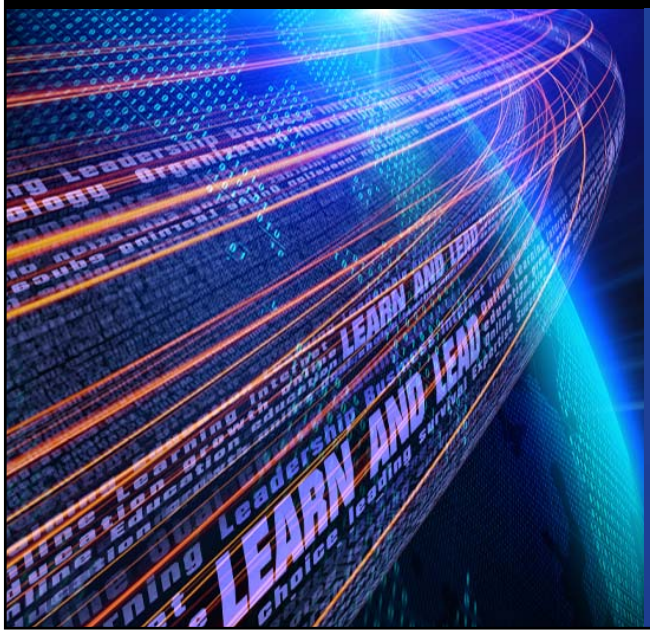
TechU



Care and Feeding of VIO Servers

Part 1 – Introduction, Maintenance and Upgrades

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IBM

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Care and Feeding of VIO Servers

Part 1 – Maintenance and Upgrades

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Agenda

- ***Presentation***
  - Fundamentals before you start
  - PowerVM 3.1 Prerequisites
  - Installation
  - Maintenance and Upgrades
- ***Documentation***
  - Useful Commands
  - Useful Links
  - Backup Material
-

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Fundamentals before you start

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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
2.2.6.32	2.2.6.61	3.1.1.25	2018.11.16	2020.09.30
2.2.6.41	2.2.6.61	3.1.1.25	2019.05.08	2020.09.30
2.2.6.51	2.2.6.61	3.1.1.25	2019.12.13	2020.09.30
2.2.6.61		3.1.1.25	2020.05.15	2020.09.30
2.2.6.65		3.1.1.25	2020.07.17	2020.09.30
3.1.0.10	3.1.0.30	3.1.1.25	2018.11.09	2021.11.30
3.1.0.21	3.1.0.30	3.1.1.25	2019.05.08	2021.11.30
3.1.0.30		3.1.1.25	2020.05.15	2021.11.30
3.1.0.40		3.1.1.25	2020.07.31	2021.11.30
3.1.1.10	3.1.1.25		2019.11.15	2021.11.30
3.1.1.21	3.1.1.25		2020.05.15	2021.11.30
3.1.1.25			2020.07.17	2021.11.30

NOTE all levels prior to 2.2.5 are 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

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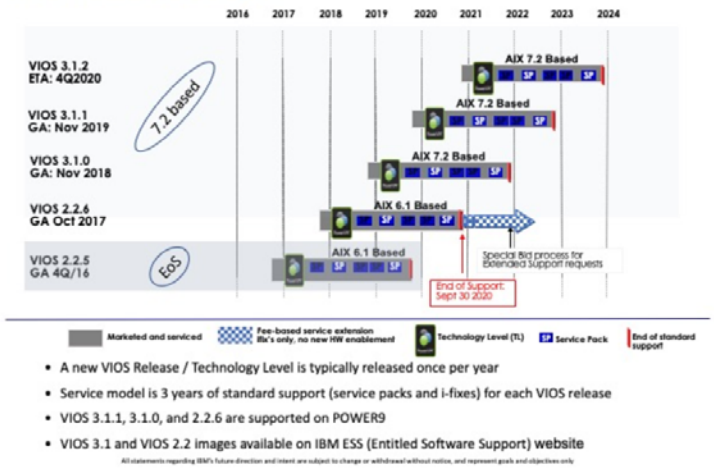
VIOS Level Service Life

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
3.1.1 and 3.1.1.10 came out 11/15/2019, 3.1.1.21 came out 5/15/2020
3.1.1.25 MP came out 7/17/2020

You can install directly from the flash copy which is at 3.1.1.25. You can also use this copy to upgrade directly from 2.2.6.32

Download 3.1.1.21 base or 3.1.1.25 flash copy from entitled software: https://www.ibm.com/servers/eserver/ess/index.wss
Current Flash copy is called:
Virtual_IO_Server_Base_Install_3.1.1.25_Flash_072020_LCD8250304.iso

You can upgrade directly from 3.1.0 (Fix Pack) or 3.1.1.0 (service pack) to 3.1.1.25 so the other option is to download the 3.1.1.25 update with all prerequisites from Fix Central: http://www-933.ibm.com/support/fixcentral/

Release notes for 3.1.1.0: ftp://ftp.software.ibm.com/systems/power/docs/hw/p9/p9eeo.pdf
Readme for 3.1.1.21 Service Pack (U/g from 3.1.1.0): https://www.ibm.com/support/pages/node/6209139
Readme for 3.1.1.25 Mini Pack: https://www.ibm.com/support/pages/node/6249971

NIM Master needs to be at 7200-04-02 at a minimum for v3.1.1.25
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

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VIO Server 3.1.1.* Hiper

https://www-01.ibm.com/support/entdocview.wss?uid=isg1IJ22290
iFix is at: https://aix.software.ibm.com/aix/ifixes/ij22290/
All VIOS Hipers: http://www14.software.ibm.com/webapp/set2/flrt/doc?page=hiper&os=vios_hiper
Appears to be fixed in 3.1.1.25

IJ22290 - I/O failures on LPARs using certain FC adapters

I/O failures or hangs can occur when using the following Fibre Channel adapters on AIX or VIOS:

- PCIe3 32Gb 2-port Fibre Channel Adapter (FC: EN1A/EN1B; CCIN: 578F)
- PCIe3 16Gb 4-port Fibre Channel Adapter (FC: EN1C/EN1D; CCIN: 578E)
- PCIe3 16Gb 2-port Fibre Channel Adapter (FC: EN0A/EN0B; CCIN: 577F)

Only VIOS 3.1.1 and AIX 7.2 TL4 are affected.

Affected VIOS/AIX Levels and Recommended Fixes

Minimum Affected Level	Maximum Affected Level	Fixing Level	Interim Fix
VIOS 3.1.1.0 devices.pciex.df1060e214103404.com 7.2.4.0	VIOS 3.1.1.10 devices.pciex.df1060e214103404.com 7.2.4.0	VIOS 3.1.1.20 IJ22290	iFix
AIX 7200-04-00 devices.pciex.df1060e214103404.com 7.2.4.0	AIX 7200-04-01-1939 devices.pciex.df1060e214103404.com 7.2.4.0	AIX 7200-04-02 IJ22290	iFix

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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:
VIO v3.1.1 is still not on here (last updated 10/17/2019)
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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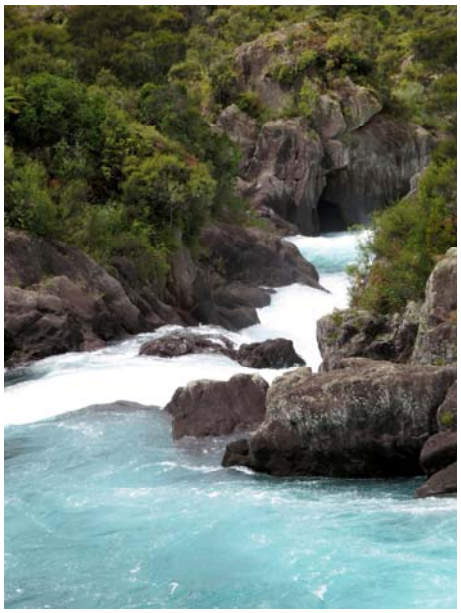
PowerVM 3.1 Prerequisites



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Minimum NIM Master Levels for VIOS Clients

http://www14.software.ibm.com/support/customercare/flrt/sas?page=viostable

If using NIM to backup, install or update a VIOS partition, the NIM master must be greater than or equal to the levels shown below.

VIOS Release	VIOS Level	Minimum NIM master level		
VIOS 3.1.0	VIOS 3.1.0.21			AIX 7200-03-03
	VIOS 3.1.0.10			AIX 7200-03-02
VIOS 2.2.6	VIOS 2.2.6.41		AIX 7100-05-04	7200-03-03
	VIOS 2.2.6.32	AIX 6100-09-12	7100-05-03	7200-03-02
	VIOS 2.2.6.31	AIX 6100-09-12	7100-05-03	7200-03-01

VIOS 3.1.1.25 requires 7.2.4.2

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PowerVM 3.1 Changes

- 3.1.0 went GA 11/9/2018 – 3.1.1 went GA 11/15/2019
- Both levels have service packs and/or minipacks out
- ***This is the move to AIX 7.2 for the VIO server***
- Base order number changes for V3 to 5765-G34
- Native compatibility mode for POWER8 and POWER9
- Accelerated secure LPM for E950 and E980
- Based on AIX 7.2 TL3 (3.1.0) and AIX 7.2 TL4 (3.1.1)
- ***USB Flash drive install for VIOS***
- Getting flashimage onto a USB
  - https://www.ibm.com/support/pages/node/715609
- IVM is removed so you must install a proper VIO server
- Database changes from Solid to Postgres for SSP management data
- Many old packages removed to clean up image
- Storage multipathing enhancements
- iSCSI support
  - Can export iSCSI disks to client LPARs using vSCSI (min FW860.20)
  - Enables MPIO support for iSCSI
  - iSCSI boot is not supported
  - iSCSI not supported for SSP (shared storage pools)
- http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/6/897/ENUS218-346/index.html&lang=en&request_locale=en
- ***As of 3.1.0.20 Java7 is no longer required***
  - Java6 and Java7 are not automatically removed but Java8 is automatically installed
  - Use updateios –remove to uninstall old versions of Java on the VIO servers

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PowerVM 3.1 Prerequisites

- At least 1 core, 8GB memory (Nigel recommends at least 16GB if SSPs)
- High performance (8, 16 and 10Gb cards or higher) cards require additional core and memory
- At least 30GB for rootvg (I recommend 100GB)
- At least 4GB free in rootvg
- ***Add an extra disk to be used for alternate disk upgrades – this extra disk is required if you are upgrading from v2 to v3***
- On one VIO it is helpful to have a 3rd disk to use for File Backed Optical if you use it – gets it out of rootvg
- NIM Master must be at AIX 7200-04-02 for 3.1.1.25
  - Upgrade your NIM to 7200-04-02-2028 so you are ready for future upgrades to your AIX LPARs as well as your VIO servers
- Must use separate HMC and VIO server - IVM is removed
- **Only supports Power7+ (D models) and above**
- **No blades supported**
  - If you need to keep older servers around, then use 2.2.6.51 VIO servers for those
- viosupgrade command on VIO becomes available at 2.2.6.30, but if you have SSPs you must go to 2.2.6.32 or higher before trying to upgrade. I did all my upgrades from 2.2.6.32
- V3.1 or v3.1.1 base is downloaded from ESS and comes as either 2 x DVDs or a flash drive image
- Server must have access to a NIM server, the HMC, a DVD drive or be able to use a flash drive
- For flash drive install USB drive must be at least 16GB
- Latest link to VIOS Maintenance Strategy
  - https://www14.software.ibm.com/support/customercare/sas/f/vios/svcstrategy.html

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PowerVM 3.1 SSP Important Changes

Important Changes in 3.1.0.X for SSP users

A database manager change has occurred for Shared Storage Pool (SSP). This change will have no direct impacts on behavior, however it does mean that non-disruptive upgrades of an SSP cluster to 3.1.0.10 requires that SSP nodes first are updated to the latest 2.2.6.X version available before upgrading to 3.1.0.0 or 3.1.0.10. As of the time of this writing, that is version 2.2.6.31.

Once all VIOS nodes in the cluster have been updated to the latest 2.2.6.X version, double check that rolling upgrade has completed. This can be done by checking the output of "cluster -status -verbose" while logged in as padmin on one of the VIOS nodes in the cluster. Then, check the output for each node, and check for this field:

Node Upgrade Status: 2.2.6.31 ON_LEVEL

If all nodes have 2.2.6.31 or newer, and all say that they are "ON_LEVEL," then upgrades to the VIOS to 3.1.0.00 or newer can occur without disruption to the SSP cluster.

Additionally, backup and restore can be used to restore older versions of the SSP cluster to 3.1.0.X versions of the VIOS.

The above is from the readme. There are additional limitations spelled out in the readme file
3.1 release notes: ftp://ftp.software.ibm.com/systems/power/docs/hw/p9/p9eeo.pdf
3.1.0.10 readme: https://www-01.ibm.com/support/docview.wss?uid=ibm10738523
3.1.1.10 readme: https://www.ibm.com/support/pages/node/1106697
Check Nigel Griffiths Blog as he has written extensively on SSPs
https://www.ibm.com/support/pages/aixpert-blog-nigel-griffiths-mrnmon

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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 – v2 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

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Sizing the VIO

Minimums
- Memory 4GB I never use less than 8GB now due to high performance adapters
- Cores .5 entitlement and 2VPs I usually do 1 full core minimum per VIO
- BUT remember that the more VFCs and high performance adapters the more memory and CPU you will need
- Also VIO servers perform based on entitlement not VPs
- So you will probably need more like 6 or 8GB and an entitlement of 1.5 or 2.

Pay attention to adapter placement – adapter slots have different priorities
Details are in the redbook for each server – look for the technical overview

If using 10Gb network or 8Gb, 16Gb or 32GB HBA adapters you need more memory for buffering and more CPU to handle traffic

i.e. 512MB for each ***active*** high performance adapter port (NPIV or vSCSI)
Plus 140MB per VFC client in the VIO

vSCSI uses more CPU in the VIO than NPIV

High values for VIO adapter slots can also increase memory needs

Not uncommon to see a VIO now needing 8GB memory and entitlement of 1-2 cores, especially if using SSPs

rootvg needs at least 30GB – give it 100GB disk space
Add an extra disk if want to use FBO – don't put FBO repository in rootvg as it will make backups of rootvg enormous

VIOS Sizing Considerations:
http://www14.software.ibm.com/webapp/set2/sas/f/vios/documentation/perf.html

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Server Memory

- Reserved Memory is based on max memory for an LPAR, not on desired
- This is because memory gets reserved for HPTs (hypervisor page tables)

BAD EXAMPLE:

	Name	Mode	Min GB	Curr GB	Max GB	ExpFact	AMS->	Weight	Prim VIOS	Sec VIOS	Curr VIOS
2	lpar1	ded	2.25	5.00	100.00						
3	lpar2	ded	2.00	15.75	100.00						
4	lpar3	ded	2.00	15.75	100.00						
5	lpar4	ded	10.00	64.00	100.00						
6	vios2	ded	2.00	6.00	100.00						
7	vios1	ded	2.00	6.00	100.00						
8											

... Ent_Sys_Pools | OnOff CoD | CoD Events | LPAR_Summary | LPAR_Profiles | LPAR_CPU | LPAR_MEM | Physical_Slo

BETTER EXAMPLE:

Name	Mode	Min GB	Curr GB	Max GB
lpar1	ded	2.25	5.00	8.00
lpar2	ded	2.00	15.75	20.00
lpar3	ded	2.00	15.75	20.00
lpar4	ded	10.00	64.00	80.00
vio2	ded	2.00	6.00	12.00
vio1	ded	2.00	6.00	12.00

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Server Memory

Status	Type Model	Serial	GHz	CPU Type	Tot Cores	Act Cores	Deconf Cores	Curr Avail Cores	Pend Avail Cores	Ded Cores	Pool Size	Virt Procs	#LPAR	Tot GB	Act GB	Deconf GB	Firm GB	Curr Avail GB
Operating	8286-41A	0	3.72	_POWER8	8	8	0	1.40	1.40	0	8	14	15	256.00	256.00	0.00	5.75	126.25

CPU Type	Tot Cores	Act Cores	Deconf Cores	Curr Avail Cores	Pend Avail Cores	Ded Cores	Pool Size	Virt Procs	#LPAR	Tot GB	Act GB	Deconf GB	Firm GB	Curr Avail GB	Pend Avail GB
PowerPC_POWER8	80	26	0	21.64	21.64	0	26	22	28	3,072.00	1,536.00	0.00	23.00	1,447.00	1,447.00
PowerPC_POWER8	80	26	0	0.31	0.31	0	26	52	39	3,072.00	1,536.00	0.00	38.50	967.50	967.50

Look at Firm GB in HMCScanner under System Summary Tab
Latest is 0.11.42 (5/23/2019)
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

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Installation

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Get the files to upgrade to V3.1.1.25 (9/14/2020)

- Latest ISO download is for VIOS 3.1.1.20
- Flash image ISO is VIOS 3.1.1.25 – use this and save a step
- Note the link below is a new URL for ESS as it just moved:
- https://www.ibm.com/servers/eserver/ess/index.wss?lnk=msdDO-enss-usen

```
Go to ESS
https://www-05.ibm.com/servers/eserver/ess/ProtectedServlet.wss
Sign in with your userid and password for ibm

At the left click on my entitled software
Make sure to the right "Brand selection" says AIX

Once it says AIX click on software updates at the left
It will prompt you for customer number and serial number for a system - use a valid one
Then you will select Powervm v3.1 (5765-ve3) and click on continue (NOTE v3 has a different program number)
Click on agree and then select I want to download now

It will take you to software downloads - make sure category says AIX and v7.2 then click on continue
Check the box that says 5765-ve3 - PowerVM Enterprise ED v3 and click on continue
Then check the powervm box (this is really repetitive) and click on continue
On the next page click on I agree and go to the bottom of the next page and click on "click here to use http"


There are 3 images to be downloaded:

Download all 3 and burn them to DVD
You can also burn the last one (with flash in its name) to a USB stick
```

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PowerVM v3 Download from ESS – 9/23/2020

Step 6: Download with HTTP

Click each link individually to download the product files or use the "Download all links" button to download a list of all HTTP links.

03.01.01 2344: IBM PowerVM V3 / VIOS v03.01.01,ENU,DVD

README for ISO Download
README_for_ISO_Downloads_6-2018.tar.gz

ISO, Virtual I/O Server v3.1.1.20 DVD 1 of 2 (5/2020)
Virtual_IO_Server_Base_Install_3.1.1.20_DVD_1_of_2_052020_LCD8250103.iso

ISO, Virtual I/O Server v3.1.1.20 DVD 2 of 2 (5/2020)
Virtual_IO_Server_Base_Install_3.1.1.20_DVD_2_of_2_052020_LCD8250203.iso.ZIP

ISO, Virtual I/O Server v3.1.1.25 Flash (7/2020)
Virtual_IO_Server_Base_Install_3.1.1.25_Flash_072020_LCD8250304.iso

Flash image

03.01.01 2345: PVM V3 Expansion Pack-VS3 v03.01.01,ENU,DVD

tar.gz Download README
README_for_tar_gz_Downloads_3-2007.tar.gz

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Install Options

- Download v3.1.1.20 from ESS
- Download 3.1.1.25 Flash Image – I used this image
- Download the latest expansion pack from Fix Central

- ***Fresh install of VIOS 3.1.1.25 on a new server***

1. LPM off all LPARS then fresh install of VIOS 3.1.1.25 on old server
2. Install from DVD or USB
3. **Use NIM to do VIO install to an alternate disk – my preference**
4. Install VIO from repository on HMC (installios)

- ***Upgrades – assumes you are at least at 2.2.6.32 of VIO***
- Use NIM viosupgrade to upgrade current server to an alternate disk
  - If using NIM for bosinst install, then VIOS IP cannot be on the SEA
  - Can still install to altdisk though

- ***Use VIO viosupgrade to upgrade current server to an alternate disk (my preferred method)***

1. VIO viosupgrade requires VIOS to be at 2.2.6.30+, SSP requires 2.2.6.32 – recommend going to 2.2.6.32 minimum
2. Use viosupgrade –l –q to monitor VIO upgrade status

- Read the readme/description files for all levels
- If you are using SSPs pay attention to the restrictions and rules around upgrades with SSPs in place
- Note if upgrading versus full install - you cannot use updateios for this upgrade – you must use the viosupgrade command

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Things to think about for Fresh Install

- It is not that different from any other VIO server fresh install
- If replacing a current VIOS
  - Use viosbr to backup metadata and copy the files to a remote system
  - Backup anything outside of rootvg on your VIOS to a remote location
  - Backup the VIOS itself or take a clone (alt_disk_copy)
  - If using SSPs then perform the steps in the README for SSPs
- Install from the v3.1.1.20 DVD or the 3.1.1.25 flash image – for NIM use the mksysb from the flash image
- If you can, use the flash image which is at 3.1.1.25 (saves an upgrade step)
  - I was able to burn this iso to both a DVD and a flash drive and to create the mksysb for NIM
- Fresh Install can be an overwrite of current disk or to an alternate disk
  - Use the alternate disk if at all possible
- Restore the metadata and anything that was outside of rootvg
- Perform post install SSP steps

- ***Before doing any install or upgrade - check for compatibility between HMC, firmware and VIOS levels as well as client operating systems***

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Backup Virtual Definitions

- Check on your viosbr backups

```
$ ls -al /home/padmin/cfgbackups
-rw-r--r--   1 padmin   staff        8451 Sep 01 11:00 autoviosbr_vio1.tar.gz
-rw-r--r--   1 padmin   staff        7763 Apr 13 2019  vio1_10158152.tar.gz
-rw-r--r--   1 padmin   staff        8522 Sep 08 00:00 viosname.01.tar.gz
-rw-r--r--   1 padmin   staff        8521 Sep 09 00:00 viosname.02.tar.gz
-rw-r--r--   1 padmin   staff        8520 Sep 10 00:00 viosname.03.tar.gz
-rw-r--r--   1 padmin   staff        8523 Sep 11 00:00 viosname.04.tar.gz
-rw-r--r--   1 padmin   staff        8522 Sep 12 00:00 viosname.05.tar.gz
-rw-r--r--   1 padmin   staff        8522 Sep 13 00:00 viosname.06.tar.gz
-rw-r--r--   1 padmin   staff        8431 Sep 14 00:00 viosname.07.tar.gz

$ viosbr -view -list
autoviosbr_vio1.tar.gz
vio1_10158152.tar.gz
viosname.01.tar.gz
viosname.02.tar.gz
viosname.03.tar.gz
viosname.04.tar.gz
viosname.05.tar.gz
viosname.06.tar.gz
viosname.07.tar.gz
```

I have my viosbr setup to run daily and keep the last 7 copies, so I only have to copy across the most recent one
viosbr -backup -file viosname -frequency daily -numfiles 7
The above is run once to setup the copy

crontab –l (after oem_setup-env) should now show:
0 0 * * * (/usr/ios/cli/ioscli viosbr -backup -file viosname -frequency daily -numfiles 7)

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Prior to install or Upgrade

- Backup anything outside of rootvg on your VIOS to a remote location
  - FBO library (if in rootvg) – it will get removed during the upgrade to 3.1.1.25
  - LVs or filebacked disks to clients
- Backup LVs for clients
  - **viosbr does not back these up and viosupgrade does not copy them so back them up**
  - Move LVs for clients to a different VG than rootvg prior to upgrade (they should never be in rootvg)
  - Migrate after backup then use cplv to copy them after the migration
    - http://www-01.ibm.com/support/docview.wss?uid=isg3T1000167
- Backup the VIOS itself
  - mount /backups (NFS filesystem from my NIM server)
  - mkdir /backups/vio2
  - umount /var/vio/VMLibrary (makes sure I don't accidentally include the media library)
  - su - padmin -c "ioscli backupios -file /backups/vio2 -nomedialib"
  - su - padmin -c "ioscli backupios -file /usr/local/backups/vio2-previo31-mar2719.mksysb –nomedialib -mksysb"
  - mount /var/vio/VMLibrary

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Pre-install Notes

- If upgrading current VIO servers
  - When working on primary you may want to failover the SEA to the secondary VIO
  - If SEA is ent10
    - As padmin:
    - $chdev –dev ent10 –attr ha_mode=standby
    - Once complete and all updates done and primary VIO has done its final reboot
    - $chdev –dev ent10 –attr ha_mode=auto
    - You should see messages in errpt that show the changes from primary to backup and back again
- Aggregation and installs and restores
  - You cannot install a VIO server from the HMC or from NIM if the network is aggregated
  - Network installs are only supported over an access port connection
  - This applies to installing any LPAR that has physical network ports that are aggregated
- Installing onto SAN disks
  - The SAN team may need you to light up the adapters so they can do their zoning and mapping

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Full Install

- From DVD or USB – complete install – with PowerVM 3.1 and higher you will be able to use USB for the install
- Basically boot in SMS mode then tell it to boot from DVD, flash, NIM or HMC and follow instructions

- Using NIM
- http://www-01.ibm.com/support/docview.wss?uid=isg3T1011386
- Minimum NIM levels
- http://www14.software.ibm.com/webapp/set2/sas/f/flrt/viostable.html

- Using HMC - check vios install box
- Commandline - installios:
- http://www-01.ibm.com/support/knowledgecenter/POWER7/p7hb1l/iphb1_vios_configuring_installhmc.htm?cp=POWER7%2F14-8-0-2-2-1-1
- **Network between HMC and VIO LPAR must be alive and not aggregated (request an access port)**

- From a mksysb
- http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp?topic=%2Fcom.ibm.acc.psm.resources.doc%2Fvios%2Fsdmc_vios-vios_backup_restore_file_nim.html

- ***After install, fix the page spaces – depending on the version you will have 1 x 512MB and 1 x 1024MB or 2 x 1024MB on the same hdisk. Get rid of paging00 and make hd6 at least 4 to 6GB, set up logging***

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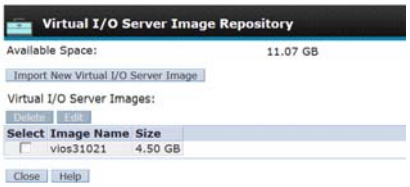
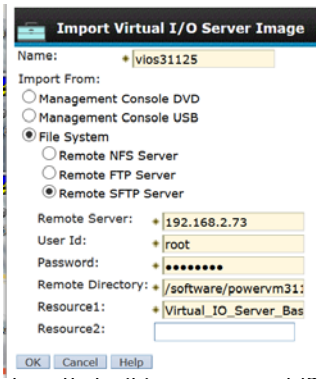
VIOS and HMC – Import VIOS31 ISO Images

aix1nim:/software/powervm31> du -sg Virt*
4.20 Virtual_IO_Server_Base_Install_3.1.1.20_DVD_1_of_2_052020_LCD8250103.iso
1.55 Virtual_IO_Server_Base_Install_3.1.1.20_DVD_2_of_2_052020_LCD8250203.iso
4.58 Virtual_IO_Server_Base_Install_3.1.1.25_Flash_072020_LCD8250304.iso
3.38 vios31125-flash-mksysb_image
So need 5.75GB minimum if not using the flash image or 4.58GB if use flash image

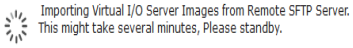
1. Check repository for space



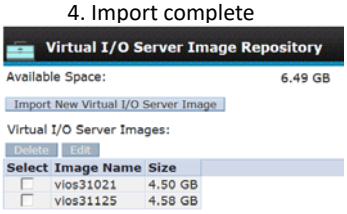
2. Import the ISO images



3. Message importing



4. Import complete



vios31125 is flash image at 3.1.1.25

You can just upload the flash image and use that – it is more current (3.1.1.25 today) and works fine

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VIOS and NIM

- Use of NIM to back up, install, and update the VIOS is supported.

- **Note**: For install, always create the SPOT resource directly from the VIOS **mksysb** image. Do NOT EVER update the SPOT from an LPP_SOURCE.

- Use of NIM to update the VIOS is supported as follows:

Ensure that the NIM Master is at the appropriate level to support the VIOS image.

- http://www14.software.ibm.com/webapp/set2/sas/f/flrt/viostable.html
- NIM Master must be at AIX 7200-04-01 for VIOS 3.1.1.10

- On the NIM Master, use the operation **viosupgrade** in altdisk mode to update the VIOS Server to v3 from v2 to an alternate disk

I had a problem with the flash ISO – you can mount it on AIX using loopmount but you need to mount it as udfs
loopmount -i /software/powervm31/ Virtual_IO_Server_Base_Install_3.1.0.21_Flash_052019.iso -o "-V udfs -o ro" -m /cdrom
If that fails then open it on windows, extract the mksysb and upload the mksysb to the NIM server

- Using NIM with VIO Servers

https://ibmsystemsmag.com/Power-Systems/09/2019/Using-NIM-with-VIO-Servers

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VIOS and NIM

- Add VIOS partition as a NIM client
- Copy the VIOS mksysb image from the CD to your NIM master
  - On VIOS 3.1 base media there are 3 images now across the two DVDs
  - Copy all 3 images individually to a directory and then use cat to combine them

cat /export/mksysb/vios3.1/mksysb_image /export/mksysb/vios3.1/mksysb_image2 /export/mksysb/vios3.1/mksysb_image3 >/export/mksysb/nim_vios3.1mksysb

OR save yourself time and use the flash image as it is just one mksysb image

- Define the mksysb resource to the NIM master after copying the mksysb into /nim/images
- Define the spot on the NIM master
  - The source for the SPOT will be the combined mksysb or the single flash image mksysb
  - **The SPOT CANNOT be created from an LPP_Source**
  - nim -o define -t spot -a server=master -a source=mksysb_vios31021 -a location=/nim/spot spotvios31021
  - nim -o check spotvios31021
- Copy the bosinst.data from the DVD and create a viosbosinst resource
- Allocate the mksysb, spot and bosinst resources to the VIO LPAR in NIM and then set it up for a bosinst install from **mksysb**
- You can now use bos_inst to do a mksysb install once the partition profile is defined (fresh install) or NIM's viosupgrade if upgrading
- NOTE syntax for NIM viosupgrade is not the same as the viosupgrade run directly on the VIO server

- https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.cmds6/viosupgrade.htm

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Cloning disks

If your server has a split backplane then you can make a clone
After installing VIO1, if you have all the disks in VIO1 you can take a clone to build VIO2
Make sure the 4 disks are split (2 and 2) across the backplane
VIO1 is using hdisk0 and hdisk1, hdisk2 and 3 are on the other adapter and will be used for VIO2
Put all the disks into VIO1 (both adapters)
Install VIO1 on hdisk0 – from NIM, DVD, USB, HMC …..
Now clone it to hdisk2

```
alt_disk_copy –B –d hdisk2
```

Check bootlist has not changed after copy finishes

Remove VIO2 hdisks from VIO1, Shutdown VIO1,
Remove VIO2 resources from VIO1 profile
Leave VIO1 down

Activate VIO2 (make sure only VIO2 resources are in VIO2 profile)
Remove any disks, adapters, networks etc that show as defined on VIO2
Now cleanup VIO2 (see next slide)

It is best to make the clone before you have the network and fibre adapters attached to VIO1 – it makes the post-clone cleanup much easier

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Cleaning up after cloning VIO

If you do not take these steps you will experience RMC issues

Cleanup VIO2:
stopsrc -g rsct_rm; stopsrc -g rsct
Clear Nodeid
chdev -l cluster0 -a node_uuid=00000000-0000-0000-0000-000000000000
OR
/usr/bin/odmdelete -o CuAt -q 'attribute=node_uuid'

Generate new nodeid
/usr/sbin/rsct/bin/mknodeid -f

lsattr -El cluster0
/usr/sbin/rsct/bin/lsnodeid
/usr/sbin/rsct/install/bin/recfgct

lspartition -dlpar
lssrc -g rsct_rm; lssrc –g rsct
You may have to start ctcas – startsrc –s ctcas

Cleanup old VIO1 resources (next slide)

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Cleaning up after cloning VIO

CLEANUP on VIO2
These will vary depending on the server and I/O drawers, etc and whether you had ethernet and fibre adapters in the vio when cloned

rmdev all devices showing as defined (fcs, ent, hdisk, etc)
rmdev -dp hdisk0
rmdev -dl hdisk0
rmdev -dp pdisk0
rmdev -dl pdisk0
rmdev -dp sissas0
rmdev -dl sissas0
rmdev -dp pci0
rmdev -dp pci1
rmdev -dp pci2
rmdev -dp pci3
rmdev -dp pci4
rmdev -dl pci0
rmdev -dl pci1
rmdev -dl pci2
rmdev -dl pci3
rmdev -dl pci4
If ethernet adapters were in VIO1 when cloned then you may need to remove all those as well

Once VIO2 is cleaned up reboot it
Then activate VIO1
Clean up VIO1 removing any extra hdisks, pdisks, pci, sissas1, etc that now show as defined. Also remove the adapter definitions for them.
Reboot VIO1 to ensure changes are good

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Maintenance and Upgrades

https://ibmsystemsmag.com/Power-Systems/05/2019/powervm-experience

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Upgrading VIOS

Run lsvopt and make sure no one is using the FBO devices
If using NPIV tape drives make sure they are not in use (or activated on IBM i)

1. Normally upgrade HMC first, then firmware, then VIOS, and then AIX
2. BUT – check the readme for all of the above first to make sure there is not a different required order
    2. As an example P9 FW940 requires that all I/O adapters be updated and the HMC be at v9r1m940 prior to installing the firmware
3. Download the updates and cross-check compatibility using FLRT
4. Read the readmes again
5. Run errpt to check for problems, check there are no stale partitions, missing disks or paths, etc
    - lsvg rootvg checks for stale PPs and physical volumes.
    - lsvg -p rootvg looks for missing disks.
    - lspath - checks for missing paths.
    - errpt checks for errors.
6. Ensure all paths on clients are redundant so LPARs will stay up when this VIOS is rebooted
7. Run HMC Scanner or sysplan to document prior to changes
8. Backup the VIOS
9. Mount the NFS filesystem or DVD or FBO image to be used for update – copy files locally if you can
10. If using SSPs there are specific additional steps outlined in the README
11. After upgrading and rebooting the first VIOS check that all your LPARs are back to dual paths (lspath)
12. Only after that should you upgrade the second VIOS

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Things to think about when Upgrading

- Migrating from v2 to VIO 3.1.1 is an ***upgrade*** not an update. You cannot use updateios

- Use viosbr to backup metadata and copy the files to a remote system
- Create a filestosave.txt file that you keep a list of critical files to be saved in
- Backup anything outside of rootvg on your VIOS
  - FBO library
  - LVs for filebacked disks to clients
- Backup the VIOS itself or take a clone (alt_disk_copy – but rename the clone)
- If using SSPs then perform the steps in the README for SSPs
- Perform the upgrade
- Restore the metadata (upgrade should do this)
- Restore anything that was outside of rootvg
- Perform post upgrade SSP steps

- Make sure no NPIV tapes are assigned
- Make sure no virtual optical is loaded and assigned

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Get the mksysb image off the .iso

On each VIO I have a /usr/local/soft local filesystem I use for upgrade software

Get the .iso from IBM and upload the .iso image to /usr/local/soft on each VIO

```
#ls /usr/local/soft
Virtual_IO_Server_Base_Install_3.1.1.25_Flash_072020_LCD8250304.iso

#mkdir /cdrom
#loopmount -i /usr/local/soft/Virtual_IO_Server_Base_Install_3.1.1.25_Flash_072020_LCD8250304.iso  -o "-V udfs -o ro" -
m /cdrom
```

Extract the mksysb image

```
#cp /cdrom/usr/sys/inst.images/mksysb_image /usr/local/soft/vios31125-flash-mksysb_image

#ls -l /usr/local/soft
#umount /cdrom
```

This is the mksysb image we will use for the upgrade

At the same time I download all the Java, SSH, SSL and I/O adapter updates that I need

Normally I copy the files locally to the VIO in case I lose the network during the install

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Create a filestosave.txt

This file is used to save files that you may need to get information out of after the v3 upgrade is complete
My filestosave.txt is in /home/padmin and consists of:
/etc/environment
/etc/group
/etc/hosts
/etc/inetd.conf
/etc/inittab
/etc/motd
/etc/netsvc.conf
/etc/passwd
/etc/profile
/etc/resolv.conf
/etc/syslog.conf
/etc/security/limits
/etc/security/login.cfg
/etc/security/passwd
/etc/tunables/nextboot
/etc/tunables/rc-tunevio.sh
/usr/local/bin/runnmon.sh
/etc/ssh/sshd_config
/home/padmin/.profile
/home/padmin/filestosave.txt
/usr/local/bin/viobackup.sh
/etc/ntp.conf
/etc/rc.tcpip
/home/padmin/config/ntp.conf

NOTE – the files must exist

These will get saved to /home/padmin/backup_files and will be available later on the upgraded system

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Upgrade

Find a spare disk and clean it off

```
$ lspv
NAME            PVID                                VG              STATUS
hdisk0          00f95d3a1b679a90                    fbovg           active
hdisk2          00f95d3a42550d49                    fbovg           active
hdisk3          00f95d3a0de356cd                    altinst_rootvg
hdisk1          00f95d3a42550ec9                    rootvg          active

$ lspv -size | head
NAME            PVID                        SIZE(megabytes)
hdisk0          00f95d3a1b679a90            51200
hdisk2          00f95d3a42550d49            51200
hdisk3          00f95d3a0de356cd            102400
hdisk1          00f95d3a42550ec9            102400
```

Then as padmin look for free or unused disks
$lspv –unused
$lspv –free

Check for mappings
$ lsmap -all | grep hdisk

In the above all disks are assigned (none unused or free). lsmap also shows none are mapped to clients using vSCSI.
We also have altinst_rootvg which is not allowed

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Forgot to clear the disk (VIO viosupgrade)

My base install mksysb file is the mksysb file that I grabbed from the flash image iso file

viosupgrade -l -i /usr/local/soft/vios31125-flash-mksysb_image -a hdisk3 -g /home/padmin/filestosave.txt

Welcome to viosupgrade tool.
Operation triggered for given node(s).
Broadcast message from root@vio2 (pts/0) at 15:59:29 ...
WARNING!!! VIOS Upgrade operation is in progress. Kindly Refrain from making any configuration changes...
Please wait for completion..
The provided disk 'hdisk3' is in use.

Go back and make sure lspv –free and lspv –unused show the disk you want to use as available

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Get a disk

altinst_rootvg cannot exist prior to the upgrade so either export and reimport with a new name or delete it
#exportvg altinst_rootvg
#importvg -y rootvgcopy hdisk3
Or just rename it:
#alt_rootvg_op -v alt_disk_jan20 -d hdisk3

OR delete it:
exportvg altinst_rootvg
OR
alt_rootvg_op -X altinst_rootvg

Recommended method is always to use alt_rootvg_op

AFTER delete:
lspv
hdisk0 00f95d3a1b679a90 fbovg active
hdisk2 00f95d3a42550d49 fbovg active
hdisk3 00f95d3a0de356cd None
hdisk1 00f95d3a42550ec9 rootvg active

alt_rootvg_op
https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/a_commands/alt_rootvg_op.html
Managing multiple instances of altinst_rootvg
https://www.ibm.com/support/pages/managing-multiple-instances-altinstrootvg-and-applying-fixes-them

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Get a disk

Just because a disk shows as not being in a volume group does not mean it is available
You will probably need to clear the owning volume manager from the disk
chpv -C hdisk3

You can also clear the boot image as well
chpv -c hdisk3

```
# lspv
hdisk0          00f95d3a1b679a90                    fbovg           active
hdisk2          00f95d3a42550d49                    fbovg           active
hdisk3          00f95d3a0de356cd                    None
hdisk1          00f95d3a42550ec9                    rootvg          active

$ lspv -free
NAME            PVID                    SIZE(megabytes)
hdisk3          00f95d3a0de356cd        102400
```

OK NOW we can use hdisk3 for our upgrade

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Upgrading VIOS to V3.1.1.25

You need to have your VIO at 2.2.6.30 or higher to use the VIO server viosupgrade command – recommend at least 2.2.6.32
If you are using SSPs then you have to be at 2.2.6.32
I recommend going to 2.2.6.32 (or .51 which is latest) regardless and use that as a starting point

As padmin run "updateios –commit" to ensure any uncommitted updates are committed
Check to ensure there are no missing filesets prior to updates
Check repository has nothing loaded

```
$ ioslevel
2.2.6.32
$cat /usr/ios/cli/ios.level
2.2.6.32

$ updateios -commit
All updates have been committed.

$ oem_setup_env
# /usr/sbin/emgr –P
There is no efix data on this system.
```

If there are any ifixes remove them

Now run checks

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What does the VIO viosupgrade command do?

This is my VIO 3.1.1.25 upgrade from 2.2.6.32 – files were all in /usr/local/soft/vios31125

It does the config backup for you then it builds vios 3.1.1.25 on the new disk
It migrates the config
It sets the bootlist
It will then reboot – you have 60 seconds to stop it

viosupgrade -l -i /usr/local/soft/vios31021-flash-mksysb_image -a hdisk3 -g /home/padmin/filestosave.txt

Below is the syntax
viosupgrade -l
Flags:
-l Specifies local Node Installation.
-i Specifies image file for the alternate disk installation.
-a Specifies alternate disk to install the provided image.
-c Specify if the node is part of the cluster.
-g Specifies the filename having the list of files to be copied to newly installed rootvg.
-q Queries the status of VIOS restore operation after booting
the VIOS with newly installed image.

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Upgrade Attempt 1 - failed

Now on the VIO:
$updateios –commit

My first attempt at the upgrade:
viosupgrade -l -i /usr/local/soft/vios31121-flash-mksysb_image -a hdisk3 -g /home/padmin/filestosave.txt

Welcome to viosupgrade tool.
Operation triggered for given node(s).
Broadcast message from root@vio2 (pts/0) at 16:04:34 ...
WARNING!!! VIOS Upgrade operation is in progress. Kindly Refrain from making any configuration changes...
Please wait for completion..
Initiating VIOS configuration backup..
VIOS configuration backup successful.
Initiating installation on alternate disk(s)..
Installation on alternate disk(s) failed.

I checked the log at: /var/adm/ras/ioslogs/viosupg_global.log

Restoring mksysb image to alternate disk(s).
restore: 0511-110 There is an unpacking error.
restore: 0511-708 There is an internal unpacking error: decode failure
restore: 0511-108 There was an error during the unpacking of ./opt/IBM/ldap/V6.4/lib64/libibmldapn.a

Turns out I had messed up my mksysb image (initially I concatenated the 3 images on the 3.1.0 DVDs)
This is when I went and got the single image from the Flash ISO

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Upgrade Attempt 2

viosupgrade -l - /usr/local/soft/vios31125-flash-mksysb_image -a hdisk3 -g /home/padmin/filestosave.txt

```
Welcome to viosupgrade tool.
Operation triggered for given node(s).
Broadcast message from root@vio2 (pts/0) at 13:46:39 ...
WARNING!!! VIOS Upgrade operation is in progress. Kindly Refrain from making any configuration changes...
Please wait for completion..
Initiating VIOS configuration backup..
VIOS configuration backup successful.
Initiating installation on alternate disk(s)..
Installation on alternate disk(s) successful.
Copying files to altinst_rootvg.
Waking up altinst_rootvg successful.
Putting volume group altinst_rootvg to sleep ...
forced unmount of /alt_inst/var/adm/ras/livedump
forced unmount of /alt_inst/var/adm/ras/livedump
forced unmount of /alt_inst/var
forced unmount of /alt_inst/var
forced unmount of /alt_inst/usr
forced unmount of /alt_inst/usr
forced unmount of /alt_inst/tmp
forced unmount of /alt_inst/tmp
forced unmount of /alt_inst/opt
forced unmount of /alt_inst/opt
forced unmount of /alt_inst/home
forced unmount of /alt_inst/home
forced unmount of /alt_inst/admin
forced unmount of /alt_inst/admin
forced unmount of /alt_inst
forced unmount of /alt_inst
Fixing LV control blocks...
Fixing file system superblocks...
VIOS will be rebooted after '60' seconds to boot from the newly installed disk.

Press contrl+c to terminate.

VIOS metadata restore (viosbr -restore) will be automatically resumed
after the reboot.
VIOS may be rebooted once during this restore process. Refrain from making
any changes to the VIOS virtual configurations during the restore process.
You can verify the restore status using 'viosupgrade -l -q' command and
resume your operation after the completion of the restore process.
```

I hit ctrl -c to stop the reboot

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Check status (after I hit ctrl-c)

```
$ viosupgrade -l -q
Welcome to viosupgrade tool.
Getting status of node(s):

viosupgrade is in progress

Please see the vioupgrade status:
====================================
Thu Mar 28 13:46:39 2019|STARTED
Thu Mar 28 13:51:14 2019|TRIGGERED

Please see the viosbr restore status:
====================================

$ viosbr -view -list
vio2_13303902.tar.gz                this is the image created by the upgrade I just did
vio2m.01.tar.gz

$ ls -alt cfgbackups
total 120
-rw-r--r--    1 padmin   staff        6922 Mar 27 16:05 vio2_13303902.tar.gz          this is the image created by the upgrade I just did
-rw-r--r--    1 padmin   staff        6960 Mar 27 10:55 vio2m.01.tar.gz
```

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Hold off on reboot

I was not ready to boot the upgrade until my maintenance window when I planned to completely redo the upgrade, so I hit ctrl-C when prompted then I did the following to make sure I did not accidentally boot the upgraded copy:

```
# bootlist -m normal -o
hdisk3 blv=hd5 pathid=0
hdisk3 blv=hd5 pathid=1
hdisk3 blv=hd5 pathid=2
hdisk3 blv=hd5 pathid=3
```

Set it back to the current (unupgraded) disk – hdisk1:

```
# lspv
hdisk0          00f95d3a1b679a90                    fbovg           active
hdisk2          00f95d3a42550d49                    fbovg           active
hdisk3          00f95d3a0de356cd                    altinst_rootvg
hdisk1          00f95d3a42550ec9                    rootvg          active

# bootlist -m normal hdisk1

# bootlist -m normal -o
hdisk1 blv=hd5 pathid=0
hdisk1 blv=hd5 pathid=1
hdisk1 blv=hd5 pathid=2
hdisk1 blv=hd5 pathid=3
```

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After reboot

I reran the process (exported the disk and started the upgrade again) during my maintenance window to make sure I was up to date
A broadcast message is sent out
WARNING!!! VIOS Upgrade operation is in progress.
Kindly Refrain from making any configuration changes...

Then it reboots from the alternate disk

There are at least 2 reboots before the VIO server stays up

After the reboot it will require you to change your password (remember this is an overwrite install even if you upgrade)

Then you have to accept the license:

```
Indicate by selecting the appropriate response below whether you
accept or decline the software maintenance terms and conditions.
Accept (a) |  Decline (d) |  View Terms (v) > a
```

Now run the viosupgrade –l –q to check what happened – see next slide:

You should see started, triggered, restore, restore and then completed and it then shows the viosbr restore status
It shows the restore that happened and provides information on devices it could not restore

Now run all your post upgrade checks

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viosupgrade –l -q

$ viosupgrade -l -q
Welcome to viosupgrade tool.
Getting status of node(s):

viosupgrade is in progress

Please see the vioupgrade status:
==========
Sat Apr 13 23:54:22 2019|STARTED
Sat Apr 13 23:58:58 2019|TRIGGERED
Sat Apr 13 23:09:26 2019|RESTORE

Please see the viosbr restore status:
==========

viosbr restore timestamp:
Sat Apr 13 23:09:26 CDT 2019

License acceptance is successful

Restoring the backup..
Lots more messages then:
I logged in too soon so it rebooted at least once more – if you wait 10 minutes after the first reboot it will do the reboot

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Status after upgrade

ioslevel
3.1.1.25

oslevel -s
7200-04-02-2028

oslevel -s -l 7200-04-02-2028

#instfix -i | grep ML
All filesets for 7.2.0.0_AIX_ML were found.
All filesets for 7200-00_AIX_ML were found.
All filesets for 7200-01_AIX_ML were found.
All filesets for 7200-02_AIX_ML were found.
All filesets for 7200-03_AIX_ML were found.
All filesets for 7200-04_AIX_ML were found.
instfix -icqk 7200-04_AIX_ML | grep :-:
#

Now I had to go make all my customizations for filesystems, paging, logging, /etc/environment, etc

Also had to rerun tunables for virtual ethernets, no commands, etc plus add back in scripts such as my nmon and backup scripts

This upgrade is basically a fresh install but it restores your virtual definitions

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Post Upgrade or install (after reboot)

- Fix page spaces if you have not already done so
- Use updateios to upgrade to 3.1.1.25 if you did not install at that level

- Update Java7 to 7.0.0.670 or the latest – better yet remove it
- Make sure Java8 is installed at 8.0.0.615 or higher
- Install ssl-1.0.2.2100 or higher
- Install ssh 7.5.102.2000 or higher (v8 is now out)
- Be aware that ssh v7 & v8 tighten up security over v6 so you may need the saved copy of /etc/ssh/sshd_config
- If you have Java6 then remove it
- You get the Java updates from Fix Central
  - Run lslpp –l | grep ava to find out what you have installed
- 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

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Java, etc Patched Levels as at 9/14/2020

```
# lslpp -l | grep ava7
  Java7.jre                 7.0.0.670  COMMITTED  Java SDK 32-bit Java Runtime
  Java7.sdk                 7.0.0.670  COMMITTED  Java SDK 32-bit Development
  Java7_64.jre              7.0.0.670  COMMITTED  Java SDK 64-bit Java Runtime
  Java7_64.sdk              7.0.0.670  COMMITTED  Java SDK 64-bit Development
  Java7.jre                 7.0.0.670  COMMITTED  Java SDK 32-bit Java Runtime
  Java7_64.jre              7.0.0.670  COMMITTED  Java SDK 64-bit Java Runtime
# lslpp -l | grep ava8
  Java8.jre                 8.0.0.615  COMMITTED  Java SDK 32-bit Java Runtime
  Java8.sdk                 8.0.0.615  COMMITTED  Java SDK 32-bit Development
  Java8_64.jre              8.0.0.615  COMMITTED  Java SDK 64-bit Java Runtime
  Java8_64.sdk              8.0.0.615  COMMITTED  Java SDK 64-bit Development
  Java8.jre                 8.0.0.615  COMMITTED  Java SDK 32-bit Java Runtime
  Java8_64.jre              8.0.0.615  COMMITTED  Java SDK 64-bit Java Runtime
# lslpp -l | grep ssl
  openssl.base             1.0.2.2100  COMMITTED  Open Secure Socket Layer
  openssl.license          1.0.2.2100  COMMITTED  Open Secure Socket License
  openssl.man.en_US        1.0.2.2100  COMMITTED  Open Secure Socket Layer
  openssl.base             1.0.2.2100  COMMITTED  Open Secure Socket Layer
# lslpp -l | grep ssh
  openssh.base.client    7.5.102.2000  COMMITTED  Open Secure Shell Commands
  openssh.base.server    7.5.102.2000  COMMITTED  Open Secure Shell Server
  openssh.license        7.5.102.2000  COMMITTED  Open Secure Shell License
  openssh.man.en_US      7.5.102.2000  COMMITTED  Open Secure Shell
```

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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

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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
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.

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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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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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Sample /etc/tunables/rc-tunevio.sh

```
#! /bin/ksh
#
# First we set the network tuneables
#
/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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POST Install Checks

```
$ ioslevel
3.1.1.25

$ oem_setup_env
#oslevel -sq
Known Service Packs
-------------------
7200-04-02-2028
7200-04-02-2027
7200-04-02-2016
7200-04-02-2015
……..

# oslevel -s
7200-04-02-2028
```

```
# oslevel -s -l 7200-04-02-2028
Should show nothing

#instfix -i | grep ML
   All filesets for 7.2.0.0_AIX_ML were found.
   All filesets for 7200-00_AIX_ML were found.
   All filesets for 7200-01_AIX_ML were found.
   All filesets for 7200-02_AIX_ML were found.
   All filesets for 7200-03_AIX_ML were found.
   All filesets for 7200-04_AIX_ML were found.

# instfix -icqk 7200-04_AIX_ML | grep :-:
#
```

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POST Install Checks

#lppchk -v
#lppchk -vm3

#errpt | more – check there are no errors

Once all checks are passed and VIO2 is back up check your client LPARs to make sure they see all their paths again
Then go do the same upgrade to VIO1
Don't forget to clean up inetd.conf and other files and then remirror rootvg once you are committed

Back up both VIO servers when done – the backups seem smaller now

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Log Files

On VIOS after viosupgrade command from VIOS

- viosupgrade command logs: /var/adm/ras/ioslogs/*
  Look at the viosupg_global.log

- viosupgrade restore logs: /home/ios/logs/viosupg_restore.log
- viosupgrade restore logs: /home/ios/logs/viosupg_status.log
- viosbr backup logs: /home/ios/logs/backup_trace*
- viosbr restore logs: /home/ios/logs/restore_trace*

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Updating - VIOS Problems at 2.2.6.32

oem_setup_env
oslevel –s
6100-00-00-0000
Or 7200-00-00-0000
instfix -i | grep ML
All filesets for 6100-07_AIX_ML were found.
All filesets for 6.1.0.0_AIX_ML were found.
Not all filesets for 6100-08_AIX_ML were found.
This means there are missing filesets

Using vios 2.2.6 examples as so far no problems with 3.1 upgrade but this will give you the idea

oslevel -sq
Known Service Packs

Top one should be: 6100-09-11-1810

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Updating - VIOS Problems at 2.2.6.32

```
# oslevel -s -l 6100-09-11-1810
Fileset                          Actual Level      Service Pack Level
--------------------------------------------------------------------------------
bos.alt_disk_install.boot_images      6.1.8.0          6.1.8.15
bos.loc.utf.ES_ES                     6.1.7.15         6.1.8.15
DirectorCommonAgent                   6.3.3.1          6.3.5.0
DirectorPlatformAgent                 6.3.3.1          6.3.5.0
adde.v2.common.ddk                    6.1.9.0          6.1.9.100
adde.v2.ethernet.ddk                  6.1.9.15         6.1.9.300
adde.v2.rdma.ddk                      6.1.9.100        6.1.9.300
```

These filesets should be corrected prior to updating
Either use updateios to update them or to remove them

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Remove or update problem filesets

DO NOT USE SMITTY – use updateios

Issues with bos.suma
updateios –remove bos.suma

```
# oslevel -s –l 6100-09-11-1810
Fileset                          Actual Level      Service Pack Level
--------------------------------------------------------------------------------
bos.alt_disk_install.boot_images      6.1.8.0          6.1.8.15
bos.loc.utf.ES_ES                     6.1.7.15         6.1.8.15
```

updateios –remove bos.loc.utf.ES_ES

Upgrade alt disk
Copy images to be updated into a directory (/usr/local/soft/missing)
Run inutoc .

updateios –commit
updateios -accept -install -dev /usr/local/soft/missing

Also remove efixes prior to updates:
/usr/sbin/emgr –P lists them

To remove:
/usr/sbin/emgr -r -L <EFIX label>
emgr -r -L IV46869m3a

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Notes on Updating I/O adapter firmware 1/2

Step 1 is to download the firmware .rpm file from Fix Central and then expand it on the VIO server
If you have an EN0T network card and an EN0F fibre card that need updating:
EN0T Network card from 30100150 to 30100310
EN0F fibre card from 0320080200 to 0325080271
I put them in a local directory by adapter type:
cd /usr/local/soft/adapters/en0t
rpm -ivh --ignoreos e4148a1614109304.30100310.aix.rpm
cd /usr/local/soft/adapters/en0f
rpm -ivh --ignoreos 77103225141004f3.0325080271.aix.rpm

1. fibre ports – remember your client LPARs in a dual VIO system will potentially lose half their paths during the update
lsdev –C | grep fcs
diag –d fcs0 –T download
Depending on the adapter you may have to do this for every FCS that is on a fibre card
You do not run this against the FCS that sometimes shows up on the 10Gb/1Gb hybrid network cards

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Notes on Updating I/O adapter firmware 2/2

2. If it is a network card on the VIO and it is in an SEA you may need to do the following:
If ent6 is etherchannel and ent7 is SEA and IP is on ent5
If you are working on the primary VIO force a failover:
chdev –l ent7 –a ha_mode=standby
ifconfig en7 down
ifconfig en7 detach
ifconfig en5 down
ifconfig en5 detach
rmdev –l ent6
rmdev –l ent7
diag –d ent0 –T download
Depending on the adapter you may have to do this for every port that is on the card
When you are done run cfgmgr and make sure everything came back

Then set primary VIO back to primary
chdev –l ent7 –a ha_mode=auto

Check readme/description file for the adapter to confirm the required steps

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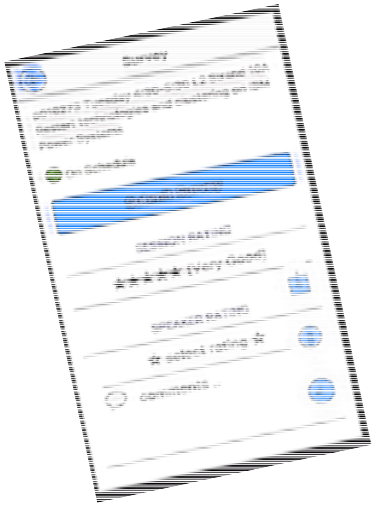
Thank you!

Jaqui Lynch

jlynch@flagshipsg.net

Please complete the Session Evaluation!



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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/vioscare-part1-oct042020.pdf

And the Virtual User Group
https://www.ibm.com/support/pages/node/1120377

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Useful Commands, Links and Documentation

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USEFUL COMMANDS

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Useful Commands

Command History
$ fc -l
725 lsrep
726 backupios -file /usr/local/backups/b750viobkp
727 exit
728 lsmap -vadapter vhost0
729 fc –l

Global command log
$ lsgcl | grep "Aug 9 2013"
Aug 9 2013, 08:25:35 root ioslevel
Aug 9 2013, 08:59:22 padmin license
Aug 9 2013, 09:00:29 padmin lsmap -vadapter vhost0
Aug 9 2013, 09:01:29 padmin lsgcl

Redirecting output when running as padmin
lsmap –all –npiv | tee npivdata.txt

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Useful Commands

vSCSI Commands

mkvdev -vdev hdisk2 -vadapter vhost0

mkvdev –fbo –vadapter vhost0

NPIV

Setup NPIV mappings

vfcmap –vadapter vfchost0 –fcp fcs0

lsmap –npiv –all

lsmap –vadapter vfchost0 –npiv

lsdev –virtual

lsnports

lsdev –slots

lscfg –vpl vfchost0

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Useful Commands

$ lsdev -virtual

```
name           status      description
ent5           Available   Virtual I/O Ethernet Adapter (l-lan)
ent6           Available   Virtual I/O Ethernet Adapter (l-lan)
ent7           Available   Virtual I/O Ethernet Adapter (l-lan)
vasi0          Available   Virtual Asynchronous Services Interface (VASI)
vbsd0          Available   Virtual Block Storage Device (VBSD)
vfchost0       Available   Virtual FC Server Adapter
vfchost1       Available   Virtual FC Server Adapter
vhost0         Available   Virtual SCSI Server Adapter
vhost1         Available   Virtual SCSI Server Adapter
vsa0           Available   LPAR Virtual Serial Adapter
b740ios1_rv1   Available   Virtual Target Device - Logical Volume
b740l1_rv1     Available   Virtual Target Device - Logical Volume
vtopt0         Available   Virtual Target Device - File-backed Optical
vtopt1         Available   Virtual Target Device - File-backed Optical
vtscsi0        Available   Virtual Target Device - Disk
vtscsi1        Available   Virtual Target Device - Disk
vtscsi2        Available   Virtual Target Device - Disk
vtscsi3        Available   Virtual Target Device - Disk
ent8           Available   Shared Ethernet Adapter
```

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Useful Commands

$ lsmap -vadapter vhost0

```
SVSA          Physloc                                  Client Partition ID
--------------- -------------------------------------------- ------------------
vhost0        U8205.E6B.1093XXX-V1-C21                 0x00000003

VTD                   b740l1_rv1
Status                Available
LUN                   0x8300000000000000
Backing device        lv_b740l1
Physloc
Mirrored              N/A

VTD                   vtopt0
Status                Available
LUN                   0x8200000000000000
Backing device
Physloc
Mirrored              N/A

VTD                   vtopt1
Status                Available
LUN                   0x8100000000000000
Backing device
Physloc
Mirrored              N/A
```

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Useful Commands

$ lsmap -vadapter vfchost0 -npiv

```
Name        Physloc                          ClntID ClntName       ClntOS
----------- -------------------------------- ------ -------------- -------
vfchost0    U8205.E6B.1093XXX-V1-C31              3

Status:NOT_LOGGED_IN
FC name:fcs0                FC loc code:U78AA.001.WZSG8XX-P1-C5-T1
Ports logged in:0
Flags:4<NOT_LOGGED>
VFC client name:            VFC client DRC:
```

$ lsmap -vadapter vfchost4 -npiv

```
Name        Physloc                          ClntID ClntName       ClntOS
----------- -------------------------------- ------ -------------- -------
vfchost4    U8205.E6B.1093XXX-V1-C36              8 b740nl1       AIX

Status:LOGGED_IN
FC name:fcs0                FC loc code:U78AA.001.WZSG8XX-P1-C5-T1
Ports logged in:3
Flags:a<LOGGED_IN,STRIP_MERGE>
VFC client name:fcs0        VFC client DRC:U8205.E6B.1093XXX-V8-C36
```

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Useful Commands

$ lsnports

```
name            physloc                        fabric tports aports swwpns awwpns
fcs0            U78AA.001.WZSG8XX-P1-C5-T1          1     64     63    2048    2041
```

$ lsdev -slots

```
# Slot                  Description       Device(s)
HEA 1                   Logical I/O Slot  lhea0 ent0
U8205.E6B.1093XXX-V1-C0     Virtual I/O Slot  vsa0
U8205.E6B.1093XXX-V1-C11    Virtual I/O Slot  ent5
U8205.E6B.1093XXX-V1-C12    Virtual I/O Slot  ent6
U8205.E6B.1093XXX-V1-C13    Virtual I/O Slot  ent7
U8205.E6B.1093XXX-V1-C21    Virtual I/O Slot  vhost0
U8205.E6B.1093XXX-V1-C22    Virtual I/O Slot  vhost1
U8205.E6B.1093XXX-V1-C23    Virtual I/O Slot  vhost2
U8205.E6B.1093XXX-V1-C31    Virtual I/O Slot  vfchost0
U8205.E6B.1093XXX-V1-C32    Virtual I/O Slot  vfchost1
U8205.E6B.1093XXX-V1-C33    Virtual I/O Slot  vfchost2
U8205.E6B.1093XXX-V1-C32769 Virtual I/O Slot  vasi0
U8205.E6B.1093XXX-V1-C32773 Virtual I/O Slot  vasi1
U8205.E6B.1093XXX-V1-C32774 Virtual I/O Slot  vasi2
U8205.E6B.1093XXX-V1-C32775 Virtual I/O Slot  vasi3
U8205.E6B.1093XXX-V1-C32776 Virtual I/O Slot  vasi4
```

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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
  - https://ibmsystemsmag.com/Authors/jaqui-lynch

- Nigel Griffiths AIXpert Blog
  - https://www.ibm.com/support/pages/aixpert-blog-nigel-griffiths-mrnmon
- Nigel Griffiths Twitter – mr_nmon
  - https://twitter.com/mr_nmon
- Nigel Griffiths YouTube
  - https://www.youtube.com/nigelargriffiths
- Gareth Coates – Tricks of the POWER Masters
  - https://www.ibm.com/support/pages/node/1116939
- Gareth Coates Twitter – power_gaz
  - https://twitter.com/power_gaz
- Jaqui's Movie Replays
  - http://www.circle4.com/movies
- 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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Useful 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
- AIX 7.2 Performance Guide
  - https://www.ibm.com/support/knowledgecenter/ssw_aix_72/performance/performance_pdf.pdf
  - https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/navigation/performance.html
- 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
- SG24-8171 – Power Systems Performance Optimization including POWER8
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg248171.pdf
- SG24-8453 - AIX Modernization and Enhancements
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg248453.pdf

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Useful Articles

- Conduct an end of year AIX Health Check (Dec 2019)
  - https://ibmsystemsmag.com/Power-Systems/12/2019/Conduct-AIX-Systems-Health-Check
- Using NIM with VIO Servers
  - https://ibmsystemsmag.com/Power-Systems/09/2019/Using-NIM-with-VIO-Servers
- PowerVM v3 Installation and Upgrade Experience
  - https://ibmsystemsmag.com/Power-Systems/05/2019/powervm-experience
- Systems Management Tips
  - https://ibmsystemsmag.com/Power-Systems/08/2019/2019-AIX-Systems-Management-Tips
- 2019 AIX System Management Tips
  - https://ibmsystemsmag.com/Power-Systems/08/2019/2019-AIX-Systems-Management-Tips
- Secure your VIO Server
  - http://archive.ibmsystemsmag.com/aix/administrator/security/secure-your-vio-server/
- Upgrading your VIO server – July 2018
  - https://ibmsystemsmag.com/Power-Systems/12/2018/powervm-3-1-update
  - https://ibmsystemsmag.com/Power-Systems/05/2019/powervm-experience
- Maintaining the HMC
  - http://ibmsystemsmag.com/aix/administrator/systemsmanagement/hmc-maintenance/
- LPM
  - https://ibmsystemsmag.com/Power-Systems/10/2018/guide-live-partition-mobility
- HMC Enhanced GUI Links
  - https://www.ibm.com/support/pages/enhanced-gui-links-documentation

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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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VIOS Specific References - Network

- SEA Failover Statistics
  - https://www.ibm.com/support/knowledgecenter/POWER9/p9hb1/p9hb1_statsseafailover.htm
- SEA Statistics
  - https://www.ibm.com/support/knowledgecenter/POWER9/p9hb1/p9hb1_statssea.htm
- Enhanced GUI Links
  - https://www.ibm.com/support/pages/enhanced-gui-links-documentation
  - Includes many Developerworks documents related to the HMC enhanced GUI
  - Includes how to dynamically add and remove virtual ethernets and VLANs
- Configure VIO Server using VLAN Tagging
  - https://www.ibm.com/support/knowledgecenter/POWER8/p8hb1/p8hb1_vios_scenarios_network_two.htm
- VLAN Tagging – Load sharing with 10Gb adapters (PPT)
  - https://www.ibm.com/support/knowledgecenter/POWER8/p8hb1/p8hb1_vios_scenarios_network_two.htm

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Backup Slides

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HMC Levels

Version	Recommended Update	Recommended Upgrade	Release Date	EoSPS Date
V8 R870 SP3			2019.04.01	2019.08.31
V9 R1 M910	V9 R1 M941		2018.03.20	2018.05.25
V9 R1 M911	V9 R1 M941		2018.05.25	2018.08.17
V9 R1 M920	V9 R1 M941		2018.08.17	2018.11.16
V9 R1 M921	V9 R1 M941		2018.11.16	2019.05.17
V9 R1 M930	V9 R1 M941		2019.05.17	2019.09.11
V9 R1 M931	V9 R1 M941		2019.09.11	2019.11.22
V9 R1 M940	V9 R1 M941		2019.11.22	2020.05.22
V9 R1 M941			2020.05.22	2021.04.30

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HMC levels

All HMC levels prior to v9.1M940 went out of service by 11/22/2019
V9 as a whole goes out of service 4/30/2021
http://www14.software.ibm.com/webapp/set2/flrt/liteTable?prodKey=hmc

HMC latest version is v9R1M941 - (5/22/2020) – prereq is v9R1.910.0 min.
Can upgrade to v9r1.910.0 from v8.8.6.0 sp1 or later
V9R1M910 (MH01733 – x86 or MH01735 – PPC):
https://delivery04.dhe.ibm.com/sar/CMA/HMA/07hbb/6/MH01735.readme.html

v9R1M941 – (MH01860 – PPC, MH01859 – x86)
https://delivery04.dhe.ibm.com/sar/CMA/HMA/08xhg/4/MH01859.readme.html

iFix MH01862 should be installed on top of 941 – came out 7/24/2020
https://delivery04.dhe.ibm.com/sar/CMA/HMA/0918w/2/MH01862.readme.html

Note - v9.1 is the last HMC release that will support x86 HMCs

V9.1 requires the HMC to be a CR7 or higher if Intel, or the new POWER HMC
V9.1 does not support any server prior to POWER7

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

NOTE – once HMC is at v9r1m920 or higher you can upload VIOS and other images from flash drive to the HMC
V9 only supports the enhanced mode GUI

NOTE there is new BMC and PNOR code as of 12/3/2019
https://delivery04.dhe.ibm.com/sar/CMA/SFA/08nhu/1/7063-CR1_OpenPowerReadme.op825.40.xhtml

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Memory Planning

http://www.circle4.com/ptechu/memoryplan.xlsx
Note div - use 64 for all pre p7+ and IBM I, – 128 for p7+ and p8

POWER Systems Memory Overhead Approximation Calculator		
USE AS IS - NO GUARANTEES - UPDATED 8/24/2017		
Complete the information below so that calculations will be accurate		
Memory Installed in box in MB	393216	
Memory active in box in MB	194560	
LMB size for server	256	
Extra High performance adapter ports per VIO	8	This is active 10Gb net, 8gb fibre etc ports (not adapters)
These include 10Gb network and 8Gb fibre		
VFCs (NPIV) per VIO server	12	Each NPIV client
I/O drawers attached	2	
POWER6 only - IVE/HEA ports active	0	Change to number of ports in use
safety net for memory in MB	512	
Active memory mirroring?	2	Set to 2 if using mirroring
Divisor	128	Set to 128 if p7+ or P8
Spreadsheet assumes 2 x VIO servers configured equally		
This spreadsheet is an approximation - the author takes no responsibility for the output		
Use at your own risk		
Output should be compared to the output from:		
IBM SPT	http://www-947.ibm.com/systems/support/tools/systemplanningtool/	
IBM WLE	http://www-912.ibm.com/wle/EstimatorServlet	
Questions can be sent to jaqui@circle4.com		

Cover Sheet

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Memory Planning Worksheet
USE AS IS - NO GUARANTEES - UPDATED 8/24/2017

This gives a rough estimate
Assumes LMB size is 256MB
Each active IVE port adds 102 MB

Max RAM Capacity	786432	Ram installed GB	393216	384	Ram Active GB	194560	190		
Change the LMB size on this line to match MRO on HMC					MB LMB =	256	LMB below in MB Used the largest to show worst possible		
					Extra high performance ports per VIO	8	NPIV VFCs per VIO	12	
LPAR NAME	Desired Memory MB	Maximum Memory MB	Ohead Max Div 64 or 128		OH/LMB MB	Roundup OH MB	Actual Ohead (MB) OH * LMB	Memory Needed	Extra high Perf ports	If NPIV
VIOS1	3172	4096	32		0.13	1	256		4096	1680
VIOS2	3172	4096	32		0.13	1	256		4096	1680
LPAR1	12032	16384	128		0.50	1	256			
LPAR2	20224	24576	192		0.75	1	256			
LPAR3	14336	16384	128		0.50	1	256			
LPAR4	16384	24576	192		0.75	1	256			
LPAR5	3072	4096	32		0.13	1	256			
LPAR6	2048	4096	32		0.13	1	256			
LPAR7	17152	17152	134		0.52	1	256			
LPAR8	65536	71680	560		2.19	3	768			
LPAR9	32768	36864	288		1.13	2	512			
HYPERVISOR							1536			
IVE							0			
I/O drawer (I use 512 per 2)							512			
Safety Net							512			
								MB Total		
MB Total	189896	224000	1750		6.8359375	14	6144	196040.00	8192	3360
GB Total	*185*						*6.00*	*191.45*	*8.00*	*3.28*
								GB Total		
							Total when Add High Perf		*199.45*	
							Or add NPIV		*194.73*	
							Or BOTH		202.73	
							Combined New Memory needed including Overhead total		*202.73*	
							Shortfall (needed - active)		12.73	

NOTES
Hypervisor requires 7GB minimum for overhead with these settings for maximum memory
LPARs require 185GB so the total active needed is at least 192GB just to cober maximum memory setting overhead

Need to add NPIV and high speed adapter memory needs as well

8GB and 10GB extra high performance adapters
For each active port add 512MB
If NPIV then 140MB per VFC adapter per client
i.e. 20 ports per VIO without NPIV would be 20 * 512 = 10GB plus VIOS base for each VIOS
if NPIV then we allocate per client so if there are 20 clients on each VIO then each
VIO needs 20 * 140 = 2.8GB above the base

This spreadsheet is an approximation - the author takes no responsibility for the output
Use at your own risk
Output should be compared to the output from:
IBM SPT http://www-947.ibm.com/systems/support/tools/systemplanningtool/
IBM WLE http://www-912.ibm.com/wle/EstimatorServlet

Actual Data

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Changes to Fix Central

- IBM has moved from anonymous FTP to Secure FTP
- http://www-01.ibm.com/support/docview.wss?uid=isg3T1024541

- On AIX this means you will be provided with a userid and password to login when you request the fixes
- ftp –s –i delivery04-mul.dhe.ibm.com
- When prompted for userid and password use the ones provided
- passive (to set passive mode)
- binary (to download as binary)
- mget * (to download fixes)
- Quit

You can also use sftp – i.e. once they give you a userid and password:
sftp user@delivery04-mul.dhe.ibm.com
Put in password when prompted then type in “mget *” then quit when done

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