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Welcome to the Computer Science Department at Loyola University Chicago.

This guide is aimed at helping you understand the services we provide in the department and those offered by university IT (ITS) that might also be helpful to your work in CS and related majors.

See *Downloading* for information about other formats.
1.1 Academic Alliances/Programs

The department has active memberships in various academic alliance programs:

1.1.1 Microsoft Developer Network (MSDN AA)

The Computer Science Department is a member of the MSDN Academic Alliance.


With this membership, any student who takes a computer science course will have an account to download the latest development tools, operating systems, server software, documentation, and technical references at his/her fingertips for free.

If you need to retrieve your username and password, try this:

- Username and Password: Your username is your Loyola email address. The email address must be entered in the form of xyz@luc.edu.
- Click the Sign In button on the top right. Click the button in forgot your username or password? section for a reminder. Check your Loyola email to get your password.

Please note that the MSDNAA excludes Microsoft Office. All Loyola University Chicago students have access to Microsoft Office 365. See http://www.luc.edu/its/exchange/about_office_365.shtml for details. (This does not cover faculty and staff, who need to get their own subscription.)

If you have a Mac running OS X, you can download VMware (see below) and install it. Then install Windows and other Windows applications as usual.

1.1.2 VMware Academic Program (VMAP)

The Computer Science Department is a member of the VMware Academic Program (VMAP).

VMware provides VMware Workstation and other virtualization products, which are helpful for users who may want to run Windows, Linux, and other operating systems on their Windows, Mac OS X, or Linux computers.

- Mac users should download VMware Fusion.
- Windows or Linux users should download VMware Workstation.

1.1.3 Apple Developer Program

The Computer Science Department is a member of the Apple Developer Program. Information can be found at https://developer.apple.com/programs/ios/university/gettingstarted/. This program requires a bit of special handling, so please contact the lab manager at People to be enrolled.

1.2 Content Management and Hosting

We no longer provide support for static web page serving, PHP, and CGI scripting. We realize that this might be an inconvenience to some. For students doing project work, we can provide temporary virtual machines on our Xen cluster for web hosting projects.

We encourage those who need to set up web sites to consider establishing web hosting account via one of the many providers out there, such as Site 5 (http://www.site5.com), which has hosting plans as low as $5/month that give you full shell access and the ability to set up your own domain name, etc.

We are able to provide many services (private or public sites) through Google Apps; however, this may not give you all of the scripting and programming capabilities that are desired.

1.3 Emergency Contacts

Security is everyone’s business. If you see something, say something, as we are frequently reminded nowadays. The following numbers will help you when you’re on campus:

• 44-911: Campus Safety for all on-campus emergencies
• 911: for all emergencies off-campus
• 773-508-6039: Campus Safety for all non-emergency situations
• 312-915-7999: Computer Science department for all non-emergency situations (available during standard business hours only, 9am-5pm US Central)

Please report all computer security issues to helpdesk@luc.edu. You should also CC the department’s help alias (see Getting Help) if the issue is one where you think the CS department would also want to know.

1.4 Facilities

1.4.1 General Computing Labs

The department has general computer laboratories at the Lake Shore and Water Tower Campuses. They are three windows labs and one free/open source laboratory (at Water Tower Campus only) running Ubuntu Linux. The Windows labs are managed by Information Technology Services (ITS) with software requests submitted regularly by the department.

1.4.2 Internet-2

The CS Department was part of a successful team that received funding to bring Internet-2 to Loyola University Chicago as a whole. This next-generation Internet allows students within the department to explore ideas such as cluster computing, grid computing, Internet telephony, and distributed scientific application development. In addition
to Internet-2, the university maintains a high-speed optical network/ring that connects all of the Loyola campuses (LSC, WTC, and Loyola University Medical Center).

1.4.3 Windows HPC Cluster

Drs. Putonti and Thiruvathukal operate two Windows HPC clusters: an 80-node dual-core Opteron cluster by Rackable Systems and a 24-node dual-core Xeon cluster by Dell. Both clusters feature high-speed Ethernet and/or Infiniband. These clusters are housed in the ITS data center.

1.4.4 GPGPU Server

Our new GPGPU Server was set up at our ETL. It is SuperServer 7046GT-TRF-TC4 with 2 x Intel Xeon Quad-Core (16 logical processors), 96GB RAM, 4 x NVIDIA® Tesla C2075 GPUs. Please read our GPGPU Server guide on how to get started.

1.4.5 Emerging Technologies Laboratory

The ETL is a growing presence for experimental computer science and engineering projects. This laboratory supports many experimental computing needs and is a place where students can explore ideas not covered directly in any particular class. Virtualization, embedded systems, green computing, and mobile development take place here.

1.4.6 Wireless

The entire department (faculty offices, computer labs, emerging technologies lab, and halls) are covered by 802.11g Wireless LAN.

1.4.7 Research Data Center

Loyola University Chicago’s Research Data Center (RDC) is a 1,000-square-foot facility dedicated to support research and funded grants projects, provides a secure home for the computational clusters and related equipment used by our research community.

The RDC (opened in 2010) delivers a high availability computing environment for research projects. This facility is equipped with power protection, including an uninterruptible power supply and a back-up generator. Multiple computer room air conditioner (CRAC) units provide redundant cooling for the space, and a structured cabling design allows for high-speed network connectivity. In addition to fire protection, additional safety and security elements for the RDC include keycard access, camera surveillance, and environmental monitoring.

Sized to accommodate moderate growth, several research initiatives are currently taking advantage of the space, which at present houses three research clusters and over 100 nodes. Additionally, collaborative research efforts with other participating institutions and/or organizations have full access and connectivity to Internet2 via the Metropolitan Research & Education Network (MREN) to accommodate high bandwidth applications, data transmissions, and computational requirements.

A steering committee, made up of senior administrators, faculty, and ITS professionals, is responsible for reviewing, evaluating, and recommending strategies, plans, and policies governing the use of the RDC resources. Loyola’s RDC is managed by Information Technology Services (ITS) in partnership with the university’s Facilities Department.

Drs. Thiruvathukal, Läufer, and Putonti have a general-purpose 80-node computing cluster that runs a mix of Windows HPC Server and the ROCKS clustering software.
1.5 Google Apps

The CS and Mathematics departments subscribe to Google Apps for Your Domain. Among other things, we can host sites, e-mail, documents, calendaring, etc. Our primary use at the moment is for Google Sites, which allows individuals, workgroups (e.g. project teams in classes), research groups, and other collaborations to host their own private or public web sites. While this software is officially in beta, it’s already proving to be a winner for many needs. Moreover, we can assign you your own hostname within one of the 3 domains. Examples include www.etl.luc.edu, gkt.etl.luc.edu, doty.math.luc.edu, and tonyg.math.luc.edu.

We reserve the right to terminate any Google site that contains inappropriate content or is reported to Google or us as being offensive. So we ask that if you have such uses in mind to consider setting up your own Google Site that is not connected to LUC or the department proper. We are not generally taking advantage of e-mail and other services at this time and reserve these address for faculty and researchers officially connected to the department. To request a Google Site or other service, please see Getting Help.

1.6 People

We pride ourselves in paying attention to human interaction. While the support aliases described in the previous section must be used whenever you want something to be done, you may want to know something about the major roles in our department that are applicable to computing.

- **Chairperson**: Konstantin Läufer. Please contact the Chairperson with any suggestions you have for improvement, especially when it comes to computing matters. The chairperson has the ultimate responsibility for all department matters, especially the departmental computing budget.

- **Computing Director**: George K. Thiruvathukal. Please contact the Computing Director with any suggestions you have for improvement or with technical support questions. The Computing Director is ultimately responsible for the implementation of all computing initiatives for the department, in particular those that support our teaching and research missions.

- **Lab Manager**: Miao Ye. The Lab Manager is ultimately responsible for the implementation of initiatives as defined by the Computing Director (who consults with the Chairperson). Because there is only one Lab Manager at the moment, it is important to recognize that he/she works to support all requests in a timely manner but may not be able to resolve your problem immediately. Please allow 24-48 hours for a response to any non-emergency need.

- **Computing Committee**: George K. Thiruvathukal (Computing Director and Committee Chair), Konstantin Läufer, Prof. Stephen Doty, and two new members to be determined (one more faculty and one more student member). The Computing Committee meets at least twice per academic year and drafts recommendations and resolutions for future computing initiatives that support the department’s teaching and research mission and those of collaborating departments. The committee’s proceedings are reported to the Chairperson.

In most cases, you should contact the **Lab Manager**

1.7 Virtualization

We are now able to host Xen and Windows Hyper-V virtual servers in the department. We can host these with a dedicated public IP address (justification is required to obtain one) or private IP addresses which would be visible when you connect via the Loyola VPN. Given our present resource limitations, we can only provide virtual machines on a limited basis, primarily for faculty and student research/outreach projects. Please send your requests to the **vm alias** (see *Getting Help*) and make sure you include the following information:

- **name**: your full name
• **university e-mail address**: we will not give virtual machines to anyone who is not part of the Loyola community, although we will allow same to be used by outsiders, provided there is a Loyola contact.

• **alternate e-mail address**: where we can find you in case you decide not to read your Loyola e-mail (or you’re not getting your messages!)

• **duration**: amount of time in months for your project, or permanent (in general, permanent machines will be given only with highly sound justification.

• **RAM**: required RAM in 256MB increments; large allocations are rarely given. We’ll prioritize requests that are smaller than 512MB.

• **disk space**: required storage in 10GB increments

• **desired OS**: We recommend Ubuntu server edition but can support many others. At present, we do not support any OS that requires a license key or activation (except Windows on our new Hyper-V racks).

• **desired hostname**: may be requested in one cs, math, etl, cslabs (a private zone), all of which are subdomains of luc.edu. For example, if you want the hostname gkt in the domain etl.luc.edu, you would ask for gkt.etl.luc.edu

• **public or private static IP**: You must say public or private. We will generally be asking you (especially if you’re a student) to start with a private IP address. This in most cases will require you to choose the domain cslabs.luc.edu, which only resolves within Loyola proper.

• **type of virtual machine**: Xen, VMware, Hyper-V program. You would only need VMware if you want to host a Windows VM but we presently have no plans to support Windows, per our emphasis on freely available OS technology without activation requirements.

• **number of CPUs**: we are only able to support 1 for most requests at this time.

### 1.8 User Accounts

All students and faculty are given accounts in the CS department. Your account is intended for your use only. Please change your initial password immediately on first use to improve security. (We are able to determine when a password has not been changed from the default and will lock accounts after a certain period.)

We presently lack a self-service mechanism to the PAM service maintained by ITS for resetting your password. In any event, given the manageable number of users, you can send a request to the accounts alias to have your password reset for you. Since we set up all of our accounts to match your university login ID, it is our policy to send your replacement password to your Loyola e-mail address. You may also opt to meet the lab manager in person but must show your Loyola or a government-issued ID with your photo on it.

To reset your password, you should log into random.cs.luc.edu using a secure shell client (a.k.a. SSH) and use the passwd program to reset it. We recommend that you are on campus when you need to change your password.
2.1 SSH

Not all computer systems in the department are intended for general use, and some are restricted to faculty and staff usage. (And many are reserved for testing purposes.) The systems available for general use include random.cs.luc.edu and infinity.cs.luc.edu.

By default, SSH traffic (on port 22) is blocked outside of Loyola. You will need to use the VPN or the public key authentication to connect to our servers on an alternate port (22222).

For most of our user community, we think the VPN is a reasonable solution. If you don’t have access, please let us know. We can get VPN access for alumni and collaborators.

2.1.1 Configuring SSH in General

To use public key authentication (PKA), you need to make a configuration after you install a ssh client, which includes three steps:

1. generate a private and public key pair (Key Type: RSA Key Length: 1024);
2. store private key in your local computer;
3. save public key on the remote Linux server.

In the remaining sections, we discuss different configurations that are commonly needed by faculty, staff, and students within our department.

2.1.2 Bitvise Tunnelier

Two Quick Steps to Configure SSH Keys Authentication With bitvise SSH client

1. Download ssh client software from http://www.bitvise.com/download-area
2. Generate a private and public key pair:
   • click the link titled ‘User keypair manager’ in the Login tab.
   • click the button [Generate New ...]
   • choose ssh-rsa and 1024bits
   • you can enter passphrase or leave it empty
   • click the button [Generate]
This passphrase is not sent to the remote host, and it is only used to protect your private key. Otherwise, anyone who has access to your private key can authenticate to your account automatically.

3. Export Public key to the Linux server *User keypair manager.*

- click the keypair in the slots
- click the button [Export..]
- chose “Export public key” and “OpenSSH format”
- click the button [Export]
- It should be something like:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAIEAo8q0r4d599buYHCbc36ViJniRuLvUr++asdSUh
```

- You need to append that line to `~/.ssh/authorized_keys` on the Linux server.

### 2.1.3 OpenSSH on Linux, Mac OS X, or Cygwin

1. Generate a private and public key pair

```bash
$ ssh-keygen -b 1024 -t rsa
```

Generating public/private rsa key pair.
Enter file in which to save the key (/home/xyz/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:

This passphrase is not sent to the remote host, and it is only used to protect your private key. Otherwise, anyone who has access to your private key can authenticate to your account automatically.

Your identification has been saved in /home/xyz/.ssh/id_rsa.
Your public key has been saved in /home/xyz/.ssh/id_rsa.pub.
The key fingerprint is: 13:91:31:0a:9c:8f:5c:11:04:e7:d2:88:e8:5d:a3:42 xyz@xxx.yy.zzz.com

2. Save Public key on the Linux server

```
~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAIEAo8q0r4d599buYHCbc36ViJniRuLvUr++asdSUh
QgsqfyStQjs7A/Oz1zHLCvdLHmW/4I9Wnse2GQtzaRlmePqNdoun1VPVnBJP/
5c73hRbHkC1wRTAGHfWk57hRqxNXt12z0kk/q9KNQ== xyz@xxx.yy.zzz.com
```

You need to append that line to `~/.ssh/authorized_keys` on the Linux server

3. connect to the Linux server:

```bash
$ ssh -p port-num xyz@server.cs.luc.edu
```

where xyz is your username on our Linux system. The port-num and server name have been sent to your Loyola mailbox with your username and password.
2.1.4 PuTTY

Five Quick Steps to Configure SSH Keys Authentication With PuTTY

1. Download ssh client software:
   - Get the zip file with all PuTTY binaries http://the.earth.li/~sgtatham/putty/latest/x86/putty.zip

2. Generate a private and public key pair
   - Double click PuTTYgen.exe, press [Generate] button, keep moving mouse. Once the keys are generated, enter a passphrase for your private key, or leave the boxes empty if you do not want to protect your private key with a passphrase.
   - This passphrase is not sent to the remote host, and it is only used to protect your private key. Otherwise, anyone who has access to your private key can authenticate to your account automatically.
   - Click [Save Private key] button to save it in a file, say, C:\ppp.ppk

3. Save Public key on the Linux server
   - cut/paste your public ssh key (Please see the figure in the web page mentioned in the beginning) on ONE LINE (That is very important!!!) in a file,
   - Do not add the rsa-key-20090614 at the end. Make sure, there is ssh-rsa at the beginning.
   - It should be something like:

     ssh-rsa ... 3434343234232m/Pmc2Jc5uV1eXfp6yJIWG5xJE9TpY1VC4n/  
     →NQ1Ws1PTcpk5+xhUJPHjeMkKcVM1hhUgg0l+Tt08

   - You need to append that line to ~/.ssh/authorized_keys on the Linux server.

4. Store Private key in PuTTY SSH authentication agent
   - Start the PuTTY SSH authentication agent PAGEANT.EXE (double click the icon).
   - After it started, right-click its syspanel icon (in the right-bottom corner of your screen)and select “add key”. Select your private key file, say C:\ppp.ppk, and type in your passphrase. The Pageant works as a passphrase keeper.

5. Use PuTTY to connect to the Linux server
   - Under “Host name or (IP address)” enter hostname
   - Under “Port”, enter port number
   - The port number and hostname have been sent to your Loyola mailbox.
   - Then, click [Open]

This is adapted from http://www.howtoforge.com/how-to-configure-ssh-keys-authentication-with-putty-and-linux-server-in-5-quick-steps

2.1.5 SSH Communications

Five Quick Steps to Configure SSH Keys Authentication With ssh Client from SSH Communications

1. Download ssh client software from:

   - http://www.colorado.edu/its/docs/authenticate/printouts/win_ssh.html
   - http://www.sfsu.edu/~helpdesk/ssh/ssh329/

2. Generate a private and public key pair
• In the toolbar of ssh client, there are several icons. First from left is “Save”, and second is “Print”. The third from RIGHT, is “Settings”.
• Click “Setting” icon.
• In the “Setting” windows, go to “Global Settings”->”User Authentication”->”Keys”.
• Click “Keys”.
• Under “Key pair management”, click “Generate New”, then click Next.
• In the “Key Generation” window that appears:
  • From the drop-down list next to “Key Type:”, select RSA
  • From the the drop-down list next to “Key Length:”, select 1024.
• Click Next. The key generation process will start. When it’s complete, click Next again.

3. Store private key
• In the “File Name:” field, enter a name for the file where SSH Secure Shell will store your private key. Your public key will be stored in a file with the same name, plus a .pub extension.
• In the boxes next to “Passphrase:”, enter a passphrase for your private key, or leave the boxes empty if you do not want to protect your private key with a passphrase.
• This passphrase is not sent to the remote host, and it is only used to protect your private key. Otherwise, anyone who has access to your private key can authenticate to your account automatically.
• click Next, and then Finish.

4. Save Public key on the Linux server
• Under “Public Key management”, click “View”. Notepad or another editor will open xxx.pub You may save it in a file. Then, you need to append that file to ~/.ssh/authorized_keys on the Linux server.
• You may need to add ssh-rsa at the beginning of the key and edit it to make the key on one line, ex.:

```
---- BEGIN SSH2 PUBLIC KEY ----
Comment: "[2048-bit rsa, cs@luc-cs-101, Thu Jul 29 2010 01:16:06]"
ssh-rsa
AAAAB3NzaC1yc25A4vaINWk8i8vRAYWOpcP8KU3Nq7WExy2a61Uq75F3pYmg46cj28gj9aEvCqAwGgo4XP4TBB
---- END SSH2 PUBLIC KEY ----
```

5. Use ssh client to connect to the Linux server
• “Host Name:” to hostname
• “Port Number:” to port number
• “Authentication Method:” to Public Key.
• The port number and hostname have been sent to your Loyola mailbox with your username and password.
• You will be prompted for the passphrase for your private key (if you supplied one). If you did not supply a passphrase for your private key, you will not receive a request for a passphrase when connecting to the remote host.

6. See http://kb.iu.edu/data/amzx.html for additional details. We have adapted our instructions from this page.

### 2.1.6 Cygwin SSH Installation

1. go to http://www.cygwin.com/setup.exe
• This will download a GUI installer called setup.exe which can be run to download a complete cygwin installation via the internet.

2. Download Source

• Please choose [Install from Internet] option, setup.exe creates a local directory to store the packages before actually installing the contents. The Root Directory for Cygwin (default C:cygwin) will become / within your Cygwin installation.

3. Choosing Packages

• Activate the window [Select Packages]
• enter ssh in [search] box
• click [+] Net ...
• click [ ]Skip openssh ...n
• then click [Next] ....

4. After installing Cygwin/openssh, you can configure OpenSSH for Public Key Authentication

2.2 Free/Open Source Software at Loyola

The department is active in free/open source software development in addition to the various “commercial” academic alliances. We encourage those who “need help” to consider joining FOSSAL, which is a student organization dedicated to all things FOSS.

FOSSAL maintains a Google Group at http://groups.google.com/group/fossal. All are welcome to join (subject to approval to prevent spamming).

2.3 Getting Help

2.3.1 Mailing List

We maintain a Google Group for systems announcements. At the moment, access is by invitation only. Please e-mail Miaoye if you wish to be added to this list. (A link to the subscription page will appear shortly.)

2.3.2 E-mail

Please direct all inquiries to Miaoye (helpdesk@cs.luc.edu).

2.4 GPGPU Server

1. After you log in the server, please run the following command to install the SDK in your home directory:

```
$ cp_gpusdk
```

   This will result in a folder being created in ~/NVIDIA_GPU_Computing_SDK,

2. Compiling the examples:
3. Run the `deviceQuery` demo to see the GPGPU device(s).

```
$ cd ~/NVIDIA_GPU_Computing_SDK/C
$ make

$ cd ~/NVIDIA_GPU_Computing_SDK/C/bin/linux/release/
$ ./deviceQuery
[deviceQuery] starting...
./deviceQuery Starting...

CUDA Device Query (Runtime API) version (CUDART static linking)

Found 4 CUDA Capable device(s)
......
```


2.5 Linux Primer

2.5.1 Getting Started

There are many tutorials on the web, just Google around and you will find them. A decent online tutorial is available for example at [Linux.org](http://Linux.org) one can also find books on Linux in a bookstore, for those who prefer a hard copy. Linux is derived from Unix, and many of its commands are identical with, or very similar to, older Unix commands. Since Apple’s Mac OS X is also derived from a version of Unix (BSD Unix), many of these commands are the same as on a Mac.

2.5.2 Essential Commands

Typically one interacts with a Unix/Linux system using a Command Line Interface (CLI), also known as a Terminal or a Shell. Unless one is using a Desktop Manager on a Linux system, running programs (commands) is by typing on the command line. Some of the more common commands that just about everyone uses are listed below:

- **pwd** - “print working directory” prints the name of the current folder
- **ls** - list directory lists all the files in the current folder
- **ls -l** - long list lists the files along with permissions, creation dates, etc
- **ls -A** - list all files in current folder, including the hidden ones
- **cd** - change directory moves the current folder back to one’s home folder
- **cd <pathname>** - change current folder to the one named by `<pathname>`
- **cd ..** - change to the parent folder of current folder
- **mkdir <foldername>** - make a new folder (folders are also known as directories)
- **cat <filename>** - prints the contents of a text file
- **cat <file1> <file2> > <file3>** - joins together text files `<file1>` and `<file2>` and puts the result in `<file3>` (cat - is short for concatenate)
- **less <filename>** - lets you scroll up and down through a text file; use Q to quit
• `cp <file1> <file2>` - makes a copy of `<file1>` named `<file2>` in the current folder; previous contents of `<file2>` (if any) are lost

• `mv <file1> <file2>` - move `<file1>` to `<file2>`; used to rename a file (previous contents of `<file2>` are lost)

• `mv <foldername1> <foldername2>` - move `<foldername1>` to `<foldername2>`; used to rename a folder

• `rm <file>` - remove a file (delete it)

• `rm -r *` - recursively remove all files and folders in the current folder (be VERY careful with this)

• `rm -r <foldername>` - recursively remove the folder and all its contents, including subfolders and their files

• `rmdir <foldername>` - remove a folder (delete it); the folder must be empty

• `man <command>` - shows the manual page for the given `<command>`

• `passwd` - change your password

• `lpr <filename>` - print a file; should work with text, postscript, and .pdf files.

• `lpq` - show status of printer and print jobs

• `lprm <printno>` - remove a printer job from the queue

• `a2ps` - anything to postscript this (if installed) converts a file into postscript and then prints it; gives nicer formatting for text files

• `nano` - edit a text file with a user friendly interface

• `pico` - edit a text file (usually pico and nano are equivalent)

• `nano <filename>` - edit the named file

• `vi <filename>` - the old Unix visual editor; see the man page for help

• `emacs <filename>` - edit with the GNU Emacs editor; see the man page for help

• `exit` - quits the current Terminal session; CTRL-D often does the same

• `ping <URL>` - see if an IP address is answering

• `who` - see who is logged on

• `whoami` - see who you are (for the existentially challenged)

• `top` - show the top running processes in a list, with process numbers

• `kill <number>` - kill a process number (you have to own the process)

• `finger <name>` - show stats for the user `<name>`; with no `<name>` finger shows stats for all current users

Note that by default you are positioned in your home folder after signing in. The file system is a tree with root at `./`, so to view the entire file system start by typing `cd` followed by `ls` and so forth. Pathnames are separated by forward slashes, so for example a file named `whosis` in your home folder `/home/myuserid` has pathname `/home/myuserid/whosis`. You can always refer to files by their fully qualified pathnames, but lacking the full pathname the system will look for the file in the current folder. Note that CTRL-C often cancels the current process, and CTRL-D often serves as an End of File marker. All of the above merely scratches the surface; see external documentation for further particulars and advice.
2.5.3 Why learn Linux?

Because Unix and its offshoots remains one of the most important operating systems for servers, and many networking concepts are rooted in Unix for historical reasons. Because Unix/Linux systems are efficient, fast, and highly stable. Because Unix/Linux is powerful: check out wildcards, regular expressions, pipes, redirecting input and output, shell scripts, and cron jobs for starters. There are some very cool ideas here for the cognoscenti that just don’t in the Windows world (or are unwieldy when transplanted there). Linux is open source software.

2.5.4 Trying Linux

For those who want to try it out on your personal laptop or desktop, find a decent Linux distribution such as Ubuntu, download and burn the installation CD for your hardware, and boot from the CD. This will give you a working version of Linux running from the CD (slow) that can be played with. You can also choose to install Linux on your hard drive next to the existing OS (a dual boot approach) so that you can choose the OS at boot time, or choose to install Linux in place of your existing OS.

2.6 Remote Access

All users of our systems can access their files remotely; however, we currently do not provide general support to students or faculty for Samba and CIFS shares (i.e. mounting as a Windows drive) owing largely to security and usability considerations. (There is a legacy Samba setup; however, no support is provided.) There are a number of alternatives to Windows shares that we do support and consider effective for most needs.

2.6.1 sshfs

If you are a Linux or Mac user, you can use the Secure Shell Filesystem client, which makes use of the Fuse project. Linux users can simply install the sshfs package (e.g., on Ubuntu: apt-get install sshfs). The Dokan project on Windows provides the same capabilities as sshfs on Linux and the Mac.

2.6.2 Secure FTP (sftp)

Most Secure Shell clients have the ability to upload/download files. If you are looking for something that is less transparent than a typical filesystem and can live with an upload/download model, this might be all you need (and seemingly, is what most of our users want).

2.6.3 Version Control Systems

We recommend that all of our students learn how to use the Concurrent Versioning System (CVS) or Subversion, especially for programming classes. Source code management is available through command-line tools or nicely integrated into many development environments, such as Eclipse and NetBeans (even Visual Studio supports Subversion through the AnkhSVN add-in). The TortoiseSVN and TortoiseHg clients for Windows are particularly nice!

2.6.4 Gnome and KDE

If you are an Ubuntu desktop user at home, both of these UIs allow you to connect to a remote place via SSH and browse folders as part of the UI’s shell (that is, you don’t need to go to the dreaded terminal). In Gnome, Places -> Connect to Server will allow a user to connect to a ssh server and will then treat that connection to your home directory like a mounted drive.
2.6.5 PuTTY and Cygwin

Speaking of SSH access, Windows users are encouraged to use the PuTTY or Cygwin support for SSH. There are a number of good commercial solutions but these cost big money (between $75-$100) and are not likely to be cost effective (let alone necessary) for most members of our community.

2.6.6 Unison

Unison is an excellent 2-way file synchronization tool. It supports all platforms.

2.7 Create CD/DVD from ISO Image

Many downloaded software products are ISO image files. An ISO image file is an exact representation of a CD/DVD. You may write an image file to a blank CD/DVD to get an identical copy of the original CD/DVD. Simply performing a direct copy of an ISO image file to a CD/DVD will not write the directory and file structure needed to use that CD/DVD.

Most CD/DVD writing software includes a feature to create a CD/DVD from an image file.

There are several free programs, e.g. ImgBurn.

Users on Mac OS X should use the Disk Utility, found in Applications -> Utilities -> Disk Utility.

Users on Ubuntu Linux should use Brasero.
CHAPTER
THREE

UNIVERSITY IT SERVICES

3.1 Windows Desktop Support

Windows desktop matters are handled by ITS. If you are experiencing trouble with Windows labs and other ITS issues, please open a support ticket using the ITS Help Desk. Linux and Mac desktop matters are the responsibility of individual faculty. We do not provide desktop support.

Note: As of June 30, 2010, we no longer provide desktop computing support in the department. These needs are addressed by the ITS desktop support group. This change does not prevent users from establishing their own standalone desktop setup but we are focusing our efforts on non-commodity needs that are synergistic with advanced teaching/research needs.

3.2 Groupwise Instant Messaging

Loyola supports instant messaging at gwim.luc.edu on port 8300. This can be accessed from anywhere and does not require the use of a VPN. To connect, you either need the Groupwise client but can also use the Adium and Pidgin instant messaging client. Just use the Groupwise protocol.

3.3 Printing in the Labs

The department maintains a number of printers for its faculty, staff, and teaching/research assistants. These printers are not for general student use, and it is prohibited to print to them without permission from the department. That said, if you need to print something, in some cases we can accommodate your requests. Please contact the department secretary, Jean Rom, during normal business hours.

There are ITS-maintained Windows labs at Damen (339, 342) and Lewis Towers (LT 410/411) that use the PrintWise system. You’ll need to have funds loaded on your ID to take advantage of these printers as a card swipe is required to print your document (from the PrintWise station). As with anything else in the Windows Labs, please report printing problems directly to ITS at https://heatss.it.luc.edu/HeatLDAP/.

At this time, printing is not supported from the Linux labs in LT 412 (at Water Tower Campus) and DH 341 (at Lake Shore Campus). In the interim, you will need to print from one of the adjacent Windows labs.

3.4 IGnation and University Blogs/Wikis

The university provides a system called IGnation, which supports wikis and blogs. While many of our users typically take advantage of publicly available sources, e.g. Blogger and Wordpress, we would like to encourage our users to consider these university-maintained sources as a starting point.
Should these not be appropriate for your needs, we can establish a Google Site for you via *Google Apps* for Your Domain (see below), which is a feature-rich solution for maintaining public and private web sites, and (unlike the university solution) can be used to collaborate with those outside of the institution (as it is tied to e-mail addresses, not university IDs).

### 3.5 Loyola VPN Access

There are a number of services (read: ports) that are firewalled because they’re not secure. The university VPN allows you to access these non-secure services.

There is a self-signup process via ITS: [http://www.luc.edu/helpdesk/resources/vpn.shtml](http://www.luc.edu/helpdesk/resources/vpn.shtml). We recommend that all students working on advanced projects to get access to the VPN so they will run into few(er) surprises.

### 3.6 Windows Labs

With our partner, Loyola Information Technology Services (ITS), we ensure that CS and Math/Stats software needs are formally requested from ITS. This allows us to focus on advanced computing needs (in particular, Linux and server-side applications) and ensure ubiquitous access to Windows labs via the Loyola login ID.

Faculty may request additional software by visiting ITS, or by sending an e-mail to the `windows` alias (see *Getting Help*). In the latter case, the lab manager (Miao Ye) will fill in a software request on your behalf. You are encouraged to submit requests one month before the end of the current term, if you need the software in the summer or following term. For example, if you need software in Fall 2009, consider getting your request in by April of 2008 (one month before the Spring 2008 term ends). You should also indicate in your request whether you are willing to help test the software after it becomes available. We cannot be held responsible for late requests or requests that do not have a designated faculty member interested in testing.

Again, because the Windows hardware and software are now maintained by ITS, we ask that all issues you encounter be reported, no matter how trivial. If you discover broken hardware and/or software, use the ITS Help Desk.

### 3.7 Wireless Access

IEEE 802.11a and IEEE 802.11b/g wireless access is provided by ITS throughout the campus. See [http://www.luc.edu/its/wireless.shtml](http://www.luc.edu/its/wireless.shtml) for additional details.
5.1 Source

We maintain the Systems Handbook using GitHub.

5.2 Travis

The book is built automatically with Travis. You can see the build history by visiting this page.

5.3 Print and Tablet

We also offer PDF and ePub formats for offline or tablet reading. These are regenerated whenever the source is changed.
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