VIOS TOP Tips for Administration

Power Virtual User Group 1/27/2022

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http://www.circle4.com/ptechu/viostoptips-jan272022.pdf

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Top 10 Tips – (OK there are 12, maybe more)

1. Stay current – upgrade regularly
    1. If you don't the upgrades become very complex and take longer
2. Install Hiper fixes and fixes to java, ssh, ssl
3. Keep it simple
4. Document well
5. Use dual vio so you get concurrent update
6. Use vio commands for maintenance
    1. emgr for HIPERs is the only exception
7. Backup regularly
    1. New backup function on HMC950 to backup VIO to HMC
8. Give vio plenty of resources
    1. Entitlement, memory, HBA queues, virtual buffers
9. Make sure storage is zoned and mapped for LPM
10. Always have a second disk available for updates and quick failback
    1. alt_disk_copy and alt_disk_mksysb are your friends
11. Use NTP to get consistent time
12. Don't forget to update I/O firmware (pay attention to patch order)

- Article from 2019 on Using NIM with VIO Servers
    - https://techchannel.com/SMB/09/2019/Using-NIM-with-VIO-Servers
    - Or http://www.circle4.com/jaqui/eserver/usingnimwithVIO-sep2019.pdf

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Patch order

1. Read the readmes
2. Usually do HMC first
3. Then server firmware
4. NIM server (it should be standalone and needs to be at highest level) plus I/O firmware
5. Then VIO servers and any I/O firmware
6. LPARs – AIX, IBM i, Linux
7. Note I document everything
8. I write up every step of the upgrade before I do it and then tweak as I go along

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1. Stay current (don't forget NIM)

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PowerVM 3.1.3

Announced 9/8/2021, effective date 9/10/2021

IBM® PowerVM® 3.1.3

IBM PowerVM 3.1.3, which delivers industrial-strength enterprise virtualization for IBM AIX®, IBM i, and Linux® environments on IBM Power® processor-based systems, is enhanced with additional capabilities.

Runs on Power7+ and later

PowerVM 3.1.3 includes:

- Power10 support
- Live Partition Mobility (LPM) optimized support for virtual optical devices
- Auto selection of best Mover Service Partition (MSP) network adapter for LPM

PowerVM VIOS 3.1.3 includes:

- Power8, Power9, and Power10 support
- Linux virtual network interface card (vNIC) performance improvements
- Hybrid network virtualization (HNV) support for Linux
- VIOS maintenance tool to provide backup and restore; verify redundancy of dual VIOS and VIOS setup
- User experience enhancements, including control over client visibility of VIOS
- Shared Storage Pool (SSP) enhancements, including dynamic thickening of devices
- Ansible® collection for VIOS included with Red Hat® Ansible Automation Platform

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Stay Current

http://www14.software.ibm.com/webapp/set2/flrt/liteTable?prodKey=vios

Version	Recommended Update	Recommended Upgrade	Release Date	EoSPS Date
2.2.6.65		3.1.3.10	2020.07.17	2020.09.30
3.1.0.10	3.1.0.60	3.1.3.10	2018.11.09	2021.11.30
3.1.0.21	3.1.0.60	3.1.3.10	2019.05.08	2021.11.30
3.1.0.30	3.1.0.60	3.1.3.10	2020.05.15	2021.11.30
3.1.0.40	3.1.0.60	3.1.3.10	2020.07.31	2021.11.30
3.1.0.50	3.1.0.60	3.1.3.10	2021.02.12	2021.11.30
3.1.0.60		3.1.3.10	2021.06.24	2021.11.30
3.1.1.10	3.1.1.40	3.1.3.10	2019.11.15	2022.11.30
3.1.1.21	3.1.1.40	3.1.3.10	2020.05.15	2022.11.30
3.1.1.25	3.1.1.40	3.1.3.10	2020.07.17	2022.11.30
3.1.1.30	3.1.1.40	3.1.3.10	2021.02.12	2022.11.30
3.1.1.40		3.1.3.10	2021.06.24	2022.11.30
3.1.2.10	3.1.2.21	3.1.3.10	2020.11.13	2023.11.30
3.1.2.21		3.1.3.10	2021.04.16	2023.11.30
3.1.3.10			2021.09.10	NA
3.1.3.14			2021.12.10	NA

NOTE all levels prior to 2.2.5 went EOS as of December 2018
2.2.5 went end of service 9/30/2019
2.2.6 is end of service 9/30/2020 – TIME TO UPGRADE TO V3
All levels prior to 3.1.2.10 go EOSPS by 11/30/2021

******PowerVM 3.1.3 announced 9/8/2021**

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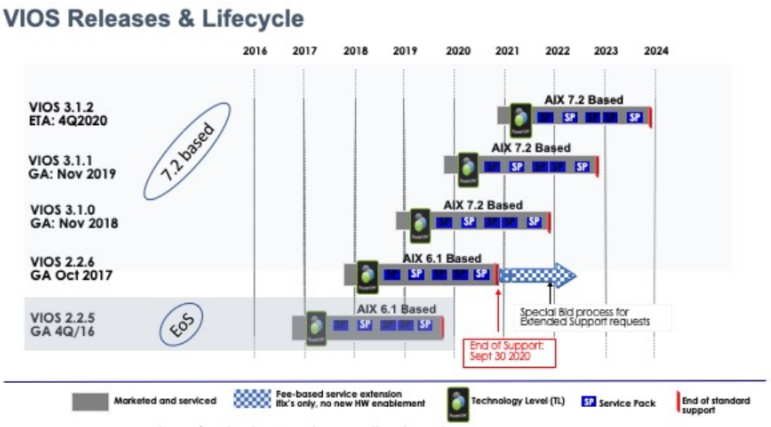
VIOS Level Service Life

Service life of VIOS levels



- A new VIOS Release / Technology Level is typically released once per year
- Service model is 3 years of standard support (service packs and i-fixes) for each VIOS release
- VIOS 3.1.1, 3.1.0, and 2.2.6 are supported on POWER9
- VIOS 3.1 and VIOS 2.2 images available on IBM ESS (Entitled Software Support) website

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only

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VIOS levels

VIOS 3.1 came out 11/9/2018 plus a minipack 3.1.0.10 and then 3.1.0.21 in May 2019
Latest is 3.1.2.21 which is AIX 7.2.5.2 based as of 4/6/2021
Powervm 3.1.3 announced 9/8/2021 and 3.1.3.14 12/10/2021

You can install directly from the flash copy which is at 3.1.3.14. You can also use this copy to upgrade directly from VIOS 3.1.2.0
There is a single step process documented for upgrading from 3.1.0.0 to 3.1.3.10 then you can upgrade to 3.1.3.14
If you are running 2.2.6 the VIO must be upgraded to v3.1.0 before putting on this update

Download 3.1.3.14 flash copy from entitled software: https://www.ibm.com/servers/eserver/ess/index.wss
Current Flash copy is called:
Virtual_IO_Server_Base_Install_3.1.3.14_Flash__122021_LCD8250309.iso
If upgrading from v2 also download v3.1.3.14 Flash copy

You can download the 3.1.3.14 update with all prerequisites from Fix Central: http://www-933.ibm.com/support/fixcentral/

Release Notes for 3.1.3.14 Service Pack - https://www.ibm.com/support/pages/node/6524698

NIM Master needs to be at 7200-05-03 at a minimum for v3.1.3.14
Check required HMC and firmware levels
Minimum server level is POWER7+ (D model) and above

Service strategy: http://www-304.ibm.com/webapp/set2/sas/f/vios/svcstrategy.html
Lifecycle: http://www-01.ibm.com/support/docview.wss?uid=isg3T1023504

When installing a new server read the redbook to ensure your VIO level, HMC, etc are supported
As an example the E980 requires a minimum of VIO 2.2.6.31, S922 and S924 are 2.2.6.21
S950 is 2.2.6.23 – these are MINIMUMs and are now out of support

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Use FLRT and check Prereqs

FLRT Home Page:
http://www14.software.ibm.com/webapp/set2/flrt/home
https://www-304.ibm.com/support/customercare/flrt/
FLRT Lite
http://www14.software.ibm.com/webapp/set2/flrt/liteHome
VIOS to NIM Master Mapping:
http://www14.software.ibm.com/webapp/set2/flrt/sas?page=viostable

System Software Maps for VIOS:
http://www-01.ibm.com/support/docview.wss?uid=ssm1platformvios
AIX/VIOS Security Tables:
http://www14.software.ibm.com/webapp/set2/sas/f/flrt3/Sec_APARs.html
VIOS Hiper Tables:
http://www14.software.ibm.com/webapp/set2/flrt/doc?page=hiper#vios_hiper
Also check MPIO driver versions as there are specific requirements for each VIO release

AIX Support Lifecycle
https://www-01.ibm.com/support/docview.wss?uid=isg3T1012517

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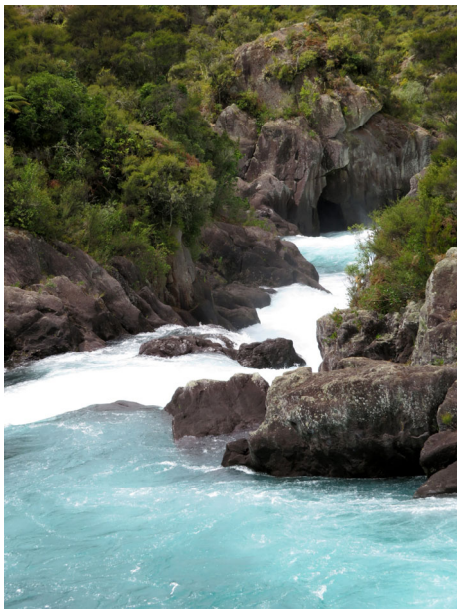
2. Install Hiper and other fixes



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Updating Java, SSH and SSL

- SSH and SSL are obtained from the Web Download Pack which has moved to:
  - https://www-01.ibm.com/marketing/iwm/iwm/web/pickUrxNew.do?source=aixbp
- Untar the files and put all ssh, ssl and java files (Java7 and java8) into a directory. I used /usr/local/soft/javasshssl
- $updateios -commit
- $updateios -accept -install -dev /usr/local/soft/javasshssl
  - There are about 96 to go on
- #lslpp -l | grep Java8
- Make sure Java8.sdk and Java8_64.sdk are on
- $updateios -commit
- **$updateios -remove Java6**
- Removes 7 filesets
- **$updateios -remove Java6_64**
- Removes 7 filesets
- As of 3.1.0.21 you can also remove Java7 the same way you remove Java6 above
- Latest Java7 and Java8 both end .700

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Efixes and ifixes

Many security patches are put on using efixes or ifixes
The VIO server also needs these to be applied – **use FLRTVC to determine what fixes are needed**
Run flrtvc and download and install the ifixes that are needed
https://www-304.ibm.com/webapp/set2/sas/f/flrt/flrtvc.html
You should do this on AIX LPARs too

/usr/sbin/emgr –l lists them
emgr –P lists the patches and the packages they affect
To apply a fix change into the directory it is in and then run it in preview mode:
cd /usr/local/soft/vios31fixes/bind_fix17
emgr -p -e IJ25927s2a.200708.epkg.Z
Remove the –p and run again for real if the preview was successful:
emgr -e IJ25927s2a.200708.epkg.Z

If you run emgr –l and there are no fixes listed then you most likely have security holes that need patching, specifically Java, openssh and openssl.

See last slide on using updateios for efixes and ifixes

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VIO Server 3.1.2.21 Efixes

VIOS 3.1.2.10 had 9 HIPER fixes to put on and there were two for 3.1.2.21
All VIOS Hipers:
http://www14.software.ibm.com/webapp/set2/flrt/doc?page=hiper&os=vios_hiper

IJ31191 also known as IJ31936
https://www.ibm.com/support/pages/apar/IJ31191
This patch resolved issues around NPIV I/O errors
iFix is at: https://aix.software.ibm.com/aix/ifixes/ij31191/

IJ31604
https://www.ibm.com/support/pages/apar/IJ31604
Zoning changes in Cisco MDS may cause 7.2.5.1 client to lose connectivity

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Efixes and ifixes

For 3.1.1.25 as of 9/14/2020 one patch is needed once SSH, SSL and Java are updated:
ij25927 ftp://aix.software.ibm.com/aix/efixes/security/bind_fix17.tar

After you untar the downloaded file you can check the efix name to put on by changing into the directory and then:
#grep 3.1.1.25 *.asc
3.1.1.25 IJ25927s2a.200708.epkg.Z key_w_fix

```
# emgr -l
 ID  STATE LABEL     INSTALL TIME      UPDATED BY ABSTRACT
=== ===== ========== ================= ========== ====================================
1     S    IJ25927s2a 08/24/20 09:42:30          IJ25927 for AIX 7.2 TL04 SP00 to SP02
```

It will vary by O/S level and SP. This was for 3.1.1.25

To remove an efix or ifix:
/usr/sbin/emgr -r -L <EFIX label>
emgr -r -L IJ16586s3a

Running flrtvc.ksh on 9/14/2020 showed no other efixes to go on

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VIO Server 3.1.3.14 Efixes

NEW for 3.1.3.14

Openssh, openssl and Java latest levels

OpenSSL 1.0.2.2102 OR 1.1.1.1200
Patch for 1.0.2.2102 for CVE-2021-3712
https://aix.software.ibm.com/aix/efixes/security/openssl_fix34.tar

8.1.102.2104 plus patch for CVE-2021-41617
https://aix.software.ibm.com/aix/efixes/security/openssh_fix14.tar
Java
7.0.0.700
8.0.0.700

lscore - CVE-2021-38991
https://aix.software.ibm.com/aix/efixes/security/lscore_fix.tar
lscore affects AIX 7.1, 7.2, 7.3 and VIOS 3.1

See last slide on using updateios for efixes and ifixes

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Efixes and ifixes

All VIOS Hipers: http://www14.software.ibm.com/webapp/set2/flrt/doc?page=hiper&os=vios_hiper

Fixes are typically accessed using ftp or https at:
https://aix.software.ibm.com/aix/ifixes
https://aix.software.ibm.com/aix/efixes

Some are also in a security subdirectory. FLRTVC provides the direct link

Removal
To remove an efix or ifix:
/usr/sbin/emgr -r -L <EFIX label>
emgr -r -L IJ16586s3a

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Know how to get help

- If your upgrade goes south
- Know how to get a perfpmr
  - https://www.ibm.com/support/pages/readme-collecting-perfpmr
  - Keep an up to date copy downloaded so you don't have to download it in a panic
- Know how to run snap
  - https://www.ibm.com/support/pages/how-collect-snap-powervm-virtual-io-server-vios
  - https://www.ibm.com/support/pages/node/670105
  - Uploading snap to Testcase
  - https://www.ibm.com/support/pages/node/681391
- Opening a support ticket
  - https://www.ibm.com/mysupport/s/my-cases
- Have your VIO predocumented as you will have to provide lots of information

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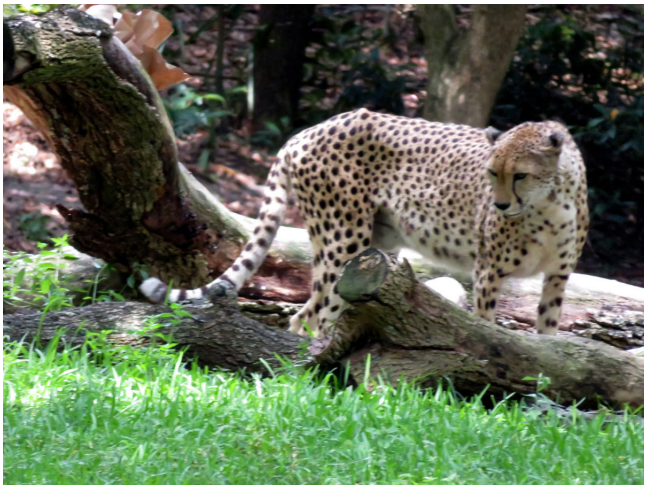
3. Keep it simple and consistent



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General

- Keep it simple
- Ensure LMB is the same on all servers if you want to use LPM
- Use hot pluggable adapters rather than built in ones
  Easier maintenance
- Use dual VIO to allow for concurrent updates
- ***All adapters should be desired, not required***
- ***Check VLANs on trunk adapters match between the 2 VIO servers that are paired***
  - Second VIO server won't boot if they don't match
- Don't mix multipath drivers on HBAs
- Run HMC Scanner and/or Sysplan before and after all changes
- Plan for at least one update per year (IBM normally puts out 2)
- At least two VIO servers, but can also separate VIOs for production and non prod, or network from storage on large systems
- Test failover (SEA failover and disk if VIO goes down)

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General

- Use VIO commands wherever possible rather than going into oem_setup_env and using smitty
- Mirror VIO rootvg if on internal disk
- Have a spare disk in your VIO to use for cloning prior to updates
- NOTE – VIO requires at LEAST 30GB in rootvg – give it 100GB
- Fix Paging- By default VIO has a 512MB hd6 and a 1.5GB paging00 on the same LUN
  - On some systems it is 2 x 1GB page spaces
- Add logging and set up dump devices properly
- Run VIOS Advisor (part) regularly
- Check errpt regularly
- NEVER run at 100% entitlement – ensure it is high enough and there are plenty of VPs and memory
- Backup regularly – use NIM or scripts
  - Make sure these are mksysb bootable image backups

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4. Document well

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Documentation is Critical

- Use HMCScanner and Sysplan
- Put together spreadsheet of documentation
- All equipment and serial numbers
- UAK expiration dates on servers
- Customer numbers
- Server and I/O firmware levels, VIO and O/S levels
- HMC information including version, BMC and PNOR, networking etc
- IP addresses
- Resource profiles
- Adapter allocations
- Standards used for network, vSCSI, NPIV mappings
- Actual vSCSI assignments
- Actual NPIV vfcmaps
- Vfchosts and their associated WWPNs
- SEA and virtual ethernet VLAN assignments
- Switchports for SAN and network
- Power needs and PDU mapping
- Anything else you can think of

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5. Use dual VIO

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Dual VIO

- Use dual VIO to allow for concurrent updates
- If properly setup you can update one vio and reboot it while the other is managing the environment
- Test failover (SEA failover and disk if VIO goes down)
- Requires a split backplane if you are using internal disks
- Provides greater redundancy and flexibility
- Can have one pair managing everything or can have a pair for network and a pair for disk I/O

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6. Use VIO commands for maintenance

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Use VIO commands

- For updates use updateios
  - updateios -accept -install -dev /usr/local/soft/vios31314
- For upgrades (v2 to v3) use viosupgrade
- If you need to update java, ssh and ssl
  - Put patches in their own directory and then use updateios against that directory
  - updateios -accept -install -dev /usr/local/soft/javasshssl-vio-mar162021
- Exceptions
  - emgr for hiper patches
  - emgr -p -e IJ31604s2a.210414.AIX72TL05SP02.epkg.Z
  - I/O firmware updates which are done using diag
  - ***See last slide on using updateios for efixes and ifixes***

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7. Backup regularly

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Use alt_disk_copy prior to changes

- Have two disks so you can take a clone
- If rootvg is mirrored you will need to unmirror for maintenance
- No need to mirror if on SAN, always mirror rootvg if on internal disk

```
# lspv | grep root
hdisk0          00ce48c008314b9f                    rootvg          active
hdisk1          00ce48c03c8f2115                    altinst_rootvg

# bootinfo -b
hdisk0

exportvg altinst_rootvg
alt_disk_copy –V –B –d hdisk1
```

I always do a bosboot and rewrite the bootlist before any reboot
Recovery, if issues with the upgrade, is to point the bootlist to the new disk and reboot

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IBM Supported Backup and Restore Methods for VIO Servers

- https://www.ibm.com/support/knowledgecenter/9009-22G/p9hb1/p9hb1_vios_backup_backup.htm
- Note that IBM does not support (even at v3) backup and restore with **USB sticks**

Table 1. Backup and restoration methods for the VIOS

Backup method	Media	Restoration method
To tape	Tape	From tape
To DVD	DVD-RAM	From DVD
To remote file system	nim_resources.tar image	From an HMC using the Network Installation Management (NIM) on Linux facility and the **installios** command
To remote file system	mksysb image	From an AIX 5L™ NIM server and a standard mksysb system installation
Tivoli Storage Manager	mksysb image	Tivoli Storage Manager

You can backup and restore AIX from USB but VIO is not supported – see below for AIX information
https://www.ibm.com/support/pages/using-and-taking-advantage-usb-devices-and-aix

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Backup Script to put in crontab

```
#! /bin/sh
#
machine=`uname -n`
mount /usr/local/backups
mkdir /usr/local/backups/$machine
umount /var/vio/VMLibrary
su - padmin -c "ioscli backupios -file /usr/local/backups/$machine -nomedialib"
su - padmin -c "ioscli backupios -file /usr/local/backups/vio-mksysbs/$machine.mksysb -nomedialib -mksysb"
mount /var/vio/VMLibrary
#
exit 0
```

NOTES
The above can be put in root's crontab to run regularly
Don't forget to set up an NFS mount to the VIO from your NIM or NFS server
Do not allow ANY NFS mount to mount automatically at boot in case the NIM or NFS server is down at the time of boot
Also, regularly grab an HMCScanner report
https://www.ibm.com/support/pages/hmc-scanner-power-server-config-and-performance-stats
https://www.ibm.com/support/pages/sites/default/files/inline-files/$FILE/hmcScanner-0.11.42.zip

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Check the virtual backup

The following adds a cron entry and will backup your VIO virtual definitions every day and keep the last 7 copies in /home/padmin/cfgbackups
You only need to run it once

viosbr –backup -file viobkup –frequency daily numfiles 7

You can view the backups taken using viosbr –view (next slide)

You can list what is in a backup using:
viosbr -view -file viosname.01.tar.gz

#crontab –l
0 3 1 * * /usr/local/bin/viobackup.sh >/usr/local/logs/viobackup.txt >2&1
0 3 15 * * /usr/local/bin/viobackup0.sh >/usr/local/logs/viobackup0.txt >2&1
0 0 * * * (/usr/ios/cli/ioscli viosbr -backup -file viosname -frequency daily -numfiles 7)

The above runs my VIO backup on the 1st and 15th and it runs the virtual definitions backup daily

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New with HMC 950

- https://community.ibm.com/community/user/power/blogs/manjunath-shanbhag1/2021/04/16/vios-maintenance-validation-and-backuprestore?CommunityKey=71e6bb8a-5b34-44da-be8b-277834a183b0&tab=recentcommunityblogsdashboard
- Blog above by Manjunath Shanbag
- Covers new functions in HMC 950
  - Ability to perform VIOS IO Configuration backup, store it in the HMC and restore it later
  - Ability to perform VIOS backup and store the backup in the HMC. Later the backup can be used to restore the VIOS
- Note HMC 950 requires 7042-cr9 or new POWER HMCs
- Latest is HMC v1011 – NOTE this does not support POWER7/7+ servers of any kinds

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8. Give VIO plenty of resources

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Your vio is your most loved one

- Give it the highest weight (I like 254)
- Make sure you give it plenty of entitlement (more than it needs)
- Tune the virtual buffers
- Tune the HBA settings (num_cmd_elems and max_xfer_size)
- Monitor with nmon and part

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Sample /etc/tunables/rc-tunevio.sh

```
#! /bin/ksh
#
# First we set the network tuneables
# NOTE YOUR VALUES MAY DIFFER
#
/usr/sbin/no -p -o rfc1323=1
/usr/sbin/no -p -o tcp_sendspace=262144
/usr/sbin/no -p -o tcp_recvspace=262144
/usr/sbin/no -p -o udp_sendspace=65536
/usr/sbin/no -p -o udp_recvspace=655360
#
vmo -p -o minfree=1024
vmo -p -o maxfree=2048

#Run ifconfig -a and check the en values - (assuming IP is on en5):
#chdev -l en5 -a tcp_recvspace=262144 -P
#chdev -l en5 -a tcp_sendspace=262144 -P
#chdev -l en5 -a rfc1323=1 -P
#
chdev -l fcs0 -a max_xfer_size=0x200000 -a num_cmd_elems=1024 -P
chdev -l fcs1 -a max_xfer_size=0x200000 -a num_cmd_elems=1024 -P
chdev -l fcs2 -a max_xfer_size=0x200000 -a num_cmd_elems=1024 -P
chdev -l fcs3 -a max_xfer_size=0x200000 -a num_cmd_elems=1024 -P
```

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Sample /etc/tunables/rc-tunebufs.sh

This tunes buffer settings for the two virtual adapters – assumes ent4, ent5 are virtuals

lsdev –C | grep ent will show the adapters so you can pick the right ones

```
#! /bin/ksh
#
chdev -l ent4 -a buf_mode=min -P
chdev -l ent5 -a buf_mode=min -P
chdev -l ent4 -a max_buf_tiny=4096 -P
chdev -l ent4 -a max_buf_small=4096 -P
chdev -l ent4 -a max_buf_medium=512 -P
chdev -l ent5 -a max_buf_tiny=4096 -P
chdev -l ent5 -a max_buf_small=4096 -P
chdev -l ent5 -a max_buf_medium=512 -P
```

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HBA Tuning

- Make the same tuning changes you would make on AIX, but VIO must be set at least as high as clients
- Set num_cmd_elems and max_xfer_size on the fiber adapters on VIO

```
chdev -l fcs0 -a max_xfer_size=0x200000 -a num_cmd_elems=1024  -P
chdev -l fcs1 -a max_xfer_size=0x200000 -a num_cmd_elems=1024  -P
```

Check these numbers are supported by your disk vendor

- If NPIV also set on clients
- **Client setting cannot be higher than the VIOs**
- **VIO must be rebooted to at least the client value prior to client change.**
- Pay attention to adapter layout and priorities

- NOTE – as of AIX v7.1 tl2 (or 6.1 tl8) num_cmd_elems is limited to 256 on the VFCs so set num_cmd_elems to the high number on the VIO but to no more than 256 on the NPIV clients
- See: http://www-01.ibm.com/support/docview.wss?uid=isg1IV63282
- **Increased again to 2048 in July 2016**
- http://www-01.ibm.com/support/docview.wss?uid=isg1IV76270
- This upper limit is set in the client LPAR not the VIO server
- BUT the client setting MUST NOT be larger than what is set in the VIO server

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HBA max_xfer_size

The default is
0x100000 /* Default io_dma of 16MB */

After that, 0x200000,0x400000,0x80000 gets you 128MB

After that 0x1000000 checks for bus type, and you may get 256MB, or 128MB

There are also some adapters that support very large max_xfer sizes which can possibly allocate 512MB

VFC adapters inherit this from the physical adapter (generally)

Unless you are driving really large IO's, then max_xfer_size on the HBA is rarely changed beyond 0x200000 which provides a 128MB DMA

Client setting cannot be higher than the VIOs were booted with

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9. Storage zoning and mapping

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Zoning and Mapping

- ***Zoning***
  - This is when the switch is configured to allow the switch port to talk to the storage and the WWPN for the LPAR or server
- ***Mapping (masking)***
  - This is when the storage is updated to allow the host (LPAR or server) WWPNs access to the specific LUNs provisioned
- LUNs must be provisioned at the storage, then mapped and zoned before they can be used in an LPAR
- For direct attach we zone and map the WWNs for the real adapters, for NPIV we use the WWPNs on the virtual adapters
- WWNs tend to start with 10 or 20
- WWPNs (NPIV) start with C0
- These can be found in an HMCScanner report or by logging onto the LPAR or VIO or from the HMC
- Check the VIO connection to the switch is NPIV enabled:

```
$ lsnports
name             physloc                        fabric tports aports swwpns  awwpns
fcs0             U78C9.001.WZS0234-P1-C12-T1         1     64     63   2048    2046
fcs1             U78C9.001.WZS0234-P1-C12-T2         1     64     63   2048    2046
fcs2             U78C9.001.WZS0234-P1-C6-T1          1     64     56   3088    3062
fcs3             U78C9.001.WZS0234-P1-C6-T2          1     64     56   3088    3062
```

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LPM Zoning and mapping - NPIV

- **Do not confuse zoning with mapping (masking)**
- Regular and LPM WWPNs must be zoned at the switch and mapped at the storage
- Each virtual fibre adapter for an LPAR has 2 x WWPNs
  - The first is the default one that is used
  - The second is used by LPM – it normally does not login unless LPM has been used
  - Both WWPNs must be zoned and mapped
- If they are not mapped at the storage and you do an LPM you will damage your boot image
  - You can avoid this problem after 2.2.4 by setting 2 parameters on vioslpm0 on all VIO LPARs
- You should also do your zoning by zoning all WWPNs for the LPAR to both switches. Keep zoning simple and have a zone that is LPARname and all the WWPNs. This will avoid problems during LPM when you allocate fiber ports to each VIO for dual VIO systems.

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LPM's use of the two WWPNs

- Each virtual fibre adapter for an LPAR has 2 x WWPNs
  - The first is the default one that is used
  - The second is used by LPM – it normally does not login unless LPM has been used
- Prior to an LPM the default WWPN is used
- After the LPM the second WWPN is used
- After the next LPM it goes back to the default WWPN
- i.e. it flip flops between them
- EXCEPT
  - If you perform an inactive LPM then it stays with whatever the WWPNs were that it used last

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Get rid of annoying FCS errors on 10/1Gb cards

- The 4 port 10Gb/1Gb cards can act as network cards or can be used for San. Most people use them as network cards and then see lots of FCS errors.
- You can stop this from happening as follows:

#lsdev -C | grep fcs

Look for the 10Gb cards - in my case they showed as fcs4 and fcs5

```
# lsdev -C | grep fcs
fcs0           Available 00-00       8Gb PCI Express Dual Port FC Adapter (df1000f114108a03)
fcs1           Available 00-01       8Gb PCI Express Dual Port FC Adapter (df1000f114108a03)
fcs2           Available 01-00       PCIe3 2-Port 16Gb FC Adapter (df1000e21410f103)
fcs3           Available 01-01       PCIe3 2-Port 16Gb FC Adapter (df1000e21410f103)
fcs4           Available 02-04       PCIe3 10Gb 4-Port FCoE Adapter (df1060e214101004)
fcs5           Available 02-05       PCIe3 10Gb 4-Port FCoE Adapter (df1060e214101004)
```

Check for the converged cards

```
# lsdev -C | grep Converged
ent0           Available 02-00       PCIe3 10GbE SFP+ SR 4-port Converged Network Adapter (df1020e214100f04)
ent1           Available 02-01       PCIe3 10GbE SFP+ SR 4-port Converged Network Adapter (df1020e214100f04)
ent2           Available 02-02       PCIe3 100/1000 Base-TX 4-port Converged Network Adapter (df1020e214103c04)
ent3           Available 02-03       PCIe3 100/1000 Base-TX 4-port Converged Network Adapter (df1020e214103c04)
```

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Get rid of annoying FCS errors on 10/1Gb cards

As padmin:
$rmdev -dev fcs4 -recursive -ucfg
$rmdev -dev fcs5 -recursive -ucfg
$chdev -dev fscsi4 -attr autoconfig=defined
$chdev -dev fscsi5 -attr autoconfig=defined
After you should see:

```
# lsdev -C | grep fscsi
fscsi0         Available 00-00-01    FC SCSI I/O Controller Protocol Device
fscsi1         Available 00-01-01    FC SCSI I/O Controller Protocol Device
fscsi2         Available 01-00-01    FC SCSI I/O Controller Protocol Device
fscsi3         Available 01-01-01    FC SCSI I/O Controller Protocol Device
fscsi4         Defined   02-04-01    FC SCSI I/O Controller Protocol Device
fscsi5         Defined   02-05-01    FC SCSI I/O Controller Protocol Device
```

As root:
Note I have a log filesystem called /usr/local/logs – change this to wherever you want to save these files
#errpt >/usr/local/logs/errpt-may152021.txt
#errpt -a >/usr/local/logs/errpta-may152021.txt
#errclear 00
#cfgmgr
#errpt

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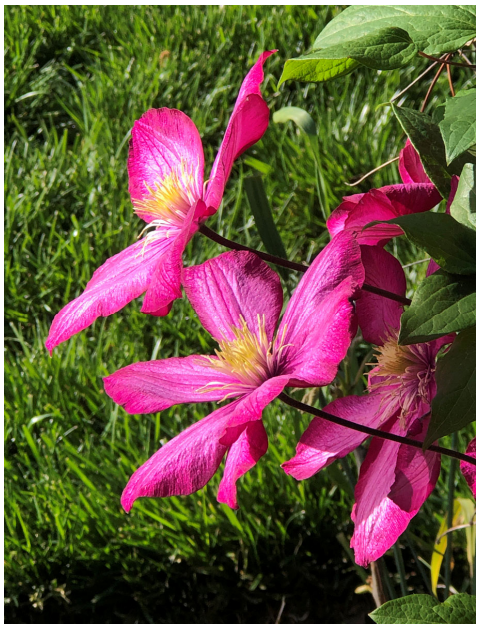
10. Have a second disk



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Always have a second disk

If on internal disk you should mirror rootvg
Make sure ordered server has a split backplane so youcan have two vio servers on internal disks with the disks split across the backplanes

If on SAN still have the second disk

Then when you do maintenance you can use alt_disk_copy to take a clone before making changes
alt_disk_copy –V –B –d hdisk1
Takes a clone of rootvg to hdisk1 which will show as altinst_rootvg on an lsvg

If you want to use FBO (file backed optical) add a 3rd disk in its own VG so rootvg does not get huge

Keep rootvg small and clean

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11. Use NTP

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Setup NTP

#vi /etc/ntp.conf
Comment out broadcast and add:
server 0.pool.ntp.org
server 1.pool.ntp.org

#vi /home/padmin/config/ntp.conf
Add to end:
server 0.pool.ntp.org
server 1.pool.ntp.org

#ntpdate 0.pool.ntp.org

Update rc.tcpip to start ntp at boot
Now start NTP
#startsrc -a "-c /home/padmin/config/ntp.conf" -s xntpd

You can substitute your own NTP servers for the ones above if you have them

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12. Update I/O firmware

Update I/O Firmware

As root run: lsmcode –A

Check on Fix Central under Power I/O Firmware
You will need to know what kind of adapters you have (feature codes)

If you are updating the primary you can let it failover or you can force a failover
chdev -l ent14 -a ha_mode=standby
When done chdev -l ent14 -a ha_mode=auto

Example updating a 5899 network adapter with code uploaded to server

cd /software/adapters/5899
rpm -ivh --ignoreos e414571614102004.10240310.aix.rpm
diag -T download -d ent0
Updated all 4 ent0-ent3

You may have to unconfigure the SEA to do this (see next slide)

Update I/O Firmware

You may have to unconfigure the SEA to do this (SEA here is on ent14)
ifconfig en14 down
ifconfig en14 detach
rmdev -l ent14

If IP is on the real then:
ifconfig en4 down
ifconfig en4 detach
rmdev -l ent4

cfgmgr
Check microcode went on and sea came back
smitty tcpip and check ip is now on
ifconfig -a

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Thank you for your time

If you have questions please email me at:
jaqui@circle4.com or jlynch@flagshipsg.net

Also check out:
http://www.circle4.com/movies/

Copy of presentation at:
http://www.circle4.com/ptechu/viostoptips-jan272022.pdf

PowerVM Virtual User Group
https://www.ibm.com/support/pages/node/1110195

POWER Systems Virtual User Group
https://www.ibm.com/support/pages/node/1120377

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Documentation on VIOS 3.1 upgrades

- What's new in Virtual I/O Server commands
- https://www.ibm.com/support/knowledgecenter/en/9040-MR9/p9hcg/p9hcg_whatsnew.htm

- Virtual I/O Server release notes – include USB Memory/Flash key install
- https://www.ibm.com/support/knowledgecenter/en/9040-MR9/p9eeo/p9eeo_ipeeo_main.htm
  - USB Memory/Flash key install
  - Minimum size for a VIOS
- Getting flash image onto a USB
- https://www.ibm.com/support/pages/node/715609

- **VIOS viosupgrade** command in VIOS 2.2.6.30
- https://www.ibm.com/support/knowledgecenter/en/9009-42A/p9hcg/p9hcg_viosupgrade.htm
  - Hint – upgrade to at least 2.2.6.32 prior to trying to upgrade to v3

- **NIM viosupgrade** command on the NIM AIX 7.2 TL3 + sp
- https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.cmds6/viosupgrade.htm
  - This one is buried in the AIX commands reference for AIX Commands of AIX 7.2

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Useful Links

- Jaqui Lynch Articles
  - http://www.circle4.com/jaqui/eserver.html
- Jaqui Lynch TechChannel Articles
  - https://techchannel.com/Authors/jaqui-lynch
- Jaqui Lynch Youtube
  - https://www.youtube.com/channel/UCYH6OdgB6rV1rPxYt6FWHpw
- Jaqui's Movie Replays
  - http://www.circle4.com/movies
- Nigel Griffiths AIXpert Blog
  - https://www.ibm.com/support/pages/aixpert-blog-nigel-griffiths-mrnmon
- Nigel Griffiths YouTube
  - https://www.youtube.com/nigelargriffiths
- Gareth Coates – Tricks of the POWER Masters
  - https://www.ibm.com/support/pages/node/1116939
- IBM US Virtual User Group
  - https://www.ibm.com/support/pages/node/1120377
- Power Systems UK User Group
  - https://www.ibm.com/support/pages/node/1110195

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IBM Website Links

- ESS Website to download base software
  - https://www.ibm.com/servers/eserver/ess/index.wss?lnk=msdDO-enss-usen
- HMC Scanner
  - https://www.ibm.com/support/pages/node/1117515
  - https://www.ibm.com/support/pages/sites/default/files/inline-files/$FILE/hmcScanner-0.11.42.zip
- VIOS Advisor
  - https://www.ibm.com/support/knowledgecenter/TI0002C/p8hcg/p8hcg_part.htm
  - https://www.ibm.com/support/knowledgecenter/TI0003N/p8hb1/p8hb1_vios_perf_adv.htm
  - https://www.ibm.com/support/knowledgecenter/TI0003M/p8hb1/p8hb1_vios_perf_adv_reports.htm
- IBM Inventory Services
  - https://www.ibm.com/support/inventoryservices/index.wss
- IBM FLRTVC
  - https://www-304.ibm.com/webapp/set2/sas/f/flrt/flrtvc.html
- IBM FLRT
  - http://www14.software.ibm.com/webapp/set2/flrt/home
- IBM AIX Linux Toolbox
  - https://www.ibm.com/support/pages/node/883796
- IBM Website to download SSH, SSL, etc
  - https://www-01.ibm.com/marketing/iwm/iwm/web/pickUrxNew.do?source=aixbp
- IBM Fix Central
  - http://www-933.ibm.com/support/fixcentral/

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VIOS Specific References

- VIO Server Support
  - https://www14.software.ibm.com/support/customercare/sas/f/vios/home.html
- SDD and SDDPCM Specific procedures for VIOS
  - http://www-01.ibm.com/support/docview.wss?uid=ssg1S7002686&aid=1
- SG24-7940 - PowerVM Virtualization - Introduction and Configuration
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg247940.pdf
- SG24-7590 – PowerVM Virtualization – Managing and Monitoring
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg247590.pdf
- SG24-8080 – Power Systems Performance Guide – Implementing and Optimizing
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg248080.pdf
- SG24-8062 – PowerVM Best Practices
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg248062.pdf
- SEA Load Sharing
  - https://www.ibm.com/support/pages/how-setup-sea-failover-load-sharing-configuration
  - https://www.ibm.com/support/pages/shared-ethernet-adapter-sea-fail-over-load-balancing
- POWERVM Enhancements – what is new in 2013
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg248198.pdf
- Capturing Debug output for padmin
  - http://www-01.ibm.com/support/docview.wss?uid=isg3T1012362

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Notes from VUG 1/27/2022

- **Thanks to those who provided tips during the session**
- VIO efix/ifix using updateios
  - https://www.ibm.com/support/pages/managing-ifix-vio-server
- Turning off and on call home when doing HMC updates
  - chsacfg -t callhome -o disable -m hmc
  - # disable HMC Call Home before upgrade suppresses the auto call home during upgrade
  - chsacfg -t callhome -o enable -m hmc
  - # enable HMC Call Home after upgrade
- Blog on NVMe Support for VIOS
  - https://community.ibm.com/community/user/power/blogs/ninad-palsule1/2020/07/25/nvme-device-support-in-virtual-io-server-vios?CommunityKey=71e6bb8a-5b34-44da-be8b-277834a183b0
- NIM and VIO Updates
  - https://www.ibm.com/docs/en/aix/7.2?topic=operations-using-nim-updateios-operation
  - https://www.ibm.com/support/pages/node/6524732
- VIOS backup to HMC and HMC Maintenance validation for LPM
  - https://community.ibm.com/community/user/power/blogs/manjunath-shanbhag1/2021/04/16/vios-maintenance-validation-and-backuprestore?CommunityKey=71e6bb8a-5b34-44da-be8b-277834a183b0&tab=recentcommunityblogsdashboard

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