

WHOIS LINUX

Ivaylo Toshev
CIO

Unimasters Logistics



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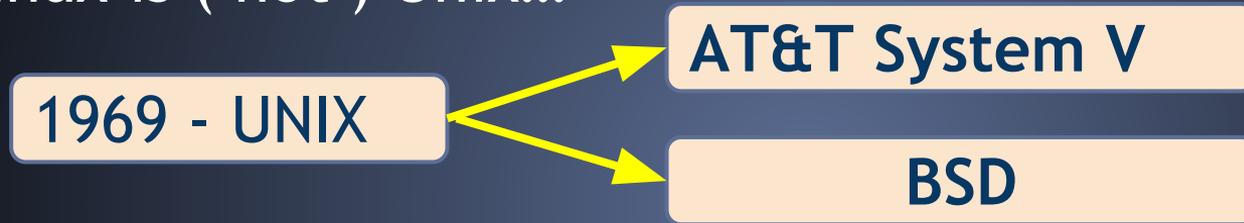
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Linux - A Short CV

Linux is (not) Unix...



1983 - Richard Stallman starts GNU Project

1985 - Intel released i80386 CPU with 32bit instruction set

1986 - Maurice J. Bach of AT&T Bell Labs published “The Design Of the Unix Operating System”

Linux - A Short CV

1987 - MINIX a Unix-like system intended for academic use, was released by Andrew S. Tanenbaum

In the early nineties a commercial UNIX operating system for Intel 386 PCs was too expensive for private users.

Linux - A Short CV

1991 - Linus Torvalds began a project that later became the Linux Kernel

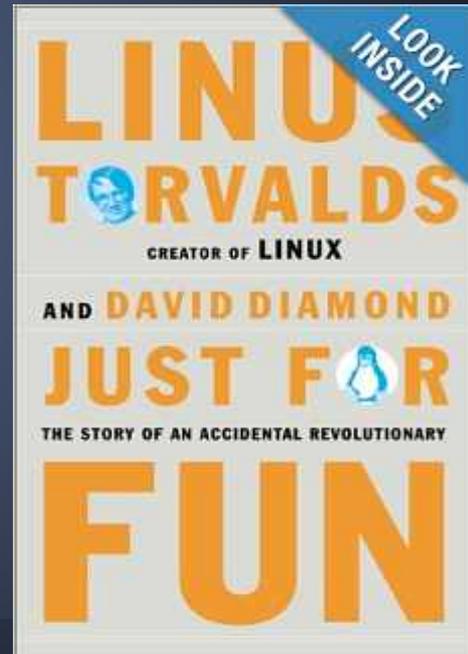
*Hello everybody out there using minix -
I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).*

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

Linus (torvalds@kruuna.helsinki.fi)

PS. Yes – it's free of any minix code, and it has a multi-threaded fs. It is NOT portable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-).

—Linus Torvalds ^[12]



MEMORABLE LINUX MILESTONES

CELEBRATING 20 YEARS OF LINUX

LINUS TORVALDS POSTS FAMOUS MESSAGE - "HELLO EVERYBODY OUT THERE..." - AND RELEASES FIRST LINUX CODE



1991

SLACKWARE BECOMES FIRST WIDELY ADOPTED DISTRIBUTION



1993

TECH GIANTS BEGIN ANNOUNCING PLATFORM SUPPORT FOR LINUX



1998

IBM RUNS FAMOUS LINUX AD DURING THE SUPERBOWL



2003

THE LINUX FOUNDATION IS FORMED TO PROMOTE PROTECT AND STANDARDIZE LINUX LINUX IS A FELLOW



2007

LINUX TURNS 20 AND POWERS THE WORLD'S SUPERCOMPUTERS, STOCK EXCHANGES, PHONES, ATMS, HEALTHCARE RECORDS, SMART GRIDS, THE LIST GOES ON



2011



LINUS LICENSES LINUX UNDER THE GPL, AN IMPORTANT DECISION THAT WILL CONTRIBUTE TO ITS SUCCESS IN THE COMING YEARS



LINUS VISITS AQUARIUM, GETS BIT BY A PENGUIN AND CHOOSES IT AS LINUX MASCOT



RED HAT GOES PUBLIC



LINUS APPEARS ON THE COVER OF BUSINESSWEEK WITH A STORY THAT HAILS LINUX AS A BUSINESS SUCCESS



THE LINUX-BASED ANDROID OS OUTSHIPS ALL OTHER SMARTPHONE OSes IN THE U.S. AND CLIMBS TO DOMINANCE



THE LINUX FOUNDATION
<http://www.linuxfoundation.org/>

*<http://www.bhratbrij.com/>

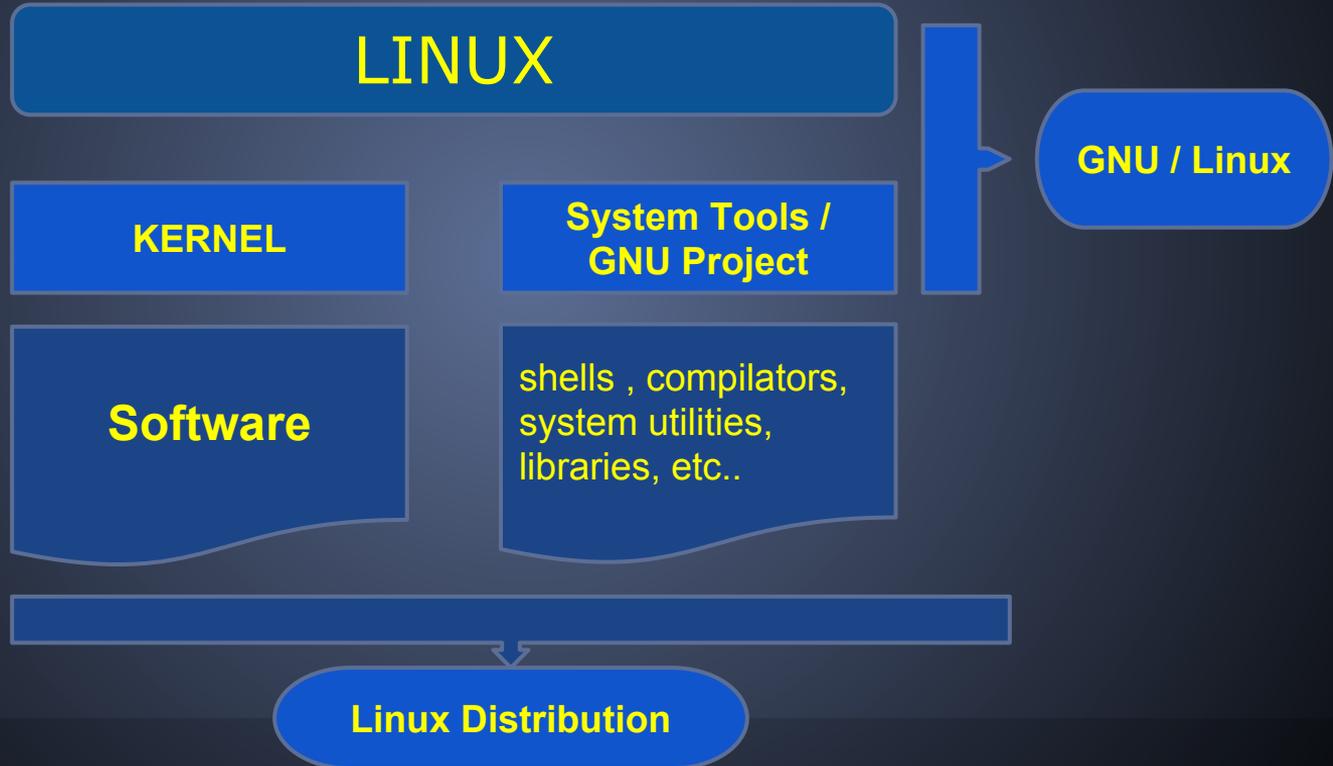
Linux - A Short CV

GNU GPL v2 / v3

GPL гарантира на потребителите на компютърни програми следните права (още наричани „свободи“):

- *Свободата да ползват* програмата за каквато и да е цел;
- *Свободата да изучават* как работи програмата и да я променят (достъпът до изходния код е необходима предпоставка за това);
- *Свободата да разпространяват* копия;
- *Свободата да подобряват програмата* и да дават на обществото достъп до подобренията (достъпът до изходния код е необходима предпоставка за това).

What is a Linux Distribution



What is a Linux Distribution

Hundreds and counting...

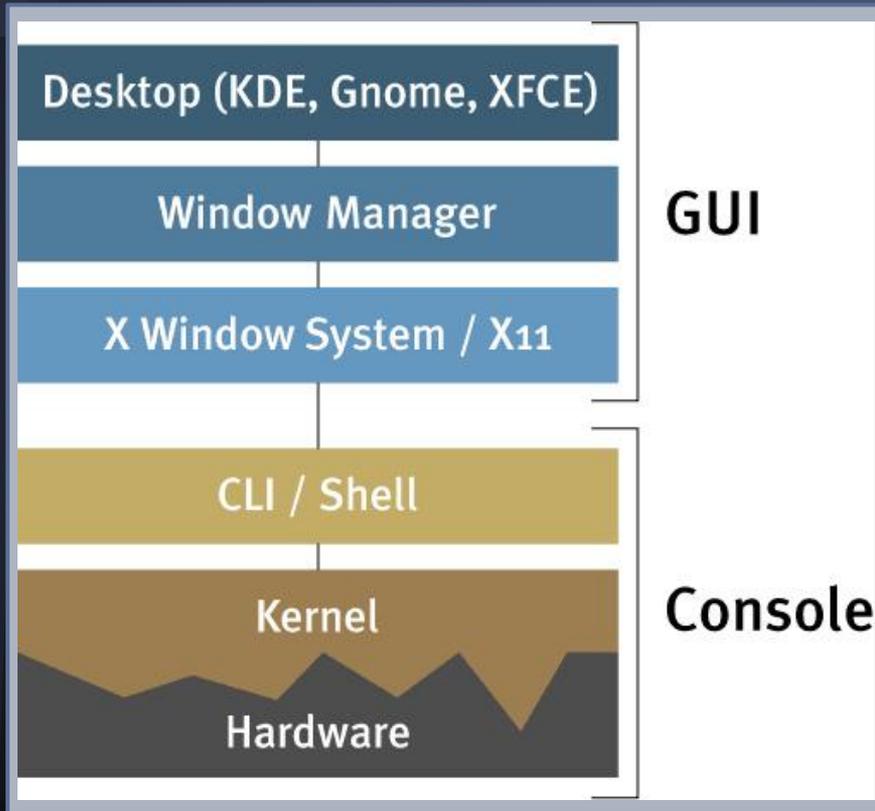
MOST FAMOUS

- RedHat EL
- Fedora
- Ubuntu
- Debian
- SuSE (Novell)

All Linux Distributions

Any "size" for everyone...

What is inside ?



Command Line Interface

- TTY Consoles
 - BASH shell
 - KSH (korn shell)
 - CLI utilities
 - CLI applications

Graphical User Interface

- X Window System / X11
 - X Server
 - X Clients
 - Applications
 - Window Manager
 - Desktop Environments

What is Inside ?

LINUX BOOT PROCESS

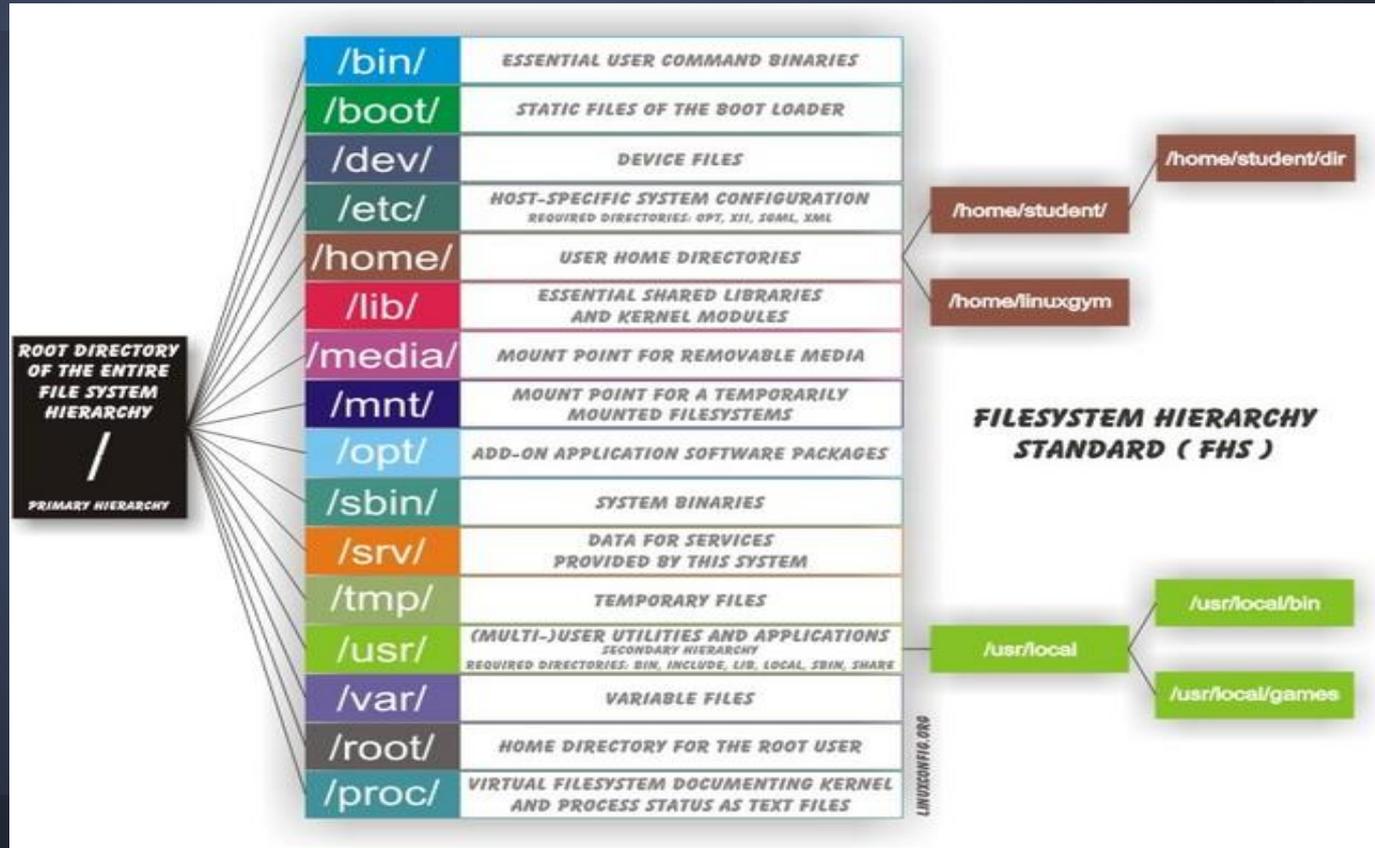
BIOS	Basic Input/Output System executes MBR
MBR	Master Boot Record executes GRUB
GRUB	Grand Unified Bootloader executes Kernel thegeekstuff.com
Kernel	Kernel executes /sbin/init
Init	Init executes runlevel programs
Runlevel	Runlevel programs are executed from /etc/rc.d/rc*.d/

What is Inside ?

Run Level	Name	Description
0	<i>Halt</i>	Shuts down all services when the system will not be rebooted.
1	<i>Single User</i>	Used for system maintenance. No Networking capabilities.
2	<i>MultiUser</i> <i>No Network Support</i>	Used for maintenance and system testing.
3	<i>MultiUser</i> <i>Network Support</i>	Non-Graphical Text Mode operations for server systems.
4	-	Custom Mode, used by SysAdmin
5	<i>Graphical</i> <i>X11</i>	Graphical login with same usability of Run Level 3.
6	<i>Reboot</i>	Shuts down all services when the system is being rebooted.

What is Inside ?

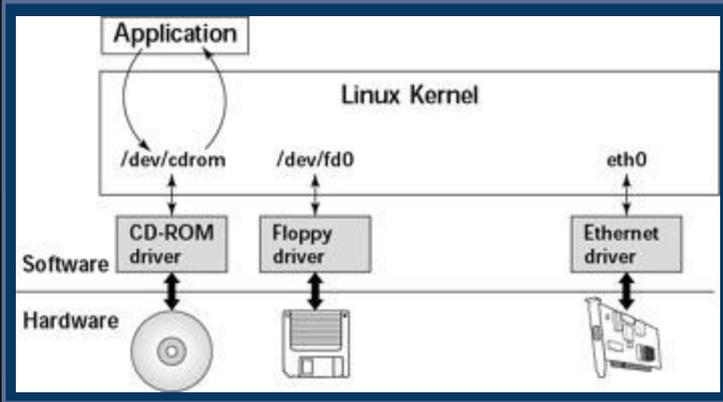
LINUX FILE SYSTEM



What is Inside ?

Everything is file ...

Hardware Devices /dev



/proc File System Tree

```
(josh)- (jobs:1)- (/proc)
(! 474)-> cat cpuinfo
processor      : 0
vendor_id    : GenuineIntel
cpu family   : 6
model        : 15
model name   : Intel(R) Core(TM)2 CPU           6600 @ 2.40GHz
stepping     : 5
cpu MHz      : 1596.000
cache size   : 4096 KB
physical id  : 0
siblings     : 2
core id      : 0
cpu cores    : 2
apicid       : 0
initial apicid : 0
fpu          : yes
fpu_exception : yes
cpuid level  : 10
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtr
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall
_tsc arch_perfmon pebs bts rep_good aperfmperf pni dtes64 monitor
tm2 sse3 cx16 xtpr pdcm lahf_lm tpr_shadow
```

Block Device files brw-rw---- 1 root disk 3, 0 Feb 16 14:50 /dev/hda

Character Device files crw-rw---- 1 root uucp 4, 64 Feb 16 14:50 /dev/ttyS0

Software and Package Managers

Unnumbered Software Sources:

- Source Tarballs (.tgz, .bz2)
- Dedicated Repositories (rpm, dpkg)

Software and Package Managers

Software Package Management Systems

- **DPKG**

used originally by Debian and now by other systems like Ubuntu, uses the .deb format and was the first to have a widely known dependency resolution tool

- **RPM**

created by Red Hat, and is now used by a number of other Linux distributions. RPM is the Linux Standard Base packaging format and is the base of a large number of additional tools, including apt4rpm; Red Hat's up2date; openSUSE's ZYpp; and YUM, which is used by Fedora, Red Hat Enterprise Linux , and Yellow Dog Linux.

Software and Package Managers

Advanced Packaging Tools

- **APT**

or **APT**, is a free software user interface that works with core libraries to handle the installation and removal of software on the Debian GNU/Linux distribution and its variants

- **YUM**

The **Yellowdog Updater, Modified (yum)** is an open-source command-line package-management utility for Linux operating systems using the RPM Package Manager

Basic Networking

What networking protocols does Linux support ?

- TCP/IP v.4 / v.6
- IPX/SPX
- AppleTalk
- WAN Networking (X.25, Frame-Relay, etc...)
- ISDN
- IPSec
- PPP
- ----

Basic Networking

Device Names

- Ethernet Device: /dev/ethX (where X=0,1,2 ...)
- Additional IP addresses: ethX:Y (where Y=0,1,2)
- VLAN Devices: ethX.Y (where Y=VLAN ID)

Basic Networking

Command-Line Tools

ifconfig

```
# ifconfig eth0 192.168.7.2 netmask 255.255.255.0 broadcast 192.168.7.255
# ifconfig eth0
eth0  Link encap:Ethernet  HWaddr 00:15:17:63:DC:FC
      inet addr:192.168.7.2  Bcast:192.168.7.255  Mask:255.255.255.0
      inet6 addr: fe80::215:17ff:fe63:dcfc/64 Scope:Link
      UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
      RX packets:40978613 errors:0 dropped:0 overruns:0 frame:0
      TX packets:31962134 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:397707871 (379.2 MiB)  TX bytes:2538882288 (2.3 GiB)
      Interrupt:177 Memory:ba820000-ba840000
```

Basic Networking



<http://www.netfilter.org>

netfilter.org is home to the software of the packet filtering framework inside the Linux 2.4.x and later kernel series. Software commonly associated with netfilter.org is iptables. Software inside this framework enables packet filtering, network address [and port] translation (NA[P]T) and other packet mangling.



Basic Networking

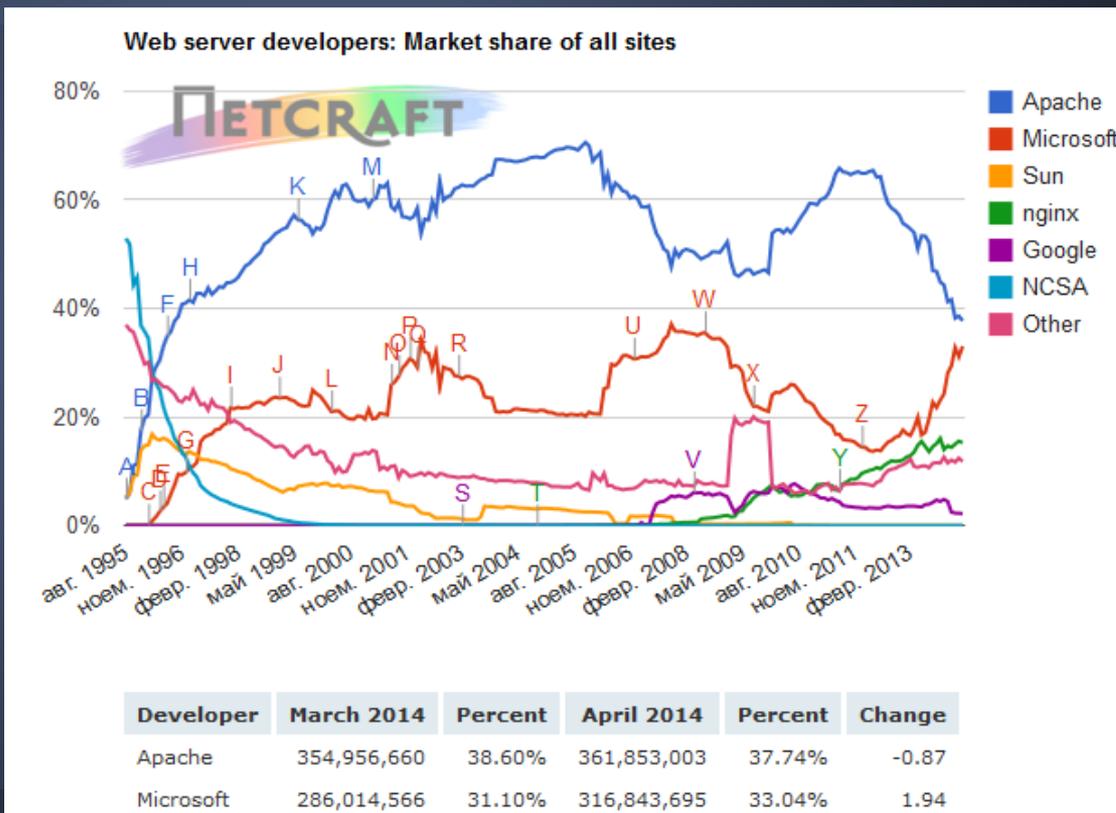
```
# iptables -I INPUT -s 192.168.7.0/24 -p tcp --dport 25 -j  
DROP
```

```
# iptables -I FORWARD -s 192.168.7.0/24 -d 10.10.2.0/24 -  
j ACCEPT
```

DEMONSTRATION

Linux As A Server

Linux
Apache
MySQL
PHP



Linux As A Server (LAMP)

Install And Configure Apache Web Server

- Install Apache Web Server

```
$ yum install httpd
```

- Install Midnight Commander (my preferred tool)

```
$ yum install mc
```

- Open Apache Configuration files folder

```
$ mc /etc/httpd
```

Linux As A Server (LAMP)

Dissection Of Apache Configuration Files

DEMONSTRATION

Linux As A Server (LAMP)

Install And Configure MySql Server

- Install MySQL Server

```
# yum install mysql-server
```

- Install MySQL Client Tools

```
# yum install mysql
```

- Install MySQL Workbench GUI Tool

```
Download from Repository http://dev.mysql.com/downloads/repo/
```

Linux As A Server (LAMP)

Basic Configuration Of MySQL Server

- Start MySQL Server For The First Time

```
# service mysqld start
```

- Setup Of Root Password

```
# mysqladmin -u root password 'new password'
```

Linux As A Server (LAMP)

Using *MySQL Workbench* GUI

DEMONSTRATION

Linux As A Server (LAMP)

Install And Configure PHP

- Install PHP

```
# yum install php
```

- Install PHP-MySQL

```
# yum install php-mysql
```

- Restart Apache Web Server

```
# service httpd restart
```

Linux As A Server (LAMP)

Make a simple `index.php` page with MySQL connect

```
<?php
function MysqlInit()
{
    $conn=@mysql_connect("localhost","root","password") or die("Unable to connect!");
    $r=@mysql_select_db("mysql",$conn) or die("No such database");
    return $conn;
}
$conn=MysqlInit(); $sel="select * from user";
$esel=mysql_query($sel,$conn) or die (mysql_error());
$ar=mysql_fetch_array($esel);
foreach($ar as $key=>$data) { echo "Column: ".$key." = ".$data."<br/>"; }
?>
```

Linux As A Server (SMTP, IMAP)

Install And Configure Postfix SMTP Server

- Install Postfix

```
# yum remove sendmail  # yum install postfix
```

- Set MX record in DNS then edit /etc/hosts

```
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.1.101  server.unixmen.local  server
```

Linux As A Server (SMTP, IMAP)

Install And Configure Postfix SMTP Server

- Edit /etc/postifx/main.cf

```
myhostname = server.unixmen.local
#Uncomment and Set domain name ##
mydomain = unixmen.local
myorigin = $mydomain
##Set ipv4 ##
inet_interfaces = all
##Change to all ##
inet_protocols = all
#Comment ##
#mydestination = $myhostname, localhost.$mydomain, localhost,
```



```
##Uncomment ##
mydestination = $myhostname,
localhost.$mydomain, localhost,
$mydomain
##Uncomment and add IP range ##
mynetworks = 192.168.1.0/24,
127.0.0.0/8
## Uncomment ##
home_mailbox = Maildir/
```

Linux As A Server (SMTP, IMAP)

Install And Configure IMAP/POP3 Server

- Install Dovecot

```
# yum install dovecot
```

- Configure Dovecot (/etc/dovecot/dovecot.conf

```
# uncomment ##  
protocols = imap pop3 lmtp
```

Linux As A Server (SMTP, IMAP)

Install And Configure IMAP/POP3 Server

- Edit /etc/dovecot/conf.d/10-mail.conf

```
## uncomment ##  
mail_location = maildir:~/Maildir
```

- Edit /etc/dovecot/conf.d/10-auth.conf

```
## uncomment##  
disable_plaintext_auth = yes  
##Add a word "login" ##  
auth_mechanisms = plain login
```

Linux As A Server (SMTP, IMAP)

Install And Configure IMAP/POP3 Server

- Edit /etc/dovecot/conf.d/10-master.conf

```
## Line 83, 84 - Uncomment and add "postfix"  
#mode = 0600  
  user = postfix  
  group = postfix
```

- Restart Dovecot daemon

```
# service dovecot restart
```

Linux As A Server (SMTP , IMAP)

Testing from the command line

DEMONSTRATION

Linux As A Workstation

X Server



TCP / IP

X clients

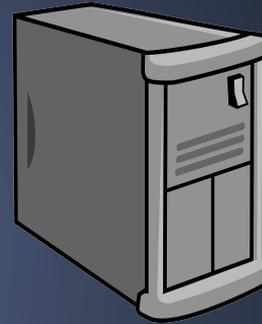
Application



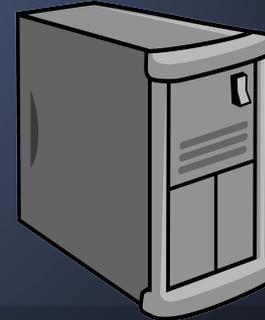
Window
Manager



Desktop
Environment



Host A



Host B

Linux As A Workstation

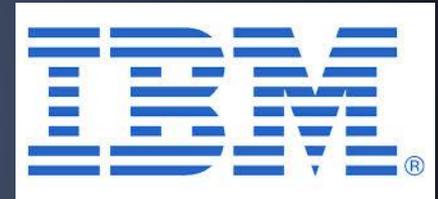
Executing Remote X applications

DEMONSTRATION

Linux As A Workstation

- **Plenty Of Free And Commercial Software**

- Office Workstation
- Developer Workstation
- Multimedia Workstation
- Scientific Workstation
- Engineering Workstation
- Games



Linux As A Workstation

Free Software Alternatives :

Find open source software alternatives to
well-known commercial software

<http://www.osalt.com/>

Logs And Monitoring

Linux Log Files

- Directory /var/log
- Apache Log Files /var/log/httpd
- Mail Log Files /var/log/maillog

Kernel Messages: dmesg

Logs And Monitoring

Command Line Monitoring Tools

- who , last
- top
- netstat
- ps
- vmstat
- sar

Logs And Monitoring

Advanced Monitoring Tools

- nagios <http://www.nagios.org/>
- cacti <http://www.cacti.net/>
- mrtg <http://oss.oetiker.ch/mrtg/>
- nfsen <http://nfsen.sourceforge.net/>

FAQs, Guides And Documentation

- Every distribution includes recent linux documentation files
- Every free software has its own documentation
- Internet is the limit

FAQs, Guides And Documentation

- GOOGLE
- The Linux Documentation Project

<http://www.tldp.org/>

WHOIS LINUX

Q&A