Power Systems

Linux on Power for AIX/IBM i guys → Doing it the Easy Way

Config, Install & Killer Apps

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AIXpert Blog by me!

https://www.ibm.com/developerworks/community/blogs/aixpert/entry/the_linux_on_power_advantage_depends_where_you_are_coming_from?lang=en

IBM © 2014 IBM 2 Linux on Power Install

The Linux on Power Advantage
- Depends where you are coming from

- Current **AIX** and POWER user
  - a) The "AIX or dead" team - missing a trick
  - b) AIX at heart but I can do Linux too - good ←
  - c) Big Iron Giants - IFL lowers costs
- Current Linux on **x86 user**
  - d) Needing POWER's higher scale up - SMP
  - e) Interested in some POWER specific features - many
  - f) Interested in an easier way of life - big box
  - g) The "Linux or die" team willing to try POWER - PowerKVM
    If it is exactly like x86
- **Cloud** rancher
  - Cost, CPU core strength, cost, advanced function: COSI/FPGA, cost, scaling and cost

Set your expectation

I assume you have a computer room
- With many machines running AIX or IBM i
- Know how to operate a HMC (or IVM)
- Know AIX … like install & general admin
- Have used VNC

Linux
- Have experimented on a PC or Laptop

- Not really covering your first ever POWER box nor first time Linux user

Success Criteria

1. Installed
2. DR ready = disks data protection & network backup
3. On the network with gateway & DNS
4. OS Updated
5. Time and date right
6. NFS with AIX
7. Users created
8. VNC to access X-Windows

- Not covering backups or applications
  - Use your favourite backup agent & mechanism
  - Too many application to cover

Philosophy

Use what you know already

- Reduces learning time
- You know HMC, VIOS etc.
- You know Virtual: disks, network and DVD

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Avoid complexity

- Don't use "rough areas of Linux" !!! like:
  a. Mirrored boot disks → tricky
  b. Bonded Ethernet failover → OK but different
  c. Adding disks → bizarre
  d. Distros: different install, admin tools → hard work to cover them all
  e. Perpetually reinventing the wheel → so docs+web out of date
- Don't use POWER rough area: HMC's VTERM with curses

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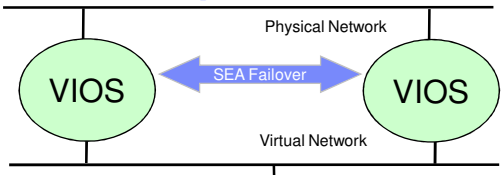
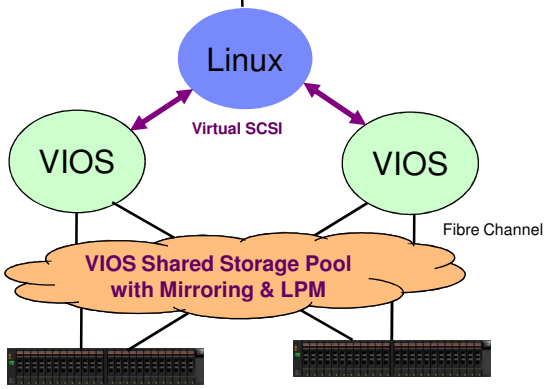
Get it right first time
- Early success build confidence
- Get to a Linux GUI ASAP – so Web hints work!

KISS = 1 net + 1 disk dual pathed

Single virtual network with redundancy

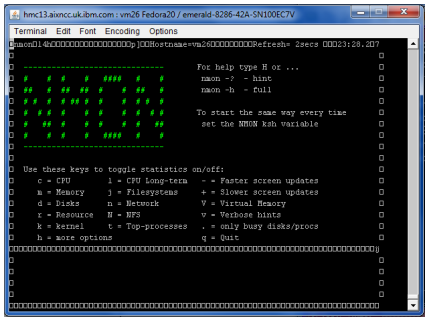


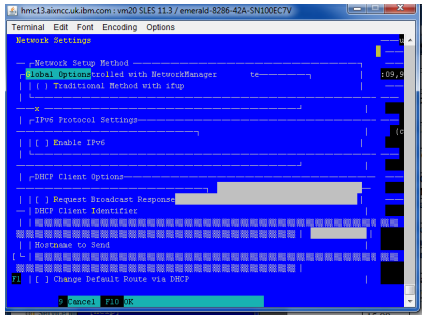
Single virtual disk over dual vSCSI to a mirrored SSP for DR redundancy



Consoles

- VTERM the terminal emulator from hell!
  - Just try nmon and weep!



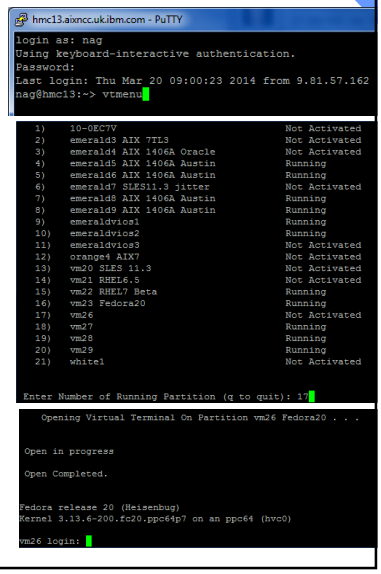


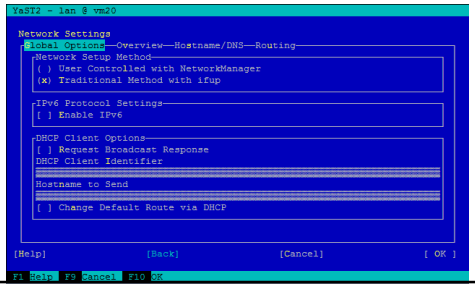
Consoles

Much better alternative:

- Putty (ssh) to your HMC
- Login to the HMC user/passwd
- Run: vtmenu
- Select your machine then LPAR

- End by logging out then: ~.





Which Linux versions work on Power Systems?

1. SUSE Linux Enterprise Server 11.3 BE
2. SUSE Linux Enterprise Server 12 LE (soon)
3. OpenSUSE 13.1 BE – installer need fixing (volunteers!)

4. Red Hat Enterprise Linux 6.5 BE
5. Red Hat Enterprise Linux 7 BE
6. Fedora 20 BE
7. Centos – not compiled for POWER (volunteers!)

8. Debian 7.5 BE
9. Ubuntu 14.4 LE

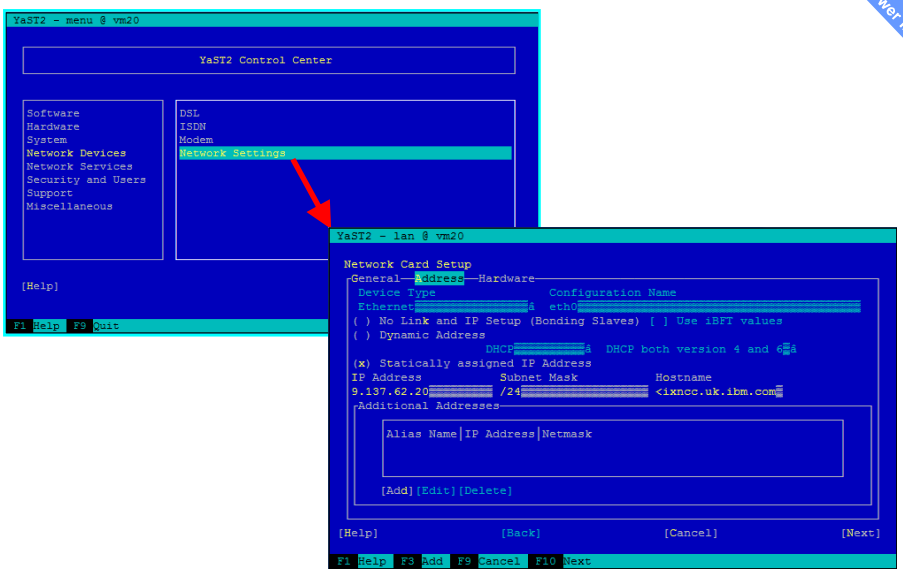
SUSE Linux

- Current SLES Version 11 sp3 → Big Endian
- Runs in POWER7 mode on POWER8
- Has IBM extra RPM for POWER, Diags, RMC etc
- POWER8 you need to boot a new DVD then regular media
  see AIXpert blog
- Nigel's Opinion (not IBM's):
  - Easier to live with for AIX people
  - yast = smitty

- Next Version SUSE 12 → Little Endian
- Running a closed / private beta program

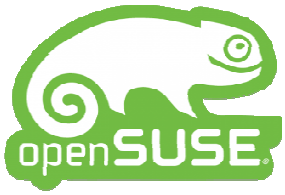
- Web download for 60 day trial
- You need to pay for repository access for updates
- Ask SUSE about the v12 release date

SUS Linux Enterprise Server - yast



Works but only Internet supported

- openSUSE 13.1
- Current daily builds don't install
  - Stops in Open Firmware prompt
- IBM LTC team investigating & may fix



- Don't ask IBM for support ☺
  but Google is a good friend!!
- You can purchase support from 3rd parties

Red Hat Linux

- Currently RHEL 6.5 & 7.0 → Big Endian
  - 6.5 on POWER8 runs in POWER7 mode
  - 7.0 on POWER8 runs in POWER8 mode
- Has IBM extra RPM for POWER, Diags, RMC etc
- Nigel's Opinion (not IBM's):
  - More hostile for AIX admin guys
  - Server admin has to hack files to get it on the network
    See my AIXpert blog for what I use + next slide
  - Red Hat may need you to set the boot disk in SMS

- Web download for 60 day trial
- You need to pay for repository access for updates

RHEL (and Fedora)

- To get on the network → is a hack!
  - /etc/sysconfig/network
  - /etc/sysconfig/network-scripts/ifcfg-eth0
  - /etc/resolv.conf
  - These can get broken with every reboot !!
    - Fix by using GUI tools to set the options
- I can get the Fedora installer to set up the network
- RHEL server installs very fast but
  - Very little installed (if that is what you want=good)
  - Nothing is setup. Beware of the firewall!

Works but only Internet supported

Fedora 20 → Big Endian

- Early SW adopter for RHEL later
- Lots of packages on the media
- Installs to Full GUI

- Good if you use RHEL officially too

- Rumour has it the RHEL additional IBM packages work
  - Like the IBM Diags, HMC connection, additional admin commands

- Runs in POWER8 mode with SMT=8

Works but only Internet supported

Debian 7 → Big Endian

- Massive Internet repository
- Works in POWER7 mode
- Don't install multi-path OS disk
  might be able to add after install

- Nice simple text (curses) installer

- For both don't ask IBM for support ☺
  but Google is a good friend!!
- You can purchase support from 3rd parties

Works – now Canonical or IBM support

- Ubuntu 14.4 based on Debian
- Little Endian
- Currently only under PowerKVM

- You can get IBM for support - once you paid for it.

Moving to both Endian's!

- Big Endian - PowerVM
  - AIX, IBM i, RHEL 6 & 7, SLES 11, Fedora, OpenSUSE, Debian
- Big Endian - PowerKVM
  - RHEL 6 & 7, SLES 11, Fedora, OpenSUSE, Debian
- Little Endian - PowerKVM
  - Ubuntu & SLES 12 (soon)

Jeff Scheel (*IBM Linux on Power Chief Engineer)* FAQ:

In coming releases, IBM expects to support concurrent LE and BE guests in KVM, as well as the support of LE guests on PowerVM.

- https://www.ibm.com/developerworks/community/blogs/fe313521-2e95-46f2-817d-44a4f27eba32/entry/just_the_faqs_about_little_endian?lang=en
- Transition of Apps period
- Then customer decides what to run and when to go LE

So which should I use for the demo

IBM partners:
- SLES ?
- RHEL ?
- But
  - after 60 days you must buy it
  - Getting your manager to purchase anything . . . argh !!!!!
- Both … no that is too much work/time!

- If a free Linux: which on Fedora, Debian, Ubuntu, OpenSUSE
- Nigel's Opinion;
  - OpenSUSE = free and yast but not working at the moment
  - Fedora. Why?
    Fedora 20 is POWER8/SMT=8 ready, free repositories
    - And it is very RHEL like

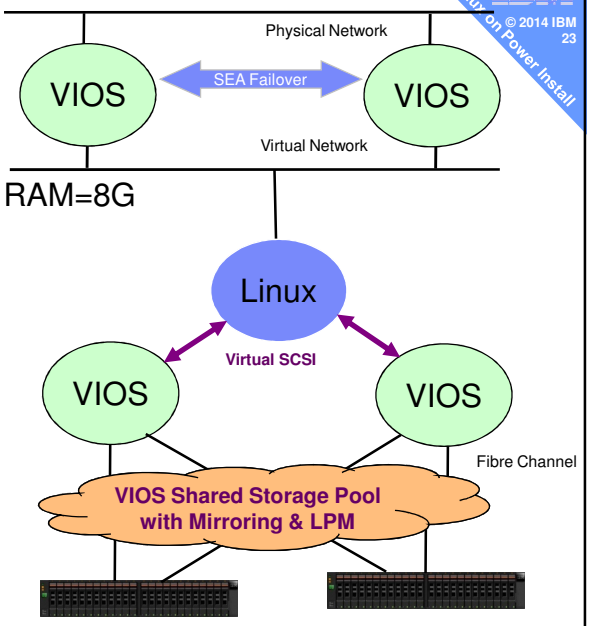
Base install then Updates to current SW levels

Linux install media don't often get updated
- You are expected to install old media then immediately update from Internet repositories

This means you either need:
- Direct internet access to the repositories (the default)
- Local copies of them
  but non-trivial to setup a repository
- RHEL /etc/yum.repos.d/repos files & use yum command
- SLES yast panel to add repo's & yast to add software

- IBMers have a "not for production" internal copy on ftp3 with manual setup

Demo



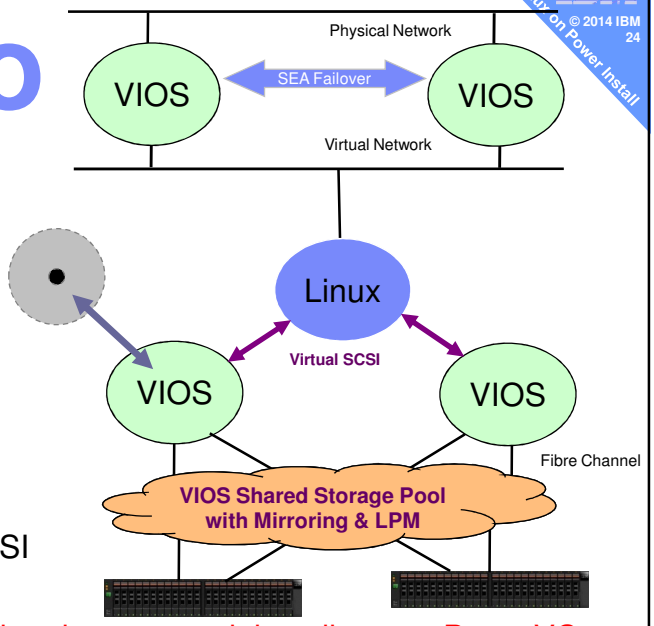
Create LPAR
E=0.5,VP=3, uncapped, RAM=8G

One virtual network

Two virtual SCSI
Created SSP LU
- Using HMC GUI
  = sets up both VIOS

VIOS: lu -create -lu fred -size 64G -vadapter vhost42 [-thick]

Demo



Need install media:

a) Physical DVD
b) Virtual DVD
c) Network Install

Recommend b)
Download the .iso
Copy to the VIOS
  - media repository
Mount it on the vSCSI

If installing dozens then later network install or use PowerVC

Install Text install

- Home Linux guys 100% graphical mode
- Professional Linux → mostly text install
  or automatic network install

- Red Hat text install OK
- SUSE text install OK
- Fedora20 text install has a bug ☹
- Debian text install is slick

- Alternatively, …

Install Text then VNC install

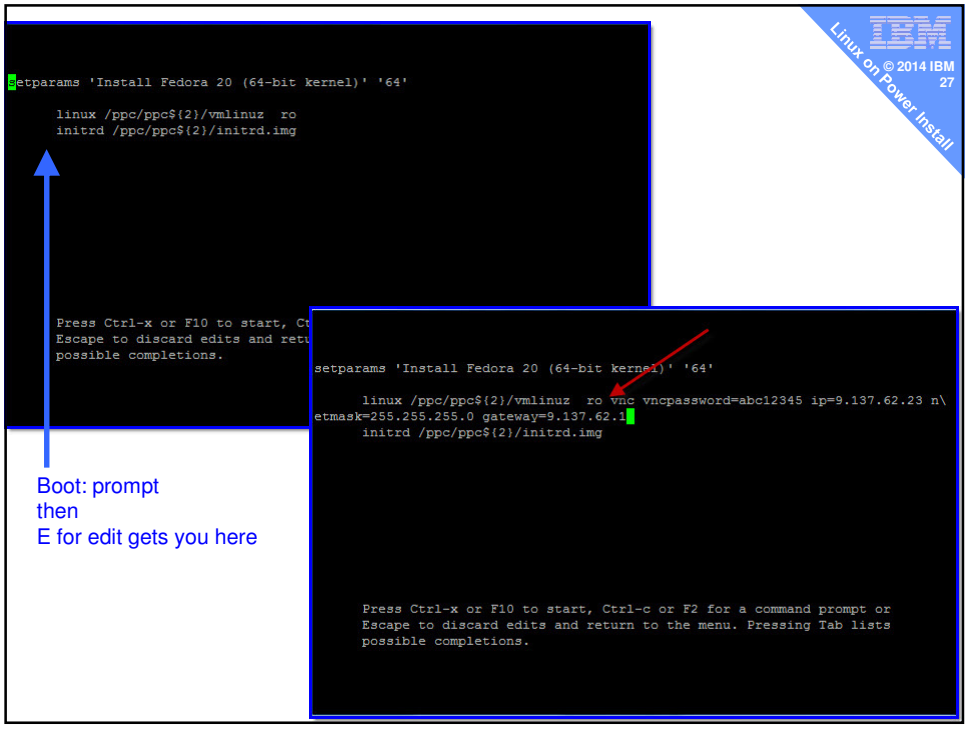
VNC = Virtual Network Computing

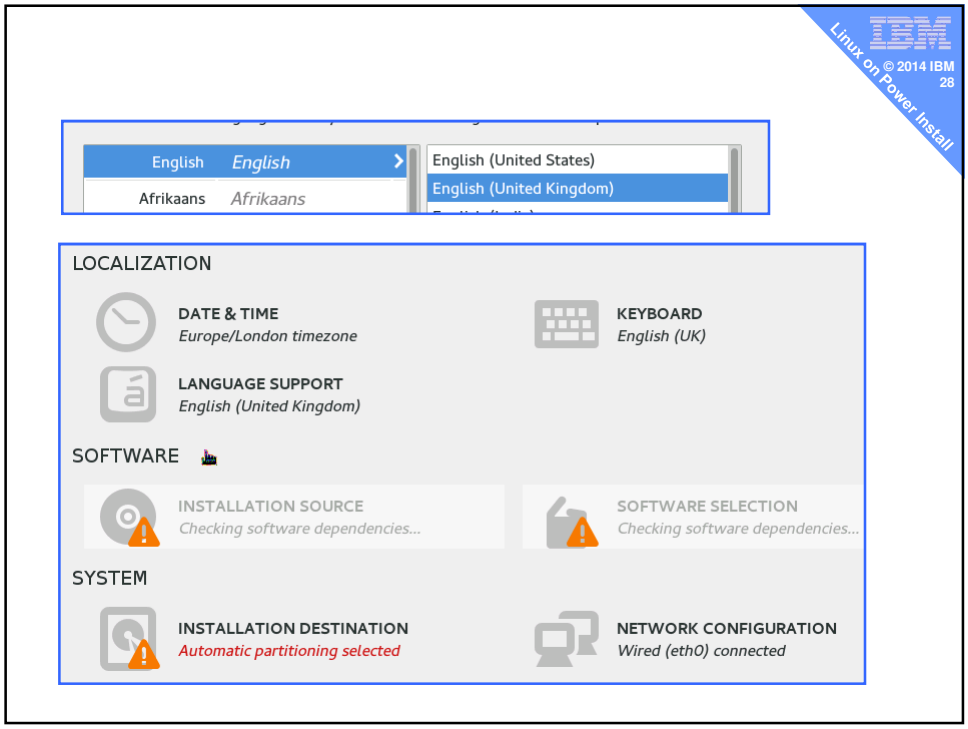
- Fedora20 mandatory (text install is broken)
- https://www.ibm.com/developerworks/community/blogs/aixpert/entry/fun_with_fedora_20_linux_on_power
- vnc vncpassword=abc12345 ip=9.137.62.23 netmask=255.255.255.0 gateway=9.137.62.1
  - See next slide

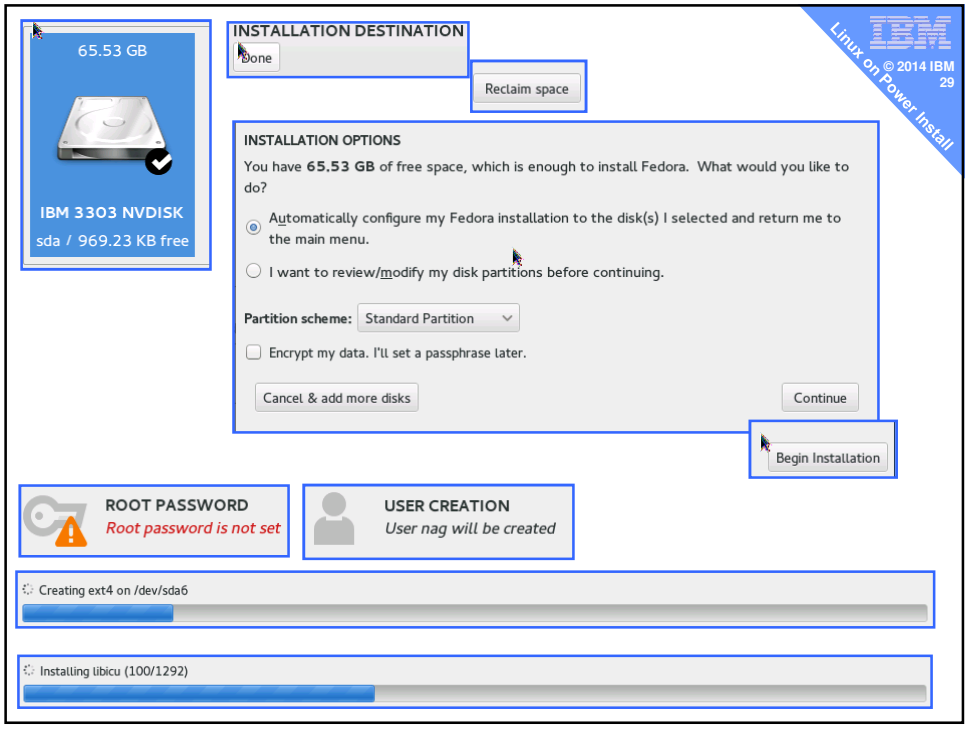
Regardless of the Linux Distro …

Recommend you install graphics option

- Gnome, KDE, Cinnamon, XFCE, LXDE or …
- or you have to “fiddle about” to get more than xterm!







Some basic early operations

NFS from AIX to Linux on Power

- mount -v -t nfs -o vers=3 purple3:/export /nfs

Data and time

- date
- date [MMDDhhmm[[CC]YY][.ss]]

Add user

- adduser -c “Nigel Griffiths” -p abc123 nag

Questions before we look at Nigel's Killer apps selection

Stuff that can add value quickly

Once the basics are done:

1. X Window system via VNC
2. Apache webserver
3. PHP for a Wiki Server
4. Samba to connect up your Windows machines for a repository or backup
5. wget
6. WireShark
7. gcc, ncurses, make, nmon
8. Firefox
9. Ganglia or LPAR2rrd
10. MySQL or postgresql

Before you start – Six hurdles

1. Check your network
2. Update Linux its online repositories [yum | yast]
   - You could have 100's of bugs & need security fixes
   - Install new version of applications
3. Install IBM supplied POWER RPMs
   - Available for SUSE, RHEL & perhaps Fedora
   - RMC for DLPAR, LPM tools, Diag's plus extra commands
4. Install nmon for Linux (if not from the above)
5. Be prepared for the firewall to block everything!
   - Good for security but very bad to get anything working
6. Get to the X-Windows GUI via VNC

X Windows via VNC

- Assuming Fedora/Red Hat
- VNC server package = dumb name (not vncserver)
  - yum list *vnc*
- Install it and all dependant packages
  - yum install tigervnc-server* ← doh!
- Run it and set a VNC password

```
[root@vm29 ~]# vncserver

You will require a password to access your desktops.
Password:
Verify:
xauth:  file /root/.Xauthority does not exist

New 'vm29.aixncc.uk.ibm.com:1 (root)' desktop is
  vm29.aixncc.uk.ibm.com:1

Creating default startup script /root/.vnc/xstartup
Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/vm29.aixncc.uk.ibm.com:1.log
```

X Windows via VNC

- Start your VNCviewer on your workstation with → vm29.aixncc.uk.ibm.com:1
- Oh dear! Can't connect at all.

- We just hit the Linux Firewall
- Ugly but works … stop the firewall completely
  - systemctl | grep -i fire
  - systemctl stop firewalld.service
- Start VNCviewer again and it works
  - Now use GUI to allow VNC and restart firewalld
- Alternatives
  1. Use X-Windows GUI tool – catch 22!!
  2. firewall-cmd --permanent --zone=public --add-service vnc-server
  3. SUSE uses iptables also RHEL 6.5

Apache Install = httpd

RHEL/Fedora

- yum list *http* → 193 packages
- yum list *httpd* → 48 packages
- yum list http* → 29 packages
- yum list httpd* → 9 packages
- yum install httpd.ppc64* httpd-man*

- On SLES look for: apache2

Apache Config = httpd

- # find /etc -name httpd.conf
  /etc/httpd/conf/httpd.conf

Edit it with vi
- ServerRoot "/etc/httpd" ← config, programs & logs
- Listen 80 ← regular web port
- Include conf.modules.d/*.conf ←other config's
- User apache ← owner id of files
- Group apache ← group id of owner
- DocumentRoot "/var/www/html"
  ← Where the web files are stored
  & often by default = empty!

Apache Config = httpd

- vi /var/www/html/index.html

```
<html>
  <head>
       <title>It Works!</title>
  </head>
  <body>
       <h1>Apache is cool!</h1>
  </body>
</html>
```

- chown apache:apache /var/www/html/index.html
  - Website user: "apache" is different on some Distro's
- Browse to http://<full-hostname>/

- Nope – dam that firewall !!!!

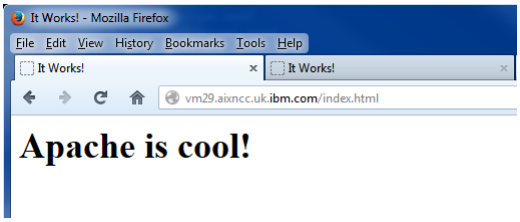
Apache Config = httpd RHEL7/Fedora

- firewall-cmd --get-services

amanda-client bacula bacula-client dhcp dhcpv6 dhcpv6-client dns ftp high-availability http https imaps ipp ipp-client ipsec kerberos kpasswd ldap ldaps libvirt libvirt-tls mdns mountd ms-wbt mysql nfs ntp openvpn pmcd pmproxy pmwebapi pmwebapis pop3s postgresql proxy-dhcp radius rpc-bind samba samba-client smtp ssh telnet tftp tftp-client transmission-client vnc-server wbem-https

```
# firewall-cmd --permanent --zone=public --add-service http
success
# firewall-cmd --permanent --zone=public --add-service https
success
# systemctl restart  firewalld.service
```

Apache Config = httpd



PHP install

- yum install php.ppc64*

- vi index.php

```
<html>
    <head>
        <title>It Works!</title>
    </head>
    <body>
        <h1>PHP is cool!</h1>
        <?php phpinfo()?>
    </body>
</html>
```

- chown apache:apache /var/www/html/index.php
- Browse to http://<full-hostname>/index.php

PHP based wiki install

- Firefox to pmwiki website and Download the package
  - http://www.pmwiki.org/pub/pmwiki/pmwiki-latest.tgz
- Install
  - Place download file in a /var/www/html
  - Then gunzip file.tgz
  - Then tar xvf file.tar
  - Then mv <pmwiki-directory> to wiki
  - chown –R apache:apche /var/www/html/wiki
  - chmod 2777 /srv/www/html/wiki
  - cd wiki; chcon -R -t httpd_sys_rw_content_t 'wiki.d'
- Point you browser at http://<machine/mywiki/pmwiki.php
  - Do as requested
- You might like to edit /srv/www/htdocs/wiki/local/config.php
  - To enable other features

Click on Edit
* Bullet list
# numbered
'''**bold**'''
[[URL|description]] for a link
%red%red text%%
[++big text++]
|table| of | items|
|a|b|c|
---- horizontal line

Samba

- yum install samba
- systemctl start smb.service
- systemctl enable smb.service
- ps -ef | grep -i smb

- Assuming you have a user called nag with password and home at /home/nag
- Give this person a samba password
- smbpasswd -a nag
  - and add the password twice

Samba - config

- vi /etc/samba/smb/conf
- Make sure it has these lines not commented out

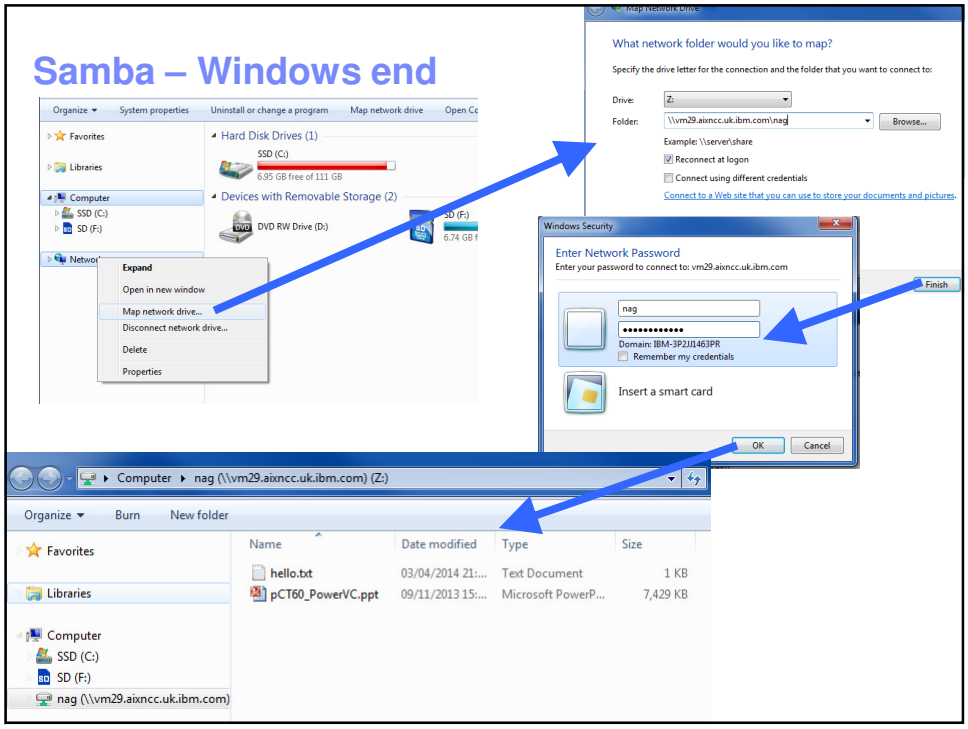
```
        security = user
        passdb backend = tdbsam
```

- Find the section [homes] & looks like this:

```
[homes]
        comment = Home Directories
        browseable = no
        writable = yes
        valid users = %S
        create mask = 0700
        directory  mask = 0700
```

- Restart: systemctl restart smb.service

Samba – Windows end



wget

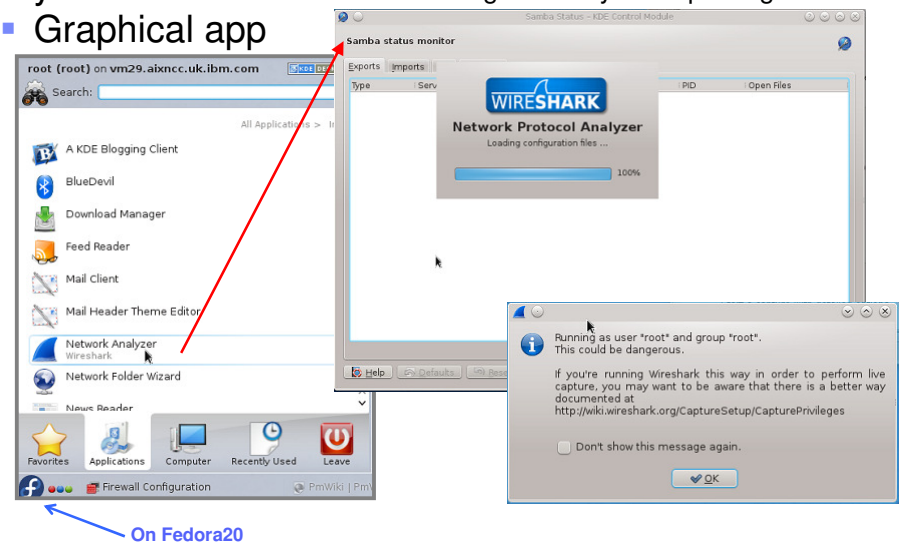
- Saves web pages or downloads from the web
- Will restart if download hangs
- VERY USEFUL for .iso image downloads

- Actually default install with Fedora20 & non-RHEL ☺

WireShark

was Ethereal

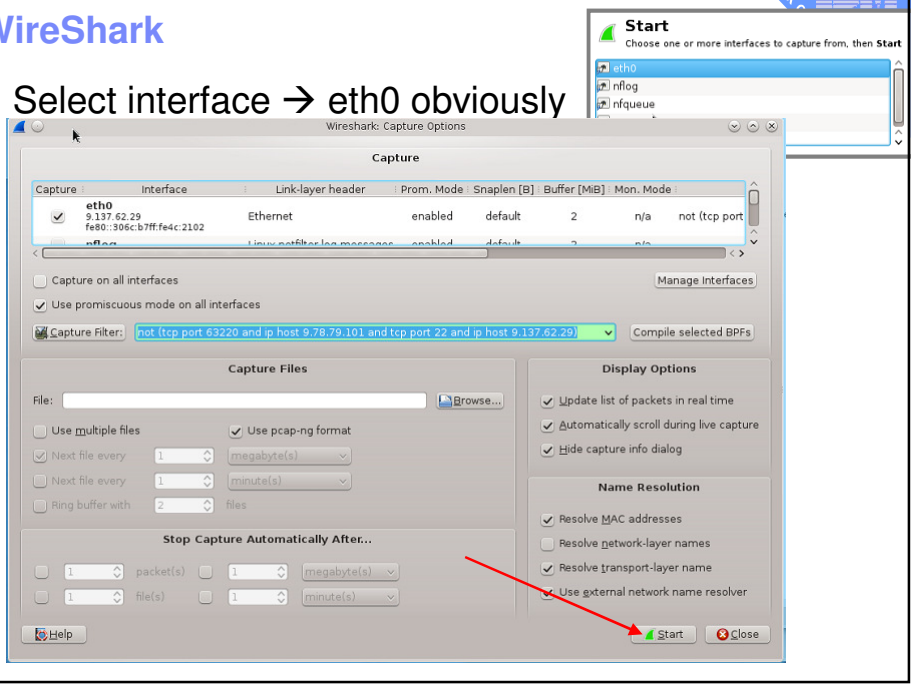
- yum install wireshark* ← brings in many other packages
- Graphical app

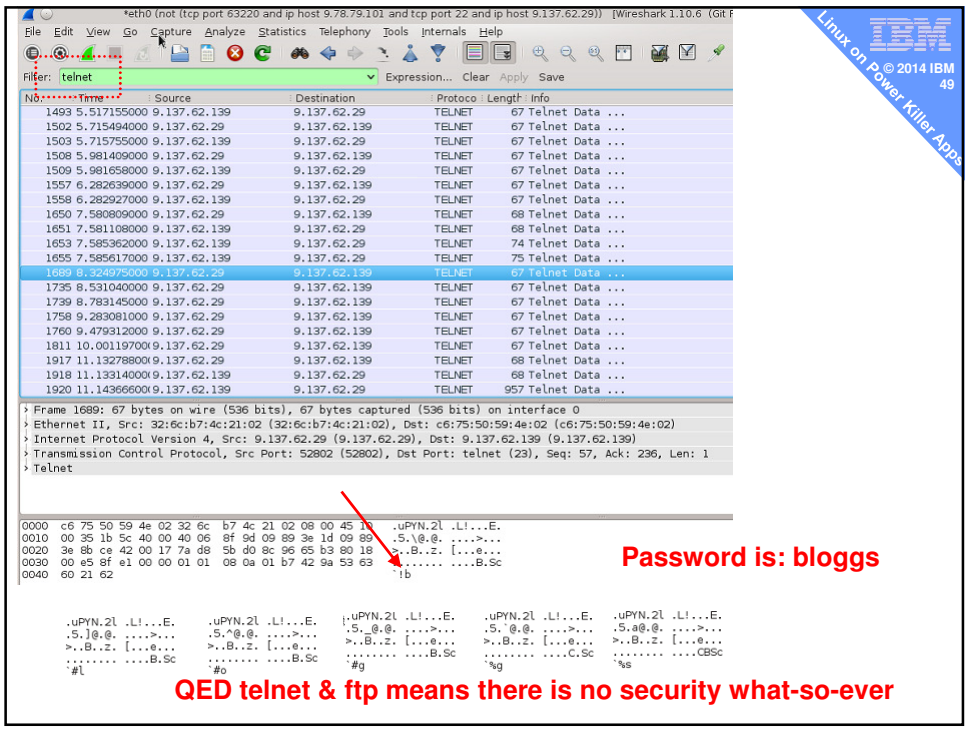


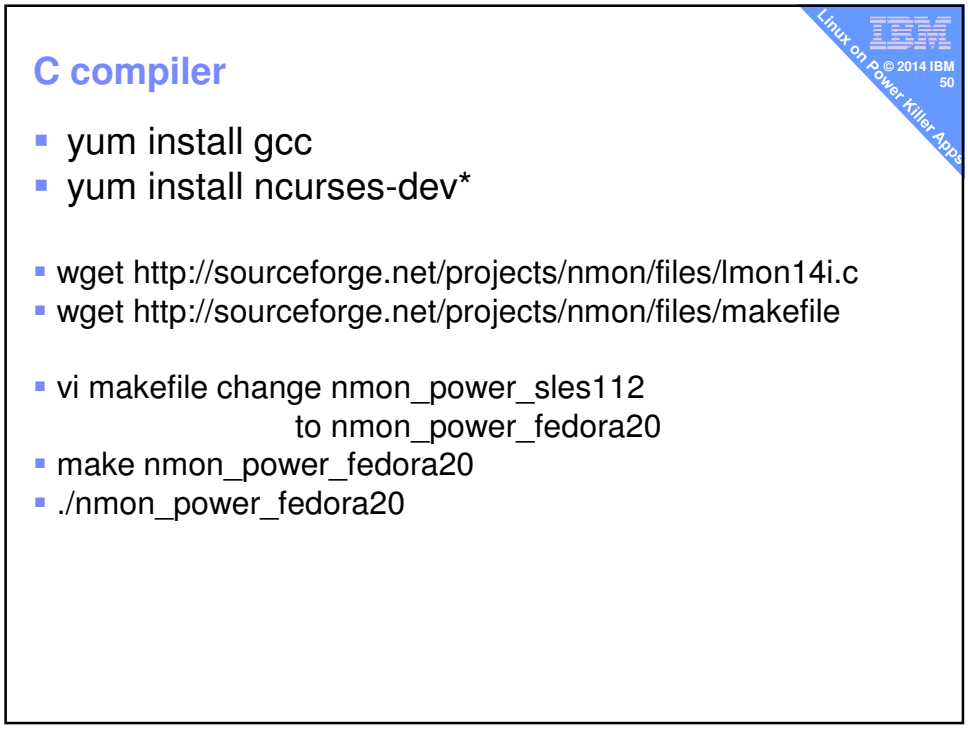
On Fedora20

WireShark

- Select interface → eth0 obviously







Firefox

- Can't install Linux GUI without getting it install
- But very useful to download Web content
  - Downloads straight in to your computer room
  - My home/office is 55 miles away

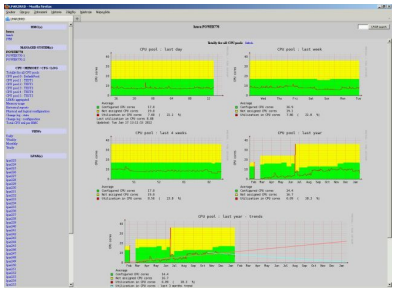
Ganglia or LPAR2rrd

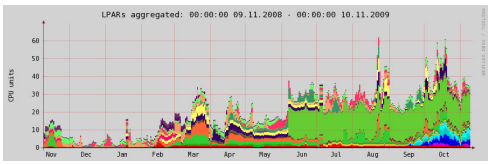
Ganglia – open source performance monitoring
- Very good Linux + AIX stats & global machine view
- Light weight on OS and network
- Needs a daemon on each OS
- See Michael Perzl's on the AIX VUG's on it
  - He is it the guru behind the POWER extensions

LPAR2rrd – open source with support
- Only needs HMC access
  - New version now seems to have agents for more OS stats
- Simpler install

LPAR2rrd - http://lpar2rrd.com/download.htm

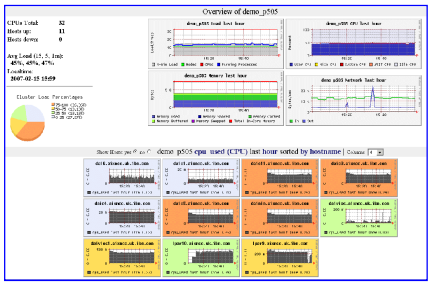
- All the instructions are on the website
- yum install rrdtool* rrdtool-perl*
- yum install perl-TimeDate perl-XML-Simple*
- wget http://www.lpar2rrd.com/download/TimeDate-1.16.tar.gz
- Downloaded lpar3rrd.XXX.tz
- Already have apache/httpd 2.4 running
- Takes an hour or so

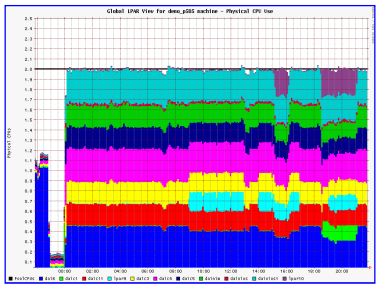




Ganglia - many OS's supported

- Admin website
  - **gmetad** to gather stats from gmond's and save to rrdtool
  - **Dynamic Apache Website** to display the stats
  - Extensions for POWER stats & LoP code → http://perzl.org
- Each VM of a machine
  - Has an tiny agent **gmond**
- Hour to set up + 5 minutes per AIX or Linux VM





MySQL → mariadb

- Was purchased by Oracle who upsets every one
- Just look at their website demanding support and you have to hunt for the free Open Source version!
- It seems the MariaDB split off is the new MySQL
  - https://mariadb.org/
- Excellent get you started
  http://www.if-not-true-then-false.com/2013/install-mariadb-on-fedora-centos-rhel/

- Hand out includes
  1. Installing
  2. Start and stop – it runs as a background service (daemon)
  3. Make it secure
  4. Connecting to it to run DBA commands
  5. Default tables and how to run a DBA script
  6. Commands to create tables
  7. How to download the TCP-H database DDL, data & SQL as a sample large DB

Done 10 Killer Apps - much easier than on AIX

1. X Windows via VNC
2. Apache webserver
3. PHP for a Wiki Server
4. Samba to connect up your Windows machines
   for a repository or backup
5. wget
6. WireShark
7. gcc, ncurses, make, nmon
8. Firefox
9. Ganglia or LPAR2rrd
10. MySQL or postgresql