

Introduction to cloud-based campus computing

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<http://github.com/mcr/ols2009-campus-desktop/tree>

Agenda

- ◆ Intro to me.
- ◆ Intro to you.
- ◆ Goals of this tutorial
- ◆ Architecture
- ◆ Get working!
- ◆ Feedback – from you.
- ◆ Feedback – my views.



Michael Richardson

20 years in IT, and software development.

Contributor to *BSD, Linux. Maintainer for Openswan and Tcpdump.

Founding employee for multiple « dot-com » companies in Ottawa, in security, networking and open source. Worked on contract for public and private sector in all kinds of capacities.

Community Volunteer: ox.org, friendsofthetrain.org, many other things.

Physics and crypto geek.

Author of four IETF RFCs.

<http://www.sandelman.ca/mcr/>

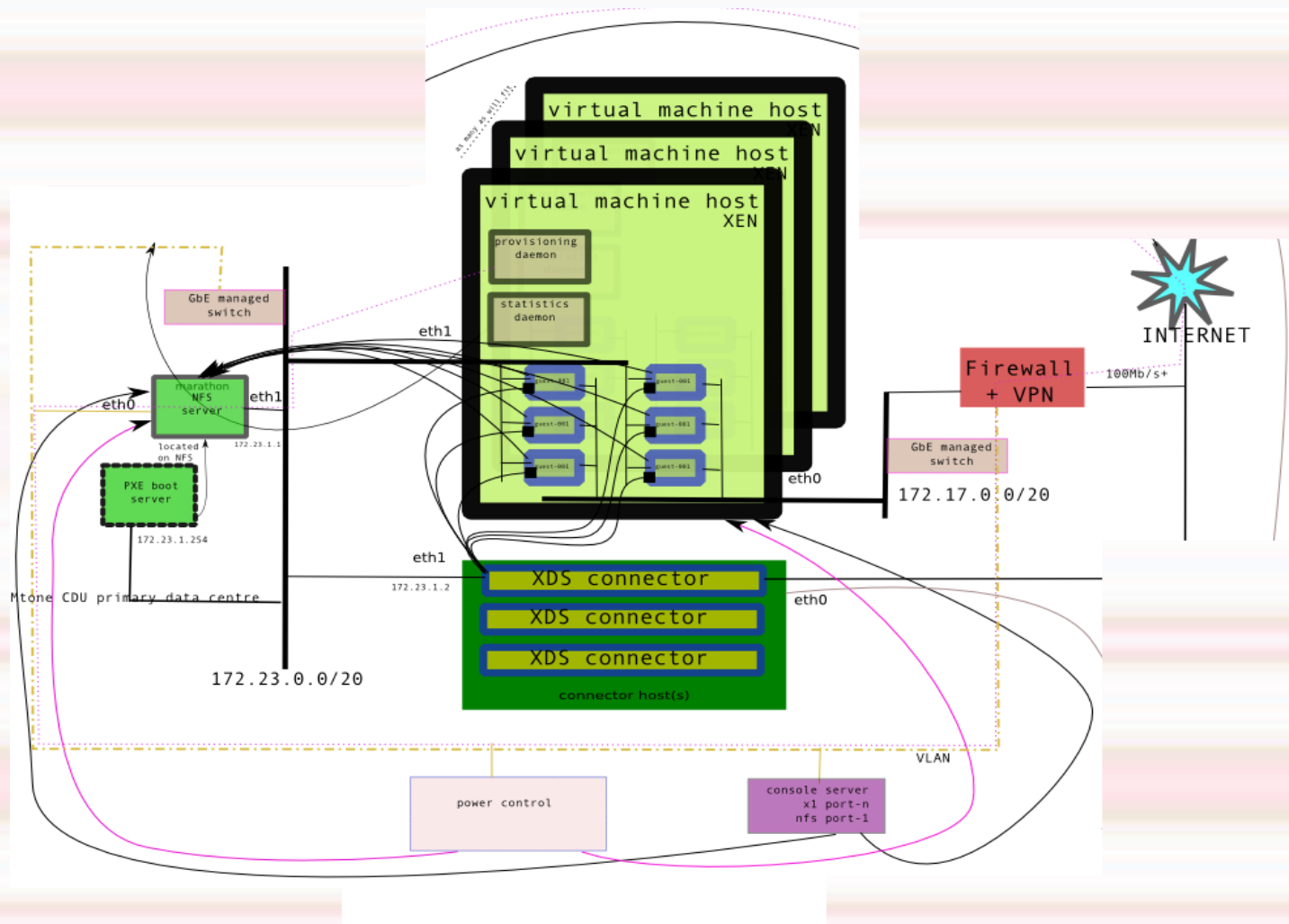
Who are you?

- ◆ Get together into some teams
- ◆ Get a login sheet

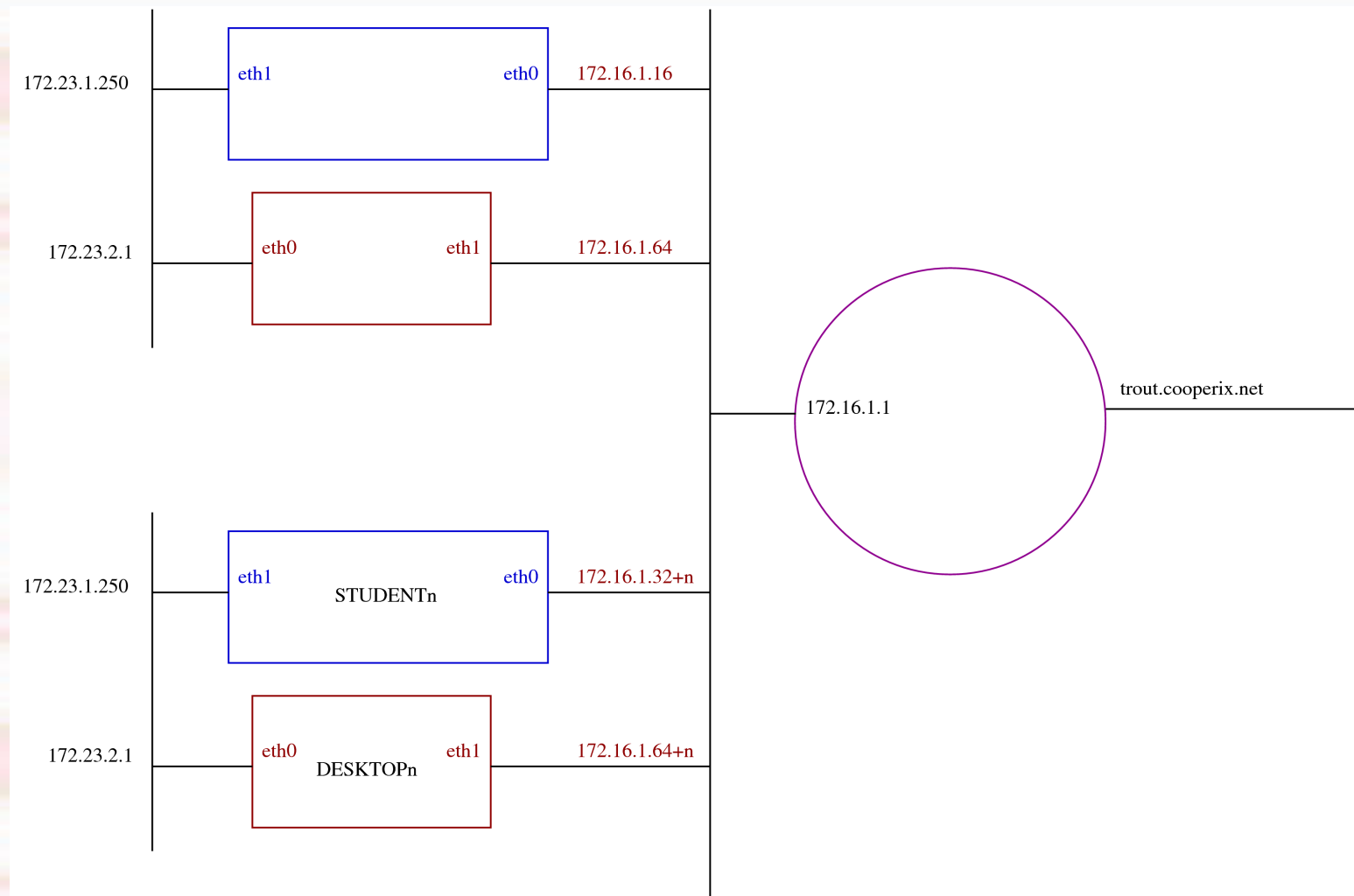
Goals of This Tutorial

- ◆ Understand the knowledge we “lost”
- ◆ Teach you how to NFS boot a machine.
- ◆ Put together a VNC based desktop

Production Architecture



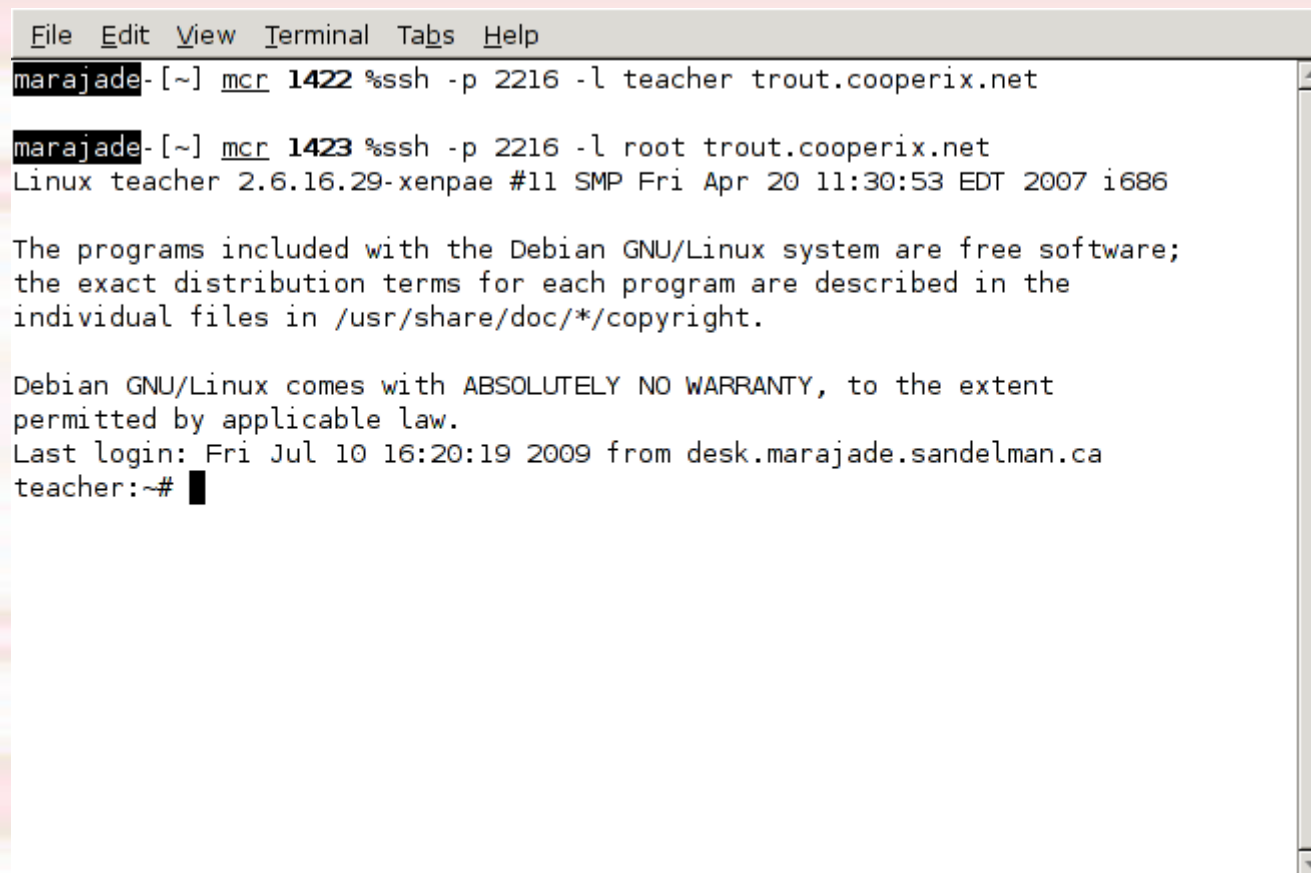
Architecture of tutorial



Get working: NFS system

- ◆ You get root on boot system. Need to set it up to permit NFS root.
- ◆ You need a distro to boot.
- ◆ ... don't start downloading yet. Look in /data!

Screenshot 1: login

A screenshot of a terminal window with a menu bar at the top containing 'File', 'Edit', 'View', 'Terminal', 'Tabs', and 'Help'. The terminal shows a user named 'marajade' at a prompt '[~]' typing the command 'mcr 1422 %ssh -p 2216 -l teacher trout.cooperix.net'. The next line shows the user typing 'mcr 1423 %ssh -p 2216 -l root trout.cooperix.net'. The terminal then displays the output of the SSH command: 'Linux teacher 2.6.16.29-xenpae #11 SMP Fri Apr 20 11:30:53 EDT 2007 i686'. This is followed by a message about Debian GNU/Linux software being free, then a disclaimer about warranty, and finally the last login information: 'Last login: Fri Jul 10 16:20:19 2009 from desk.marajade.sandelman.ca'. The prompt changes to 'teacher:~#' followed by a cursor. A vertical scrollbar is visible on the right side of the terminal window.

```
File Edit View Terminal Tabs Help
marajade-[~] mcr 1422 %ssh -p 2216 -l teacher trout.cooperix.net

marajade-[~] mcr 1423 %ssh -p 2216 -l root trout.cooperix.net
Linux teacher 2.6.16.29-xenpae #11 SMP Fri Apr 20 11:30:53 EDT 2007 i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Jul 10 16:20:19 2009 from desk.marajade.sandelman.ca
teacher:~# █
```

Get working: NFS server setup.

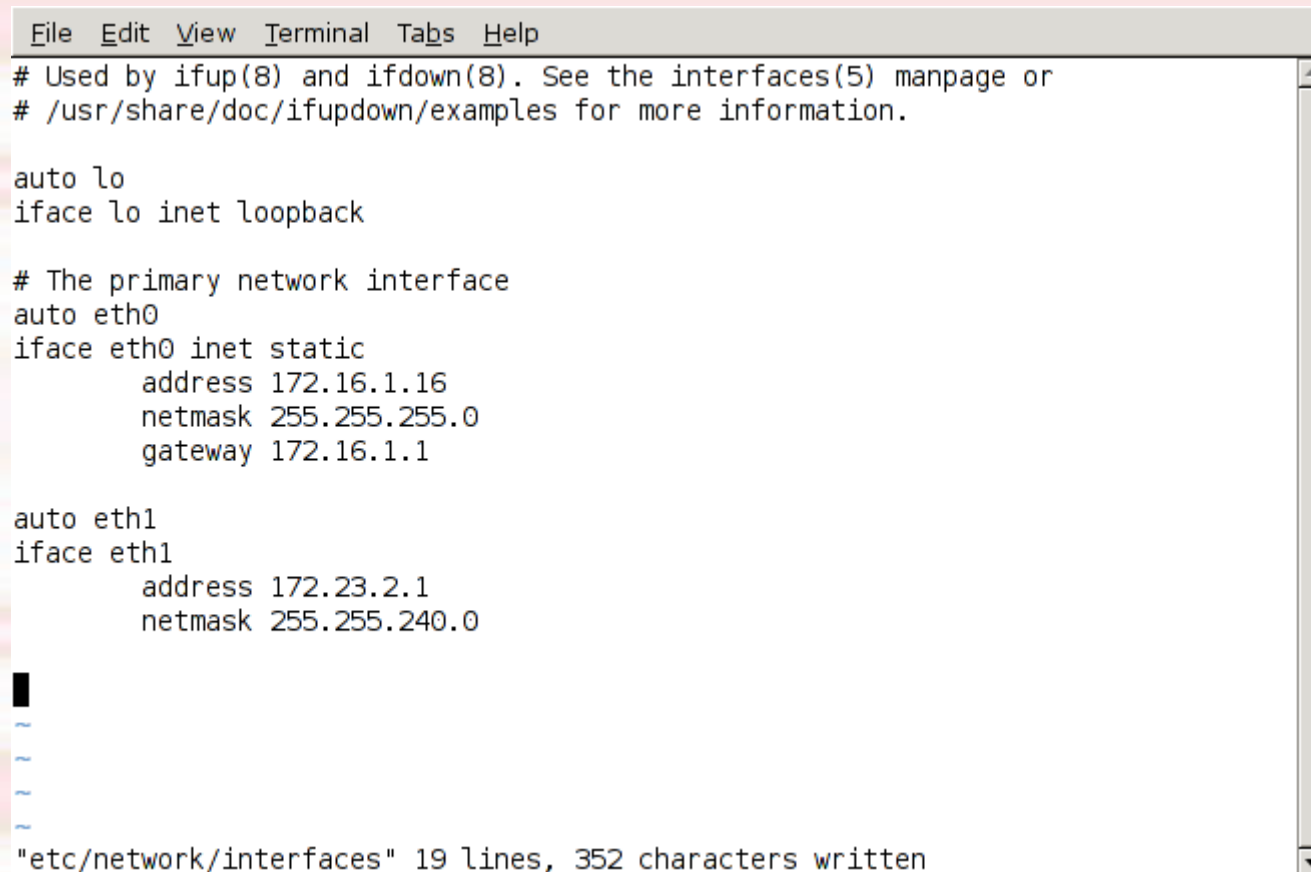
- ◆ cp root partition:
 - ◆ Mkdir /export/root
 - ◆ Cd /export/root
 - ◆ Cp -r /data/vL2009-25/root 11-22-33-44-55-66
- ◆ edit etc/network/interfaces
- ◆ edit etc/fstab
- ◆ edit etc/hosts
- ◆ Edit etc/resolv.conf (to: 172.16.1.1)
- ◆ edit /etc/exports
- ◆ apt-get install nfs-kernel-server

Screenshot 2: cp root

```
File Edit View Terminal Tabs Help
teacher:/data# ls -lta
total 7152
drwxr-xr-x 11 root root    4096 Jul 10 15:11 usr
drwxr-xr-x  6 root root    4096 Jul 10 15:09 .
drwxr-xr-x 22 root root    4096 Jul 10 15:09 root
drwxr-xr-x 25 root root    4096 Jul 10 14:03 ..
drwx-----  2 root root   16384 Jul  9 22:58 lost+found
-rw-r--r--  1 root root     54 Jun 18 10:31 sha1sumsum.txt
drwxr-xr-x  4 root root    4096 Jun 18 10:31 vL2009-25
-rw-r--r--  1 root root 7269482 Jun 18 10:31 sha1sum.txt
teacher:/data# rm -rf usr root
teacher:/data# ls -lta
total 7144
drwxr-xr-x  4 root root    4096 Jul 10 15:24 .
drwxr-xr-x 25 root root    4096 Jul 10 14:03 ..
drwx-----  2 root root   16384 Jul  9 22:58 lost+found
-rw-r--r--  1 root root     54 Jun 18 10:31 sha1sumsum.txt
drwxr-xr-x  4 root root    4096 Jun 18 10:31 vL2009-25
-rw-r--r--  1 root root 7269482 Jun 18 10:31 sha1sum.txt
teacher:/data# mkdir -p /exports/root/12-00-00-aa-11-11
teacher:/data# cd !$
cd /exports/root/12-00-00-aa-11-11
teacher:/exports/root/12-00-00-aa-11-11# cp -r /data/vL2009-25/root/. .
█
```

Screenshot 3:

etc/network/interfaces



```
File Edit View Terminal Tabs Help
# Used by ifup(8) and ifdown(8). See the interfaces(5) manpage or
# /usr/share/doc/ifupdown/examples for more information.

auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
    address 172.16.1.16
    netmask 255.255.255.0
    gateway 172.16.1.1

auto eth1
iface eth1
    address 172.23.2.1
    netmask 255.255.240.0
█
~
~
~
~
"etc/network/interfaces" 19 lines, 352 characters written
```

Screenshot 4: /etc/exports

[illegible]

Screenshot 5: /etc/exports

```
File Edit View Terminal Tabs Help
```

```
/exports/root/12-00-00-aa-11-11      172.23.2.1(rw,sync,no_root_squash,no_subtree_check)
/data/vL2009-25/usr                  172.23.0.0/255.255.240.0(ro)
```

```
"~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~"
```

```
"/etc/exports" 2 lines, 135 characters
```

Screenshot 6: etc/hosts

The screenshot shows a Notepad++ window with the menu bar (File, Edit, View, Terminal, Tabs, Help) and a single tab titled 'etc/hosts'. The text area contains the following line: `127.0.0.1 teacher localhost localhost.localdomain`. The status bar at the bottom indicates: `"etc/hosts" [New File] 1 line, 50 characters written`.

Get working: XEN server

- ◆ Each of you have a limited account on my system “trout”
- ◆ You get three important commands: `xm`list, `start` and `destroy`.
- ◆ `Cat bin/start` if you like.
- ◆ It was all created with a script, in `/images/mls-student` if you want to see it.
- ◆ Boot your desktop VM if you like...
- ◆ `Cat /etc/xen/`cat .mac`` to see the config file.

Screenshot 7:

```
marajade-[~] mcr 1008 %ssh -p 1201 -l teacher trout.cooperix.net
Last login: Fri Jul 10 14:02:27 2009 from desk.marajade.sandelman.ca
teacher@trout:~$ xmlist
```

Name	ID	Mem	VCPUs	State	Time(s)
Domain-0	0	1437	2	r-----	7098.7
cirrus	9	256	1	-b-----	1305.2
student1	19	64	1	-b-----	12.7
student2	21	64	1	-b-----	12.4
teacher	25	64	1	-b-----	99.0

```
teacher@trout:~$ start
```

Get working: the config file

```
name = "12-00-00-aa-21-11"
memory = "128"
kernel = "/images/kernel/vmlinuz-vL2007-45t1"
ramdisk = "/images/initrd/initrd-vL2007-45t1"
nfs_server = "172.23.1.250"
nfs_root = "/exports/root/12-00-00-aa-11-11/,rsize=1024,wsize=1024"
root = "/dev/nfs ro"
vif = [ 'mac=12:00:00:aa:21:11, bridge=back1',
        'mac=12:00:00:bb:21:11, bridge=front' ]
ip = "172.23.2.1"
netmask = "255.255.240.0"
on_reboot = "restart"
on_crash = "restart"
```

Sc

```
ip_nat_pptp version 3.0 loaded
ip_tables: (C) 2000-2006 Netfilter Core Team
ClusterIP Version 0.8 loaded successfully
arp_tables: (C) 2002 David S. Miller
TCP westwood registered
NET: Registered protocol family 1
NET: Registered protocol family 10
lo: Disabled Privacy Extensions
IPv6 over IPv4 tunneling driver
ip6_tables: (C) 2000-2006 Netfilter Core Team
NET: Registered protocol family 17
Bridge firewalling registered
802.1Q VLAN Support v1.8 Ben Greear <greearb@candelatech.com>
All bugs added by David S. Miller <davem@redhat.com>
Using IPI No-Shortcut mode
XENBUS: Device with no driver: device/console/0
/proj/thintropy/slice/src/xen-3.1.0-src/linux-2.6.18-xen/drivers/rtc/hctosys.c:
unable to open rtc device (rtc0)
Freeing unused kernel memory: 188k freed
Loading, please wait...
WARNING: Couldn't open directory /lib/modules/2.6.18-xen: No such file or direct
ory
FATAL: Could not open /lib/modules/2.6.18-xen/modules.dep.temp for writing: No s
uch file or directory
Begin: Loading essential drivers... ...
FATAL: Could not load /lib/modules/2.6.18-xen/modules.dep: No such file or direc
tory
Done.
Begin: Running /scripts/init-premount ...
FATAL: Could not load /lib/modules/2.6.18-xen/modules.dep: No such file or direc
tory
FATAL: Could not load /lib/modules/2.6.18-xen/modules.dep: No such file or direc
tory
Done.
Begin: Mounting root file system... ...
Begin: Running /scripts/nfs-top ...
Done.
FATAL: Could not load /lib/modules/2.6.18-xen/modules.dep: No such file or direc
tory
FATAL: Could not load /lib/modules/2.6.18-xen/modules.dep: No such file or direc
tory
IP-Config: eth0 hardware address 12:00:00:aa:11:11 mtu 1500
IP-Config: eth0 guessed broadcast address 172.23.15.255
IP-Config: eth0 guessed nameserver address 172.23.1.250
IP-Config: eth0 complete (from 172.23.1.250):
address: 172.23.2.1      broadcast: 172.23.15.255    netmask: 255.255.240.0
gateway: 0.0.0.0        dns0      : 172.23.1.250      dns1   : 0.0.0.0
rootserver: 172.23.1.250 rootpath:
filename :
Begin: Running /scripts/nfs-premount ...
Done.
```

Screen

```
address: 172.23.2.1      broadcast: 172.23.15.255  netmask: 255.255.240.0
gateway: 0.0.0.0        dns0      : 172.23.1.250   dns1   : 0.0.0.0
rootserver: 172.23.1.250 rootpath:
filename :
Begin: Running /scripts/nfs-premount ...
Done.
Done.
Begin: Running /scripts/nfs-bottom ...
Done.
Done.
Begin: Running /scripts/init-bottom ...
Done.
* Reading files needed to boot...
...done.
* Setting the system clock
Cannot access the Hardware Clock via any known method.
Use the --debug option to see the details of our search for an access method.
* Unable to set System Clock to: Fri Jul 10 19:32:52 UTC 2009
* Starting basic networking...
/etc/network/interfaces:15: too few parameters for iface line
ifup: couldn't read interfaces file "/etc/network/interfaces"
...fail!
* Starting kernel event manager...
...done.
* Loading hardware drivers...
...done.
* Setting the system clock
Cannot access the Hardware Clock via any known method.
Use the --debug option to see the details of our search for an access method.
* Unable to set System Clock to: Fri Jul 10 19:32:53 UTC 2009
* Setting kernel variables...
error: "kernel.maps_protect" is an unknown key
error: "vm.mmap_min_addr" is an unknown key
...fail!
* Activating swap...
...done.
mount.nfs: rpc.statd is not running but is required for remote locking.
Either use '-o nolock' to keep locks local, or start statd.
mount.nfs: 172.23.1.250:/export/root/12-00-00-aa-11-11 failed, reason given by s
erver: Permission denied
* Checking file systems...
fsck 1.40.8 (13-Mar-2008)
...done.
dd: opening `/SWAP': Read-only file system
* Mounting local filesystems...
...done.
* Activating swapfile swap...
...done.
* Checking minimum space in /tmp...
/etc/rcS.d/S37mountoverflowtmp: 51: awk: not found
mv: cannot create regular file `/var/log/udev': Read-only file system
* Configuring network interfaces...
...fail!
* Starting portmap daemon...
...done.
* Starting NFS common utilities
```

Screenshot 10:

```
File Edit View Terminal Tabs Help
# Used by ifup(8) and ifdown(8). See the interf
# /usr/share/doc/ifupdown/examples for more inf

auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
    address 172.16.1.16
    netmask 255.255.255.0
    gateway 172.16.1.1

auto eth1
iface eth1 inet static
    address 172.23.2.1
    netmask 255.255.240.0
```

```
Begin: Running /scripts/nfs-bo
Done.
Done.
Begin: Running /scripts/init-b
Done.
* Reading files needed to boot
...done.
* Setting the system clock
Cannot access the Hardware Clo
Use the --debug option to see
* Unable to set System Clock
* Starting basic networking.
/etc/network/interfaces:15: to
ifup: couldn't read interfaces
...fail!
* Starting kernel event manag
...done.
* Loading hardware drivers...
...done.
* Setting the system clock
Cannot access the Hardware Clo
Use the --debug option to see
* Unable to set System Clock
* Setting kernel variables...
error: "kernel.maps_protect" :
error: "vm.mmap_min_addr" is a
...fail!
* Activating swap...
...done.
```

Cannot access the Hardware Clock via any known method.
 Use the --debug option to see the details of our search for an ac
 * Unable to set System Clock to: Fri Jul 10 19:32:52 UTC 2009
 * Starting basic networking...
 /etc/network/interfaces:15: too few parameters for iface line
 ifup: couldn't read interfaces file "/etc/network/interfaces"
 ...fail!
 * Starting kernel event manager...
 ...done.
 * Loading hardware drivers...
 ...done.
 * Setting the system clock
 Cannot access the Hardware Clock via any known method.
 Use the --debug option to see the details of our search for an ac
 * Unable to set System Clock to: Fri Jul 10 19:32:53 UTC 2009
 * Setting kernel variables...
 error: "kernel.maps_protect" is an unknown key
 error: "vm.mmap_min_addr" is an unknown key
 ...fail!
 * Activating swap...
 ...done.
 mount.nfs: rpc.statd is not running but is required for remote lo
 Either use '-o nolock' to keep locks local, or start statd.
 mount.nfs: 172.23.1.250:/export/root/12-00-00-aa-11-11 failed, re
 server: Permission denied
 * Checking file systems...
 fsck 1.40.8 (13-Mar-2008)
 ...done.
 dd: opening `/SWAP': Read-only file system
 * Mounting local filesystems...
 ...done.
 * Activating swapfile swap...
 ...done.
 * Checking minimum space in /tmp...
 /etc/rcS.d/S37mountoverflowtmp: 51: awk: not found
 mv: cannot create regular file `/var/log/udev': Read-only file sy
 * Configuring network interfaces...
 ...fail!
 * Starting portmap daemon...
 ...done.
 * Starting NFS common utilities
 teacher@trout:~\$
 teacher@trout:~\$
 teacher@trout:~\$
 teacher@trout:~\$ destroy
 teacher@trout:~\$ start

Screenshot 11:

```

marajade-[/cc
do
  echo READY
  wincap >$ca
  cap=$(( $cap
  read ans
done
READY for 1
marajade-[/cc
do
  echo READY
  read ans
  wincap >| $c
  cap=$(( $cap
done
READY for 1

xwdtopnm: wri
READY for 2

xwdtopnm: wri
READY for 3

xwdtopnm: wri
READY for 4

xwdtopnm: wri
READY for 5

xwdtopnm: wri
READY for 6

xwdtopnm: wri
READY for 7

xwdtopnm: wri
pnmtopng: 5 c
READY for 8

xwdtopnm: wri
pnmtopng: 3 c
READY for 9

xwdtopnm: wri
pnmtopng: 3 c
READY for 10

```

Screenshot 12:

```
File Edit View Terminal Tabs Help
anacrontab      hp/             purple/
apm/            idmapd.conf    python/
apparmor.d/     imlib/          python2.5/
appport/        init.d/         qt3/
apt/            initramfs-tools/ rc.local
avahi/          inputrc        rc0.d/
bash.bashrc     iproute2/      rc1.d/
bash_completion.d/ issue          rc2.d/
teacher:/exports/root/12-00-00-aa-11-11# vi etc/rcS.d/
K06keyboard-setup  S17procps      S43portmap
README             S20checkroot.sh S44nfs-common
S01mountkernfs.sh  S22mtab.sh     S45waitnfs.sh
S01readahead       S30checkfs.sh  S46mountnfs-bootclean.sh
S02hostname.sh     S32domU-safe   S49console-setup
S08hwclockfirst.sh S32startswap   S55pppd-dns
S08loopback        S35mountall.sh S70screen-cleanup
S10udev            S36mountall-bootclean.sh S70x11-common
S11hwclock.sh       S37mountoverflowtmp S80bootmisc.sh
S11mountdevsubfs.sh S37udev-finish  S85urandom
S13pcmciautils      S39readahead-desktop S90console-screen.sh
S15module-init-tools S40networking
teacher:/exports/root/12-00-00-aa-11-11# vi etc/rcS.d/S03remount.sh
teacher:/exports/root/12-00-00-aa-11-11# chmod +x etc/rcS.d/S03remount.sh
teacher:/exports/root/12-00-00-aa-11-11#
```

Screenshot 13:

```
File Edit View Terminal Tabs Help
root:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/bin/sh
bin:x:2:2:bin:/bin:/bin/sh
sys:x:3:3:sys:/dev:/bin/sh
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
mail:x:8:8:mail:/var/mail:/bin/sh
news:x:9:9:news:/var/spool/news:/bin/sh
uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh
proxy:x:13:13:proxy:/bin:/bin/sh
www-data:x:33:33:www-data:/var/www:/bin/sh
backup:x:34:34:backup:/var/backups:/bin/sh
list:x:38:38:Mailing List Manager:/var/list:/bin/sh
irc:x:39:39:ircd:/var/run/ircd:/bin/sh
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/sh
nobody:x:65534:65534:nobody:/nonexistent:/bin/sh
dhcp:x:100:103:./nonexistent:/bin/false
syslog:x:101:104:./home/syslog:/bin/false
klog:x:102:105:./home/klog:/bin/false
hplip:x:103:7:HPLIP system user,,,:/var/run/hplip:/bin/false
statd:x:104:65534:./var/lib/nfs:/bin/false
/etc/passwd" 30 lines, 1382 characters
```


Get working: NFS servers and kernels

- ◆ When I created my teacher system, I used the same kernel as the desktop.
- ◆ It had no NFS support in the kernel:
`Not starting NFS kernel daemon: no support in current kernel. (warning).`
- ◆ I use statically linked kernels for three reasons:
 - ◆ It's one file to sort out.
 - ◆ Virtual machines do not get new hardware plugged in.
 - ◆ You can turn off LKM completely, perhaps eliminate a zero-day local attack.

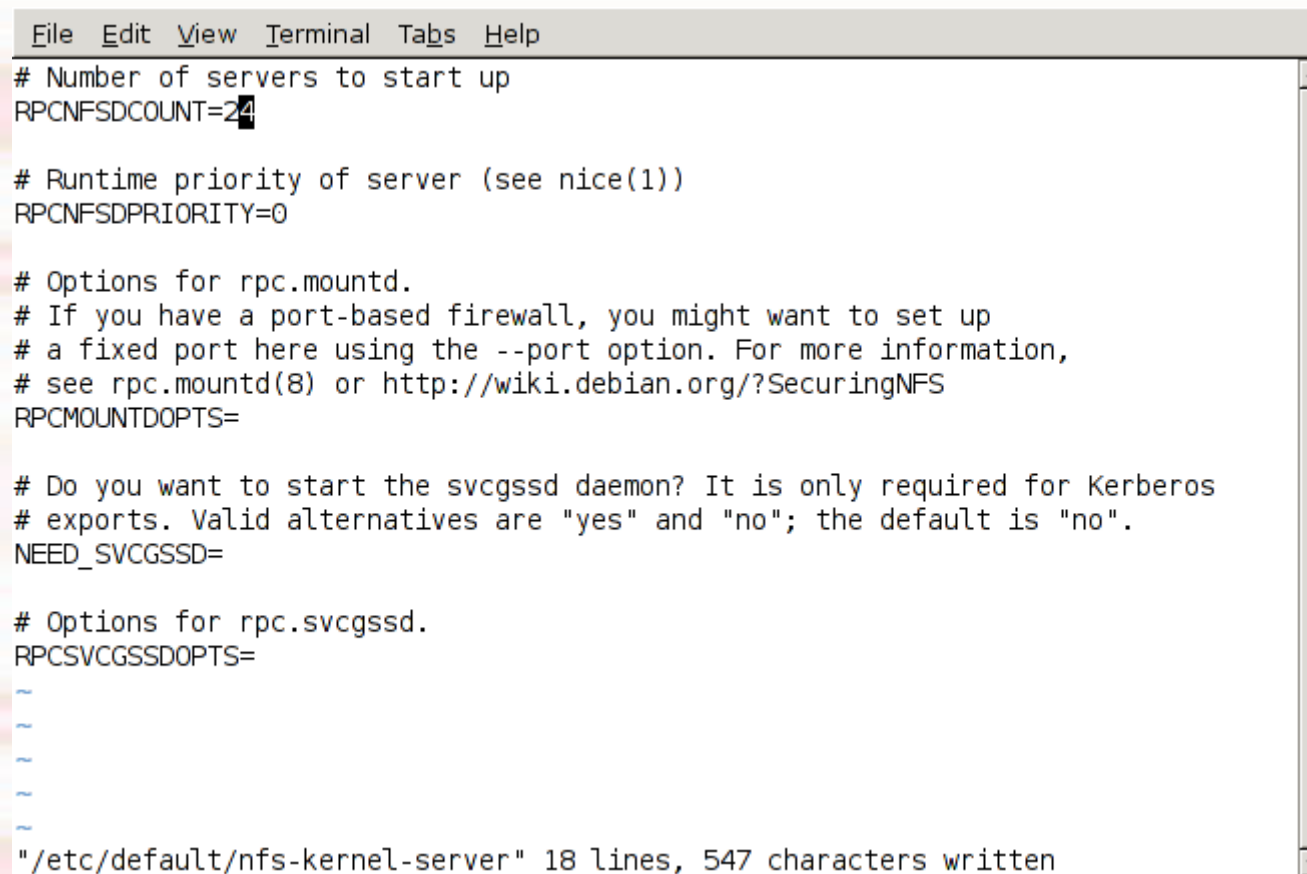
Screenshot 14:

```
File Edit View Terminal Tabs Help
apport/          init.d/          qt3/
apt/             initramfs-tools/ rc.local
avahi/           inputrc          rc0.d/
bash.bashrc      iproute2/        rc1.d/
bash_completion.d/ issue            rc2.d/
teacher:/exports/root/12-00-00-aa-11-11# vi etc/rcS.d/
K06keyboard-setup      S17procps        S43portmap
README                 S20checkroot.sh  S44nfs-common
S01mountkernfs.sh      S22mtab.sh        S45waitnfs.sh
S01readahead           S30checkfs.sh     S46mountnfs-bootclean.sh
S02hostname.sh         S32domUsafe       S49console-setup
S08hwclockfirst.sh     S32startswap      S55pppd-dns
S08loopback            S35mountall.sh    S70screen-cleanup
S10udev                S36mountall-bootclean.sh S70x11-common
S11hwclock.sh          S37mountoverflowtmp S80bootmisc.sh
S11mountdevsubfs.sh    S37udev-finish    S85urandom
S13pcmciautils         S39readahead-desktop S90console-screen.sh
S15module-init-tools  S40networking
teacher:/exports/root/12-00-00-aa-11-11# vi etc/rcS.d/S03remount.sh
teacher:/exports/root/12-00-00-aa-11-11# chmod +x etc/rcS.d/S03remount.sh
teacher:/exports/root/12-00-00-aa-11-11# vi etc/passwd
teacher:/exports/root/12-00-00-aa-11-11# vi etc/rcS.d/S03remount.sh
teacher:/exports/root/12-00-00-aa-11-11# cp etc/rcS.d/S03remount.sh etc/rc2.d/
teacher:/exports/root/12-00-00-aa-11-11#
```

Screenshot 15

[illegible]

Screenshot 16:



```
File Edit View Terminal Tabs Help
# Number of servers to start up
RPCNFSDCOUNT=24

# Runtime priority of server (see nice(1))
RPCNFSDPRIORITY=0

# Options for rpc.mountd.
# If you have a port-based firewall, you might want to set up
# a fixed port here using the --port option. For more information,
# see rpc.mountd(8) or http://wiki.debian.org/SecuringNFS
RPCMOUNTDOPTS=

# Do you want to start the svcgssd daemon? It is only required for Kerberos
# exports. Valid alternatives are "yes" and "no"; the default is "no".
NEED_SVCGSSD=

# Options for rpc.svcgssd.
RPCSVCGSSDOPTS=
~
~
~
~
~
"/etc/default/nfs-kernel-server" 18 lines, 547 characters written
```

Get working: BOOT guest machine.

- ◆ `useradd -m user`
- ◆ `cp gdm.conf.in to gdm.conf`
- ◆ Add `AutomaticLogin=user`
- ◆ Start it up.

Screenshot 19: cp the gdm.conf

- ◆ Cp the gdm.conf
- ◆ And edit it to add AutomaticLogin=

```
root@teacher:/etc/xdg/ubuntu/gdm# cp gdm.conf.in gdm.conf
```

Screenshot 18: add Automatic Login

```
# This determines whether GDM will honor requests DYNAMIC requests from the
# gdmconfig command.
#DynamicXServers=false

# This determines whether GDM will send notifications to the console.
#ConsoleNotify=true

# Timed login, useful for kiosks. Log in a certain user after a certain amount
# of time.
TimedLoginEnable=false
TimedLogin=
TimedLoginDelay=30

# Automatic login. if true the first local screen will automatically logged in
# as user as set with AutomaticLogin key.
#AutomaticLoginEnable=false
#AutomaticLogin=
AutomaticLoginEnable=true

#NOTE: line "AutomaticLogin=<username>" will be appended to this file
#      by the desktop-serving-guest creation script.
AutomaticLogin=user
"gdm.conf" [Modified] line 600 of 600 --100%-- col 13
```

Screenshot 20: Set the screen resolution to 800x600

```
# server flexible, but not with an indirect query. If you need flexible
# indirect query server, then you must get rid of the -terminate and the only
# way to kill the flexible server will then be by Ctrl-Alt-Backspace.
flexible=false
# Not local, we do not handle the logins for this X server.
handled=false

[server-VNC]
name=VNC server
command=/usr/bin/Xvnc4 -SecurityTypes=None -to 0 -geometry 800x600 -depth 24 -fp
/usr/share/fonts/X11/75dpi,/usr/share/fonts/X11/100dpi,/usr/share/fonts/X11/Typ
e1,/usr/share/fonts/X11/misc
#command=/usr/bin/Xvnc -geometry 1012x758 -depth 16 -fp /usr/share/X11/fonts/mis
c/
#command=/usr/bin/Xrealvnc -geometry 1000x700 -depth 24 -fp /usr/share/X11/fonts
/misc/
flexible=true

# To use this server type you should add -query host or -indirect host to the
# command line.
"gdm.conf" 500 lines, 28024 characters written
```


Screenshot 21: See GDM start

- ◆ You may have some
- ◆ Trouble. You should
- ◆ Nautilus running.

```
99 ? S 0:00 [pdf]ush]
100 ? S 0:00 [pdf]ush]
101 ? S< 0:00 [kswapd0]
102 ? S< 0:00 [aio/0]
742 ? S< 0:00 [kpsmoused]
1614 ? S< 0:00 [rpciod/0]
1772 ? Ss 0:00 /sbin/portmap
1773 ? Ss 0:00 /sbin/rpc.statd
1961 ? S< 0:00 [loop0]
4103 ? Ss 0:00 /sbin/syslogd -u syslog
4124 ? S 0:00 /bin/dd bs 1 if /proc/kmsg of /var/run/klogd/kmsg
4126 ? R+ 2:25 /sbin/klogd -P /var/run/klogd/kmsg
4266 tty1 Ss 0:00 /bin/login --
4267 tty1 S 0:00 -bash
4277 ? S 0:00 [lockd]
4320 ? Ss 0:00 /usr/sbin/gdm --config=/etc/gdm/gdm-cdd.conf
4324 ? S 0:00 /usr/sbin/gdm --config=/etc/gdm/gdm-cdd.conf
4327 ? S 0:00 /usr/bin/Xvnc4 :0 -SecurityTypes=None -to 0 -geometry
4334 ? Ss 0:00 /bin/sh /etc/gdm/Xsession start:fce4
4373 ? Z 0:00 [katrina-agent] <defunct>
4380 ? S 0:00 /bin/sh /etc/gdm/Xsession start:fce4
4385 ? S 0:00 /usr/bin/zenity --info --text Xsession: run_parts() c
4389 tty1 R+ 0:00 ps ax
root@teacher:/etc/xdg/ubuntu/gdm#
```

Get working: connect to the desktop

- ◆ Xvncviewer trout:59xx
- ◆ No security in this version. (SIMtone's product provides that, so it doesn't matter to me.)
- ◆ You could use xrdp package, but it seems really old.

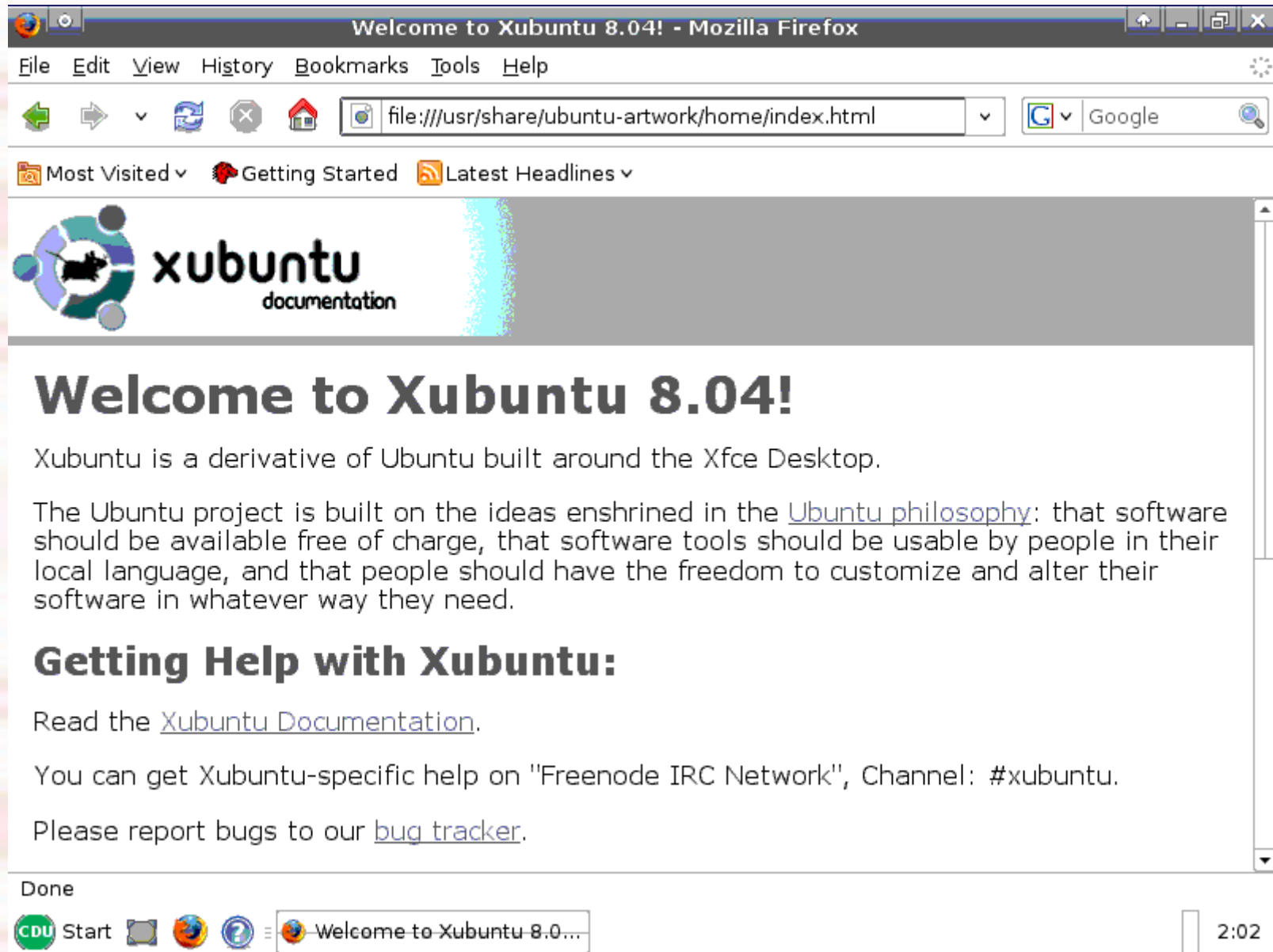
Screenshot 22: Connect to the desktop

- ◆ Use port 5900 + student#

```
marajade-[^] mcr 1424 %xvncviewer trout.cooperix.net:5900
```

Screenshot 23: Booted desktop

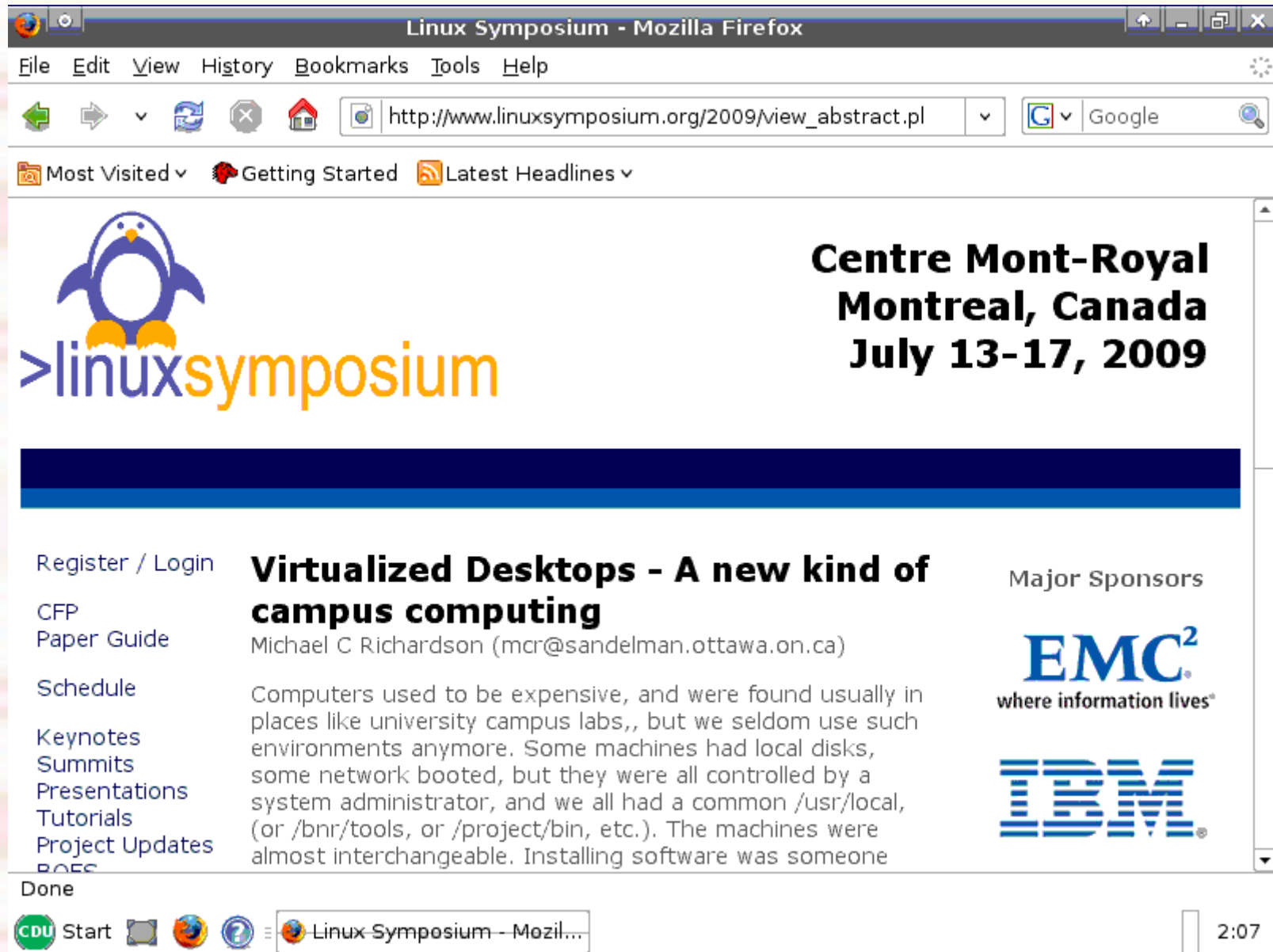




Screenshot 25:

*Why Firefox
takes so long
to load....*

```
Firefox 5046 user 14u unix 0xc16f5980 8702 socket
Firefox 5046 user 15r CHR 1.0 2449 /dev/random
Firefox 5046 user 16u unix 0xc16f5200 8705 socket
Firefox 5046 user 17w REG 0.14 0 339277 /home/user/.mozilla/firefox/k3gvir9x.default/parentlock (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 18u unix 0xc6034ac0 8707 /tap/orbit-user/linc-13b6-0-163dfc0334e82
Firefox 5046 user 19r CHR 1.0 2449 /dev/random
Firefox 5046 user 20u unix 0xc6034740 8709 /tap/orbit-user/linc-13b6-0-163dfc0334e82
Firefox 5046 user 21w REG 0.14 0 339277 /home/user/.mozilla/firefox/k3gvir9x.default/parentlock (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 22r FIFO 0.6 8808 pipe
Firefox 5046 user 23r CHR 1.0 2449 /dev/random
Firefox 5046 user 24r FIFO 0.6 8748 pipe
Firefox 5046 user 25w FIFO 0.6 8748 pipe
Firefox 5046 user 26r REG 0.19 178319 17047 /usr/lib/firefox-3.0.11/chrome/classic.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 27w FIFO 0.6 8808 pipe
Firefox 5046 user 28r REG 0.19 136311 17053 /usr/lib/firefox-3.0.11/chrome/en-US.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 29u REG 0.14 2048 339286 /home/user/.mozilla/firefox/k3gvir9x.default/permissions.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 30r REG 0.19 1890423 17048 /usr/lib/firefox-3.0.11/chrome/browser.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 31w REG 0.14 139264 339284 /home/user/.mozilla/firefox/k3gvir9x.default/places.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 32u REG 0.14 86176 339292 /home/user/.mozilla/firefox/k3gvir9x.default/places.sqlite-journal (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 33r REG 0.19 39550 214644 /usr/lib/xulrunner-1.9.0.11/chrome/reporter.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 34u REG 0.14 8200 339293 /tap/nfs00052d5d00000008 (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 35r REG 0.19 338779 214637 /usr/lib/xulrunner-1.9.0.11/chrome/en-US.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 36r REG 0.19 118768 78589 /usr/share/ubufox/chrome/ubufox.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 37r REG 0.19 397935 214628 /usr/lib/xulrunner-1.9.0.11/chrome/classic.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 38r REG 0.19 1931740 214642 /usr/lib/xulrunner-1.9.0.11/chrome/toolkit.jar (172.23.1.250:/data/vL2009-25/usr)
Firefox 5046 user 39u REG 0.14 2048 339295 /home/user/.mozilla/firefox/k3gvir9x.default/search.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 40r REG 0.14 848561 339291 /home/user/.mozilla/firefox/k3gvir9x.default/XUL.nfs01 (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 41u REG 0.14 4096 339296 /home/user/.mozilla/firefox/k3gvir9x.default/formhistory.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 42u REG 0.14 7168 339297 /home/user/.mozilla/firefox/k3gvir9x.default/content-prefs.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 43u REG 0.14 2048 339298 /home/user/.mozilla/firefox/k3gvir9x.default/cookies.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 44u REG 0.14 275 339300 /home/user/.mozilla/firefox/k3gvir9x.default/Cache/_CACHE_MRP_ (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 45u REG 0.14 4096 339301 /home/user/.mozilla/firefox/k3gvir9x.default/Cache/_CACHE_001_ (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 46u REG 0.14 4096 339302 /home/user/.mozilla/firefox/k3gvir9x.default/Cache/_CACHE_002_ (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 47u REG 0.14 4096 339303 /home/user/.mozilla/firefox/k3gvir9x.default/Cache/_CACHE_003_ (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 48u IPv4 3118 UDP 172.16.1.64:1043->192.168.7.165:domain
Firefox 5046 user 49u REG 0.14 65536 339305 /home/user/.mozilla/firefox/k3gvir9x.default/cert8.db (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 50u REG 0.14 4096 339306 /home/user/.mozilla/firefox/k3gvir9x.default/key3.db (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 51r FIFO 0.6 8848 pipe
Firefox 5046 user 52w FIFO 0.6 8848 pipe
Firefox 5046 user 54u REG 0.14 32768 339307 /home/user/.mozilla/firefox/k3gvir9x.default/uriclassifier3.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
Firefox 5046 user 56u REG 0.14 2048 339309 /home/user/.mozilla/firefox/k3gvir9x.default/downloads.sqlite (172.23.1.250:/exports/root/12-00-00-aa-11-11/)
root@teacher:/var/log/gdm# ls -l -p 5046 | wc -l
191
root@teacher:/var/log/gdm#
```



Feedback from you.

Feedback from me.

- ◆ Need to work on gdm!
- ◆ Hardy Heron image isn't great. (But Feisty image was too old)
- ◆ The firefox load time really is a problem.

Conclusion.

- ◆ Apt-get install beer-garden ?