McDonald Observatory / Department of Astronomy Computing

Chris Wilkinson 25 August 2003
last updated 22 August 2008
McDonald Observatory at The University of Texas at Austin

Introduction

This document forms a basic picture of the computing services offered by the Department and Observatory. It makes an effort to emphasize the facilities that are of particular interest to newly arrived researchers, including the following: data analysis software, hardware environment, and user facilities (including printers, tape backup units, and public workstations). It also describes the current computing staff as well as their areas of expertise, should you need assistance.

The computer support group has rather diverse responsibilities, including the following:
1. Make available a consistent set of current research-related software across all UNIX-based platforms
2. Provide flexible and secure computation facilities
3. Maintain security of all systems connected to our network
4. Provide support for data reduction packages
5. Write software for instrument control and data acquisition
6. Provide consulting for new purchases of software and hardware

General Architecture of Software Resources

In order to provide a consistent set of software across all the machines we manage, the majority of our application software is organized on network disks (/opt/local) which are mounted remotely from a server and can be accessed by other systems via NFS (Network File System). Software is distributed from *pegasus* for both Sun Solaris and GNU/Linux. For both platforms, the standard distributed applications (some of which are listed below) are generally contained in /opt/local/bin. Under Solaris, additional binaries can be found in /opt/local/X11R6/bin and /opt/local/gnu/bin.

Data analysis software available includes IRAF (Interactive Reduction and Analysis Facility) from NOAO, STSDAS (Space Telescope Data Analysis System) from STScI, MIDAS from ESO, Lick Mongo, SuperMongo, and PGPLOT. Commercial software includes IMSL (International Mathematical and Statistical Library), IDL (Interactive Data Language from Research Systems Inc.), Maple, and Spyglass. TeX/LaTeX, StarOffice, OpenOffice, nroff/troff, and Adobe Transcript are the main tools for text processing. Utilities include EMACS, X11R6, Adobe Acrobat reader, and ghostscript. The majority of these packages are available both under Sun Solaris and GNU/Linux operating systems.

A standard set of compilers are available under both GNU/Linux and Solaris. Solaris features a very stable set of compilers, including Sun C, C++, Fortran 77, and Fortran90. GNU/Linux offers a similar set produced by the GNU project, including gcc, g++, and g77. Because compiler heuristics vary between the equivalent Sun and Linux compilers, a rewrite of your code may be required when transitioning between the two platforms. Commercial compilers are also available for purchase, should a set of compilers available under GNU/Linux be inadequate to your needs.

Spam filtering is available via our Mirapoint spam appliance. Please email helpdesk@astro for more information.

Our network topology is configured to provide maximum system accessibility from each desktop computer connected to our systems. Note that while the Observatory operates several systems for general use, any given individual may find access to more CPU time and more disk space on a given faculty member's private systems.

Primary Facilities in Austin

Common multi-user workstations and resources:

1. astro – Sunfire v490, Solaris 10. Four 1.8GHz CPUs with a total of 16 GB of memory. Console accessible in RLM 16.304. It serves as the main departmental mail server and provides data reduction services for users without adequate access to private workstations. It also hosts a variety of tape drives (listed in detail below), all of which are available for user archiving and data restoration. Disk space usage is governed by a quota system and the scratch areas (/scratch/astro/d[1-5]) are purged weekly of files that have not changed in two months. Suitable applications for *astro* include code development, data reduction and number crunching, document preparation, electronic mail, and printing.
2. ceres – Sunblade 100. Solaris 10. RLM 16.304. This system offers access to a Solaris desktop environment as well as a 9 GB local disk (/data1/ceres) governed by a 1-month purging scheme. Login usernames and passwords are frequently synchronized to those on *astro*.
3. vesta – Sunblade 100. Solaris 10. RLM 16.304. This system offers access to a Solaris desktop environment as well as a 9 GB local disk (/data1/vesta) governed by a 1-month purging scheme. Login usernames and passwords are frequently synchronized to those on *astro*.
4. Public PC and Macintosh Workstations – RLM 16.304. This is a work in progress. When complete, the lab will contain 4 iMacs, 2 Windows PCs and 2 Linux boxes. Available software applications include Microsoft Office, Mozilla, a secure shell client, Adobe Acrobat, ghostview. Two machines contain a supplemental configuration which includes a Canon Canoscan LiDE 90 color scanner, OCR software, and Photoshop.
These machines are for astronomy department users and applications only. Do not install personal applications software on these systems.

Public printers available from the majority of our hosts:

1. laser4 – HP LaserJet 4300dtn. 1200dpi, 45ppm. Duplex capability via *laser4dup* queue. Most appropriate for day-to-day printing of black & white documents and manuals. Has a multipurpose feed tray, capable of printing on overheads and envelopes.
2. laser5 – HP LaserJet 4300dtn. 1200dpi, 45ppm. Duplex capability via *laser5dup* queue. Most appropriate for day-to-day printing of black & white documents and manuals. Has a multipurpose feed tray, capable of printing on overheads and envelopes.
3. dw – HP Color LaserJet 5500dtn. 600dpi, 4ppm color. Duplex capable via *dwdup* queue. Excellent for producing sharp, reproducible color output. Especially useful for printing Power Point presentations and color plots from papers. Requires specialized transparency films, which are available for purchase.
4. epson – Epson Stylus Pro 5500 photo-quality inkjet. 2880dpi. Capable of printing on paper with dimensions up to 329mm x 483mm (Super A3). While highly useful, it requires a small amount of training to produce good results. Excellent for specialty printing, including small draft versions of large posters, but requires specialmedia and files of adequate resolution. Please see Chris Wilkinson if you would like help with this resource.
5. laser15 – HP LaserJet 4300dtn. 1200dpi, 45ppm. Duplex capability via *laser15dup* queue. Most appropriate for day-to-day printing of black & white documents and manuals. Located in 15.202A.

Publicly-accessible tape drives attached to astro:

1. Exabyte 8505 XL 8mm – available on *astro* (nrst11, 7 GB native capacity; nrst19, 10GB compressed).Media cost ~$8.00/ea. These drives are also capable of reading 8200-series 8mm tapes if the proper procedure is followed.
2. Exabyte Mammoth 8mm – available on *astro* (nrst4, 20 GB native capacity; nrst28, 30GB compressed). This drive is also capable of reading (but NOT writing) 8500-series and some 8200-series 8mm tapes if the proper procedure is followed. Often it is under use for system-wide backup operations.
3. Exabyte Mammoth2 8mm – available on *astro* (nrst1, 60 GB native capacity; nrst25, 90GB compressed). This drive is NOT capable of reading any format other then Mammoth2 and is typically limited to being used for backup operations.
4. Sony DDS-4 4mm DAT – available on astro (nrst10, 20 GB native; nrst18, 40GB compressed). As of this writing, media cost ~$9.00/each. Excellent for general backups, offering a low cost for the quantity of data held per tape.

Restricted access systems:

1. pegasus – Sun StorageTek Storage Appliance. RLM 15.320E. Provides distributed software services (/opt/local) for all Solaris systems in Austin.
2. preakness – Duel 2.8 GHz Intel Xeon w/ Gigabit Ethernet. GNU/Linux. RLM 15.320E. This system is the host for all mass storage arrays, currently totaling over 3 TB. It also provides distributed software services (/opt/local) for most GNU/Linux-based systems in Austin.
3. affirmed – Sun Ultra 5. Solaris 2.8. RLM 15.320E. This system hosts the Department and Observatory web server, http://www.as.utexas.edu/, which contains a variety of useful information including access to course pages. There are no private web pages on this server.
4. continuum – Intel Pentium-4, GNU/Linux. RLM 15.320E. Provides login management and windows domain services for “public” windows systems.

Austin Ethernet Network

The Departmental network connects computers using TCP/IP and EtherTalk protocols. It currently delivers a minimum of 100 Mb/s of data to all network ports. The physical network has a star topology, centered around an array of high-speed switches which connect one department computer to another and each to the outside world. The switches intelligently channel network traffic between systems, allowing packets to only move on the segments required for point-to-point communication. This has important security connotations, since it means that users on other segments are unable to see the traffic between two computers on other segments. Not all segments in the building are activated, although this can be easily remedied by contacting helpdesk@astro.

As required by University policy, all connections to the campus network must be identified and authenticated.
This is done in the following two ways:
1. Static machines – Workstations, servers, and printers which are always present on the Departmental network are assigned static addresses. These are fixed and ensure that the reliability of central services is maintained.
This list is carefully maintained and monitored. For example, there are 494 static hosts on the Austin Ethernet network. If a desktop workstation is being purchased, we will be happy to assign it a fixed address.
2. DHCP – We provide a pool of addresses for laptops connecting to the departmental network. This methodology is the same as the one used by commercial cable-routers as well as the University at large, which often means a given user doesn't need to reconfigure their laptop when they change locations. If you would like to have the option to connect your laptop to our network, email helpdesk@astro or bring your laptop into the computing suite, 15.320.

Connections to Mt. Locke are routed over two 1.5 Mbit T1 lines, making them fairly slow compared to the traffic on our internal network. Please be patient when transferring data over this connection.

Austin Computing Team

For system and user support of hardware and software, email the computing group at helpdesk@astro.as.utexas.edu. Requests are immediately forwarded to appropriate staff.

1. Anita Cochran –RLM 16.338, 471-1471 office, anita@astro
Assistant Director, McDonald Observatory
2. Chris Wilkinson – RLM 16.206, 471-2880 office, 743-4022 cell, equus@astro
Projects manager, workstation installation and maintenance, network and mass storage (RAIDs and tape-backup subsystems) coordinator, system management and consulting, policy; purchasing advice, specialized system backup and restoration, modem pool accounts, etc.
3. Dario Landazuri – RLM 15.320B, 471-3334 office, 791-3690 cell, dario@astro
MS Windows and GNU/Linux support, new PC installations, driver and patch installations, Macintosh installation and maintenance, system management and consulting, network connections and changes, new public Windows accounts, etc.
4. Cloud Mason – RLM 15.320H, 232-2582 office, cmason@astro
Solaris desktop support and DocuShare maintenance.
5. Marci Coleman – RLM 15.320G, 471-3338 office, marci@astro
Linux and MS Windows support, special projects, general user services including new *astro* accounts, printer maintenance, small purchases, media (tapes, laser printer cartridges, overhead, CD- R/RW, transparencies), etc.
6. Jim Umbarger – RLM 15.320A, 471-3343 office, jimum@astro
Astronomy course web pages, power point presentation help, www support, maintainer of Department of Astronomy and Observatory web pages, etc.
The following machines are those typically used by the computing staff. Should you see someone logged into your system from one of these hosts, it is highly likely they are performing system maintenance.
1. affirmed – Chris Wilkinson, 15.320H. Duel Intel P3 running GNU/Linux
2. barolo – Anita Cochran, 16.338. Sun Ultra 1 running Sun Solaris 2.9
3. secretariat – Chris Wilkinson, 15.320H. P3 running Windows 2000
4. shadowfax – Chris Wilkinson, 15.302H. Sun Ultra 5 running Sun Solaris 2.9
5. speedwagon – Dario Landazuri, 15.320B. P3 running GNU/Linux
6. mcp – Marci Coleman, 15.320G. P3 running GNU/Linux
7. bit – Marci Coleman, 15.320G. iMac running OS 10.5.3
8. guarneri – Dario Landazuri, 15.320B. iMac running OS 10.5.3
9. syrtis – Cloud Mason, 15.320H. Sun Ultra 5 running Sun Solaris 2.9

West Texas Computing

Mt. Locke computer support is provided by Darren Crook and Marian Frueh at the mountain (under the Assistant Superintendent for Observing Support, Earl Green) and all relevant Austin computing team staff listed above. Sam Odoms and Robert Eastman, who are based in Austin, serve as software developers for instrumentation in west Texas. Ben Laws is the primary contact for resources at the Hobby*Eberly Telescope on Mt. Fowlkes. If you have questions involving resources located in west Texas, it is suggested that you first speak with Anita Cochran or Chris Wilkinson.

The following machines are located at Mount Locke and are frequently used for data acquisition and instrument control. All mount a local version of /opt/local, providing users with access to the same reduction and analysis software available in Austin.

1. oberon – Sun Ultra 10. Solaris 2.8. This system is the primary workstation used by observers at the 2.7m. It provides access to the 2.7m instrument control computers, atlas and colossus, and allows for quick-look data reduction. It also serves as an instrument control computer for the TK3 and TK4 CCD systems. It has three 20- inch displays, supports high and low density Exabyte 8mm tape drives, and has a 4mm DAT drive.
2. atlas – Sun SparcStation 10. Solaris 2.6. This system is used for instrument control of the older CCD systems at the 2.7m. It has 27 GB of disk space and supports high and low density Exabyte 8mm tape drives. It is typically operated remotely from oberon.
3. charon – Sun Ultra 5. Solaris 2.6. This system provides a secondary workstation in the 2.7m control room. It provides a mirror of Austin's dust:/opt/local, which supplies the latest Solaris versions of all reduction and analysis software to all other Solaris systems on Mt. Locke.
4. colossus – AMD K6-2. LynxOS. This is a rack-mounted PC in the 2.7m old cass control room which serves as the high-level interface to the 2.7m control system. It is typically operated remotely from oberon.
5. nereid – Sun Ultra 10. Solaris 2.8. This system is the primary workstation used by observers at the 2.1m. It is the instrument control computer for the TK-4 CCD systems and allows for quick-look data reduction. It also provides access to older CCD systems through miranda. It has two 20-inch displays and 130 GB of disk space.
6. miranda – Sun SparcStation 10. Solaris 2.6. This provides instrument control of the older CCD systems at the
2.1m. It has 10 GB of disk space and supports an Exabyte 8mm tape drive. It is typically operated remotely from nereid.
7. dione – Sun SparcStation 5. Solaris 2.6. This system is still used by observers at the 0.9m for checking PC- TCS pointing and filling out night reports. It does not support CCD operation at the 0.9m. In addition to providing a Solaris desktop environment and 2.5 GB of disk space, it also supports an 8mm Exabyte tape drive.
8. luna – Sun Ultra 10. Solaris 2.8. This system is the primary workstation used by observers at the 0.8m. It provides access to the instrument control computer, titan, and allows for quick-look data reduction. It has two
20-inch displays, 130 GB of disk space, a 4mm DAT drive, and an 8mm Exabyte tape drive.
9. titan – Sun SparcStation 20. Solaris 2.6. This system provides instrument control of the PFC at the 0.8m. It has 80 GB of disk space, a 4mm DAT drive, and an 8mm Exabyte tape drive. It is typically operated remotely from luna, although it can serve as a secondary workstation.
9. prometheus – Dell opteron. This system provides instrument control at the 2.1m.
10. media107 – Dell. Linux. This system is located in the 2.7m control room, and can be used to burn CDs and DVDs.

Graduate Student Computers

Due to a bequest, the Astronomy Department is able to purchase new computers for each of the incoming graduate students.
This year we've purchased 20inch iMacs. Data analysis software installed includes IRAF (Interactive Reduction and Analysis Facility) from NOAO, MIDAS from ESO, and SuperMongo. Commercial software includes IDL (Interactive Data Language from Research Systems Inc. TeX/LaTeX and Microsoft Office are the main tools for text processing.
Note that the Department retains ownership of these machines. The Computing Services Group will retain root access and will periodically update the machines for security and software patches. However, each user is responsible for what happens on his/her machine, so please report any unauthorized or strange activity. The machines are configured to provide a standard user environment, access to our software libraries, and as much security as possible. Please speak with one of the computing staff before making changes to the operating systems. If you would like a piece of software installed, it is possible there is either a precompiled binary available or that others in the department might require a similar package. Aside from installing system updates from Apple, graduate students should not install or modify science software installations. Please email helpdesk@astro for assistance. Damaging software on your machine will likely result in a rebuild.
A 1.4 TB RAID array is available for grad student use, mounted as /san/graduate on the grad student machines. Due to the nature of our RAID system, the array can have one hard drive fail without losing any data. Even with this redundancy, it is remotely possible that a multi-disk failure could cause the array to fail. Currently, the array is not regularly backed up. Please do not keep the only copy of your thesis on the array. This array is not designed to back up large data archives, but is for maintaining a backup of critical files. If you have questions regarding the mass storage arrays, please email helpdesk@astro.

Available Documentation

There are considerable amounts of online information in the form of the UNIX man pages (/usr/share/man, /usr/dt/man, /opt/local/man, and /opt/local/X11R6/man). Sun's Answerbook and SunSolve online documentation, and in various Frequently Asked Questions (FAQ) files in /opt/local/doc.
UT Libraries provides access to computer books online. Many O'Reilly books are among the collection at netlibrary.com. (http://www.lib.utexas.edu/books/etext.html#computer) Most of our paper manuals are available for loan from the computing staff. They include operating system manuals, basic books on UNIX, as well as IDL and IRAF manuals. Please email helpdesk@astro if you are looking for something specific.

Important DOs and DON'Ts

1. DO backup your data. We don't back up the desktop machines, nor do we backup the scratch disks on the public systems. If a disk crash occurs and you don't have a backup, you are out of luck. Please ask us to show you how backup your data to a remote disk or tape drive.
2. DO keep your passwords safe, hard to guess, and change them periodically.
3. DO watch out for unusual activity on your computers and notify us about anything strange.
4. DO obey the University's computer security and usage regulations. Everyone who uses University owned equipment OR connects equipment to the University network is responsible for following these regulations!!
You can review them at the following URL: http://www.utexas.edu/computer/policies/. Ignorance is no excuse.
5. DON'T hack._
6. DON'T spam._
7. DON'T forge email._
8. DON'T run a gaming server (quake, counterstrike, etc.). _
9. DON'T setup servers for porn or MP3 files. This includes the use of peer-to-peer clients._
10. DON'T attempt to run your web server on the public machines._
11. DON'T remove your department-owned machine from the building, disconnect it from the network, or make radical software changes, except as instructed by us. Due to security concerns, such occurrences may result in having access to the network barred._
12. DO think carefully about whether you want to direct email to your desktop machine. If you have a dual boot system, mail will not be received if your machine is down or booted into Windows, although it ought to be held at the source. However, after three days, the mail will begin to bounce. For email reception, it is safer to use *astro* or one of the other Sun workstations that is always up, with a permanent address. Another advantage with receiving mail on *astro* is that the mail directories are retained in our tape backup rotations; this is not the case with ANY other machine. _
13. DO think carefully about using your desktop machine to serve web or FTP servers to distribute course materials or other information to the general public. Your servers would only be available when the machine is up and running Linux. It is recommended that you either use the machine of a faculty member or a department server for more permanent materials. If you choose to operate a server on your desktop despite these warnings, email helpdesk@astro.