Orientation

Reseach Support Center
Computing Support

Team Members

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What we do

- Support CS Department faculty, staff, and students accounts
- install and deploy software on CS servers and desktops
- manage servers and clusters of servers
- manage the Dept network
- manage Dept storage
- resolve your problems via helpdesk tickets

For more information see: www.cs.virginia.edu/computing

We don't ...

- manage email services
- manage mailing lists
- resolve NetBadge, Collab, or SIS issues

The main UVA ITS organization supports these functions.

Submit issues to 4help@virginia.edu

For more information see: https://its.virginia.edu/helpdesk

And we don't ...

- manage phones
- room access
- facilities requests
- environmental requests (too hot/too cold)
- department mailing lists

For these issues, email cs-office@virginia.edu

Help desk tickets

For computing support issues, please email cshelpdesk@virginia.edu

You will receive an auto-response and ticket number on the subject line

These tickets help us track issues and resolutions

Always reply to the original email thread, do not modify the subject line

Your CS Dept account

- Your CS Department account has the same userid (ex "*pgh5a*") as your NetBadge (Collab, etc.) account, *but a different password*.
- Faculty and graduates students get accounts automatically. Undergraduates can request accounts to be created for them.
- Your CS account allows you to login to department resources (servers, desktops, etc.)
- The account comes with a home directory and associated storage
- The account allows you to host web content by putting content in your public_html directory. This content is then 'scraped' by our web server and served publically.

Your CS account

- When your account is created you will receive an email with the subject line "*UVA Computer Science New Account Information*".
- The email will include your account name and a temporary password that needs to be changed upon first login.
- Follow the instructions in the email, and save the email. It has important links to information that will make your use of computing resources easy and productive.

Your CS account

- Your CS account provides access to general purpose and specialized servers.
- Specialized servers include those with Graphical Processing Units (GPUs), very large memory, non volatile memory, FPGAs, etc.
- Your home directory will be accessible from any system in CS
- When you leave UVA, your files will be preserved for one month
- Nightly backups are taken and retained for one month, so if you accidentally remove a file, it can be restored.

Your CS account

- If you forget or want to change your password, you can do so online with no helpdesk ticket needed by going to:

  www.cs.virginia.edu/PasswordReset

Computing Resources

- the *portal* cluster is the entry point to the computing environment. It is a load balanced cluster of 4 servers.
- the NX cluster provides a NX/Nomachine linux graphical desktop from a PC, Mac, or Linux laptop or desktop.
- the *gpusrv* cluster provides 16 general purpose GPU servers, each with 4 GPUs.
- there are four servers that allow non privileged users to create Docker containers
- there are ~120 additional servers providing large memory sizes, GPUs, non volatile memory, etc. Users schedule jobs on them, which will provide exclusive use of the server.
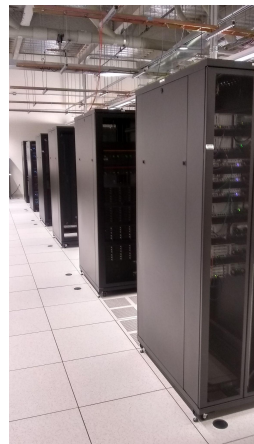
Computing resources

- Additional computing resources can be accessed via the job scheduler (SLURM)
- A job script specifies the number of cores, memory, and other requirements, and the scheduler will find an appropriate node and start the job
- You can submit a job from the *portal* nodes
- There is a direct job option that doesn't require a job script
- For a list of available resources, see: http://www.cs.virginia.edu/wiki/doku.php?id=compute_resources
- For information about the job scheduler, see:http://www.cs.virginia.edu/wiki/doku.php?id=compute_slurm

slurm
workload manager

Operating Systems

- Most major operating systems are found running in the Dept
- We officially support
  - CentOS Linux on servers
  - Ubuntu Linux on desktops
  - Windows 10 on desktops, laptops
  - Mac OSX on desktops
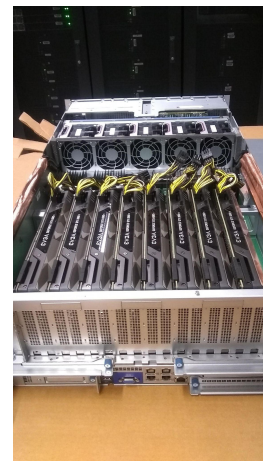
Linux support on servers

- All research servers run CentOS Linux
- Common software (python, torch, cuda, matlab, etc.) is available via the *'module'* command. You do not need to load it yourself.
- multiple versions of most packages are available.

The module command

```
[pgh5a@portal02 ~]$ module avail

-------------------------- /sw/centos/Modules/systemModfiles --------------------------
slurm-client          slurm-client-testing

-------------------------- /sw/centos/Modules/modulefiles --------------------------
afl                   cudnn-7.1.1          lammps               pgi-llvm
altera_pro            cudnn-7.3.1          libav                pgi-nollvm
anaconda3             cudnn-7.5.0          libtorch             php
anaconda3-2019.10     cudnn-7.6            libtorch-1.3.1       php7
antlr                 cudnn-8.1.1          lua                  php7.1.10
atom                  dmd                  lua-5.3.4            python
boost                 dmd-2.088.0          lxd                  python2
boost-1.67.0          doxygen              modelsim_ae          python2.7.15
boost-1.77.0          eclipse              modelsim_ase         python3
clang-llvm            emacs                nano                 python3.6.2
clang-llvm-6.0.0      fio                  nccl                 python3.8.0
clang-llvm-7.1.0      gcc                  nccl-10.0            pytorch-1.9.0
cmake                 gcc-11.2.0           nccl-9.2             qsys
cmake-3.10            gcc-5.5.0            netdata              quartus
cmake-3.15            gcc-6.3.0            nios2eds             R
cs6620                gcc-7.1.0            nvtop                rstudio
cuda-toolkit          gdb-8.1              openmpi              ruby
cuda-toolkit-10       ghex                 openmpi2.1.5         ruby2.5.1
cuda-toolkit-10.1     git                  openmpi4.0.0         sbt
cuda-toolkit-11.0     gradle               openmpi4.0.2         scala
cuda-toolkit-11.1     hashcat              parallel             sqlite3
cuda-toolkit-11.2.2   java                 perl                 storm
cuda-toolkit-8.0      java11               perl-5.26            svn
cuda-toolkit-9.0      java8                perl-6               torch
cuda-toolkit-9.2      java8u161            pgi-2020             verilator
cudnn                 java9                pgi-20.4
cudnn-7.0.5           java9.0.4            pgi64

-------------------------- /sw/linux-any/Modules/modulefiles --------------------------
ant                   cplex-cpoptimizer    go                   scons
antlr                 cplex-opl            matlab               scons-3.0.1
apktool               cplex-studio-all     matlab-2020a         tmux
cplex                 dmd                  ripgrep              tmux-2.7
cplex-concert         dmd-2.088.0          sbt                  vscode
```

The module command

- Type '*module avail*' to see available modules
- Type '*module load <module>*' to load the module
- ex. "*module load python*", "*python*"

Linux support on desktops

- Ubuntu 20.04 and 21.04 are the standard supported versions of Ubuntu.
- Ubuntu is only loaded on a desktop if requested.
- Dual boot of Windows and Linux is not supported.

Windows OS support

- Desktop systems come with Windows 10 by default
- Users can be assigned administrator privileges if requested
- Windows desktops are scanned monthly for malware, viruses, etc.
- Windows desktops can be joined to the CS Dept domain, so home directories are automatically available.

Mac OSX support

- Macs are supported ad-hoc
- not joined to the CS domain
- not setup for sharing of home directories
- users can use SAMBA to mount home directories and to print

The CS network
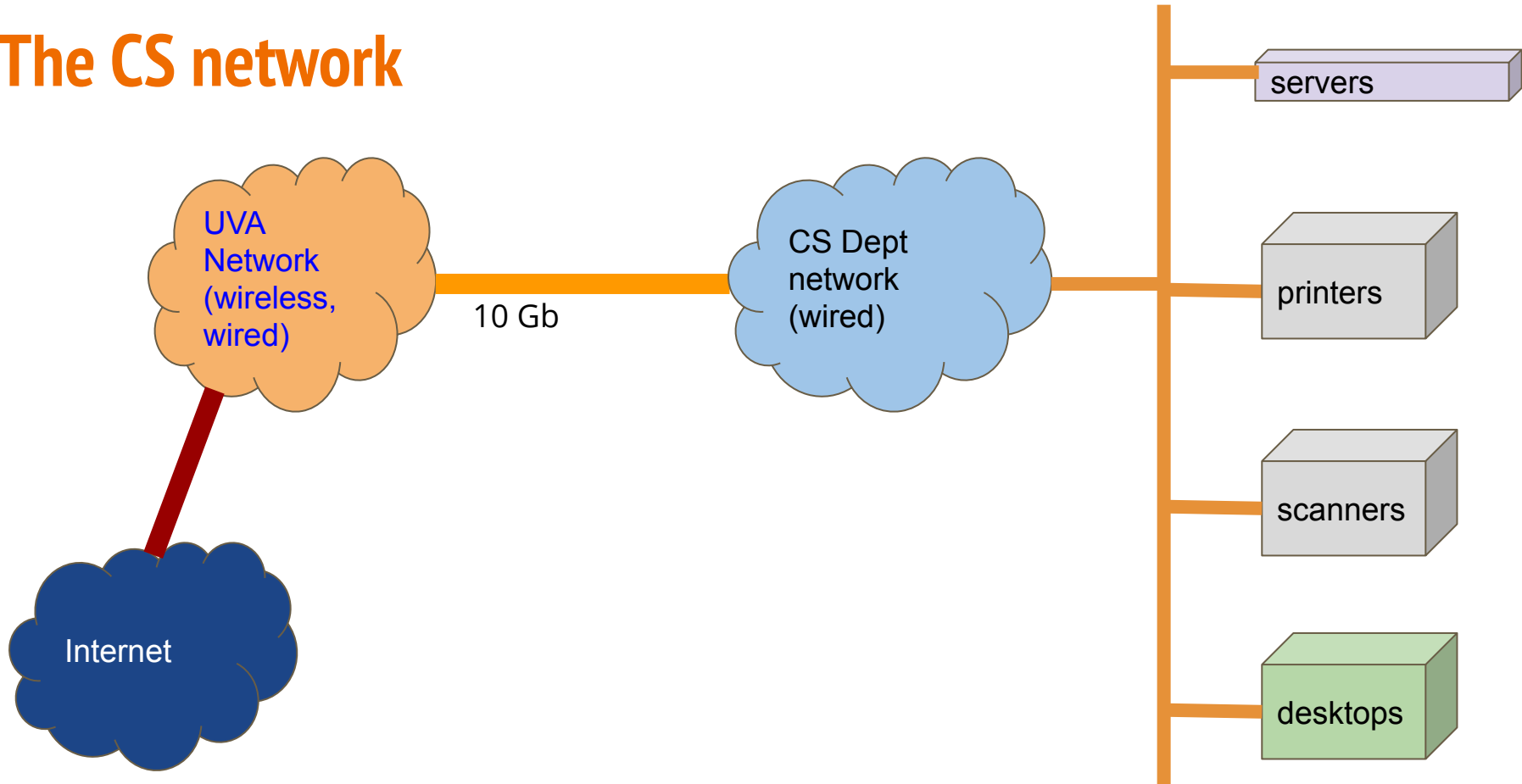
CS Network

- The CS network is its own network apart from the main UVA network
- We control and advertise our own public IP addresses (6 class C networks)
- We control and advertise hostnames via our own DNS server which is the authority for the *cs.virginia.edu* domain.
- We do *not* provide a wireless network. This is provided by UVA/ITS and defaults to *eduroam*.

CS Network

- Network devices must be registered on the CS network. This is done via a request to cshelpdesk@virginia.edu. The request should include the device's MAC address.
- A network device is assigned an IP address via DHCP, and its hostname is registered and advertised.
- Network devices that are not registered will not get a DHCP response, and thus will not be assigned a CS network IP address.

CS network

- CS deploys its own firewall and router at the edge of the network.
- The firewall blocks ICMP (*ping*), *telnet*, *ftp*, *ssh* from non-UVA addresses…
- *except* for *ssh* access to the *portal* cluster (*portal.cs.virginia.edu*)
- from on grounds, users can directly access, via *ssh*, CS dept resources
- from off grounds, users can directly access, via *ssh*, the *portal* cluster only
- from off grounds, if a VPN is established, users can then access all CS resources
- We support a "jumphost" option which allows a user to login to *portal* then to another server with a single command. See:

  http://www.cs.virginia.edu/wiki/doku.php?id=linux_ssh_access#jumphost_option

CS network

- UVA blocks Samba and Remote Desktop access from off grounds.
- Users must first establish a VPN connection to use these services from off grounds
- UVA's firewalls monitor network traffic and will flag abuse (botnets, malware, torrents, spam, mining, etc.)
- Flagged traffic is reported to CS and investigated
- Inappropriate use of the CS network is an honor code violation
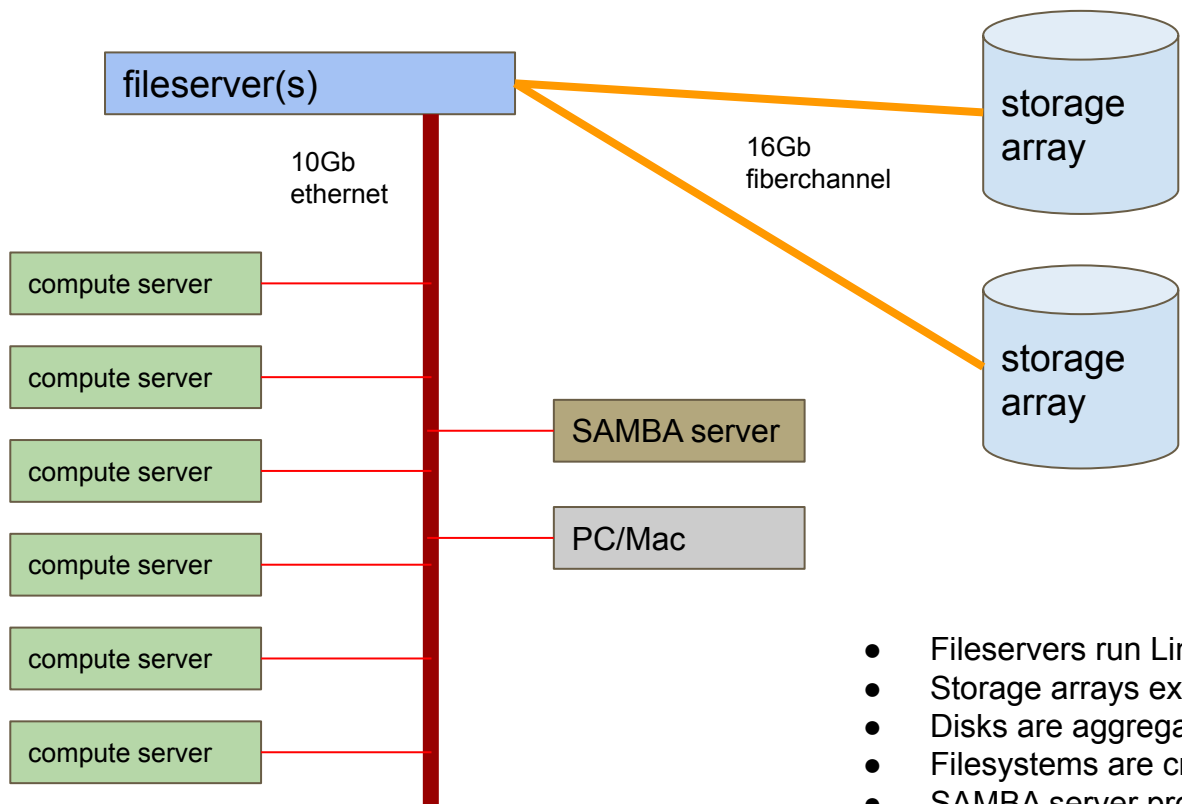
CS Network

- Rouge wireless access points are flagged and shutdown without warning
- If a private wireless network is needed, this can be created with certain restrictions on discoverability.

File Storage

- our fileservers run Linux and ZFS
- home directories are located in */u*
- project directories are located in */p*
- users should not store research data in /u since that directory is deleted when a user graduates. The data should be stored in a /p project directory.
- project directories are created with a user request to cshelpdesk@virginia.edu
- project directories start at 500GB

File Storage

fileserver(s)

10Gb ethernet

16Gb fiberchannel

storage array

storage array

compute server

compute server

compute server

compute server

compute server

compute server

SAMBA server

PC/Mac

- Fileservers run Linux and ZFS
- Storage arrays export virtual disks
- Disks are aggregated into ZFS pools
- Filesystems are created in the pools and exported via NFS
- SAMBA server provides CIFS and SMB file shares
- All filesystems are snapshotted every night at 12am

File Storage network access

- Department computers are setup to access filesystems automatically
- Windows desktops can mount home directories to the K:\ drive via SAMBA (*samba.cs.virginia.edu**<userid>*)
- Linux desktops can mount fileystems directly
- Mac desktops can mount filesystems via SAMBA
- off grounds users can mount filesystems after establishing a VPN connection

Volatile large storage (/bigtemp)

- A large (80TB) filesystem is available on all systems for temporary data
- Can be used as scratch space when running code
- This storage is not backed up
- Files may be deleted as space dwindles
- The filesystem is available at */bigtemp*

File storage - backup

- backups are taken every night at 12am
- backups are kept for 30 days
- deleted files can be restored for 30 days
- since backups use *snapshots*, which keeps a copy of data, if you delete a file from a directory, the filesystem size will not change until all snapshots 'age out' after 30 days

Web Services

- every account can have content served by our www.cs.virginia.edu web server.
- the server runs PHP with database connectors
- content can be placed in your home directory under ~/public_html
- the content is accessed at www.cs.virginia.edu/~<userid>
- for example, www.cs.virginia.edu/~pgh5a is my web page

Services

- The computer support group also provides:
  - printer services
  - poster printing
  - loaner laptops
  - hardware repair for desktops
  - software installation
  - operating system installation

Printing

- printing is available at no cost
- printers are available on the CS network
- a printserver is used to handle print requests (*printserver.cs.virginia.edu*)
- printers are generally named "*printer001*", "*printer002*", etc.

Poster printing

- posters can be printed by sending an email to cshelpdesk@virginia.edu
- posters are 24x36 or 36x48 landscape orientation
- please request the poster 48 hours before you need it to be printed
- printed posters can be picked up outside the door of Rice Hall 007
- .pdf file format is required
- see: http://www.cs.virginia.edu/wiki/doku.php?id=poster_printing

Loaner laptops

- Laptops can be loaned to students whose personal laptop is in need of repairs
- for undergraduates, if their personal laptop is incapable of handling the level of course work, a laptop can be loaned to them
- laptop loans are requested via an email to cshelpdesk@virginia.edu
- the duration of a loan is typically 2-3 weeks
- failure to return the laptop may result in the withholding of final grades

The CS Office (front office, Rice 528)

- The CS office handles:
  - mailing lists
  - room (keycard) access
  - conference room scheduling
  - grade, course, and other related issues
- The office can be contacted via email to cs-office@virginia.edu

Conclusion

- The CS Dept has a lot of computer power and storage available
- The Dept runs its own network and computing resources
- The Dept has a dedicated group to provide support for your computing needs
- Email cshelpdesk@virginia.edu for help