



# *The Ultimate IBM on Linux Workshop for Windows Admins*

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**BLUG**  
Benelux Lotus User Group



- Regulatory compliance expert in the field
- Written multiple articles on compliance and eDiscovery
- Speaker at 20+ Lotus® related conferences/LUGs
- Co-authored two IBM® Redbooks on Linux®
- Designed disclosure response solutions for Fortune® 100, medium-sized, and small established regulated firms
- IBM Champion for Collaboration Solutions
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What's your Linux experience?



- Course will cover as much information as possible in the time allotted
- Attendees are encouraged to ask questions
- *Geared towards seasoned Windows admins that are new to Linux, rather than the Linux expert*
- Although not designed to make you an expert...
  - You should have a significantly higher level of confidence
  - Be proficient in many aspects
  - Comfortable enough to try Linux in your work place, or at home

Your Moment of Zen...

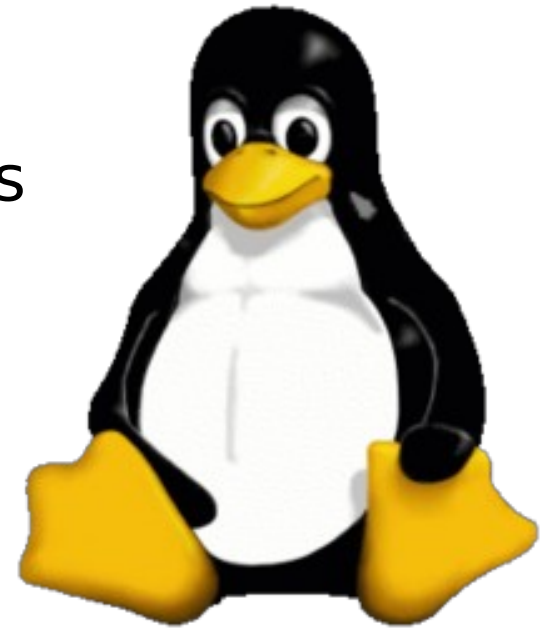
**M W L U G**  
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AUGUST 15-17, 2012



**THOMAS SALUR**



- Introduction
- Basic Theory and Installation
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- Never need to worry about drive letters
- Can mount most every subdirectory anywhere
  - Path remains the same
- Common top-level directories
  - opt - option programs
  - var - variable files (e.g. log files)
  - home - user directories and writable space
  - tmp - temporary files written here
  - root - administrator's (root's) secure space
  - usr - "everything else"; user accessible files, exe
  - etc - configuration files
  - boot - boot loader





- Bin - Essential command binaries
- Dev - Device files
- Lib - Essential shared libraries and kernel modules
- **Media - Contains mount points for replaceable media**
  - Primarily on desktop systems
- Mnt - Mount point for mounting a file system temporarily
- Proc - Virtual directory for system information (2.4 and 2.6+ kernels)
- Sbin - Essential system binaries
- Sys - Virtual directory for system information (2.6+ kernels)
- Srv - Data for services provided by the system



- Bourne Again SHell
- Most common shell on servers and desktops
  - Easiest to use, with great additions
- Learn some of the features to make things easy
  - Auto-fill; command and file completion
  - Configuration files
    - Store customized short cuts
    - Functions
    - Shell settings
  - File structure
    - Displaying hidden files -- “ls -a” | “ls -al”
    - Navigation -- view application specific configuration files



- Disk drives are stored differently than Windows
- Structure is intuitive
  - SCSI - /dev/sda, /dev/sdb
  - IDE - /dev/hda, /dev/sdb
- Partitions appended numerically
  - /dev/hda1, /dev/sda1, /dev/sda2
- Commands
  - mount, df -h
  - less /etc/fstab
- Tools: partman, cfdisk



- To setup multiple partitions on your desktop, acquire the Ubuntu alternate installer
- Creating an LVM? Absolutely enter a value for label
  - Ensure it is descriptive, covering what the data will be there later
    - E.G. volgrp01-home, volgrp02-vmware
    - *You will thank me for this one tip later*
  - Red Hat's Disk Druid is much better with LVMs
  - Adjust *typical usage* for each partition
    - Standard = one inode per 1kB block
    - news = one inode per 4kB block
    - largefile = one inode per 1MB block
    - largefile4 = one inode per 4MB block



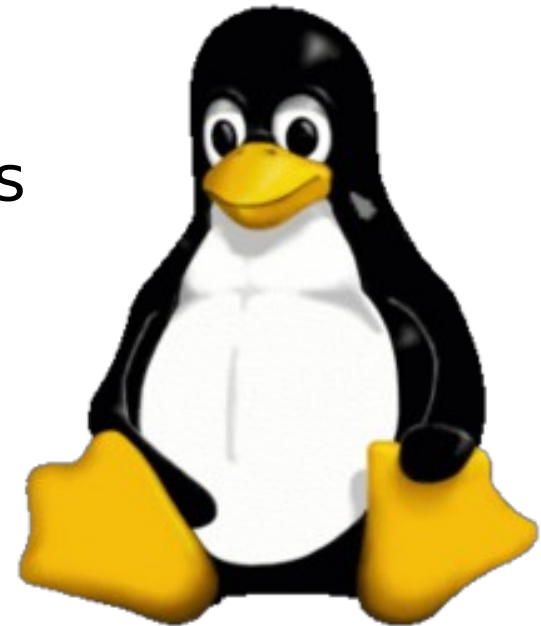
- /boot = 200MB
- Create an LVM or two for the rest
- Use multiple swap partitions
- Tip: Always keep the filesystems  $\geq 10\%$  to avoid fragmentation, else drive performance will degrade



- All NICs are mapped to a device, prefaced with type
  - e.g. eth0, wlan0
- Main files
  - Ubuntu
    - /etc/network/interfaces
  - Red Hat
    - /etc/network/<x>
- DNS is stored in the resolver
  - /etc/resolv.conf
- /etc/hosts
- Advanced Tool: route
  - RTFM before use



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- Includes a plethora of free tools, many are useful
- Administration privileges: `sudo` or `su` - and use root
- What is my partition block size?
  - `#tune2fs -l /dev/sda1 | grep -i 'block size'`
- Abridged list of my most frequently used commands

`less`

`top`

`tar`

`ifconfig`

`rpm`

`ssh/scp`

`cp`

`mv`

`man`

`chmod`

`chown`

`rm`





Some additional applications that may be valuable, or assist with learning

	Package Names	
iostat (not installed by default)	vmstat	pmap
uptime	mpstat	cal
netstat	iptraf	grep
whatis	which	gzip



- ImageMagick: converts any image file to any format
  - `$man imagemagick` to get list of tool names
- Webmin is a great all-around administration portal
  - <http://webmin.com>
  - More challenging on Ubuntu 12, but not necessary for a desktop
  - Use primarily on servers
- To convert text files that do not wrap properly
  - `$sudo apt-get install dos2unix`

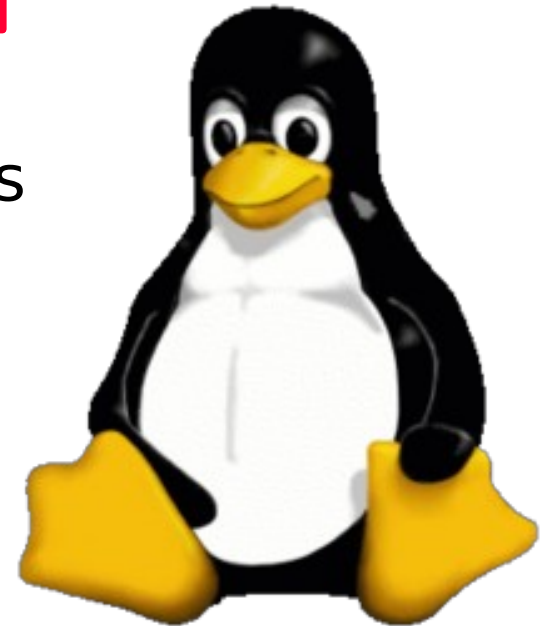


- Getting help
  - `$man <command>`
  - `$whatis <command>`
  - `$which <command>`
- Tar is very unforgiving; be certain you type the syntax correctly
  - This is your only warning
  - First argument **must** be either: [a, c, t, x]

User Account Management Commands			
Scope	Create	Remove	Profile Edits
User	<code>#useradd</code>	<code>#userdel</code>	<code>#usermod</code>
Group	<code>#groupadd</code>	<code>#groupdel</code>	<code>#groupmod</code>

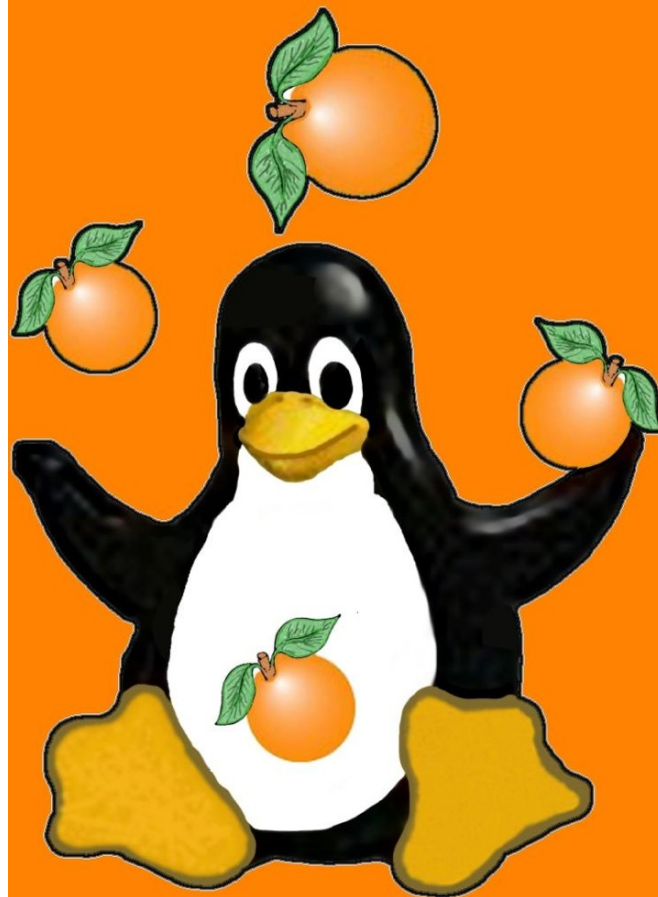


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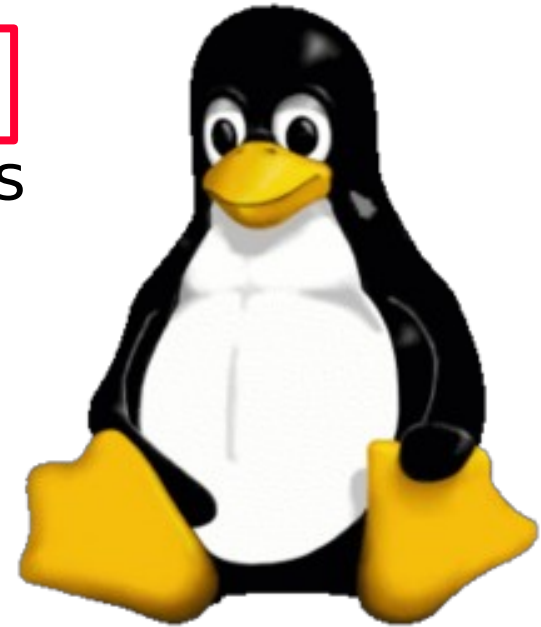


- Excellent for shell scripting, modifying INI files
  - Avoid updating your resume with it
- Most distros map vi to vim (vi Improved)
- Two modes: edit (insert) and navigate
- Safe learning available `$vimtutor`
- Leaving insert mode: depress Esc
- Entering insert mode: depress i
- When you leave insert mode, the same keys navigate
- Useful features: `.`, `<n>x`, `<n>Shift-G`, `dd`, `dw`, `:wq`





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- BASH scripts must include `#!/bin/sh` on first line
- Use `vi` (or your other favorite editor) to create
- Set to executable status with `chmod` when done
- Append `“.sh”` to easily identify the script
- Use `#` in first column to create comments after row one in the file
- N.B. Ensure that you set as executable when done
  - Hint – use `chmod`





- Example to make a quick backup of files

```
#!/bin/sh
# Create a tar file from home, dump to USB HD along with a TOC for the archive
# -----
tar cvzf /media/WD_1.5TB_EXT4/t60p/backups/09.mar.2010.home.tgz /home/bill
tar tvzf /media/WD_1.5TB_EXT4/t60p/backups/09.mar.2010.home.tgz >
/media/WD_1.5TB_EXT4/t60p/backups/09.mar.2010.home.toc
```



- Examples to mount and unmount file systems located on a second HD

```
#!/bin/sh
# Mount the pieces of SDB
# sudo -i
mount /dev/LVM/home /home/sdb.home/
mount /dev/LVM/local /local
mount /dev/LVM/opt.ibm /opt/sdb.ibm/
mount -r -t ext3 /dev/sdb7 /sdb/boot
mount -r -t ext3 /dev/sdb6 /sdb/root
```

```
#!/bin/sh
# Umount the pieces of SDB
# sudo -i
umount /dev/mapper/LVM-home
umount /dev/mapper/LVM-local
umount /dev/mapper/LVM-opt.ibm
umount /dev/sdb7
umount /dev/sdb6
```



## Scripting with ssh is easy to do

- Edit `.bashrc` or `.bash_profile`
- Create an *alias* to save time accessing servers

```
#alias la='ls -A'  
#alias l='ls -CF'  
alias ll='ls -l'  
alias sshess='ssh -p 12345  
FooGetsInNotYou@roma.testdomain.com'  
alias sstest='ssh bill@server2.test.com'
```



Alias takes static commands, as it uses a literal  
How do you pass an argument to an alias in your  
*.bashrc* file?

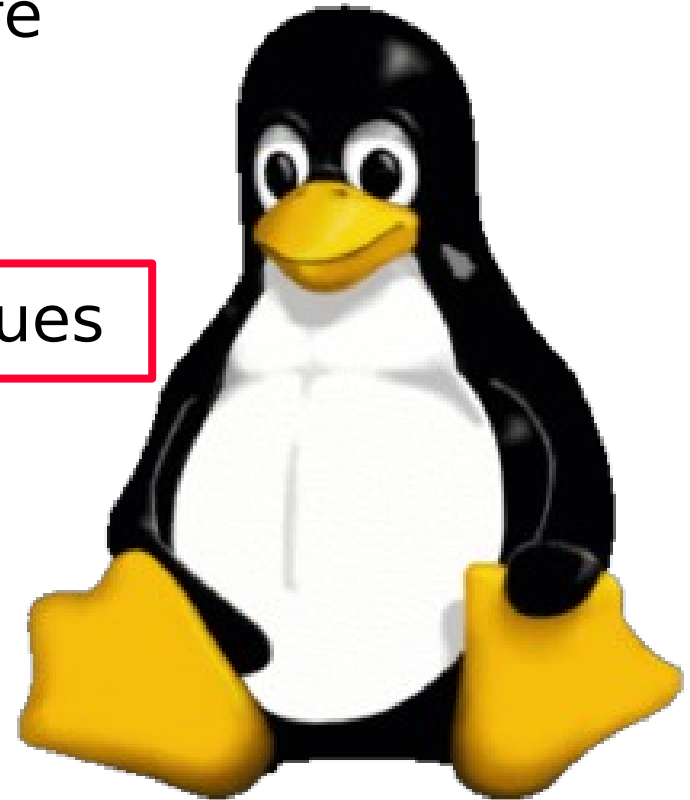


## Use a function

```
function scpess () { scp -P 12345 $1  
FooGetsInNotYou@roma.testdomain.com:/dl/dom  
ino85 ; }
```



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- Red Hat – RPM – The industry standard
  - Installs local tools, helps manage them
  - Red Hat Package Manager
  - Rpm -qa
  - Rpm -qi <Installed\_package\_entry>
  - Rpm -ivh <package\_name>.rpm
  - Use wildcards to precisely install multiple files
  - Rpm - e <package\_name>
- Remote Management
  - Yum – Yellowdog
    - Update applications, pull down from server
  - RHN – Red Hat Network



- Ubuntu - Debian based package management
  - Dpkg
  - Local packages
  - `$ sudo dpkg -i <package_file>`
  - `$ dpkg-deb or dpkg -I <package_file>`
- Remote management
  - Apt-get
  - `$ sudo apt-get remove -purge 2.6.27-7-*`
- If new, then the GUI for desktop can be beneficial
  - Just point and click to install
  - Use the Ubuntu Software Center to remove





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- IBM/Lotus application installation uses the tools we discussed in this session
  - Tar
  - Ssh
  - Gunzip
  - Rpm
  - Vi
- The rest is easy... just tab and type
- All the IBM software programs, when installed on Linux use most of these basic tools to get started
  - Even if the installation requires a browser



- Each application has specific Linux requirements
- Domino has three key components for Red Hat
  - Install non-standard issue library files
  - Disable SELinux and XGL (SUSE too)
  - Set ulimits to unlimited
- Always RTFM
  - Know you may need to go back a few versions to get the full story
- Bonus
  - Install gdb before you need it
    - Critical tool for any server crashes



## Read this technote

- Contains the latest on IBM Domino 9 OS requirements, patch levels, and support notations
- <http://tinyurl.com/d73zoqs>



- Domino 9 includes an excellent OS checking tool
  - Indicates which library files you need
  - Prevents Domino from installing until satisfied
  - Run manual: `#perl checkos.pl -f checkos.dat`



```
root@localhost:/home/bill/Downloads/ND9/se/linux64/domino
File Edit View Search Terminal Help
eclipsemodsrc.zip  mozillamodsrc.zip  tools
install            remote_script.dat  unix_response.dat
[root@localhost domino]# ./install

IBM Domino for Unix Install Program
-----
```

To run this installer you need 32bit (i686) packages installed on your 64 bit Linux RedHat.

They are not installed by default, but are mandatory. The installer will exit after this message.

```
libXtst-1.0.99.2-3.el6.i686
libXmu-1.0.5-1.el6.i686
libXft-2.1.13-4.1.el6.i686
libXi-1.3-3.el6.i686
libstdc++-4.4.4-13.el6.i686
```



- Running the checkOS manually

```
root@localhost:/home/bill/Downloads/ND9/ee/linux/tools
File Edit View Search Terminal Help
[root@localhost tools]# perl checkos.pl -f checkos.dat
```

```
OS: Linux 2.6.32-358.0.1.el6.x86_64
MACHINE: x86_64
```

The following OS patches or higher are missing. Please update all patches before starting the Domino Server.

```
libXtst-1.0.99.2-3.el6.i686
libXmu-1.0.5-1.el6.i686
libXp-1.0.0-15.1.el6.i686
libXft-2.1.13-4.1.el6.i686
libXi-1.3-3.el6.i686
libstdc++-4.4.4-13.el6.i686
```



- Utilizing package management software
  - Yum on Red Hat makes it simple
  
- Powerful command sequence
  - `#yum install libXtst.i686`
  - `#yum install libXmu.i686`
  - `#yum install libXft.i686`
  - `#yum install libXi.i686`
  - `#yum install libstdc++.i686`
  - `#yum install libXp-1.0.0-15.1.e16.i686`





```
[root@localhost linux]# sestatus
SELinux status:                enabled
SELinuxfs mount:              /selinux
Current mode:                  enforcing
Mode from config file:        enforcing
Policy version:                24
Policy from config file:      targeted
[root@localhost linux]#
```



- Edit file via vi, then set to disable

```
[root@localhost linux]# vi /etc/selinux/config
```

```
root@localhost:/home/bill/Downloads/ND9/ee/linux
File Edit View Search Terminal Help

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
# SELINUX=enforcing
SELINUX=disabled
# SELINUXTYPE= can take one of these two values:
#   targeted - Targeted processes are protected,
#   mls - Multi Level Security protection.
SELINUXTYPE=targeted
```



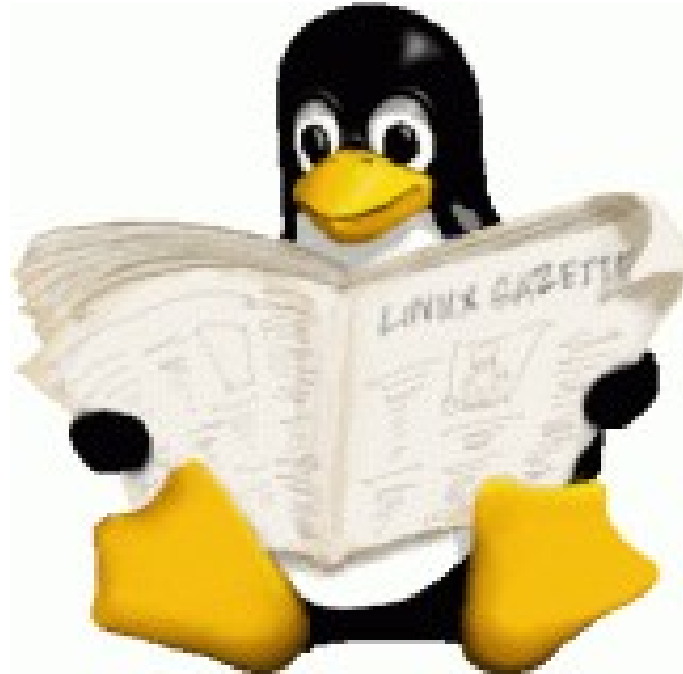
```
[root@localhost ~]# sestatus  
SELinux status: disabled
```





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- Bill Mal's Linux Section -- <http://www.billmal.com/billmal/billmal.nsf/dx/linux-links.ht>
- IBM's Linux Portal: <http://ibm.com/linux>
- Linux: The Era of Open Innovation  
<http://www-03.ibm.com/ibm/history/ibm100/us/en/icons/li>
- TCO IBM/Linux versus Microsoft
  - [ftp://ftp.software.ibm.com/pub/lotusweb/competitive/Linux-Windows\\_TCO\\_Presentation.pdf](ftp://ftp.software.ibm.com/pub/lotusweb/competitive/Linux-Windows_TCO_Presentation.pdf)
- Fun -- Tux in Kernel Code <http://www.100mb.nl/>





- Red Hat Versus Free Linux Cost Analysis

<http://tinyurl.com/8le8ewo>

- Manually uninstalling VMware

<http://kb.vmware.com/selfservice/microsites/search.do?la>

- Installing Lotus Notes 8.5.x on Ubuntu 12.04

<http://usablesoftware.wordpress.com/2012/05/04/install-lc>

- Problems launching VMware on Ubuntu, post reboot?

<http://raywoodcockslatest.blogspot.com/2010/05/resuming>

- IBM and RedHat show how KVM can deliver highest storage I/O rates ever reported - 50% higher than competition <http://ibm.co/XDtuQp>





# Running Linux inside of Windows, natively





- Get the files: <http://cygwin.net/>
- Install the base first,
  - Then go back to the same server and install additional files
  - Timeouts are tricky and you can waste time otherwise
- Base install, then the following programs
- Admin -> cron
- Archive -> unzip, zip
- Devel -> bashdb (optional, but select if you want to try BASH scripting at some point, as it can help with debugging)



- GParted Partition Editor
- Dropbox
- Ubuntu restricted extras
- GIMP Image Editor
- Secure shell (SSH) server (if needed to put files locally from other areas)
- The Network Mapper – utility for network exploration or security auditing



- Editors -> vim, vim-common, xxd, and if you want to edit binary files, try bvi
- Graphics -> GraphicsMagick, ImageMagick, bmp2png
- System -> ping, util-linux
- Text -> a2ps, enscript (one of my favorite programs)
- Utils -> hdparm (only use in read mode, but provides useful info on your local HD), xtail



- If you encounter an installation program which requires an X Window environment,
  - Go back and install the X11 environment with Gnome or KDE
  - Otherwise, keep it simple.
- The nice thing about the installation program, is that once you run the first install, if your selected options require additional files that you omitted, you will be prompted accordingly: <next slide>
- Then it will install the newly selected files.



**Cygwin Setup - Resolving Dependencies**

**Resolving Dependencies**  
The following packages are required to satisfy dependencies.

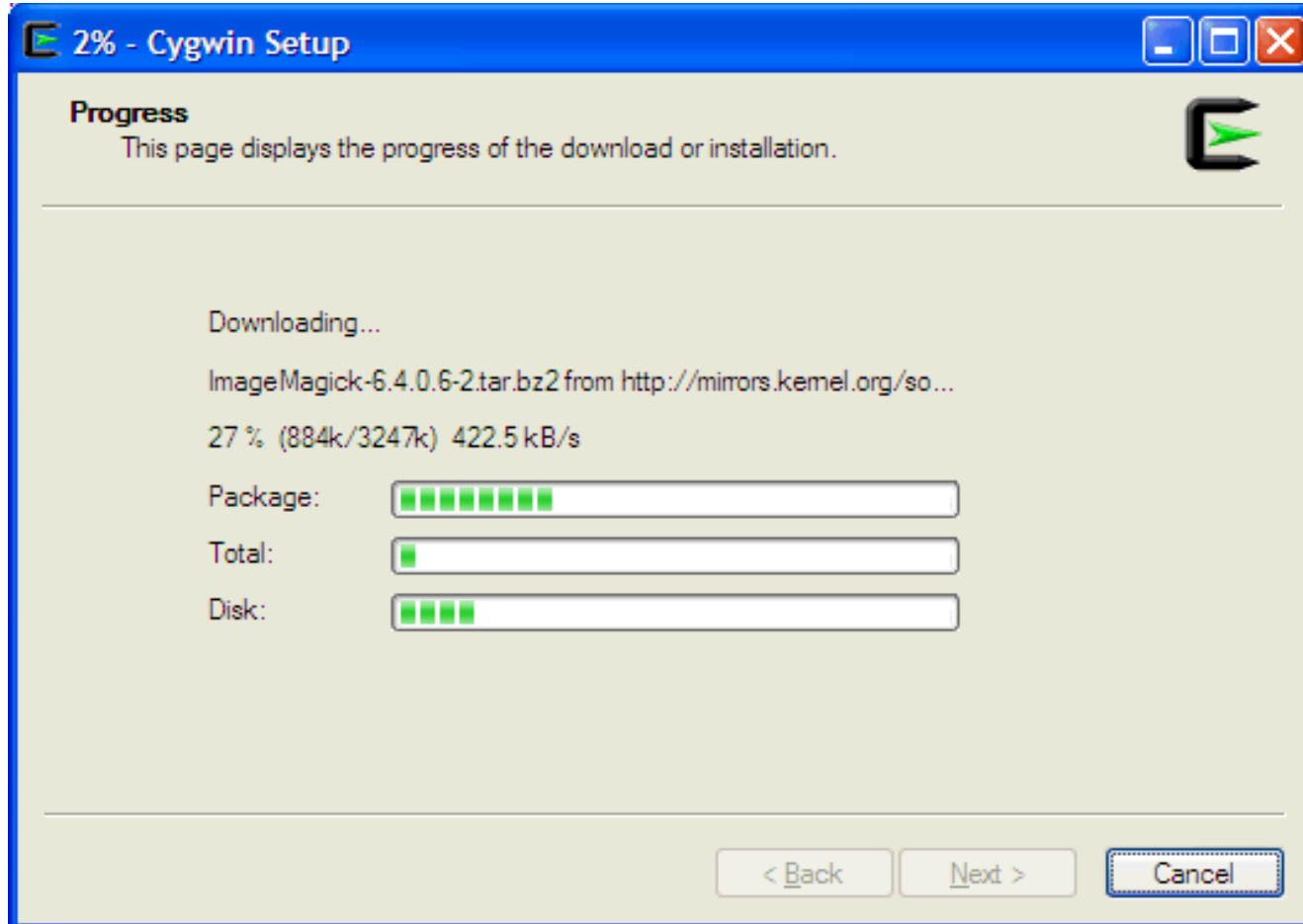
crypt	(1.1-1)	Encryption/Decryption utility and library Required by: perl
ed	(1.0-1)	The GNU version of the original UNIX line editor Required by: tetex-bin
font-encodings	(1.0.4-1)	X.Org font encodings Required by: font-ibm-type1

Select required packages (RECOMMENDED)

< Back    Next >    Cancel



And unlike Windows, the histograms are actually accurate.





**Cygwin Setup - Installation Status and Create Icons**

**Create Icons**  
Tell setup if you want it to create a few icons for convenient access to the Cygwin environment.

- Create icon on Desktop
- Add icon to Start Menu

**Installation Status**  
Installation Complete

< Back    Finish    Cancel





- How can I help you?

