User Guide:
How to access and use the Nimbus HPC cluster

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Pre-requisites

1. **University of Bath VPN**
   a. A VPN is required to connect to Nimbus.
   b. Instructions for setting up a VPN are found on the University of Bath website, **Bath_VPN.**

2. **Resource Allocation**
   a. To be able to access the Nimbus environment a user must be added to one Agresso project.
   b. This is done through the user's Principal Investigator (PI) who will need to request that Agresso/Finance team set up a new account.

3. **Bash and Slurm**
   a. To access Nimbus the user should be familiar with bash scripts and Linux command line.
   b. The user should be familiar with job submission scripts using SLURM.

Access to Nimbus can be achieved in one of two ways

SSH

Through a terminal application on a local device, ie Windows Power Shell, MobaXterm, or Putty.

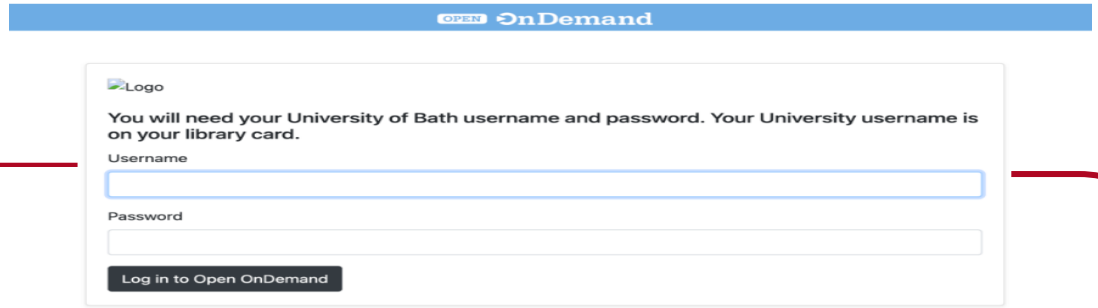
`ssh username@nimbus.hpc.bath.ac.uk`

Open On Demand service (OOD)

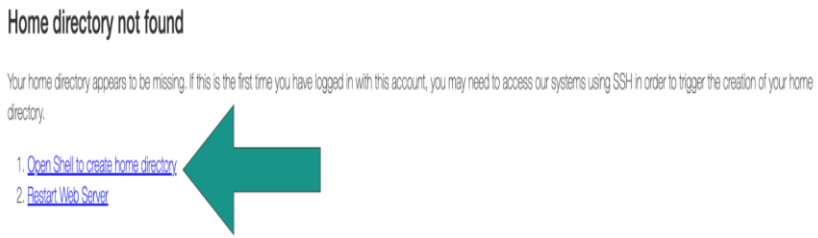
OOD provides a web-based portal to Nimbus including a Graphical User Interface (GUI), and connect via ssh, **Bath_OOD.**

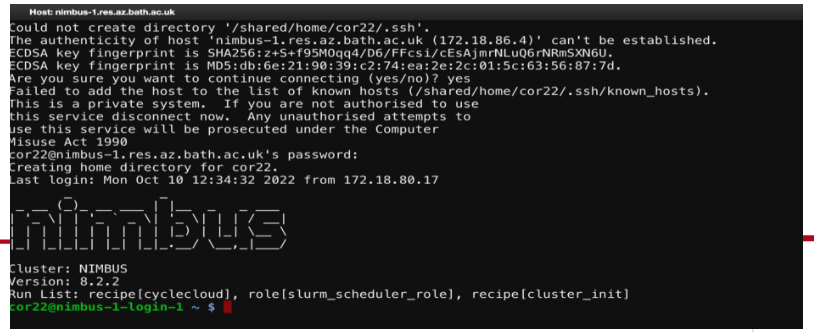
Access to Nimbus using Open On Demand, OOD

Navigate to **Bath_OOD**

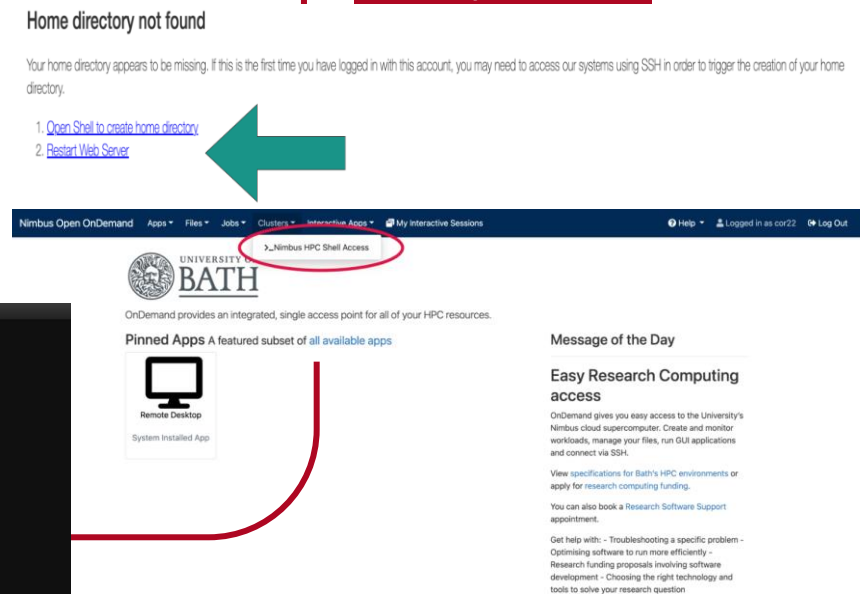


If your home directory doesn't exist





If your home directory already exists



Nimbus Infrastructure: what instance type is suitable for my tasks?

- Nimbus provides users access to a number of different compute instances.
- Once a user is logged into Nimbus, sinfo command line will list all the existing partitions.
- The instances follow a naming convention, [pricing tier]-[instance type]-[number of cpu]. Ie spot-fsv2-32: spot priced fsv2 with 32 CPUs per node.
- The instance types currently available in Nimbus:

Instance type	CPU model	vCPUs	GPU model	vGPUs	Used for
fsv2	Intel skylake	2, 4, 8, 16, 32, 48, 64, 72	-	-	Apps driven by compute: HPL, ORCA, etc.
hb	AMD Epyc Naples	60	-		Apps driven by memory bandwidth: Ansys, OpenFOAM, etc.
hbv2	AMD Epyc Rome	120	-		
hbv3	AMD Epyc Milan	120	-		
hc	Intel skylake	44	-		Apps driven by compute: HPL, ORCA, etc.
ncv3	Intel Broadwell	6	Tesla v100	1	n* stands for NVIDIA. GPU accelerated workloads and visualisation sessions
ncv3	Intel Broadwell	12	Tesla v100	2	
ncv3	Intel Broadwell	24	Tesla v100	4	
ncv3r	Intel Broadwell	24	Tesla v100	4	
ndv2	Intel skylake	40	Tesla v100	8	

What are the different modules installed in Nimbus?

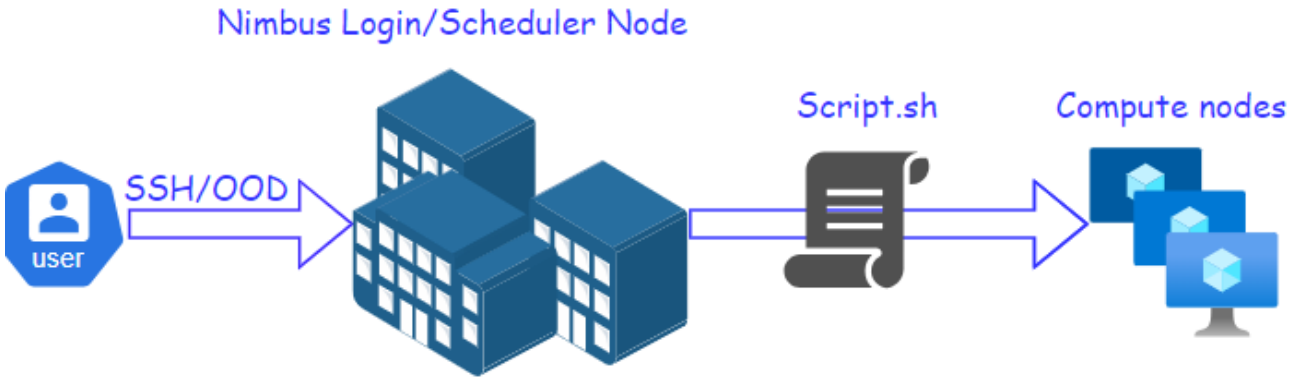
- On Nimbus system module is used to manage pieces of software and libraries.
- The user can use the commands listed below:

Command	Utility
module list	List all loaded modules
module avail	List available modules
module load <module_name>	Load a module
module unload <module_name>	Unload a module
module show <module_name>	Display information about a module
module purge	Unload all loaded modules

- Users can check the modules available from the login node.
- Users are not able to load modules or run tasks on the login node; users can only check module availability and edit Slurm scripts with the appropriate module path.

Process of submitting jobs in Nimbus

- In Nimbus, the standard procedure involves submitting jobs or simulations to the compute nodes designated for executing tasks.
- This can be done by connecting to the system using ssh or OOD and then running the Slurm script.
- Each compute node (instance) has different software available; users should check that the software is available on the instance.



Storage can be accessed at Bath_storage_options
Currently using storage is free of charge.

/home

- /home: Each user is given by default 5GB.
- /home has limited storage and is not intended for use as workplace.
- /home is primarily for logging into the system and storing credentials.
- Access this space using the command

  cd $HOME

/burstbuffer

- /burstbuffer/*/: can be used during an active Slurm session.
- /burstbuffer: users can copy, remove and transfer files to and from this space when a Slurm session is running.
- /burstbuffer: once the session expires, access to this space is revoked. Operations must complete before the session concludes.
- This option (/burstbuffer) should be used for simulations that require substantial storage.
- Access this space using the command *cd $BURSTBUFFER*

/campaign

- /campaign: each resource allocation has an associated storage located at /campaign/<resource_allocation_id>.
- /campaign: the disk quota is set by default to 50 GB for each user.
- /campaign is for storing active project files.
- Access this space using the command

  cd /campaign/<resource_allocation_id>

/XDrive

- /x/: the parts of the University Research x-drive that can be mounted on Nimbus using *source /usr/sbin/mountXDrive.sh*
- If a user plans to use this storage his PI should seek permission from the Xdrive management team.
- /x/: the parts of the University Research x-drive that can be mounted on Nimbus using *source /usr/sbin/mountXDrive.sh*

How can I transfer my files from and to my local machine using command line?

- Users can download files from the internet using wget

```
wget https://<file>.tar.xz
```

- Transfer from Nimbus to user's device using scp

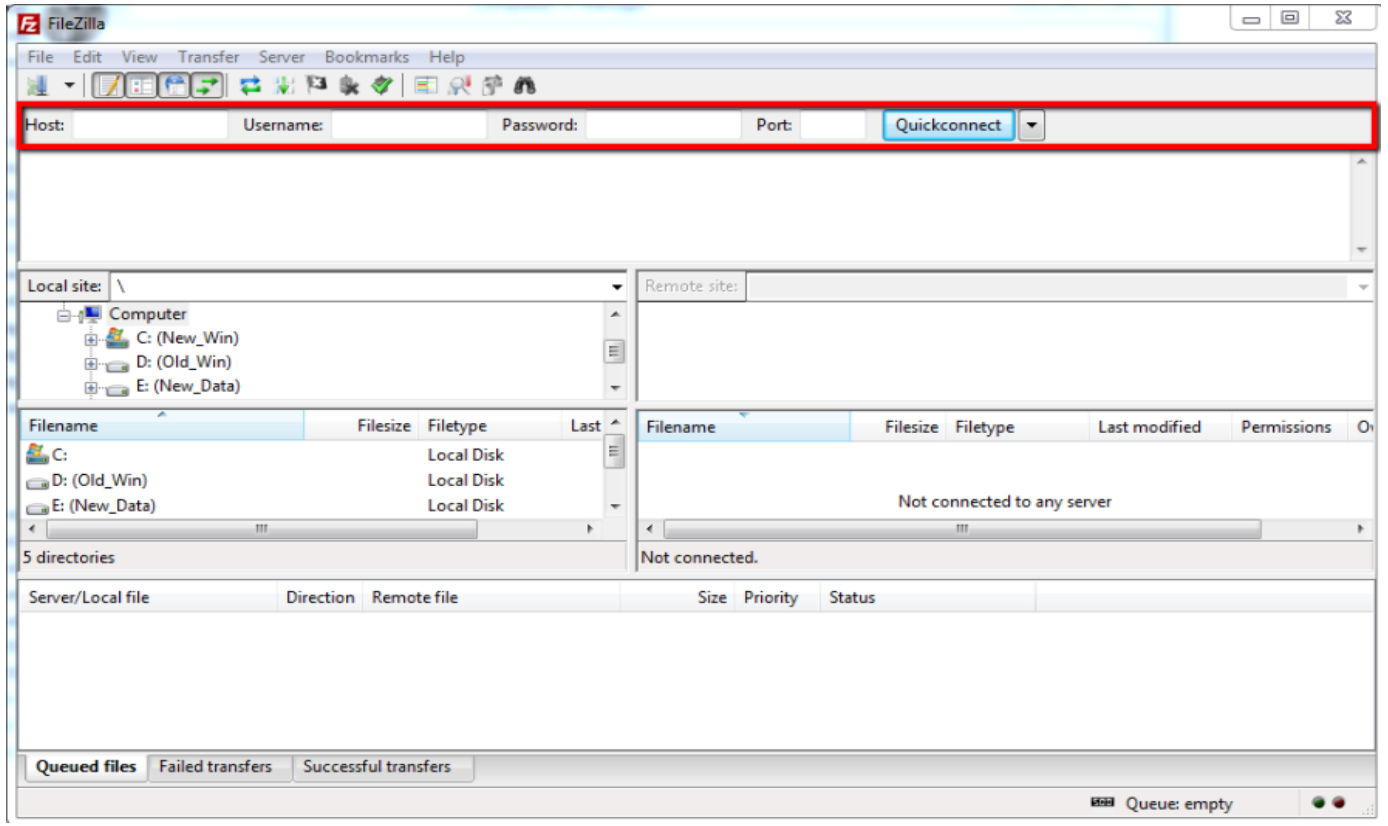
```
scp /path/to/local/file.txt
```

- Transfer to Nimbus from user's device using scp

```
scp user_id@nimbus.hpc.bath.ac.uk:/path/on/remote/device/file.txt  /path/to/local
```

How can I transfer my files from and to my local machine using FileZilla?

- FileZilla: download and install the software from the official website: Filezilla.
- Host: sftp://login.nimbus.bath.ac.uk
  a. Username: User Id
  b. Password: User password
  c. Port: leave it empty



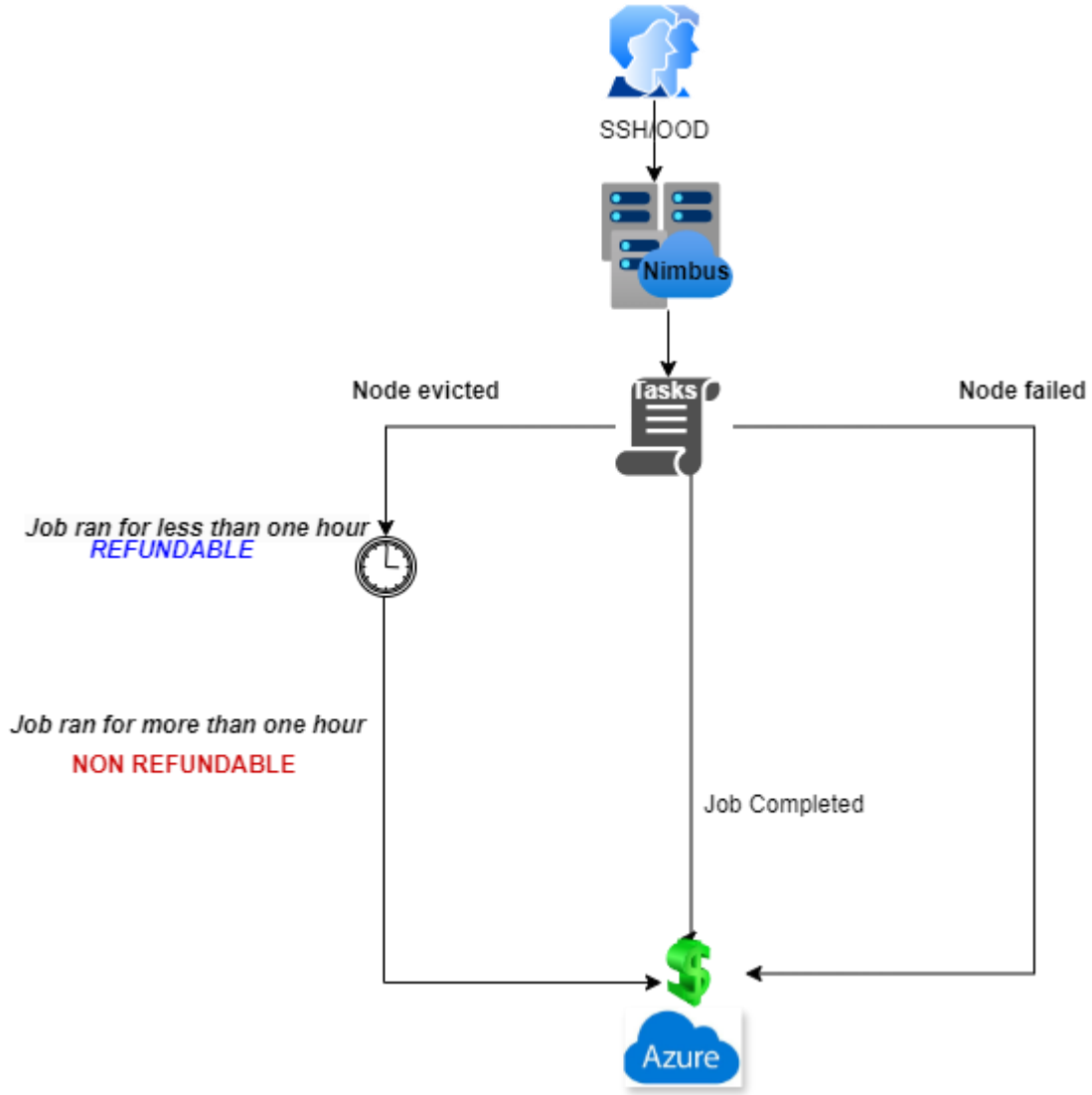
Payment process and refunding cases

- Users should use the Research Computing Cost Estimator **RCCE** to calculate compute cost.
- The payment process involves a finance check on the project balance prior to job submission:

a. Job successfully completed: amount is deduced from user's account.

b. Node evicted: the University covers this cost if the simulation time is **less than one hour**. For **more than one hour, the user will have the funds deducted from the project account**.

c. Job failure: the user will have the fund deducted from the project account.



How can I submit a ticket on TopDesk?

- The University has an HPC ‘Get support’ page.
- The user should access the support and training section via **Bath_Training_and_Support**
- Select submit a request via ‘Our TopDesk’.
- Please provide the following details to help investigate queries more efficiently:
  a. which HPC system;
  b. screenshots;
  c. details of the error;
  d. RCAM accounts;
  e. scripts;
  f. version of software.

Useful resources and URL

- **Research Computing Account Management: RCAM**
- **Accessing Nimbus**
- **Nimbus Infrastructure**
- **Slurm**
- **Compute instances**
- **Running a job**
- **Unix shell**

Review status

This document is version	1.0
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Ready for review	Khaled Mahjoubi 08/07/24
Technical review sign-off	Roberto Scipioni 08/07/24
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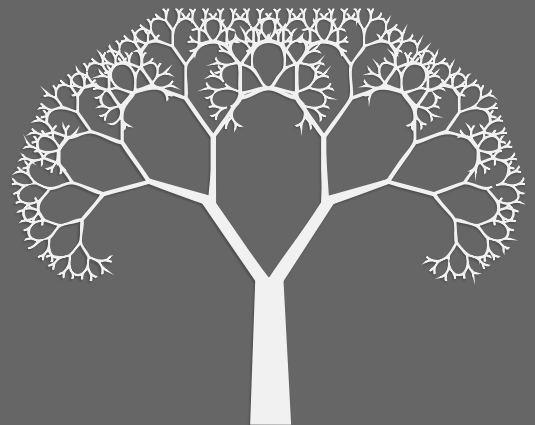

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