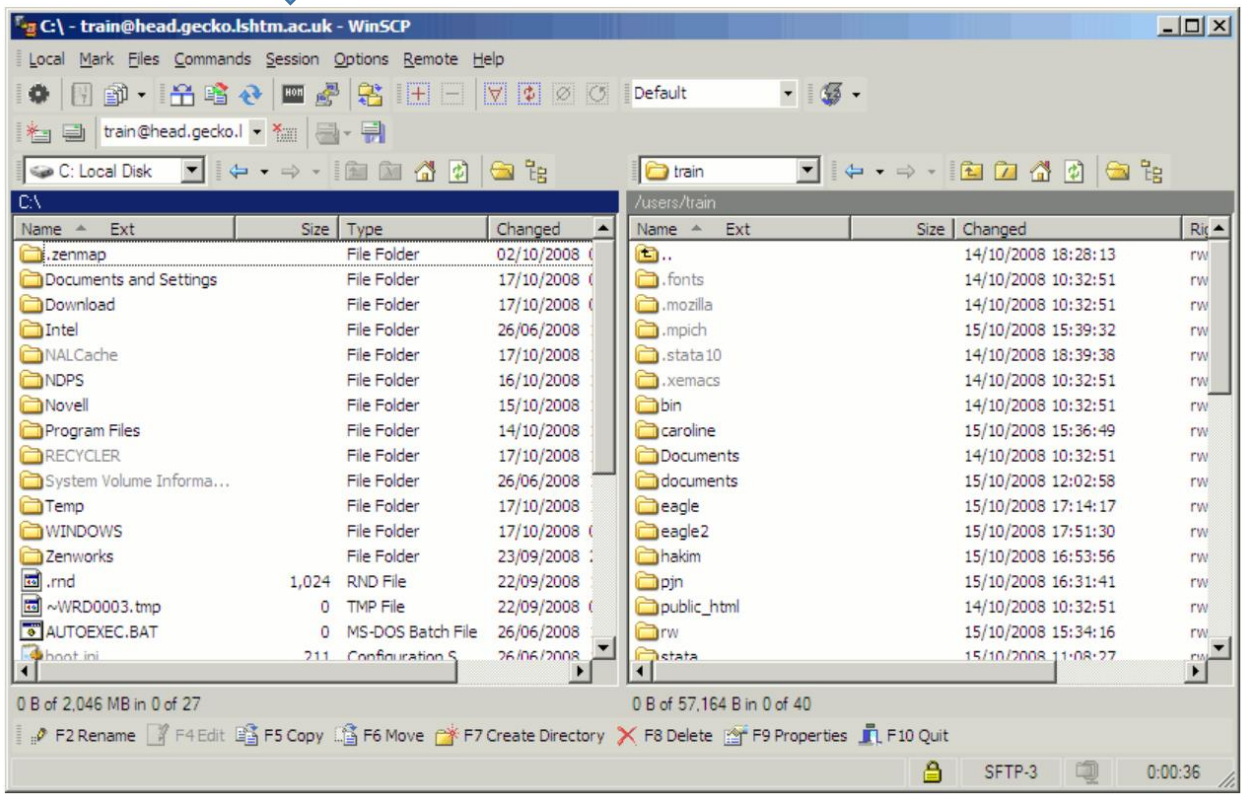




**hpclogin.lshtm.ac.uk**

Your local drive

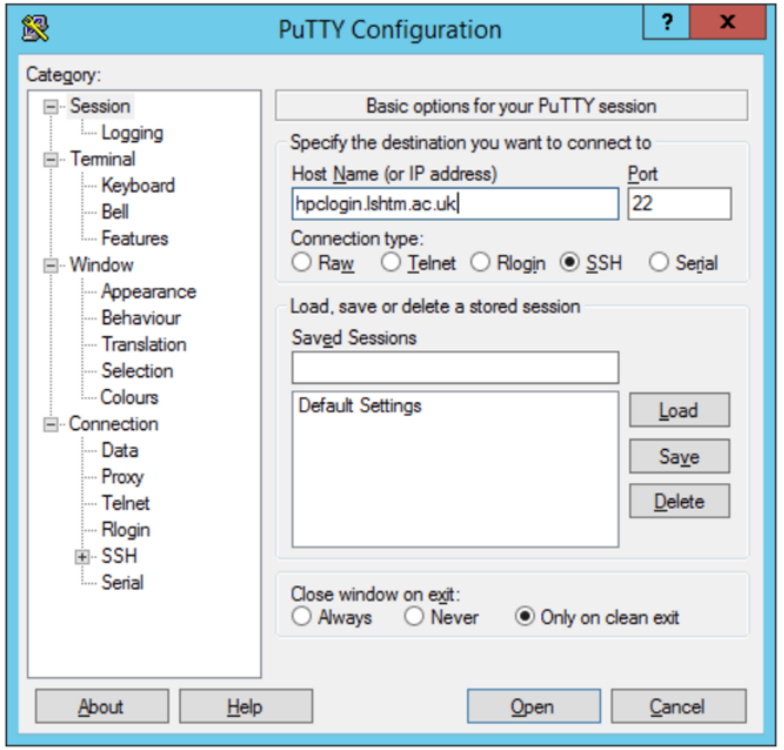
Your HPC drive



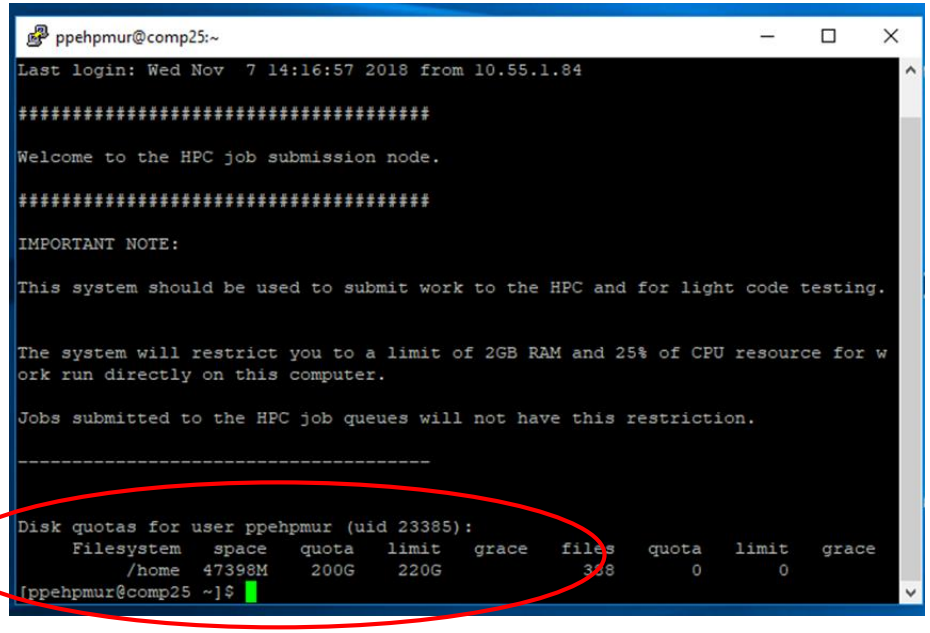
# Getting started

**To submit a job:**

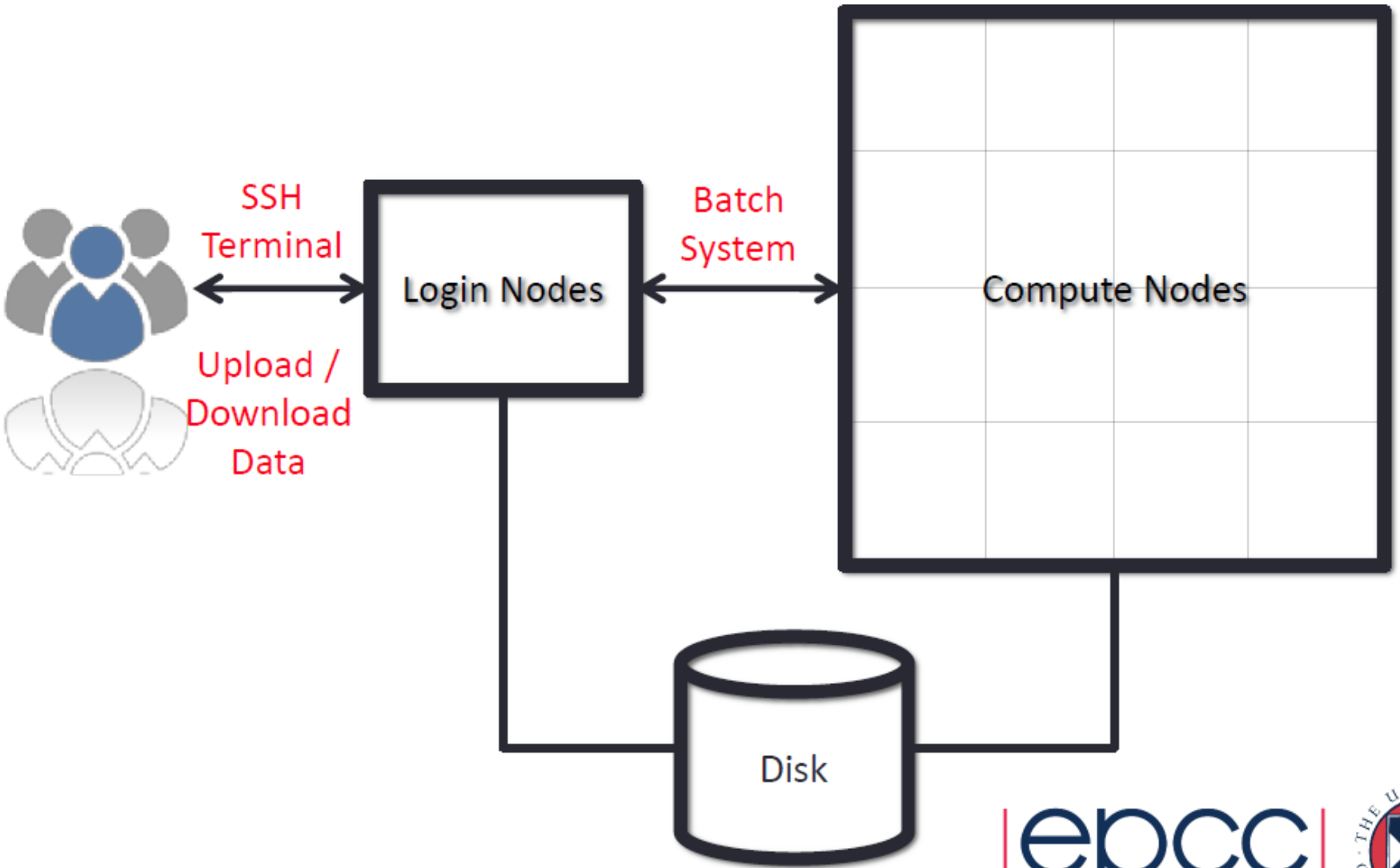
- PuTTY software provides remote terminal access to the HPC
- Check LSHTM wiki page on how to configure PuTTY
- Once again use your usual LSHTM username and password







# Typical HPC system layout

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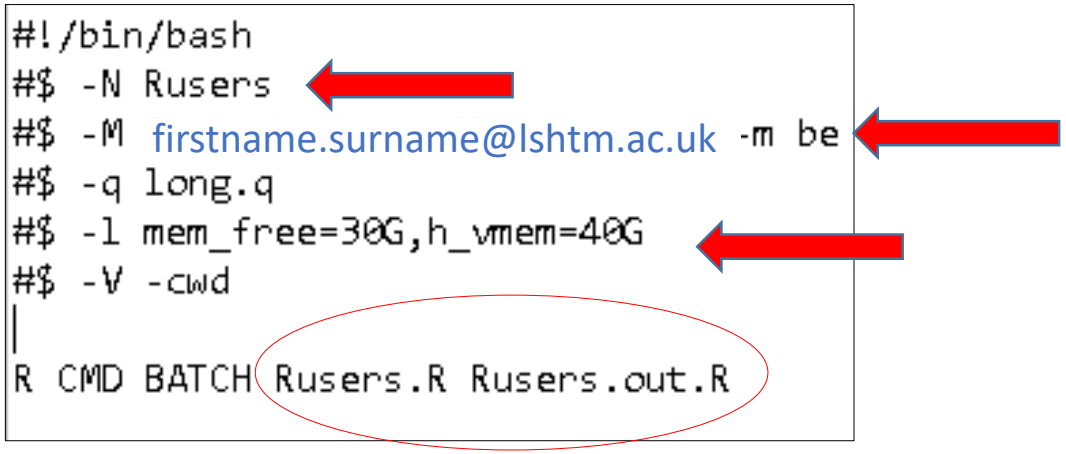
# Brief example

- Preparing a task/job
  - Transfer files to your new HPC drive
  - Check that the job works …run part of the job interactively or on own PC

- Brief description of my task
  save R scripts on HPC drive

- Submitting a “simple” job
  - batch/ shared system
  - use a ‘.txt file’ – specify required memory
  - running the script on PuTTY
  - example of script –
    running a job = *qsub myjob.txt*
    every job is issued a jobID
    deleting a job = *qdeljobID*



# Brief example using R

- Email notifications
  - Job started
  - Job completed

```
Job 3129103  (Rusers) Started
User      = ppehpmur
Queue     = short.q
Host      = comp34.cluster
Start Time = 11/28/2018  22:12:22
```

```
Job 3129102  (Rusers) Complete
User          = ppehpmur
Queue         = short.q@comp35.cluster
Host          = comp35.cluster
Start Time    = 11/28/2018  18:28:43
End Time      = 11/28/2018  18:57:10
User Time     = 00:24:12
System Time   = 00:04:14
Wallclock Time  = 00:28:27
CPU           = 00:28:27
Max vmem      = 62.127G
Exit Status   = 1
```

- Submit one jobs with multiple tasks
  E.g. process 5 tasks using 5 different data files
  Run job on one textfile '.txt'

```
#!/bin/bash
#$ -N merge_hpc
#$ -M Peninah.Murage@lshtm.ac.uk -m be
#$ -q short.q
#$ -l mem_free=90G,h_vmem=100G
#$ -t 1-5

R CMD BATCH merge_hpc${SGE_TASK_ID}.R merge_hpcout${SGE_TASK_ID}.out.R
```

-t 1:5 specifies the number of sequential tasks
The job is submitted in 5 tasks and will create 5 R output files

- Parallel processing?

# Other issues

- Queuing
  show all your on jobs, *qstat*
  other jobs on queue *qstat -u '*'*
  details of specified job *qstat -j jobid*

- Installing packages
  Login to ‘PuTTY’ and run R interactively

```
R
```

Install Library from Cran

```
install.packages('packageName')
```

You should be prompted to choose a cran repository mirror. If you have problems choosing, you

```
install.packages('packageName', repos="http://cran.ma.imperial.ac.uk/")
```

- Loading different versions of R
  Presently not possible at LSHTM!
  See University of Sheffield example here

http://docs.hpc.shef.ac.uk/en/latest/sharc/software/apps/R.html

- Service desk and LSHTM wiki page contacts
  Steven Whitbread (Datacentre and Infrastructure Manager)