Client buying guide for UCScienceNet (UCSN)

This guide is for users who wish to take advantage of the research network’s higher speed. There are four main components to consider: CPU, memory, disk and the network connection.

CPU

The CPU should be one that has been released in the past year or so. The more recent the release, the better. You will see specifications like “quad core” and speeds in the Gigahertz range. Most workstations can be configured with multiple cores (CPUs). Current CPUs are 7th generation Intel i3, i5 and i7 processors. Any of these are fine.

Memory

The more memory, the better. This memory will help you buffer communications and disk access. An example configuration would come with 64GB or 256GB of RAM. Most workstation class machines can handle up to 1TB of RAM. If you do a lot of visualization you will want to maximize the amount of RAM in your machine. **16GB of RAM should be the minimum amount.**

Disk

The latest disk drives are essential. Currently (10/2017) some of the best drives are Intel’s SSD (solid state) drives for PCIe cards, though any late-model SSD should offer similar performance:


Throughput for each card should be at least 1/3 of you network connection. Equipping a workstation with 4-6 disks setup in a RAID arrangement should allow you to fully exploit the higher network speeds. Note that different RAID arrangements have different features. For example, RAID 0 is fast but not fault-tolerant. RAID 6 is extremely fault tolerance but write speeds suffer.

You can also set up a high-speed storage network utilizing a 10GB/s connection to your computers. This allows you to have one storage facility for all of your computers. Typical "lab" storage arrays will hold 20-50TB of data. You can read a review of devices:  
[https://www.pcmag.com/article2/0,2817,2401086,00.asp](https://www.pcmag.com/article2/0,2817,2401086,00.asp)  Note that you will need a storage device that can use a 10Gigabit Ethernet connection if you want your room/lab to connect at that speed. Most come with at least Thunderbolt 3 or USB 3.0c connectors, which are not as fast.

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It is recommended that you use the storage facility in our data center for very large amounts of data (more than 80TB) or data that must be secured (FISMA, HIPAA, etc.). The Isilon is already connected to the UC ScienceNet and features a very low cost for storage. You can request a quote through the UCIT website.

Network Interface Card (NIC)

The network interface card (NIC) connects your machine to the network. It must meet certain requirements. First, it must be able to handle throughput of at least 10Gbs. Second, check to see if you need copper connections or fiber for your NIC. Some switches can connect either but others are copper or fiber only. **IT can let you know which kind you need to connect to the nearest switch.** (Email: sciencenet_requests@uc.edu) The card should also support PCIe (PCI express) generation 4 or later. ScienceNet connections can only be made to machines with their own 10Gb/s interfaces.

Your vendor for the machine(s) you are using can provide some recommendations for NICs if you are not sure what to buy. They also tend to be more compatible with your system. Most machines come with at least one open slot for a NIC card.

You can also buy an adapter or NIC to convert existing equipment. This allows you to purchase machines now with slower connections and then upgrade them as your budget allows, for example.

Examples of 10Gb/s NICs and adapters:

Typical 10GBase-T card on Amazon:

https://www.amazon.com/dp/B01LWU88EB?ref_=ams_ad_dp_ttl&th=1

Very low-cost 10GBase-T cards on eBay:

http://www.ebay.com/itm/671798-001-HP-10GB-MELLANOX-CONNECTX-2-PCIe-10GBe-ETHERNET-NIC-/350983607686?hash=item51b840d586:g:uGEAAOSwwPhWJC2g

Thunderbolt3 to 10GBase-T adapter (Mac or PC)

https://www.amazon.com/Sonnet-Technologies-TWIN10GC-TB3-Thunderbolt-Ethernet/dp/B01N9RVOKA/ref=sr_1_fkmr2_1

Thunderbolt2 to 10GBase-T adapter (Mac or PC)

https://www.akitio.com/adapters/thunder2-10g-network-adapter

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Servers

Here are some examples of machines that meet the above requirements from Dell and HP, provided for comparison purposes. Select a machine to bring up the associated website.

HP Z840 Workstation (starting at $2400)
Precision Tower 7000 Series (7910) tower or rack versions (starting at $2100)

Note that adding extra RAM, disks, etc. can increase the price considerably. **Be sure to compare the cost of hosting your data in the IT data center before you purchase a large amount of storage.** In general, if you need at least 80TB of data the Isilon in the data center is your best choice for data storage. Amounts below that are still competitive and you can access it via the high-speed research network.

List of top-rated workstations for 2017

Note that the machines on the list would have to be upgraded to meet our specifications. Most notably the NIC cards to allow 10 Gb/sec. **Make sure to get a quote from your vendor and then check with IT to make sure the equipment you are buying will work well on our network.** There are currently 10 Gb/sec Ethernet NICs and adapters for Windows, Mac and Linux machines.

You will need Cat6 or Cat6A cables to connect your machines to the wall jacks.

A simple overview of how your machine is connected to the network.

Traffic from your machine goes through the wall jack to a switch. The switch forwards the data to a router. From the router, your traffic goes out to the Internet2 via OARnet and then on to your destination.

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