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Using the IMA Workstations

Welcome to the IMA! The purpose of this handout is to familiarize our visitors to the IMA computer system. As we expand the system and add new software, we will make revisions to this document.

We have a request tracking system for the IMA Systems office. Please send your requests for computing assistance to **help@ima.umn.edu**.

More information are available online at <http://www.ima.umn.edu/systems/>.

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1 General Policies

The facilities and resources of the IMA are provided to support the research and scholarship of our visiting faculty and postdoctoral students. We depend upon the cooperation of all system users to help maintain a productive computing environment. The IMA reserves the right to close computer accounts and remove files of any user due to misuse of the system.

1.1 Acceptable Use Policy

Your IMA computer account is for the use of one, and only one, person. You should not let others use your account. If they have a valid reason why they should have access to the computer system, they should apply for an account of their own.

People who improperly use the system are subject to having all of their activities on the system monitored and recorded by system personnel. In the course of such monitoring, or in the course of system maintenance, some activities of authorized users may be monitored. Anyone who uses the system expressly consents to this monitoring.

Activities which will result in immediate disciplinary action and review of computing privileges include, but are not limited to:

- disruption of the computer network;
- unauthorized monitoring of electronic communications;
- unauthorized use, alteration, or damage to computers, the network, software, documentation, or data;
- circumventing or attempting to circumvent accounting and security systems;
- using accounts assigned to other individuals, or giving away information to allow non-owners to access or use accounts;
- providing services for users at other locations without the approval of the system administrators, such as `ircd`, `httpd`, or `gnutella`;
- any attempt to sabotage the work or research of another person;
- the falsification, theft, fabrication, misrepresentation, or plagiarism of data, research results, or research proposals;
- unauthorized duplication of copyrighted materials;
- threats or other disruptive behavior directed at other individuals, procedures, facilities, or organizations;
- posting obscene or other inappropriate material to the Internet;
- causing excessive waste of resources, including computer cycles, storage capacity, communications bandwidth, manuals and other library materials, printing resources, and the time of personnel, whether directly wasted by the user or wasted by responsible system administrators in detecting, controlling, and eradicating problems caused by the user.

We also remind you that using e-mail and the Internet to participate in illegal acts is itself illegal and can lead to prosecution by state and federal authorities. By not indulging in unprofessional behavior, you help all of us maintain a cooperative academic environment.

1.2 Visitor's Own Computer on IMA network

Each Office has an extra ether jack to connect to a visitor's own laptop. Configure your laptop's network setup to use DHCP. If you can't find the network cable, or don't have an extra cable, please **DO NOT UNPLUG** an IMA workstations network cable. Just ask IMA System Staff for assistance.

1.3 Resetting and Restarting your workstation (Read this first!!)

Never reset, turn off, unplug, or otherwise crash any of our equipment. If you suspect trouble severe enough to require a hard reset, contact the system administrators immediately. Rebooting machines improperly can disrupt other users and damage equipment. If the system administrators don't know that there has been a problem, it may not be properly repaired. You may safely reboot your workstation from the system menu by choosing Shut Down... then the press reboot icon.

1.4 About your Linux account

An account on our Linux workstations is normally prepared for you prior to your arrival. You should receive a sheet in your orientation folder with your account's login name and a temporary password. Please change this password when you first login using the `yppasswd` command in a terminal window. If you did not get an account and wish to have one, please contact one of the system administrators and let them know.

If you need assistance with your computer account, our system administrators are Chad Sullivan and Shawn Golley. You can contact them by phone at 4-4353, in person at Lind 414 or 413, or by e-mail at

`help@ima.umn.edu`

When sending e-mail, please describe the problem as completely as possible, and give the name of the machine you observed it on (such as **red** or **cyan**) and your room number.

Unless you contact the systems office, your account will be **closed** after your departure. See section 1.7 for details. You may, of course, easily transfer your files to your regular institution with `scp`, Flash Drive or recordable CD/DVD. If you wish, we can set up a mail alias to forward your e-mail to your new e-mail address; we normally leave these in place for two years.

1.5 Disk Space Usage

Your files are stored on a central disk server and are available on all Linux workstations at the IMA. We do not currently enforce strict disk quotas for our visitors; however, be aware that you are sharing space on a disk partition with many other users. Please do not use so much space in your home directory that other users can't get enough storage to do their work. We may occasionally ask users to remove files from the system that are no longer needed to make room for new files.

If you are working with or generating large amounts of data, temporary "scratch" space is available on many machines in `/scratch`. `/scratch`, if present, is on a local disk that is not shared with other workstations. `/scratch` is faster than your home directory. Files in "scratch" space are **not** backed up. Use `scp` to transfer files between `/scratch` directories on different machines ; see section 10.1 for details.

The command `du -h` will show you how much disk space you are using in the current directory; you must have read access to all subdirectories of the current directory to get accurate results.. The command `df -h` will show you how much space is currently available on mounted disk partitions. If you give a directory as an argument (`df -k /scratch`), it will show how much space is free in that directory's disk partition.

1.6 Backup

Files in user home directories are backed up every day. Our backup script starts everyday 4:30 PM. If you accidentally delete an important file, contact a system administrator as soon as possible. Let them know which files were lost, when they were lost, and when they were last changed. The system staff will do their best to restore your files from backup, but this is not always possible. Daily backups are normally kept for about 60-days, weekly backups are kept for 28 week, and monthly backups are kept for 6 months.

1.7 Account Expiration Policy

Long-term visitors will be given a computer account upon arrival. This account will remain active for six months after your departure. Extensions may be granted upon approval of a formal request.

Postdocs accounts will remain active for 2 years after departure. Please keep in mind that the UofM account (username@umn.edu) will be closed 21 days (university policy) after departure. Postdocs will receive a notice prior to account closing.

Before departure, you may want to forward your email to another account by creating a file `$HOME/MailHome/.forward`. The `.forward` file should contain one line with the forwarding email address. See section 7 for more information.

2 System Overview

2.1 Distributed workstations

The IMA maintains a wide variety of workstations distributed throughout Lind Hall and Lind Hall Skyway Offices. The computers are connected to full-duplex Fast Ethernet (1 Gbps each way). Traffic between Lind Hall and Skyway Offices is a full-duplex Gigabit Ethernet. And outbound to the Internet is carried on a full-duplex Gigabit Ethernet fiber optic line routed through the University network backbone. The majority of our computers are Linux workstations running Ubuntu 14.04, and are available for remote access using `ssh` (see section 3.2).

See section 2.5 for information on our dedicated computational servers.

2.2 MacOS X and Windows computers

We have one Mac and one Windows machine for public use. We strongly suggest that you keep copies of your work in-progress on backup disks, as these machines may be reinstalled without warning and your data may be lost.

2.3 Login Server

We have a login server which is `shell.ima.umn.edu`. Users can connect to `shell.ima.umn.edu` from outside the IMA thru SSH. There are some SSH clients for Windows/Mac for example PuTTY. PuTTY is freeware.

2.4 FTP Server

For security reasons, we strongly recommend using `sftp` or `scp`.

2.5 Computational servers

For intensive computations, IMA has two major computational servers.

- (1). **titanium** : 16 core AMD 64-bit 2.4GHz CPUs with 64GB of Memory.
- (2). **platinum** : 48 core AMD 64-bit 2.8GHz CPUs with 128GB of Memory.

Each server has enough local disk storage as scratch space, located at `/scratch`.

2.6 Wireless Networking

The IMA uses the University-wide Wireless Network. There are multiple wireless network options: **UofM Secure**, **UofM Guest**, **UofM**, and **Eduroam**. For best results, use **Eduroam** or **UofM Secure**. These requires authentication but are the fastest and most stable.

Long-term visitors will receive an email on their home email address with account information for connecting to **UofM Secure**.

Visitors from institutions that participate in **Eduroam** access service should use it. University Internet ID users may also use **Eduroam**. The advantage of using **Eduroam** is that the user can use the same connection at any institution that participates in **Eduroam**.

2.7 Supercomputing resources

Access to supercomputing facilities may be available upon request. We have made arrangements with the University of Minnesota Supercomputer Institute which allow us to allot a limited amount of supercomputer time to IMA researchers. The exact equipment which may be available to IMA researchers changes frequently, and we suggest you check the website at <http://www.msi.umn.edu/> for details on the computing facilities available.

In order to get computing time, you must submit a proposal consisting of one or two brief paragraphs to the associate program director describing your research project and the amount of CPU time that you think you will need. If this is of interest, please contact IMA Deputy Director Jiaping Wang.

3 Accessing IMA Workstations

3.1 Logging in at a workstation

Your Linux account will work on any of the Institute's Linux workstations.

If this is the first time that you've logged into the system, we suggest you change your password with `yppasswd`. See section 4.1 for instructions.

3.2 Logging in from/to remote workstations

We are running a Firewall for security reasons. Because of that, users at remote locations can connect to only one machine `shell.ima.umn.edu` which is our a login server with `ssh`. From `shell.ima.umn.edu` you can connect to any other machine within the IMA.

Once you've logged in at any IMA computer system, use `ssh`, the "secure shell" remote login program. One of the advantages of using `ssh` is that it can set your `DISPLAY` variable properly to transmit all X Window related traffic over a cryptographically secured channel. Use `ssh -X` to use X forwarding over `ssh`.

3.3 Logging out

When you wish to logout, simply position the mouse on the icon top right of the screen. Then, press the left-most mouse button and select the `Log Out` option from the menu, then release the button. The screen should clear, and in a few seconds the original login prompt should return.

4 Configuring Your Linux Environment

4.1 Changing your password

When you login to your account for the first time, you should immediately change your password. We strongly suggest that you also change it again every few months. **If you choose a guessable password, the system administrators may summarily close your account.** We will not remove your files, but we may suspend your login privileges to protect the system.

Unfortunately, choosing a secure password is complicated by the sophisticated technology available to system intruders.

DON'T use passwords that

- are your name, your login name, or a trivial variation thereof (if your name is John Q. Public, `public1`, `JohnqP`, and `JpUbL!c` are all very bad passwords)
- any variation of a proper name of a person or place (`clinTon`, `9gandalf`)
- have less than six characters (numbers, letters, or symbols)
- are words in any dictionary (English or otherwise!)
- are simple misspellings or reversals of words (`fuzion`, `raazab`), or words appended with numbers (`zebra3`)
- are sequences of keys on a typewriter (`qwertyui`) or in the alphabet (`abc123`)

So, you may be asking what works. You should use passwords with more than six characters, and which look random but which you can remember. Use punctuation characters, different case letters, and odd symbols in your password. One effective strategy is to choose a short phrase that you can easily remember, and make an acronym out of it. For example, the phrase “Why, would someone break into my account?” might become

`w,W$b!ma`

which would be very difficult for someone to guess.

To change your password on the Linux workstations, type `yppasswd` at the prompt. You will be asked to enter your old password once and your new password twice.

4.2 Customizing your startup files

When you login to the system, your initial working directory is set to your home directory, and selected configuration files often called “dot files” are read by the system to set up your work environment. (Files with names that begin with a period are normally not displayed by `ls`, and therefore configuration files usually have names that begin with a “dot”).

The `.cshrc` file runs first, and also whenever you start a new shell. This file does most of the work in setting up your environment. The locations where `tcsh` looks for programs that can be run are designated by the `PATH` environment variable, or the `path` shell variable. Similarly, the locations of man pages are set with the `MANPATH` variable. `PAGER` is used to select the program that allows you to scroll through a long document a screen at a time, and is usually `less` or `more`. `EDITOR` and `VISUAL` are used to select which editor you would prefer to use by default in certain utilities. `PRINTER` changes the default printer `lpr` uses.

You can also set various other `tcsh` options in your `.cshrc` file, or change the default access permissions a newly created file is assigned. Look through the default `.cshrc` file and the `csh(1)` and `tcsh(1)` man pages for more information and examples.

Your `.login` file normally runs after `.cshrc`, and only when you first login to a system (normally not whenever a new shell is started). Your `.logout` file likewise runs when you log out of the system.

4.3 Problems with your Linux environment

Sometimes, especially after making changes to your configuration files, you may have problems with your environment. These are usually caused by errors introduced when the files were changed.

Typically, a “dot file” will stop running when it reaches the first error. Look at how much of your environment got configured and at the configuration files to figure out where the error is. If there is a problem with the `.xsession` file, there may be an error logged in `.xsession-errors` which will lead you to the problem.

If your window manager isn’t working correctly, you might have trouble logging in normally to fix the bug. In that case, try logging in with `gdm` normally, but press `F1` instead of `Enter` after typing your login name and after typing your password; this should start up X with a minimal working environment that will allow you to make corrections.

If you haven’t changed anything and are having problems, it’s possible something is wrong with the workstation or the network. In that case, please contact one of the system administrators.

4.4 Creating a personal web page

We allow our visiting researchers to set up their own personal web pages in order to publicize their research interests and make information available on the web. We ask guests not to abuse this privilege, and to review the IMA acceptable use policy in section 1.1 regarding appropriate and inappropriate use of our computer system.

All IMA home directories contain a `public.html` subdirectory, which will be where you place your web page. A web page is a text file which contains information and HTML commands to format this information and to provide hypertext links. Teaching you how to use HTML to create web pages is beyond the scope of this document, but many good sources of information are available on the web, and books may be available for checkout from the system administrators.

You may wish to use the IMA template for your webpages. It can be downloaded from:
<http://www.ima.umn.edu/systems/template.txt>

When you have placed your main web page (usually called `index.html`) in your `public.html` directory, make sure that:

- your `index.html` file is at least world-*readable* and world-*executable*;
- your `public_html` directory is at least world-*executable* (it does *not* need to be world-readable); and
- your home directory is also at least world-*executable* (it also does *not* need to be world-readable).

If you don't understand Linux permissions, check the man pages on `ls` and `chmod`, or one of the good introductory books on Linux, or ask the system administrators. In the meantime, you can run the commands `chmod 755 public_html/index.html`, `chmod 711 public_html`, and `chmod 711 /ima/home/username` from your home directory to make sure that you have at least these minimal permissions set.

You can now test your IMA home page. In a web browser, open the URL

`http://www.ima.umn.edu/~username/`

where *username* is your IMA login name. You should send e-mail to `web@ima.umn.edu` when you're done so that we may add a link to your page from the IMA web site.

5 Software

5.1 On-line help

Most programs installed on the system have on-line help files installed in the form of manual (or "man") pages. The `man` utility is used to look up these files and display them on the terminal; at the prompt, type `man command` for detailed information on the command *command*. For instance, `man man` displays information on the `man` command. An X client, `xman`, is also available.

If you aren't exactly sure what man page might cover your question, you can try typing `apropos keyword`, which will attempt to find a list of man pages which seem to match *keyword*. It's not perfect, but it can be helpful.

Many GNU utilities have documentation in `info`. The `info` files are hypertext documents arranged in a topical hierarchy; when executed without options, `info` displays the top-level file.

The more sophisticated (or well-designed) programs often have built-in help systems. Failing that, documentation for many packages on our Linux systems might be found in the `/usr/doc` directory. Larger software packages which are installed in their own directories may have documentation stored there as well.

5.2 Basic Linux commands

It is impossible to cover all the Linux commands installed on our system in a document of this size; we strongly suggest that you check out one of the good introductory books on the subject in the Suggested Readings (section 11). The list below is just a quick overview of some of the more common commands.

Command	Action
<code>ls <i>somedirectory</i></code>	LiSt files in <i>somedirectory</i>
<code>cd <i>somedirectory</i></code>	Change Directory to <i>somedirectory</i>
<code>cp <i>file1 file2</i></code>	CoPy <i>file1</i> to <i>file2</i>
<code>mv <i>file1 file2</i></code>	MoVe <i>file1</i> to <i>file2</i>
<code>mv <i>file directory</i></code>	MoVe <i>file</i> into <i>directory</i>
<code>rm <i>file</i></code>	ReMove or delete <i>file</i>
<code>rmdir <i>directory</i></code>	ReMove DiRectory <i>directory</i> ; it must be empty
<code>less <i>file</i></code>	view contents of <i>file</i> a page at a time; an alternative to <code>more</code>
<code>which</code>	shows WHICH location a command is in
<code>where</code>	shows all places on the system in your <code>PATH</code> WHERE a command may be found
<code>ps</code>	shows all Processes you are running
<code>top</code>	shows the TOP processes using the most CPU time

5.3 Text editors

There are a wide variety of text editors available on our system. They range from editors which are easy to learn but lack sophisticated features, such as `pico`, to more advanced editors such as `vi`, `emacs`, and `nano`. The more advanced text editors tend to be more popular. The `vi` editor is an interactive screen-mode text editor widely used on Linux systems. GNU Emacs (`emacs`) is an extensible and readily customized screen-mode editor that includes full undo, automatic file backup, and many other powerful features. If you want a particular editor to be used as the default text editor by various applications, alter the lines `setenv EDITOR editor_name` and `setenv VISUAL editor_name` in your `.cshrc` file.

5.4 The X Window System

The X Window System (or “X” for short) is a network-transparent window system which runs on many kinds of computers. Each workstation operates an X “server” which can display windows for various programs (“clients”) running on your computer. In addition, these windows may be displayed across the network from one workstation to another.

The `xterm` or `rxvt` clients create windows that allow access to the Linux prompt under X as if the window was a terminal. You can have multiple `xterm` or `rxvt` clients running at the same time.

Text can be copied and pasted between windows with the mouse. Select text by dragging the mouse over it while holding down the left mouse button (turning it black). Move the mouse into another `xterm` or `rxvt` window. By clicking on the middle mouse button, you paste the selected text into that window.

Your `DISPLAY` environment variable tells X which X server to display a newly created window on. On login, this is the name of the workstation you’re looking at followed by `:0.0` (i.e., `blue.ima.umn.edu:0.0`). When you use `ssh -X` to remotely login to another machine, the `DISPLAY` variable is usually automatically set to the machine you’re logging in from.

Note: Some programs cannot be displayed on an arbitrary X terminal.

5.5 Compilers

On most of Linux workstations, the default C/C++ compiler is `gcc` 4.8.4 or later, installed as `cc` and `gcc` for C compiler and `g++` for C++ compiler. For sure, use `.c` extension for C language and use `.C` or `.cc` extension for C++ language. For Intel/(AMD) base machines, user can experience with new Intel C/Fortran compiler, `icc` and `ifc`.

A Fortran compiler is also installed on the system. By default the GNU Fortran compiler (`gfortran`), 4.8.4 is installed.

We currently have one commercial Fortran/C/C++ compiler on the Intel Linux workstation.

The Portland Group Fortran/C/C++ compiler is installed in `/usr/local/pgi/bin` on the computational servers.

Intel compiler is installed in `/usr/local/intel/`.

Compilers and interpreters for other languages are also available.

5.6 Math. Libraries

We have `blas` and `lapack`.

5.7 Mathematics packages

Mathematica is a symbolic manipulation and graphics package. It is available on all of our Linux workstations by typing `math` at the prompt. A *notebook* style version of Mathematica is available as an X client by typing `mathematica`. Documentation is a part of Mathematica.

MATLAB is a high-performance language for technical computing. It is intended for numeric calculations, particularly matrix manipulation. It has graphing capabilities, and an API that allows users to write C and Fortran programs that interact with MATLAB. Several toolboxes are available; check with the system staff if you have questions. MATLAB is installed on all of our Linux workstations, and is run by typing the command `matlab` at the prompt.

Maple is also installed on all Linux workstations as either `maple` or `xmaple`. Documentation is also available for Maple.

Comsol Multiphysics is a finite element analysis, solver and Simulation software / FEA Software package for various physics and engineering applications, especially coupled phenomena, or multiphysics. COMSOL Multiphysics also offers an extensive interface to MATLAB and its toolboxes for a large variety of programming, preprocessing and postprocessing possibilities.

Sage is a free open-source mathematics software system licensed under the GPL. It builds on top of many existing open-source packages: NumPy, SciPy, matplotlib, Sympy, Maxima, GAP, FLINT, R and many more. Access their combined power through a common, Python-based language or directly via interfaces or wrappers.

5.8 Statistical package

We have a **R**. R is a language which bears a passing resemblance to the S language developed at AT&T Bell Laboratories. It provides support for a variety of statistical and graphical analyses. R is a true computer language which contains a number of control-flow constructions for iteration and alternation. It allows users to add additional functionality by defining new functions. For more information, check `man R`. Rstudio is an IDE for R and can be run with the `rstudio` command.

5.9 Visualization packages

`gnuplot` is an interactive plotting program installed on all workstations. It can be run with commands from the keyboard or from a script file, and graphs can be displayed to an X client.

`techplot` is also available.

5.10 Graphics and drawing packages

GIMP, the GNU Image Manipulation Program, is a freely distributed package for image authoring, image composition, and photographic retouching, and is similar to Adobe Photoshop. It is currently installed on the Linux workstations as `gimp`. Man pages are available, as is on-line documentation at the <http://www.gimp.org/> website.

`display`, Image Magick, is a machine architecture independent image processing and display program. It can display an image on any workstation screen running an X server. `display` can read and write many of the more popular image formats (e.g. JPEG, TIFF, PNM, Photo CD, etc.). For more information, check `man display`.

`xfig`, Facility for Interactive Generation of figures under X11, is a menu-driven tool that allows the user to draw and manipulate objects interactively under the X Window System. For more information, check `man xfig`.

5.11 T_EX: Technical typesetting

The T_EX typesetting system is installed on all of our Linux workstations. By default, we use T_EX version 5 and L^AT_EX, accessible as `tex` and `latex` respectively. See the `tex` and `latex` man pages for more details.

When `tex` or `latex` are run on the T_EX file `paper.tex`, if it finds no errors it will process it and exit after creating the device-independent file `paper.dvi`. If there are errors, T_EX will halt and point the first one out, and pressing Enter will allow subsequent errors to be listed.

A PostScript file may be created directly from the DVI file by typing `dvips -o paper.ps paper.dvi`. The resulting PostScript file then may be printed normally (see section 6). You may preview a DVI file on your monitor with `xdvi`, or a PostScript file with `gv`.

A number of popular fonts and macro packages have been installed on the system, particularly if relevant to mathematics. If you can't find the package you need on our system, please let the system administrators know so that we may add it.

User can use the `pdftex` or `pdflatex` to generate a PDF file from TeX file without conversion from a PostScript to a PDF.

We also have a new package `prospcr`. This is a new LaTeX class for creating slides. It will do a trick as much as MS-PowerPoint does. It generates a PDF file. Check more information on <http://prospcr.sourceforge.net/>.

There is another package to generate a PowerPoint like PDF file from TeX file. `PPower4` is the one. `PPower4` is used to post process presentations in PDF format which were prepared using (La)TeX to add dynamic effects. Check more information on <http://www-sp.iti.informatik.tu-darmstadt.de/software/ppower4/>.

If you have questions related to using T_EX or L^AT_EX, please feel free to ask our systems staff. If you notice a problem with the T_EX software itself, please notify the system administrators.

`kile` (the KDE Integrated LaTeX Environment) is a user-friendly LaTeX source editor and TeX shell for KDE.

`Texmaker` and `TeXworks` are also installed on Linux workstations.

5.12 Web browsers, Skype, Dropbox, and Internet information

We currently have Firefox, Chrome and Chromium web browsers available on Linux workstations. By typing `firefox`, `chrome`, or `chromium` in the Ubuntu Dash menu you get our current default version.

Dropbox is installed on Linux workstations. Please send a request to help@ima.umn.edu if you have problems.

Skype is installed on all IMA Workstations.

Audio Setup

- System Sound Settings (Speaker Icon, Sound Settings)
- Set the Input to the webcam's microphone.
- In Skype, set both the input and output to PulseAudio
- Set video setting to use the webcam.

The University of Minnesota Libraries can be accessed at <http://www.lib.umn.edu/> Of particular interest may be the Mathematics Library on the third floor of Vincent Hall, Wilson Library on the West Bank (the main campus library), and the Science and Engineering Library currently operating in the Walter Library/Digital Media Center; see <http://math.lib.umn.edu/> and <http://sciweb.lib.umn.edu/>

`MathSciNet` is the American Mathematical Society's Web version of Mathematical Reviews and Current Mathematical Publications, the main indexes to mathematics literature published from 1940 to the present. The database includes all citations and reviews. Besides offering powerful search options, MathSciNet links directly to articles in many electronic journals from search results.

6 Printing

There are 5 public B/W duplex laser printers and 3 duplex Color laser printers.

6.1 Linux Printing

You can print an ordinary text file or PostScript (.ps) file with the command

```
lpr filename
```

Computers in Lind Hall print by default to **central** in the central Lind open space. To print to a different printer, type

```
lpr -Pprinter filename
```

where *printer* is one of the following printer names:

Name	Room	Location	Type
north	Lind 400	North Lind	HP LaserJet 2300DN, double-side
canon	Lind 400A	Central Lind	Canon ImageRunner C5180 MFC
color	Lind 400A	Central Lind	HP Color LaserJet 5500DN, double-side
central	Lind 407	Central Lind	HP LaserJet 8150N, double-sided
sys		South Lind Hallway	HP LaserJet 2300DN, double-sided
3rd		3rd F. Skyway Hallway	HP LaserJet 2300DN, double-sided
keller	3-176	Keller	HP LaserJet 2300DN, double-sided
maincolor	Lind 306C	3rd floor Lind	Konica Minolta C451

A number of other printers around the IMA are restricted to staff access only. Many of the printers have duplex units which can print on both sides of the page; for example, the **central** and **central-simplex** queues go to the same printer, but print two-sided and one-sided respectively. The **central/a4** printer is loaded with both US Letter paper (8.5 x 11") and A4 paper (210 x 297 mm). We ask that you restrain your use of the **color** printer to jobs that require color output.

To check the printer queue for a particular printer, type `lpq -Pprinter`. To remove a job from the printer queue, first use `lpq` to determine the job number *userid@machine+num* of your job, then type

```
lprm -Pprinter userid@machine+num.
```

6.2 Printing from Wireless

IMA printers are networked to allow printing from the *UofM Secure* and *Eduroam* wireless networks. You can add them as IP printers using the address *printername.ima.umn.edu*. i.e. 3rd.ima.umn.edu

6.3 Windows Printing

Our Windows Workstation has most of our printers installed.

Any of our printers can be added as an IP printer when connected to the IMA wired network or to the *UofM Secure* and *Eduroam* wireless networks. To add a printer to a Windows 7 laptop, follow these instructions.

- (1). Click **Start**.
- (2). Click **Devices and printers**.
- (3). Click **Add printer**.
- (4). Click **Select Add a local printer**.
- (5). Select **Create a new port**, then Click **Next**.
- (6). Select **Standard TCP/IP Port** then Click **Next**.
- (8). Enter a printer name for example **north.ima.umn.edu** then Click **Next**.
- (9). Click **Next** as **Standard Generic Network Card**.
- (10). Click **Next** to complete.
- (11). Select correct printer description.
- (12). Follow the rest of instructions.

If Windows can't find the correct driver, you might need to press the Windows Update button to have Windows look for more drivers.

6.4 Mac Printing

OS X can use lpd or install one of the IMA printers as and IP printer.

6.5 Poster Printing

The IMA can print posters up to 44 inches wide. We prefer to print posters 30"x40". Please send a PDF file formatted to 30"x40" to poster@ima.umn.edu and IMA staff will print the poster.

6.6 Printer Control Center

We have a printer control center web page to control printer after hours and weekend. The URL for the printer control center is <https://print.ima.umn.edu:631/printers/>.

The user will be prompted to log in. They should use their Linux username/password.

7 Mail

Use **thunderbird** with **SSL/TLS** and **IMAP** with **mail.ima.umn.edu** as In/Out mail server.

IMAP Server: mail.ima.umn.edu SSL/TLS Port 993

Outgoing SMTP Server: mail.ima.umn.edu SSL/TLS port 465

IMA e-mail accounts can send and receive attachments up to 100MB in size. Messages left in the trash folder will be deleted after 90 days.

7.1 WebMail

We have WebMail <https://webmail.ima.umn.edu>. People can check their email through a Web browser when they are away from the IMA.

7.2 Forwarding Mail

You can forward IMA email to another account by creating a file `$HOME/MailHome/.forward`. The `.forward` file should contain one line with the forwarding email address. If you are forwarding to a Gmail address (University email or personal), you can configure the Gmail account to send as your ima email. Go to settings, accounts, and under the Send mail as section, click on Add another email address you own. Follow the instructions.

7.3 Procmal

If you want to change your procmal, change `$HOME/MailHome/.procmalrc_personal`.

7.4 Spam and Viruses

We also have an e-mail virus scan and a SPAM filter on the mail server. The mail system will send a notice to the user if there is any e-mail virus. If user sets up a SPAM filter, mail system will send a SPAM notice to user. By default, we are using SpamAssassin and AMaVis for a spam filter and an e-mail virus checker.

Unless the user changes their `$HOME/MailHome/.procmalrc_personal`, caught spam mail will be in `$HOME/MailHome/.spam` folder.

More information about the SpamAssassin, check <http://spamassassin.org/>.

More information about the AMaVis, check <http://amavis.org/>.

When using an IMAP client such as Thunderbird, you will have the folders called *ham*, *spam*, and *missed-spam*. Messages flagged as spam will go into the spam folder. If you have a message marked as spam that is not spam, moving it to the ham folder will train your spam filter to not mark messages like that as spam. If you have spam in your inbox, move the message to the missed-spam folder to train your spam filter to flag messages like that as spam.

You can add email addresses to your whitelist by adding them to your `$HOME/MailHome/.spamassassin/user_prefs` file.

If you want to autotrain spamassassin, create the file `$HOME/MailHome/.spamautotrain`

In a terminal, run: `touch /MailHome/.spamautotrain`

Spam messages will be automatically deleted after 30 days and trash will be deleted after 90 days. Ham messages will be removed from the Ham folder nightly by the spam learning script.

7.5 Vacation

Users can activate a vacation message while they are gone. To activate a vacation message, create `$HOME/MailHome/.vacation.msg`.

To deactivate the vacation message:

- Remove/move the `$HOME/MailHome/.vacation.msg` file.
- Clean up `$HOME/MailHome/.vacation.cache`.

8 Digital scanning

We have two multi-function copiers that that have scan to email capabilities. They are the Canon copier on the 4th floor and the Maincolor copier on the 3rd floor. Instructions for scanning paper to PDF are posted next to the copy machines. Please note that IMA's incoming mail size is **100MB** but other destinations such as Gmail are limited to **25MB**.

9 Microsoft Office

Microsoft Office is available on the Windows and Apple machines on the 4th floor of Lind. Microsoft Office can be purchased for use on personal computers from <http://www.oit.umn.edu/technology-products>

9.1 LibreOffice/OpenOffice

We have LibreOffice installed on our workstations. To run LibreOffice, just type `libreoffice` in the Unity dash menu.

The entire suite contains;

- Native XML file format for small, yet powerful documents.
- The powerful LibreOffice.org API allows you to create external functions to leverage the power of the suite just how you need it.
- Ability to import many different types of documents and templates from a range of other programs.
- Ability to export to a huge range of formats from HTML to MS Office
- Functionality to import address book from Thunderbird or LDAP

It has most MS-Office features.

- WRITER - Word Processor
- CALC - Spreadsheet
- DRAW - Drawing
- IMPRESS - Exploits all the effects and graphics tools from Draw

Check <http://www.libreoffice.org/> for more information.

10 Transferring files

10.1 scp: Secure Copy

The `scp` command can be used to copy files between two hosts on the network. Unlike the older `rcp` utility, `scp` uses `ssh` for improved security and will prompt you if it needs a password or passphrase for authentication.

`scp` works much like `cp`, except that any file name may contain a hostname or username to indicate the file is to be copied to or from that host. For example, the command

```
scp smithj@example.edu:/ima/home/smithj/show.ppt smith-show.ppt
scp smith-show.ppt smithj@shell.ima.umn.edu:/ima/home/smithj/show.ppt
```

would connect to the machine `example.edu` using the account `smithj` (prompting you for any necessary password), and copy the file `/home/smithj/show.ppt` on that machine to `smith-show.ppt` in the current directory on your workstation. If you omit the username but specify a machine name, `scp` will assume the username on the remote machine is the same as your local username at the IMA.

- `scp` needs to be able to make an `ssh` connection to the remote machine in order to function.
- WinSCP is a nice Windows version of `scp`. Source for WinSCP is <http://winscp.sourceforge.net/eng/>.
- Filezilla is an excellent free graphical file transfer application that supports secure file transfer and has been ported to Linux, OS X, and Windows.

10.2 ftp: File Transfer Protocol

FTP is not secure and is not supported by the IMA. Please use `scp` or `sftp` protocol with Filezilla.

10.3 Flash drives and CD/DVD disks

User also can mount `Flash drives` and/or `cdrom`. Ubuntu will handle mounting. You should be able to use Linux commands to copy, delete, and read those files.

11 Suggested Reading

Abrahams, Paul W. and Bruce R. Larson. 1997. *Unix for the Impatient*, 2nd. Ed. Reading: Addison-Wesley.

Hekman, Jessica, et al. 1999. *Linux in a Nutshell*, 2nd. Ed. Sebastopol, CA: O'Reilly and Associates.

Both these books are good general introductions to Linux. While the second book is written specifically for Linux, most of the material in it is applicable to other Linux operating systems.

Quercia, Valerie and Tim O'Reilly. 1993. *Volume 3: X Window System User's Guide*. Sebastopol, CA: O'Reilly and Associates.

This volume is the basic user guide for the X Window System. While written for X11R5, almost all of the material is still valid for later revisions of X.

Knuth, Donald E. 1989. *The T_EXbook*. Reading: Addison-Wesley.

Lamport, Leslie. 1994. *L^AT_EX: A Document Preparation System*, 2nd Ed. Reading: Addison-Wesley.

Donald Knuth is the inventor of the T_EX typesetting system, which he wrote to typeset his magnum opus, *The Art of Computer Programming*. Leslie Lamport then developed L^AT_EX as a higher-level command set for use with T_EX. This document was typeset using L^AT_EX 2_ε.

Kernighan, Brian W. and Dennis M. Ritchie. 1988. *The C Programming Language*, 2nd Ed. Englewood Cliffs: Prentice-Hall.

Stroustrup, Bjarne. 1997. *The C++ Programming Language*, 3rd Ed. Reading: Addison-Wesley.

These two texts are the definitive references for the C and C++ programming languages. Be sure to get the editions listed for each of these books, since there are many important changes from prior editions.

DuBois, Paul. 1995. *Using csh and tcsh*. Sebastopol, CA: O'Reilly and Associates.

Wall, Larry, Tom Christiansen, and Randall L. Schwartz. 1996. *Programming Perl*, 2nd Ed. Sebastopol, CA: O'Reilly and Associates.

The IMA uses `tcsh` as our standard interactive shell, and small scripts may be written with it. However, if you plan to write scripts of any length, we suggest you check out the Berkeley shell (`sh` or `bash`), or Perl, both of which are superior scripting languages to `tcsh`.

Geist, Al, Adam Beguelin, Jack Dongarra, Weiching Jiang, Robert Manchek, and Vaidy Sunderam. 1994. *PVM: Parallel Virtual Machine — A User's Guide and Tutorial for Networked Parallel Computing*. Cambridge, MA: MIT Press.

Gropp, William, Ewing Lusk, and Anthony Skjellum. 1996. *Using MPI: Portable Parallel Programming with the Message Passing Interface*. Cambridge, MA: MIT Press.

MPI and PVM are packages to make portable parallel programming possible. MPI is the newer and currently more popular system, but there is still a lot of code in existence which uses PVM. Both packages work with Fortran or C/C++.