

I010917 (Orlando: i014507) The latest with VIOS - for IBM i

Janus Hertz
Senior IT Specialist
IBM Europe ETS Center of Competency lead for Power Systems

Intended for an IBM i audience!



2016

IBM Systems Technical Events

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Agenda

- **VIOS – Quick recap**
- **PowerVM Editions & Versions**
- **Recent Enhancements**
 - GUI – HMC + for VIOS install
 - Linux LE & E850 support
 - Simplified SEA failover configuration
 - Shared Storage Pool enhancements
 - Live Partition Mobility
 - Performance
- **Reminders**
 - Sizing & Planning
 - Backup & Maintenance
- **Useful References**



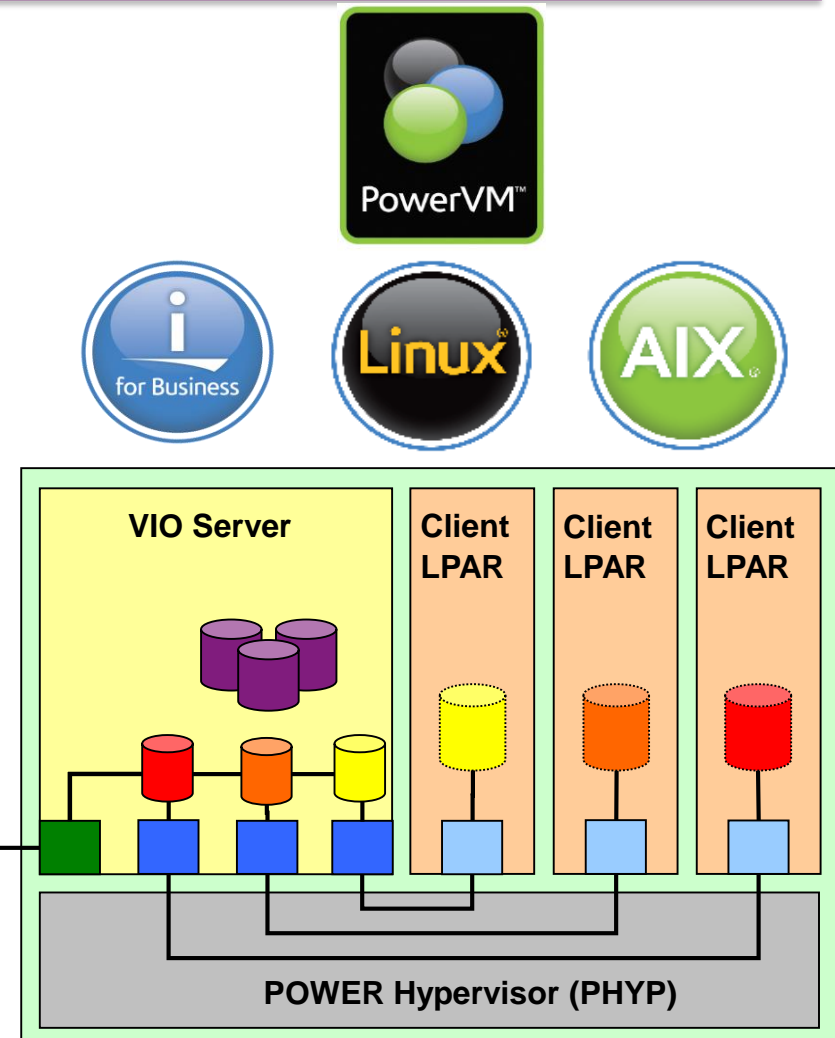
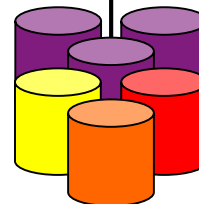
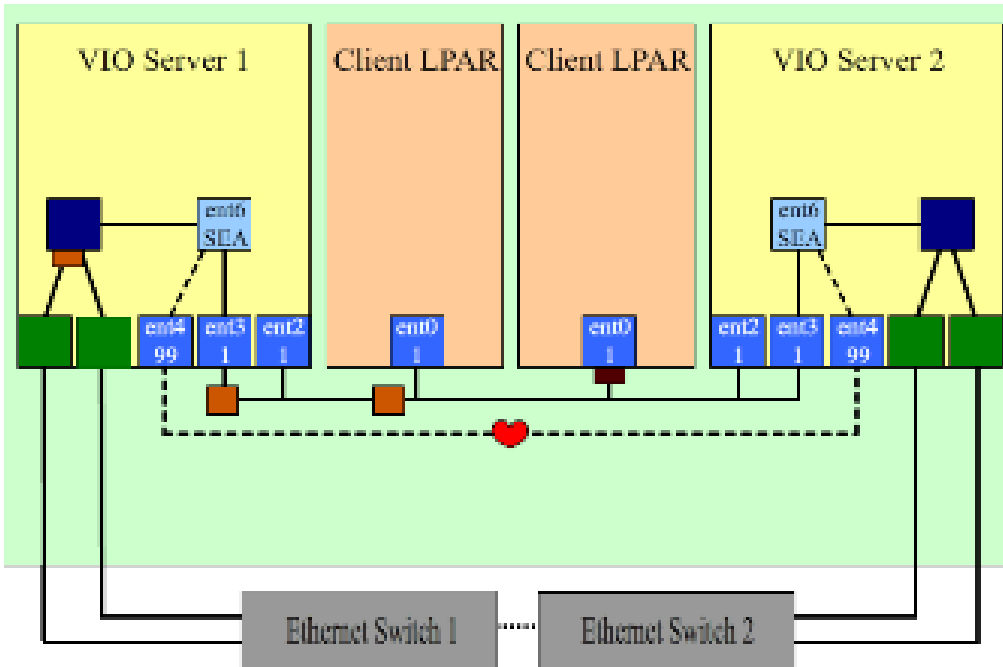
Virtual I/O Server – What?

What is VIOS?

- Appliance - runs in a partition on a POWER6/7/8 server
- Provides virtual resources to AIX, Linux, and IBM i 7.3, 7.2, 7.1 (& 6.1) client partitions
- Facilitates sharing of physical I/O resources between partitions
- Core function is virtual I/O: disks, tape, optical, Ethernet
- VIOS packaged in PowerVM
- Advanced functions (Suspend/Resume, LPM, AMS, NPIV, etc)
- Two Virtual I/O Server partitions recommended to provide redundancy
- Partitions can have a mix of physical and virtual resources
 - Except blades/PureFlex, and certain functions e.g. LPM



Virtual I/O Server



Virtual I/O Server – Why?

- Why use VIOS?
- Benefits of virtualisation
 - Increased utilisation
 - +
 - Improved service
 - +
 - Improved flexibility
 - =
 - Reduced costs (hardware, floor space, energy, licensing)
- Faster response to changing business need – flexible infrastructure
- Foundation for future



Storage

- **External** - wide range supported with VIOS than with native IBM i attach
 - IBM i POWER External Storage Support Matrix Summary
 - <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4563>
- **Internal :**
 - General recommendation - do **not** use IBM i with VIOS using integrated disks
 - **But** if you are considering IBM i with VIOS using internal disks – **be aware** :
 - SAS Adapter Performance Boost with VIOS article in developerWorks
 - <https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/SAS%20Adapter%20Performance%20Boost%20with%20VIOS>
 - The newer SAS adapters align data on different boundaries than before
 - In the past the recommendation has always been to virtualize the whole hdisk to IBM i and not to use storage pool/logical volume(LV) or file-backed (FB)
 - IBM i 7.2 enhancement does allow LV/FB if you are using 4K byte sector disks
 - Or consider IBM i hosting IBM i



Editions & Versions



PowerVM Editions

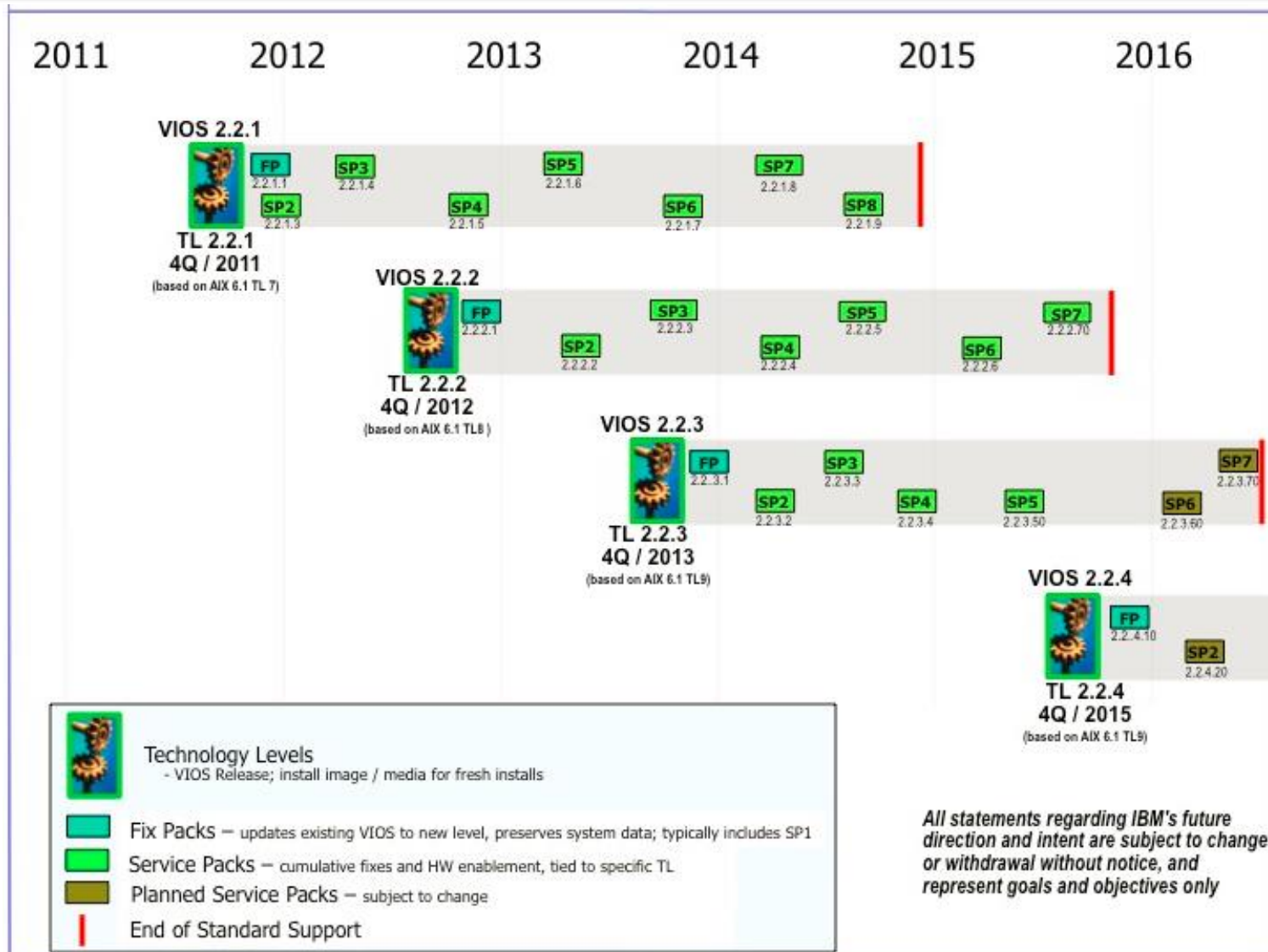


Features	Standard	Enterprise
Maximum VMs	1000 / Server	1000 / Server
Management	VMControl, IVM*, HMC, PowerVC, FSM	VMControl, IVM*, HMC, PowerVC, FSM
Virtual I/O Server	✓ (Dual)	✓ (Dual)
Suspend/Resume	✓	✓
NPIV	✓	✓
Shared Processor Pools	✓	✓
Shared Storage Pools	✓	✓
Thin Provisioning	✓	✓
Active Memory Sharing		✓
Live Partition Mobility		✓
PowerVP Performance Monitor		✓
SR-IOV	✓	✓

* IVM only supports a single Virtual I/O Server



Service life of VIOS levels



Update to the VIOS fix level numbering scheme

- VIOS VRMF - Version-Release-Maintenance-Fix level
- How it was before : FP level was always single digits, incremented by 1 for each SP – e.g. 2.2.3.4.
- **Beginning in June 2015** – a change to the numbering scheme used for the VIOS fix level :
 - **FP (Fixpack)**
 - **updates VIOS to latest level**
 - **contains new feature / function / product enhancements / new hardware enablement / fixes**
 - Level is a multiple of 10 (ie. 2.2.3.50, 2.2.3.60, 2.2.3.70)
 - **SP (Servicepack)**
 - **contains fixes and new hardware enablement (Power servers and I/O)**
 - does not typically introduce new feature function
 - **applies to a specific release level** (e.g. a v2.2.3 SP (2.2.3.4) could only be applied to v2.2.3
 - is cumulative. E.g. SP5 for a particular release (VRM) includes all fixes/function from SPs 1-4 will result in an update to the fix level (last nibble)
 - **MP (Minipack)**
 - **supplement to a SP**
 - **targeted to specific enablement (ie HW, PowerVC, etc).**
 - increment by 1's off the associated SP (ie. 2.2.3.51, 2.2.3.52, etc)
 - always has a prereq to a specific SP. E.g. SP 2.2.3.50 is a prereq for MP 2.2.3.51.
 - only cumulative back to the parent SP. E.g. MP 2.2.3.55 for a particular VIOS SP (fix level) will contain all fixes/function in MPs 2.2.3.51-2.2.3.54.
 - **Interim fix**
 - **An interim fix (iFix) applies to a specific VIOS servicepack (ie. fix level) and provides a fix for a specific issue.**
 - The official fixes are typically bundled in the next VIOS servicepacks and / or fixpacks. Applying one or more iFIX's will not alter the VIOS VRMF level.



VRMF – Changes to VIO Maintenance


Virtual I/O Server (VIOS) Maintenance Strategy

Updated with description for new Minipack and change to fix level numbering scheme (May 2015)

VIOS release

VIOS Releases contain product enhancements, new function, new hardware support and fixes. New VIOS releases are typically released once per year. A VIOS release is reflected by an increase to the version, release, and/or maintenance level number(s) (See VRMF section).

Translate this page

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VIOS service strategy

VIOS follows the standard IBM software lifecycle which provides three years of standard support per release plus two years of extended support at an additional cost.

The VIOS service stream has four delivery vehicles: Fixpacks, Servicepacks, Minipacks(New), and Interim Fixes:

Fixpack

A fixpack (FP) updates the VIOS software to the latest level. It contains new feature / function, product enhancements, new hardware enablement, and fixes. It is used to upgrade an existing VIOS to a new VIOS release level while preserving existing customized information. Applying a fixpack to a VIOS will update one or all of the VIOS's version, release, or maintenance level (see VRMF section).

Servicepack

Servicepacks contain fixes and new hardware enablement (Power servers and I/O). Servicepacks do not typically introduce new feature function.

A servicepack (SP) applies to a specific VIOS release level only. For example, a v2.2.3 SP (ie. 2.2.3.4) could only be applied to a v2.2.3 VIOS.

Servicepacks are cumulative. For example, SP5 for a particular VIOS release (VRM) will contain all fixes and HW enablement that was in SP's 1-4.

Applying a servicepack will result in an update to the fix level (last nibble) of the VIOS version, it does not change the VIOS version-release-maintenance level (see VRMF section).

Minipack

Minipacks (MP) introduced June 2015

A minipack is a supplement to a servicepack. A minipack is very similar to a servicepack in that it contains a bundle of fixes (same PTF format) but it is targeted to specific enablement (ie HW, PowerPC, etc.). This enablement would typically be delivered via iFIX in the past. Minipacks are

<http://www-304.ibm.com/webapp/set2/sas/f/vios/svcstrategy.html>



Recent Enhancements



Added with VIO 2.2.3.50

- PowerVM will support for LE Linux guest as well as traditional guests
 - Linux (BE)
 - AIX
 - IBM i
- Linux Little Endian Guest VM Support(LE)
 - RHEL 7.1
 - SLES 12
 - Ubuntu 14.10
 - Ubuntu 15.04
- Hardware Support E850
- Past session at i-UG
 - SAMBA on Linux on Power for IBM i specialists
 - http://media.wix.com/ugd/bd23da_8b16bfdc4d94448e94295acc4fad8885.pdf



VIO 2.2.4 + Firmware 840 + HMC 8.8.4.0

- Improved performance
 - VM Mobility with SR-IOV Adapters (vNIC)
 - Live Partition Mobility (LPM) improvements
- New features for Shared Storage Pool
- Greater scalability
 - OpenStack cloud deployments via new NovaLink architecture
- Integrated Facility for Linux (IFL) enhancements
- New Virtual HMC

PowerVM 2.2.4 - [developerWorks](#)

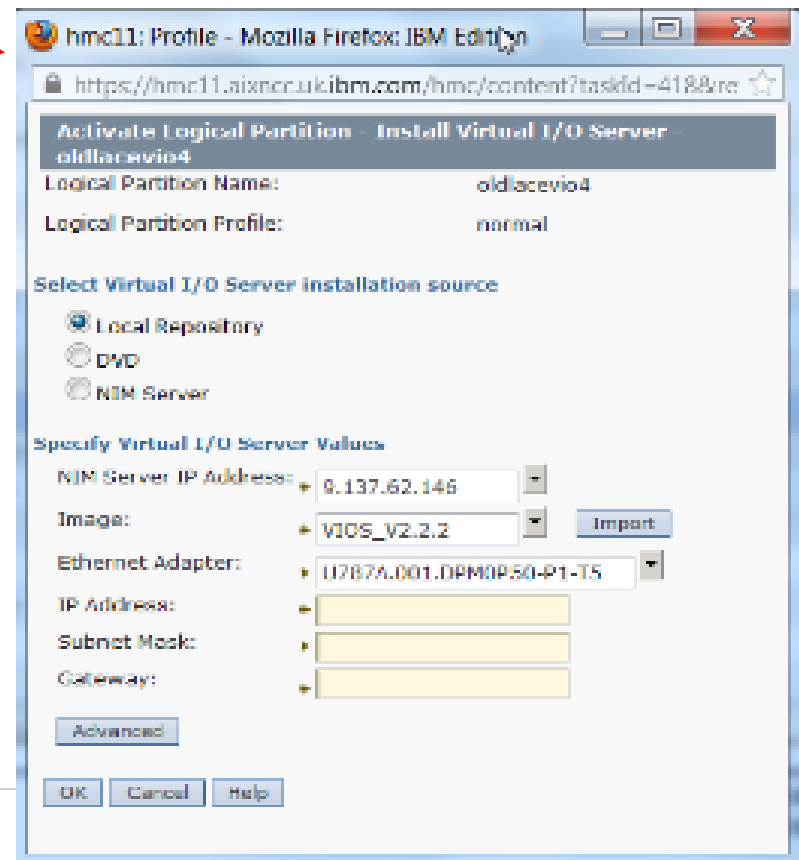
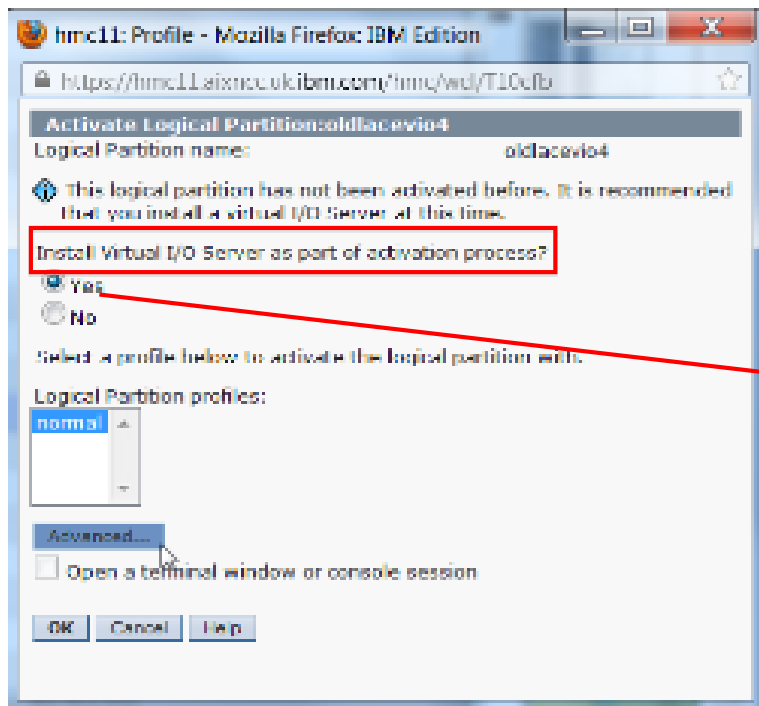


Easier Install via HMC GUI

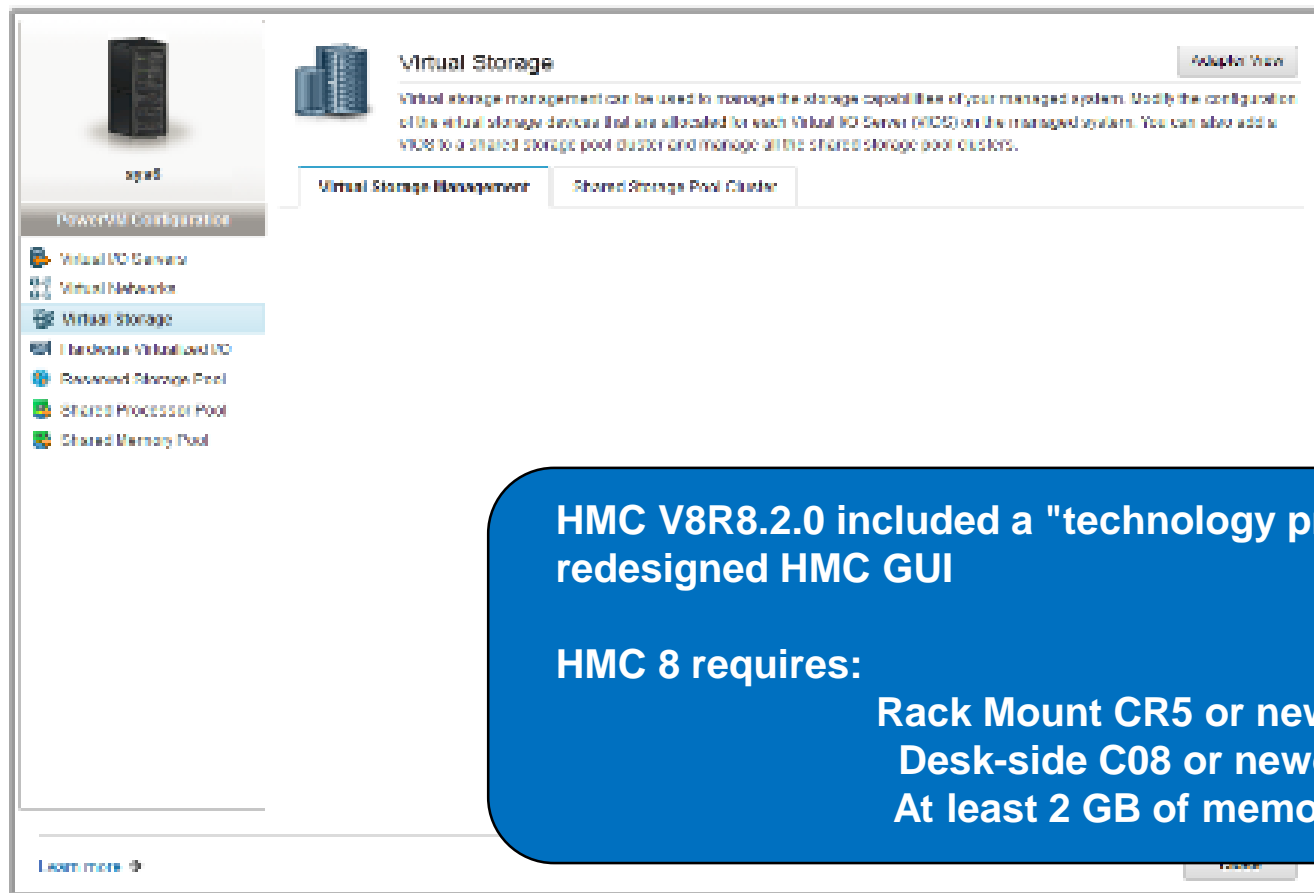
- HMC enhancement
 - V7R7.7.0 SP1
 - Readme - <http://www-933.ibm.com/support/fixcentral/firmware/readme?fixid=MH01343#enhance>
 - “Add a GUI enhancement for the installation of VIOS, allowing the user to install the Virtual I/O Server and managing Virtual I/O Server images using a GUI interface.”
 - SP2 recommended
 - See AIXpert blog entry:
https://www.ibm.com/developerworks/community/blogs/aixpert/entry/upgrading_to_hmc_v7r770_upgrade_to_service_pack_2_immediately?lang=en
 - InfoCenter
 - http://pic.dhe.ibm.com/infocenter/powersys/v3r1m5/topic/p7hb1/iphb1_vios_configuring_installhmc_dvd.htm
 - Past session at i-UG
 - http://www.nisug.org/nisug/index.php?option=com_remository&Itemid=84&func=fileinfo&id=121



Activating the VIOS partition



With HMC 8.8.2 SP1 (2015) – New view



HMC V8R8.2.0 included a "technology preview" of a new, redesigned HMC GUI

HMC 8 requires:

**Rack Mount CR5 or newer
Desk-side C08 or newer
At least 2 GB of memory**

Forum/feedback via <https://www.ibm.com/developerworks/community/forums/html/forum?id=45c57f22-9da9-4e3c-bb9b-75a5c9d177a0&ps=25>

Video - <https://www.youtube.com/watch?v=vW4ivdWg2V8>

Note: HMC V8R8.3.0 SP2 / HMC V8R8.4.0 SP1 (03-2016)



Use HMC to Create Shared Ethernet Adapters

Manage Profiles or Dynamic Partitioning

Create Virtual Ethernet Adapter - VIOS7

General | **Advanced**

Virtual ethernet adapter
 Adapter ID : * 21
 VSwitch : ETHERNET0(Default)
 Port Virtual Ethernet (VLAN ID): 107 [View Virtual Network...](#)

IEEE Settings
 Select this option to allow additional virtual LAN IDs for the adapter.
☐ IEEE 802.1q compatible adapter

Shared Ethernet Settings
 Select Ethernet bridging to link (bridge) the virtual Ethernet to a physical network
☒ Use this adapter for Ethernet bridging
 Priority: 1 (1 or 2)

OK Cancel Help

Virtual Network Management

Virtual LANs

Use Virtual VLANs to view the VLANs defined for the managed system. You may also view VLANs by their partition participation by changing the "View by" selection to Partitions.

View by: VLANs

Select a virtual local area network (VLAN) to manage. You then can view configuration details for the VLAN and select management tasks for the VLAN.

Select	VLAN ID	Bridge
<input type="radio"/>	99	
<input checked="" type="radio"/>	107	
<input type="radio"/>	248	VIOS3(ent4), VIOS4(ent6)

Details

Partitions

Partition	Virtual Adapter
VIOS7	ent4(Slot 21)
VIOS8	ent4(Slot 21)

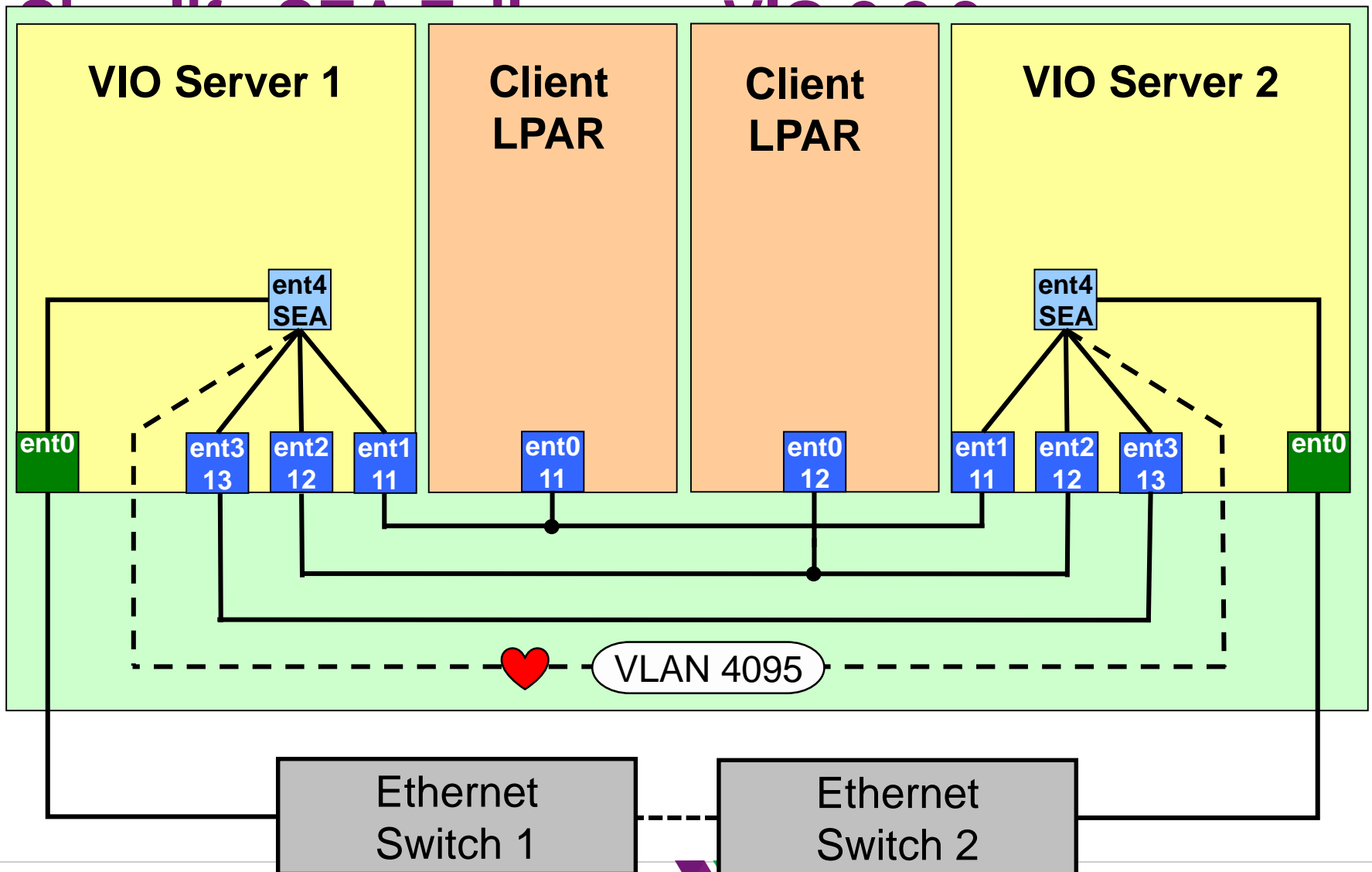
Shared Ethernet Adapters

Shared Adapter	Priority	VIOS

[Create SEA...](#)

- Forces user to make one VIOS Primary and one Secondary for each SEA
 - Prevents broadcast storm
- ~~Requires control channel to be created before creating SEA with failover~~
- Change specific settings using chdev after building the SEA if necessary





Simplify SEA Failover

- No Need for a Control Channel
- Requirements
 - VIO server 2.2.3 or higher
 - HMC 7.7.8 or higher
 - System Firmware 780
 - Note – Function was not available on “B” model servers
 - IBM Power 770 (9117-MMB)
 - IBM Power 780 (9179-MHB)
- VLAN ID 4095 not in use



Simplify SEA Failover

- Verify VLAN IDs and Trunk Priorities

```
padmin@vio1$ entstat -all ent1 | grep -iE "Priority|Port VLAN ID"
  Priority:      1  Active: False
Port VLAN ID:   11
padmin@vio1$ entstat -all ent2 | grep -iE "Priority|Port VLAN ID"
  Priority:      1  Active: False
Port VLAN ID:   12
padmin@vio1$ entstat -all ent3 | grep -iE "Priority|Port VLAN ID"
  Priority:      1  Active: False
Port VLAN ID:   13
```

```
padmin@vio2$ entstat -all ent1 | grep -iE "Priority|Port VLAN ID"
  Priority:      2  Active: False
Port VLAN ID:   11
padmin@vio2$ entstat -all ent2 | grep -iE "Priority|Port VLAN ID"
  Priority:      2  Active: False
Port VLAN ID:   12
padmin@vio2$ entstat -all ent3 | grep -iE "Priority|Port VLAN ID"
  Priority:      2  Active: False
Port VLAN ID:   13
```



Simplify SEA Failover

- Create your Shared Ethernet Adapter

```
padmin@vio1$ mkvdev -sea ent0 -vadapter ent1 ent2 ent3  
                -default ent1 -defaultid 11 -attr ha_mode=sharing  
ent4 Available
```



ctl_chan=ent#

```
padmin@vio2$ mkvdev -sea ent0 -vadapter ent1 ent2 ent3  
                -default ent1 -defaultid 11 -attr ha_mode=sharing  
ent4 Available
```



ctl_chan=ent#



Simplify SEA Failover

- Verify VLAN IDs and Trunk Priorities

```
padmin@vio1$ lsdev -dev ent4 -attr
```

attribute	value	description	user_settable
accounting	disabled	Enable per-client accounting of network statistics	True
adapter_reset	yes	Reset real adapter on HA takeover	True
ctl_chan		Control Channel adapter for SEA failover	True
gvrp	no	Enable GARP VLAN Registration Protocol (GVRP)	True
ha_mode	sharing	High Availability Mode	True
hash_algo	0	Hash algorithm used to select a SEA thread	True
jumbo_frames	no	Enable Gigabit Ethernet Jumbo Frames	True
large_receive	yes	Enable receive TCP segment aggregation	True
largesend	1	Enable Hardware Transmit TCP Resegmentation	True
lldpsvc	no	Enable IEEE 802.1qbg services	True
netaddr	0	Address to ping	True
nthreads	7	Number of SEA threads in Thread mode	True
pvid	15	PVID to use for the SEA device	True
pvid_adapter	ent1	Default virtual adapter for non-VLAN-tagged packets	True
qos_mode	disabled	N/A	True
queue_size	8192	Queue size for a SEA thread	True
real_adapter	ent0	Physical adapter associated with the SEA	True
send_RARP	yes	Transmit Reverse ARP after HA takeover	True
thread	1	Thread mode enabled (1) or disabled (0)	True
virt_adapters	ent1,ent2,ent3	List of virtual adapters associated with the SEA	True



Simplify SEA Failover

- Where is the Control Channel

```
padmin@vio1$ entstat -all ent4 | grep -i "Control Channel PVID"  
Control Channel PVID: 4095
```

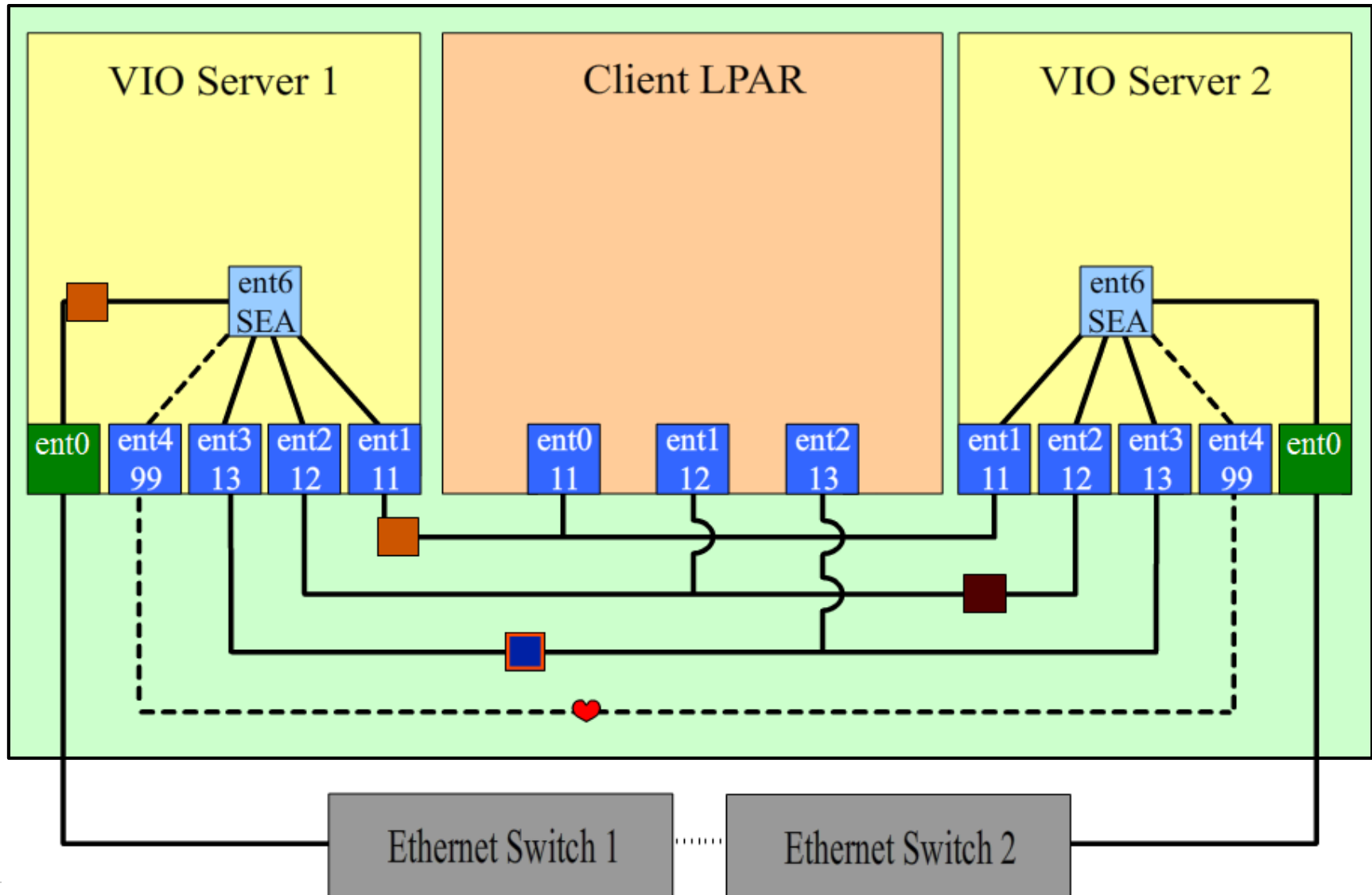
```
padmin@vio1$ entstat -all ent4 | grep -i state  
State: PRIMARY_SH
```

```
padmin@vio2$ entstat -all ent4 | grep -i "Control Channel PVID"  
Control Channel PVID: 4095
```

```
padmin@vio2$ entstat -all ent4 | grep -i state  
State: BACKUP_SH
```



Remove Existing Control Channel



Simplify SEA Failover

- Requires both SEA adapters in a defined state (outage)

```
padmin@vio1$ oem_setup_env  
root@vio1# rmdev -l ent6  
ent6 Defined
```

or

```
padmin@vio1$ rmdev -dev ent6 -ucfg  
ent6 Defined
```

```
padmin@vio2$ oem_setup_env  
root@vio2# rmdev -l ent6  
ent6 Defined
```

or

```
padmin@vio2$ rmdev -dev ent6 -ucfg  
ent6 Defined
```



Simplify SEA Failover

- Blank out the control channel

```
root@vio1# lsattr -El ent6 -a ctl_chan
ctl_chan  ent4    Control Channel adapter for SEA failover      True
root@vio1# chdev -l ent6 -a ctl_chan=""
ent6 changed
```

```
padmin@vio1$ lsdev -dev ent6 -attr ctl_chan
ctl_chan  ent4    Control Channel adapter for SEA failover      True
padmin@vio1$ chdev -dev ent6 -attr ctl_chan=""
ent6 changed
```

```
root@vio2# lsattr -El ent6 -a ctl_chan
ctl_chan  ent4    Control Channel adapter for SEA failover      True
root@vio2# chdev -l ent6 -a ctl_chan=""
ent6 changed
```

```
padmin@vio2$ lsdev -dev ent6 -attr ctl_chan
ctl_chan  ent4    Control Channel adapter for SEA failover      True
padmin@vio2$ chdev -dev ent6 -attr ctl_chan=""
ent6 changed
```

Simplify SEA Failover

- Requires both SEA adapters in a defined state (outage)

```
root@vio1# mkdev -l ent6  
ent6 Available
```

or

```
padmin@vio1$ cfgdev -dev ent6  
ent6 Available
```

```
root@vio2# mkdev -l ent6  
ent6 Available
```

or

```
padmin@vio2$ cfgdev -dev ent6  
ent6 Available
```



Simplify SEA Failover

- Where is the Control Channel

```
padmin@vio1$ entstat -all ent4 | grep -i "Control Channel PVID"  
Control Channel PVID: 4095
```

```
padmin@vio1$ entstat -all ent4 | grep -i state  
State: PRIMARY_SH
```

```
padmin@vio2$ entstat -all ent4 | grep -i "Control Channel PVID"  
Control Channel PVID: 4095
```

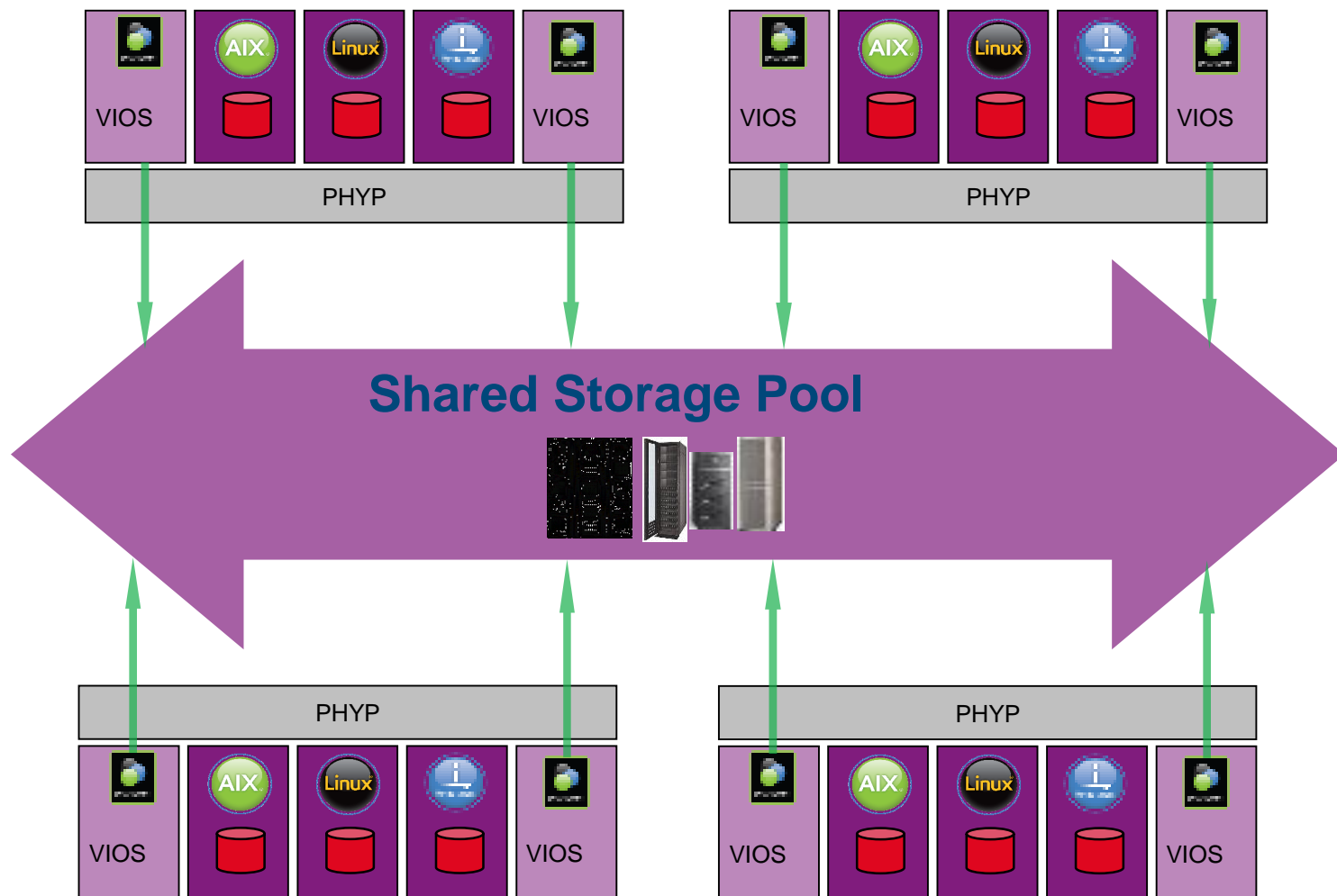
```
padmin@vio2$ entstat -all ent4 | grep -i state  
State: BACKUP_SH
```

Simplification Summary

- Simplified SEA Failover setup
- If you do not specify a control channel (ctl_chan) when running `mkvdev -sea ...` The system will “discover” SEA Failover “partner” adapter in the other VIO
- Discovery protocol uses VLAN id 4095. If this is one of your actual tagged VLANs, you must continue to use control channel on both sides
- Multiple SEA pairs in the machine can share VLAN 4095 for discovery
- This is still SEA failover, and we still set priority 1 or 2 on the trunked virtual adapter in the SEA
- VIO server 2.2.3, HMC 7.7.8, Firmware 780. Not supported on MMB or MHB at this time.
- Perhaps we stay consistent with our current Power7 practices, and use this for new Power8 machines.



Shared Storage Pools



VIO 2.2.3

■ Shared Storage Pool Enhancements

- Pool Resiliency – mirror the storage pool (two failover groups)
- Pool shrink by removing physical volume
- Dynamic disk growth in the pool
- Scaling – more clients, larger physical volumes
- New lu, pv, failgrp commands
- Cluster wide operations performed concurrently
- VIO 2.2.2 added
 - ability to roll out updates to VIO servers without stopping the cluster
 - In case of failed repository disk, cluster remains active, no changes, until disk is replaced
 - VLAN tagging supported in the cluster

■ developerWorks articles to get started

■ Shared Storage Pool 4 - Best Practice & FAQ blog – Nigel Griffiths

- https://www.ibm.com/developerworks/community/blogs/aixpert/entry/Shared_Storage_Pool_4_Best_Practice_FAQ?lang=en



Shared Storage Pool Limits

Feature	Min	Max
• Number of VIOS Nodes in Cluster	1	16
• Number of Physical Disks in Pool 1024		1
• Number of Virtual Disks (LUs) Mappings in Pool	1	8192
• Number of Client LPARs per VIOS node	1	200
• Capacity of Physical Disks in Pool	10GB	16TB
• Storage Capacity of Storage Pool 512TB		10GB
• Capacity of a Virtual Disk (LU) in Pool	1GB	4TB
• Number of Repository Disks	1	1
• Capacity of Repository Disk	512MB	1TB

Recommended VIO server requirements – per SSP node:

- Minimum CPU: 1 CPU of guaranteed entitlement
- Minimum memory: 4GB
- Storage requirements per SSP cluster (minimum):
- One fiber-channel attached disk for cluster repository, 1 GB

• At least one fiber channel attached disk for data, 10GB



New command: lu

```
$ lu -list
POOL_NAME: test_pool
TIER_NAME: SYSTEM

LU_NAME          SIZE (MB)    UNUSED (MB)  UDID
aix2-rootvg      10240        0             ad4f5d...
aix3-rootvg      20480        18460         242eac...
aix4-rootvg      102400       0             56e22b...
aix5-rootvg      10240        0             1a4758...
aix6-rootvg      40960        0             bfa955...
aix7-rootvg      51200        0             599ad4...
```



New command: pv

```
$ lspv
```

NAME	PVID	VG	STATUS
hdisk0	00f629dbc192abd7	rootvg	active
hdisk1	00f629dbbe759aa5	caavg_private	active
hdisk2	00f629dbbe7c9b29	None	
hdisk3	00f629dbbd739cbe	None	

```
$ pv -list
```

```
POOL_NAME: test_pool
```

```
TIER_NAME: SYSTEM
```

```
FG_NAME: Default
```

PV_NAME	SIZE (MB)	STATE	UDID	
hdisk2	1048576	ONLINE	3C231IBM	FlashSystem



Shared Storage Pool Enhancements with VIOS 2.2.4



- **Storage tiers within a Shared Storage Pool**
 - greater flexibility and control for quality of service
 - Isolation
 - redundancy
 - up to 10 tiers of storage within a storage pool

- **Dynamically grow a virtual disk**

- **Technical webinar with Nigel Griffiths**
 - 18 Nov 2015 - <http://tinyurl.com/PowerSystemsTechnicalWebinars>



Live Partition Mobility

- **Evacuate option**

`migrIpar -o m -m source_server -t target_server --all`

<https://www-01.ibm.com/support/knowledgecenter/9117-MMD/p7hc3/iphc3serverevacuation.htm?cp=9117-MMD>

- **Checklists**

- Preparation - <http://www.redbooks.ibm.com/abstracts/tips1185.html?Open>

- Setup - <https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/tips1184.html?Open>

- **Performance suggestions**

- large_send, large_receive on physical adapters in VIO
- Suggesting tcp_sendspace, tcp_recvspace 524288 on VIO interface
- Jumbo frames if your environment supports it



Live Partition Mobility enhancements with VIOS 2.2.4



- Better NPIV storage validation
 - disk level validation - check that individual disk LUNs assigned to the partition are usable on the target system
- Improved performance
 - support network bandwidth up to 35Gb
- Improved resiliency
 - Allow LPM even when one VIOS has failed
- Allows selection of vSwitch name on target system

See developerWork -

https://www.ibm.com/developerworks/community/wikis/home?lang=en_us#/wiki/Power%20Systems/page/Live%20Partition%20Mobility%20%28LPM%29%20improvements%20in%20PowerVM%202.2.4



**After you have the
system up and
running...**



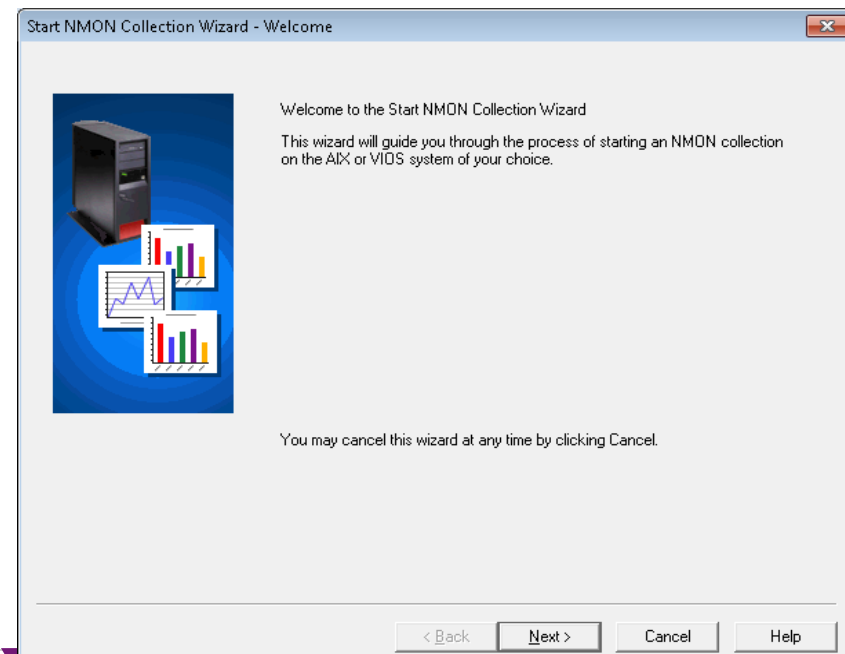
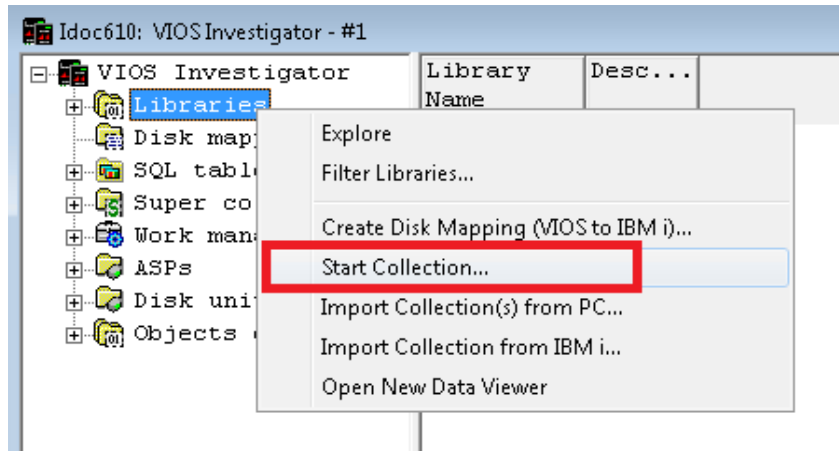
Performance Advisors

- Three advisors available....
 - PowerVM Virtualization Performance Advisor – runs on an AIX partition
 - Java Performance Advisor (JPA) – for Java/WAS applications running on AIX
 - **VIOS & Virtual Ethernet (built-in VIOS function in v2.2.2.1 via ‘part’ command)**
- Run advisors on test or production systems
 - evaluate performance / receive guidance
- “Built-in Smarts” to detect common problems
- Available on [developerWorks](#) – No charge
- VIOS Commands - topas, nmon, or topas_nmon
- **HMC Performance views**
- **IBM iDoctor for i – VIOS Investigator**



iDoctor VIOS Investigator – Start Data Collection menu in GUI

- First add VIOS partitions to the iDoctor connection list
- Use this wizard to start an NMON collection via iDoctor GUI
- SSH 2.0+ must be installed on the VIOS.
- The user id must be authorized to run topas_nmon



Monitoring with VIOS Advisor

VIOS Performance Advisor

- Default Installed with VIOS starting with Version 2.2.2 (late 2012)
- Easy to use
 - Run from VIOS command line with one parameter
 - **part** <duration of monitoring period in minutes>
 - Recommend running for at least 30 - 60 minutes
 - Minimum = 5 minutes, Maximum = 1440 minutes (24 hours)
- Output is written to file `vios_advisor.xml` in directory where tool is located
- Send file back to workstation and directory where tool was unzipped and open the report



part - Components Monitored

Types of advisory reports generated by VIOS Performance Advisor tool:

- System configuration advisory report
- CPU (central processing unit) advisory report
- Memory advisory report
- Disk advisory report
- Disk adapter advisory report
- I/O activities (disk and network) advisory report

An option for VIO servers below v2.2.2.1

<https://www.ibm.com/developerworks/wikis/display/WikiPtype/VIOS+Advisor>



VIOS Performance Advisor Summary View

VIOS Performance Advisor

The ratings and recommendations in the table below were chosen with the following information:

Hostname : virt002.austin.ibm.com

PartitionID: 1

Monitoring Start Time : 08/17 13:25:13

Monitoring Stop Time : 08/17 13:30:13 Duration : 5 min

IBM Systems Workload Estimator link: <http://ibm.com/systems/support/tools/estimator> (VIOS Sizings)

SYSTEM - CONFIGURATION

Name	Value
Processor Family	POWER7
Server Model	IBM,9117-MMC
Server Frequency	3.920 GHz
Server - Online CPUs	16 cores
Server - Maximum Supported CPUs	64 cores
VIOS Level	2.2.1.0
VIOS Advisor Release	081711A

VIOS - I/O ACTIVITY

Name	Value
Disk I/O Activity	avg: 1906 iops @ 103KB peak: 1893 iops @ 57KB
Network I/O Activity	[avgSend: 9641 iops 0.6MBps , avgRcv: 75914 iops 97.7MBps] [peakSend: 9956 iops 0.6MBps , peakRcv: 78668 iops 112.5MBps]

VIOS - DISK ADAPTERS

Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
FC Adapter Count	2	-	08/17 13:25:13	-	n/a	n/a
FC Avg IOPS	avg: 827 iops @ 3KB	-	08/17 13:25:13	08/17 13:30:13	n/a	n/a
FC Idle Port (fcs1)	idle	-	08/17 13:25:13	08/17 13:30:13	4	4
FC Adapter Utilization	pass	-	-	-	n/a	n/a
FC Port Speeds	running at speed	-	-	-	n/a	n/a

VIOS - DISK DRIVES

Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
Physical Drive Count	13	-	08/17 13:25:13	-	n/a	n/a
I/Os Blocked (hdisk0)	high:9.1% I/Os blocked	5.0% or less	08/17 13:25:45	08/17 13:28:45	n/a	n/a
Long I/O Latency	pass	-	-	-	n/a	n/a

VIOS - CPU

Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
CPU Capacity	4.0 ent	-	08/17 13:25:13	-	n/a	n/a
CPU Consumption	avg:27.1% (cores:1.1) high:27.4% (cores:1.1)	-	-	-	n/a	n/a
Processing Mode	Shared CPU, (UnCapped)	-	08/17 13:25:13	-	n/a	n/a
Variable Capacity Weight	128	129-255	08/17 13:25:13	-	1	5
Virtual Processors	4	-	08/17 13:25:13	-	n/a	n/a
SMT Mode	SMT4	-	08/17 13:25:13	-	n/a	n/a

SYSTEM - SHARED PROCESSING POOL

Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
Shared Pool Monitoring	enabled	-	08/17 13:25:13	-	n/a	n/a
Shared Processing Pool Capacity	16.0 ent.	-	08/17 13:25:13	-	n/a	n/a
Free CPU Capacity	avg_free:14.9 ent. lowest_free:14.8 ent.	-	-	-	n/a	n/a

















VIOS - MEMORY






Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
Real Memory	4.000 GB	7.000 GB	08/17 13:25:13	-	1	5
Available Memory	0.571 GB	1.5 GB Avail.	08/17 13:25:33	08/17 13:29:30	n/a	n/a
Paging Rate	163.8 MB/s pg rate	No Paging	08/17 13:25:33	08/17 13:30:00	n/a	n/a
Paging Space Size	1.500 GB	-	08/17 13:25:13	-	n/a	n/a
Free Paging Space	1.491 GB free	-	-	-	n/a	n/a
Pinned Memory	0.748 GB pinned	-	-	-	n/a	n/a

Color-coded Icons

VIOS - Shared Ethernet Adapters

Risk/Impact 1=lowest 5=highest

	Name	Measured Value	Suggested Value	First Observed	Last Observed	Risk	Impact
	SEA Adapter Count 	1		09/29/2014 01:34 PM			
	 SEA (ent4)	Mapping: Physical : (ent0),Virtual : (ent2,ent3)		09/29/2014 01:34 PM			
	SEA LargeSend - ent4 	Enabled					
	SEA LargeReceive - ent4 	Disabled	Enabled				
	SEA Thread - ent4 	Enabled					
	Phy FlowControl - ent0 	Enabled					
	Phy LargeSend - ent0 	Enabled					
	Phy LargeReceive - ent0 	Disabled	Enabled				

Icons	Definitions
	Information related to configuration parameters
	Values acceptable in most cases
	Possible performance problem
	Severe performance problem
	Investigation required

VIOS Performance Advisor Summary View

VIOS Performance Advisor

The ratings and recommendations in the table below were chosen with the following information:

Hostname : virt002.austin.ibm.com

PartitionID: 1

Monitoring Start Time : 08/17 13:25:13

Monitoring Stop Time : 08/17 13:30:13 **Duration :** 5 min

IBM Systems Workload Estimator link: <http://ibm.com/systems/support/tools/estimator> (VIOS Sizings)

SYSTEM - CONFIGURATION

	Name	Value
	Processor Family	POWER7
	Server Model	IBM,9117-MMC
	Server Frequency	3.920 GHz
	Server - Online CPUs	16 cores
	Server - Maximum Supported CPUs	64 cores
	VIOS Level	2.2.1.0
	VIOS Advisor Release	081711A

VIOS - I/O ACTIVITY

	Name	Value
	Disk I/O Activity	avg: 1906 iops @ 103KB peak: 1893 iops @ 57KB
	Network I/O Activity	[avgSend: 9641 iops 0.6MBps , avgRcv: 75914 iops 97.7MBps] [peakSend: 9956 iops 0.6MBps , peakRcv: 78668 iops 112.5MBps]

VIOS Performance Advisor Summary View

VIOS - DISK ADAPTERS

	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
	FC Adapter Count	2	-	08/17 13:25:13	-	n/a	n/a
	FC Avg IOps	avg: 827 iops @ 3KB	-	08/17 13:25:13	08/17 13:30:13	n/a	n/a
	FC Idle Port: (fcs1)	idle	-	08/17 13:25:13	08/17 13:30:13	4	4
	FC Adapter Utilization	pass	-	-	-	n/a	n/a
	FC Port Speeds	running at speed	-	-	-	n/a	n/a

VIOS - DISK DRIVES

	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
	Physical Drive Count	13	-	08/17 13:25:13	-	n/a	n/a
	I/Os Blocked (hdisk0)	high:9.1% I/Os blocked	5.0% or less	08/17 13:25:45	08/17 13:28:45	n/a	n/a
	Long I/O Latency	pass	-	-	-	n/a	n/a

VIOS Performance Advisor Summary View

Click on any topic to get more details, including recommended actions.

VIOS Performance Advisor

VIOS Performance Recording Summary

Hostname : billv2

PartitionID: 2

[IBM Systems Workload Estimator](#) (VIOS Sizings)

Advisory Report

System - Configuration

Name	Value
Processor Family	Architecture PowerPC Implementation POWER7_COMPAT mode 64 bit
Server Model	IBM 9117-MMB
Server Frequency	3500.0 MHz
Server - Online CPUs	1.0 cores
Server - Maximum Supported CPUs	2.0 cores
VIOS Level	2.2.3.0
VIOS Advisor Release	0.1

This value is an average of processor consumption by the VIOS partition.
This value is calculated when the VIOS is busy, and not idle.
Higher processor consumption can cause delays in I/O processing, as well as delays for disk access and network operations

VIOS - I/O Activity

Name	Value
Disk I/O Activity	Average : 1810 @ 4.85 KB Peak: 6572 @ 6KB
Network I/O Activity	[Average Send: 67 @ 3.0 MBps , Average Receive: 67 @ 72.1MBps] [Peak Send: 83 @ 4.1 MBps , Peak Receive: 83 @ 90.4MBps]

VIOS - Disk Adapters

Risk/Impact 1=lowest 5=highest

Name	Measured	Suggested	First	Last	Risk	Impact
------	----------	-----------	-------	------	------	--------

VIOS - Processor

	Name	Measured Value
✓	CPU Capacity	1.0 ent
i	CPU consumption	Average:37.0% (cores:0.4) High:55.0% (cores:0.6)
i	Processing Mode	Shared CPU (Capped)
✓	Virtual Processors	1
✓	SMT Mode	SMT4

VIOS - Memory

	Name	Measured Value	Suggested Value
⚠	Real Memory	4.000 GB	4.000 GB
ⓘ	Available	0.000 GB	4.000 GB



VIOS Advisor - CPU Advisories

Receive early detection of potential performance inhibitors.



WARNING: Best practice is for VIOS to have an increased priority when in uncapped shared processor mode.

LEGEND



Informative



Warning



Investigate



Critical



Optimal

VIOS - CPU

	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
	CPU Capacity	4.0 ent	-	08/17 13:25:13	-	n/a	n/a
	CPU Consumption	avg:27.1% (cores:1.1) high:27.4% (cores:1.1)	-	-	-	n/a	n/a
	Processing Mode	Shared CPU, (UnCapped)	-	08/17 13:25:13	-	n/a	n/a
	Variable Capacity Weight	128	129-255	08/17 13:25:13	-	1	5
	Virtual Processors	4	-	08/17 13:25:13	-	n/a	n/a
	SMT Mode	SMT4	-	08/17 13:25:13	-	n/a	n/a

SYSTEM - SHARED PROCESSING POOL

	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
	Shared Pool Monitoring	enabled	-	08/17 13:25:13	-	n/a	n/a
	Shared Processing Pool Capacity	16.0 ent.	-	08/17 13:25:13	-	n/a	n/a
	Free CPU Capacity	avg_free:14.9 ent. lowest_free:14.8 ent.	-	-	-	n/a	n/a



Fibre Channel Statistics

VIOS - Disk Adapters

Risk/Impact 1=lowest 5=highest

	Name	Measured Value	Suggested Value	First Observed	Last Observed	Risk	Impact
	FC Adapter Count	2		09/29/2014 01:34 PM			
	FC I/O Operations per second	0 @ 0 KB		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	fcs0	Average : 0 @ 0 KB		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	fcs1	Average : 0 @ 0 KB		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	FC Adapter Utilization	optimal					
	NPIV Client Utilization - fcs0	High: 0.31 % Average: 0.02 %		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	aix1	Average 6 iops @ 2 KB Peak: 63 iops @ 5 KB		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	FC I/O Operations Blocked	optimal		09/29/2014 01:34 PM	09/29/2014 01:44 PM		
	FC Port Speeds (fcs0)	2 GB	Supported: 8 GB	09/29/2014 01:34 PM	09/29/2014 01:44 PM		



Severe Performance Problem

VIOS - Shared Ethernet Adapters

	Name	Measured Value	Suggested Value
✓	Phy LargeSend - ent0 ?	Enabled	
✗	Phy LargeReceive - ent0 ?	Disabled	Enabled
✓	LPAR client buffer alloc. - ent0 ?	Optimal	
✓	Virt ent2 buffer alloc. ?	Optimal	
✓	Virt ent3 buffer alloc. ?	Optimal	

This feature enables coalescing the receive packets into a large packet before passing to the next layer for enhanced performance. The feature is enabled by default and is also known as TCP segment aggregation.

The adapter hardware offload capability can complete data aggregation faster than operating system software. This feature can improve receive performance.

The following command enables large receive for physical device ent1:

```
chdev -l en1 -a state=down
chdev -l ent1 -a large_receive=yes (if hardware supported)
chdev -l en1 -a state=up
```

Investigate



This feature enables a VIOS to monitor the shared processing pool in which it participates.

Shared pool monitoring feature must be enabled to view the statistics of the shared processor pool.

To enable the feature, access the partition properties for a specific VIOS on the HMC. On the Hardware page, select the option to 'Allow performance collection'.

System - Shared Processing Pool

	Name	Measured Value	Suggested Value
	Shared Pool Monitoring	disabled	enabled
	Shared Processor Pool Capacity	Unattainable (Enable Shared Pool Monitoring)	



Sizing & Planning Backup & Maintenance



VIO Sizing Recommendations

IBM

IBM PowerVM Best Practices

Updated Jan 2015

A collection of recommended practices to enhance your use of the PowerVM features

A resource to build on knowledge found in other PowerVM documents

A valuable reference for experienced IT specialists and IT architects



<http://www.redbooks.ibm.com/abstracts/sg248062.html?Open>



VIO Sizing – System Planning Tool

IBM System Planning Tool

for POWER processor-based systems

[Overview](#)[Download](#)[News](#)[Resources](#)[Support](#)

The IBM System Planning Tool (SPT) is a browser-based application that helps you design system configurations; it is particularly useful for designing logically partitioned enables you to plan a system based on existing performance data or based on new workloads. System plans generated by the SPT can be deployed on the system by the Hardware Management Console (HMC) and Integrated Virtualization Manager. The SPT is available to assist the user in system planning, design, validation and to provide a system validation report that reflects the user's system requirements while not exceeding system recommendations.

Models supported

Plan and design the system configuration

The System Planning Tool (SPT) helps you design a system to fit your needs. You can use the SPT to design a logically partitioned system or you can use the SPT to design an unpartitioned system. You can create an entirely new system configuration, or you can create a system configuration based upon any of the following:

- Performance data from an existing system that the new system is to replace
- Performance estimates that anticipates future workloads that you must support
- Sample systems that you can customize to fit your needs

<http://www-947.ibm.com/systems/support/tools/systemplanningtool/>



System Planning Tool

IBM System Planning Tool

System plan: P8 S822L

System: P8 S822L [IBM Power System S822L (8247-22L)] ▼

System

Partitions

Hardware

Networking

Virtual Storage

Consoles

Summary

Partition properties

Processors

Memory

Memory

System memory (MB): 131072

Configured memory (MB): 28672

Hypervisor memory (MB): 4864

Unassigned memory (MB): 97536

Logical memory block size (MB): 256 ▼

Memory for Partitions

			Memory (MB)		
Name	ID	Operating System	Min	Desired	Max
LPAR1	1	Virtual I/O Server	1024	4096	8192
LPAR2	2	Virtual I/O Server	1024	4096	8192



VIO Sizing – Workload Estimator

- Updated with information on POWER8 and PowerKVM

IBM Systems Workload Estimator

The IBM Systems Workload Estimator is a web-based sizing tool for IBM Power Systems™, System i®, System p®, System x®, IBM Flex Systems™, and IBM PureFlex™ Systems. You can use this tool to size a new system, to size an upgrade to an existing system, or to size a consolidation of several systems.

The Workload Estimator (WLE) allows measurement input to best reflect your current workload and provides a variety of built-in workloads to reflect your emerging application requirements. Virtualization can be used to yield a more robust solution. The Workload Estimator will provide current and growth recommendations for processor, memory, and disk that satisfy the overall client performance requirements.

Launch the IBM Systems Workload Estimator

[IBM Systems Workload Estimator](#)

More information

For the latest information about Workload Estimator and Energy Estimator features, visit the [IBM Systems Workload Estimator and Energy Estimator Community](#).


IBM Sizing Guides



Find the server to handle your specific application requirements

[→ Search Sizing Guides](#)

Translate this page

Select Language 

<http://www-947.ibm.com/systems/support/tools/estimator/>



IBM Workload Estimator

IBM Workload Estimator v2015.3

[Solution Overview](#) | [Workload Questions](#) | [Server Consolidation](#) | [Sizing Report](#) | [Help](#)

Power System user options

General Options

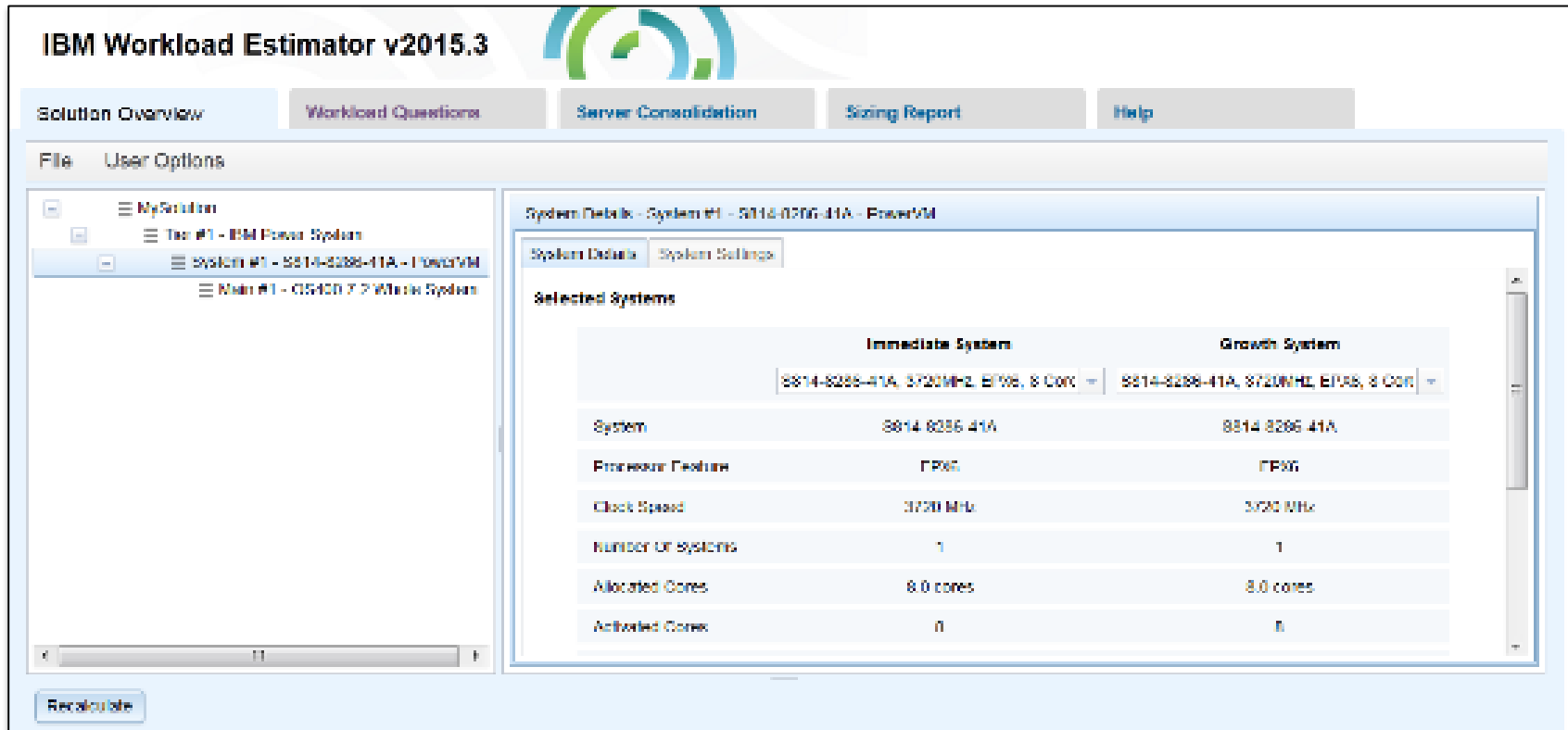
Default OS for new Estimations	IBM i - 7.2 ▾
IBMC Support	No ▾
Select which Family to target the sizing against	Default (All Current) ▾
Select which system brand to target the sizing against	IBM Power Systems, IBM System i ▾
Select a form factor to limit which systems will be selected	Default (All) ▾
Select a preferred hypervisor to control virtualization	Default (PowerVM) ▾

CPU Utilization Target Thresholds

Overall System CPU Utilization Threshold	Dedicated LPAR CPU Utilization Threshold
--	--



IBM Workload Estimator



The screenshot shows the IBM Workload Estimator v2015.3 application window. The title bar reads "IBM Workload Estimator v2015.3". The interface includes a top navigation bar with tabs: "Solution Overview" (selected), "Workload Questions", "Server Consolidation", "Sizing Report", and "Help". Below this is a "File" menu and a "User Options" section. On the left, a tree view shows the project structure: "MySolution" > "Tier #1 - IBM Power System" > "System #1 - 8214-8288-41A - PowerVM" > "Main #1 - OS400 7.2 Work System". The main area is titled "System Details - System #1 - 8214-8288-41A - PowerVM" and contains two sub-tabs: "System Details" (selected) and "System Settings". Under "System Details", there is a "Selected Systems" section with a table comparing "Immediate System" and "Growth System". Both systems are configured as "8214-8288-41A, 3/20MHz, EP06, 8 Core". The table lists various specifications for both systems, which are identical in this configuration.

	Immediate System	Growth System
	8214-8288-41A, 3/20MHz, EP06, 8 Core	8214-8288-41A, 3/20MHz, EP06, 8 Core
System	8214-8288-41A	8214-8288-41A
Processor Feature	EP06	EP06
Clock Speed	3/20 MHz	3/20 MHz
Number of Systems	1	1
Allocated Cores	8.0 cores	8.0 cores
Activated Cores	0	0

At the bottom left of the main area, there is a "Recalculate" button.

Reminder – viosbr and backupios

\$ viosbr -backup file backup -frequency daily numfiles 5

Creates a backup file once a day, prefixed with “backup” in /home/padmin/cfgbackups

- backup.01.tar.gz
- backup.02.tar.gz
- backup.03.tar.gz
- backup.04.tar.gz
- backup.05.tar.gz

\$ viosbr -restore file /home/padmin/cfgbackups/backup.03.tar.gz

backupios command

- creates a backup of VIOS and places it onto a file system, bootable tape, or DVD
- use it to reinstall a system to its original state if it has been corrupted

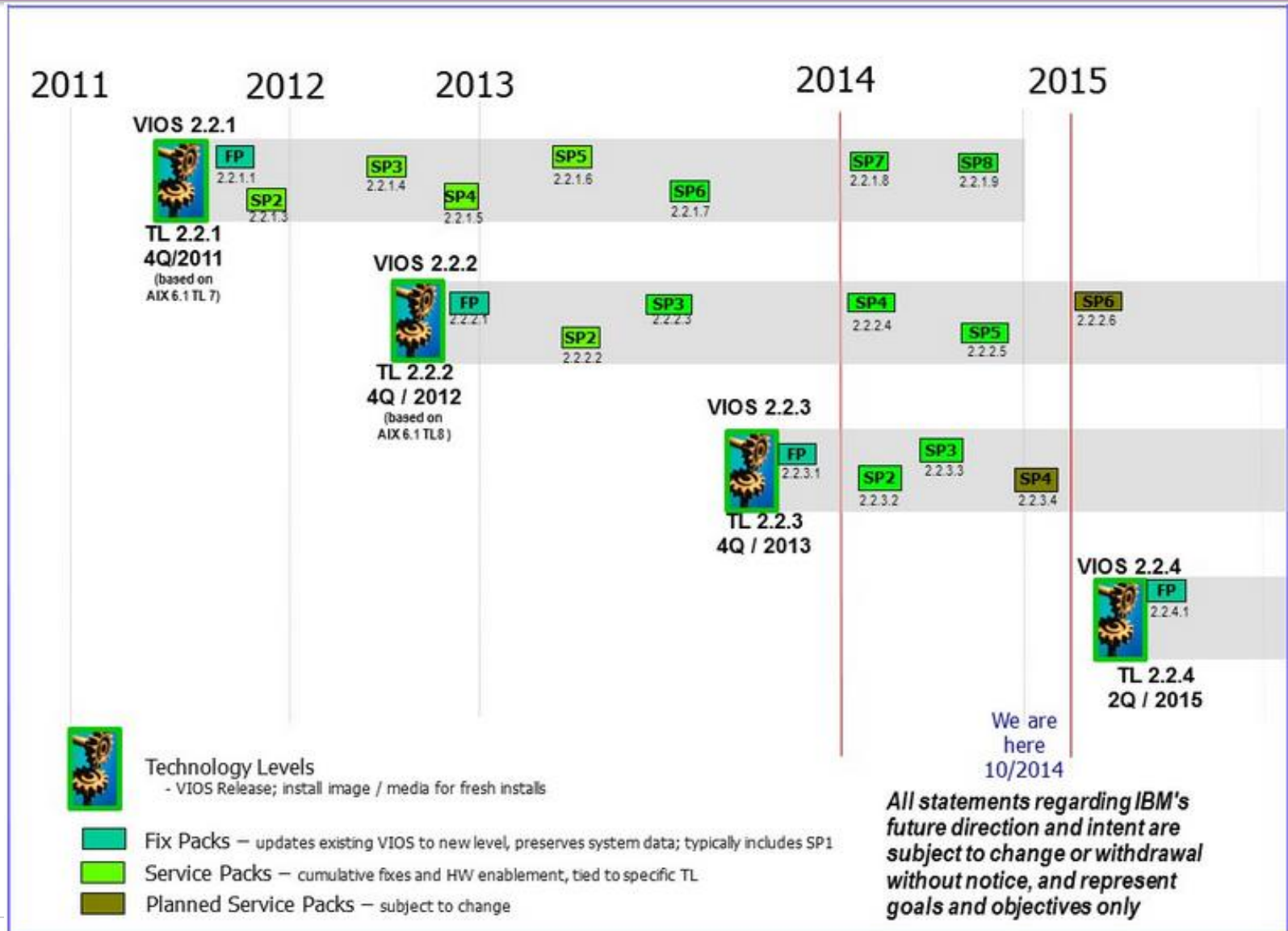


Maintenance

- **Fix Central** - <http://www-933.ibm.com/support/fixcentral/>
- **Dual VIOS Upgrade step-by-step** - Video - <https://www.youtube.com/watch?v=gh5OD4gehz4>
- **Fix Level Recommendation Tool (FLRT)**
 - cross-product compatibility information and fix recommendations
 - use to plan upgrades of key components / verify the current health of a system
 - enter your current levels of firmware and software to receive a recommendation
 - For planning upgrades, enter the levels you want to use to verify compatibility across products before you upgrade
 - <https://www-304.ibm.com/support/customerare/flrt/>
- **Fix Level Recommendation Tool Vulnerability Checker (FLRTVC) - AIX**
 - provides security and HIPER reports based on inventory of your system
 - FLRTVC is a ksh script with uses FLRT security and HIPER data (CSV file) to compare the installed filesets and interim fixes against known vulnerabilities and HIPER issues
 - <http://www14.software.ibm.com/webapp/set2/sas/f/flrt/flrtvc.html>
- **System Software Maps**
 - <http://www-01.ibm.com/support/docview.wss?uid=ssm1maps>
 - System to VIOS map - <http://www-01.ibm.com/support/docview.wss?uid=ssm1platformvios>



VIOS service life cycle



Virtual I/O Server

<http://www.ibm.com/support/customer/sas/f/vios/home.html>

IBM Support

Feedback

Virtual I/O Server

Support for Power Systems

The Virtual I/O Server facilitates the sharing of physical I/O resources among client logical partitions within the server. The Virtual I/O Server provides virtual SCSI target, virtual fibre channel, Shared Ethernet Adapter, PowerVM Active Memory Sharing and PowerVM Client Partition Mobility capability to client logical partitions within the system. As a result, client logical partitions can share SCSI devices, fibre channel adapters and Ethernet adapters. With VIOS, you can expand the amount of memory available to logical partitions by using paging space devices, and also move AIX and Linux logical partitions from one system to another.

The Virtual I/O Server is included in all PowerVM Editions.

Find links to Fix Central for current updates and to Readmes for current and previous updates below.

Additional resources

- [Supported VIOS updates in Fix Central](#)
- [VIOS Fix Central image management policy](#)
- [VIOS service policy](#)

Translate this page

Select Language

[→ Translate](#)

Update Release 2.2.3.4 for VIOS 2.2.3

Package	Description
Update release 2.2.3.4 10 November 2014	<p>To take full advantage of all the function available in the VIOS, it is necessary to be at the latest system firmware level. The Fix Level Recommendation Tool (FLRT) provides information on recommended levels of system firmware and VIOS. If a system firmware update is necessary, it is recommended that the firmware be updated before you upgrade the VIOS to V2.2.3.4.</p> <p>The VIOS Update Release V2.2.3.4 includes the IVM code, but it will not be enabled on HMC-managed systems. V2.2.3.4, like all VIOS Update Releases, can be applied to either HMC-managed or IVM-managed VIOS.</p>

[→ Download the latest Update Release 2.2.3.4 from Fix Central](#)

[→ Release Notes and installation instructions for the latest Update Release 2.2.3.4](#)

Update Process

- Access fixes and new release levels from IBM Fix Central
- www.ibm.com/support/fixcentral/

← IBM Support Portal

Fix Central

- Supported products
- Help

Related links

- Go to Fix Central mobile

Fix Central

Fix Central provides fixes and updates for your system's software, hardware, and operating system. Not looking for fixes or updates? Please visit [Passport Advantage](#) to download most purchased software products, or [My Entitled Systems Support](#) to download system software.

For additional information, click on the following link.

[Getting started with Fix Central](#)

Find product Select product

Select the product below.

When using the keyboard to navigate the page, use the **Alt** and **down arrow** keys to navigate the selection lists.

Product Group*

Virtualization software

Select from Virtualization software*

PowerVM Virtual I/O Server

Installed Version*

2.2.3.4

Continue

Note: A callout box from the 'Update Process' section points to the 'Installed Version' dropdown menu, which is highlighted with a green border.

Run ioslevel command to find out current version

Update Process – IBM Fix Central continued

← IBM Support Portal

Fix Central

Supported products

Help

Related links

• Go to Fix Central mobile

Change your selection

Product selector

PowerVM Virtual I/O Server

Installed Version

2.2.3.4

Submit

Filter your content

Platform

☐ VIOS (3)

And Category

☐ Availability (3)

And Applies to

☐ 2.2.3.4 (3)

And Severity

☐ 30 - Moderate Impact/High Probability of Occurrence (3)

And Component

☐ 5765G3400 (3)

And Fix type

☐ Interim fix (3)

Select fixes

Virtualization software, PowerVM Virtual I/O Server (2.2.3.4, All platforms)

Download options

• Download method: Download Director

[Change download options](#)

• Include requisites: No

Select fixes

The following results match your request. Select the fixes you want to download.

[Share this download list](#)

• Fixes for product PowerVM Virtual I/O Server require entitlement.

Continue

Clear selections

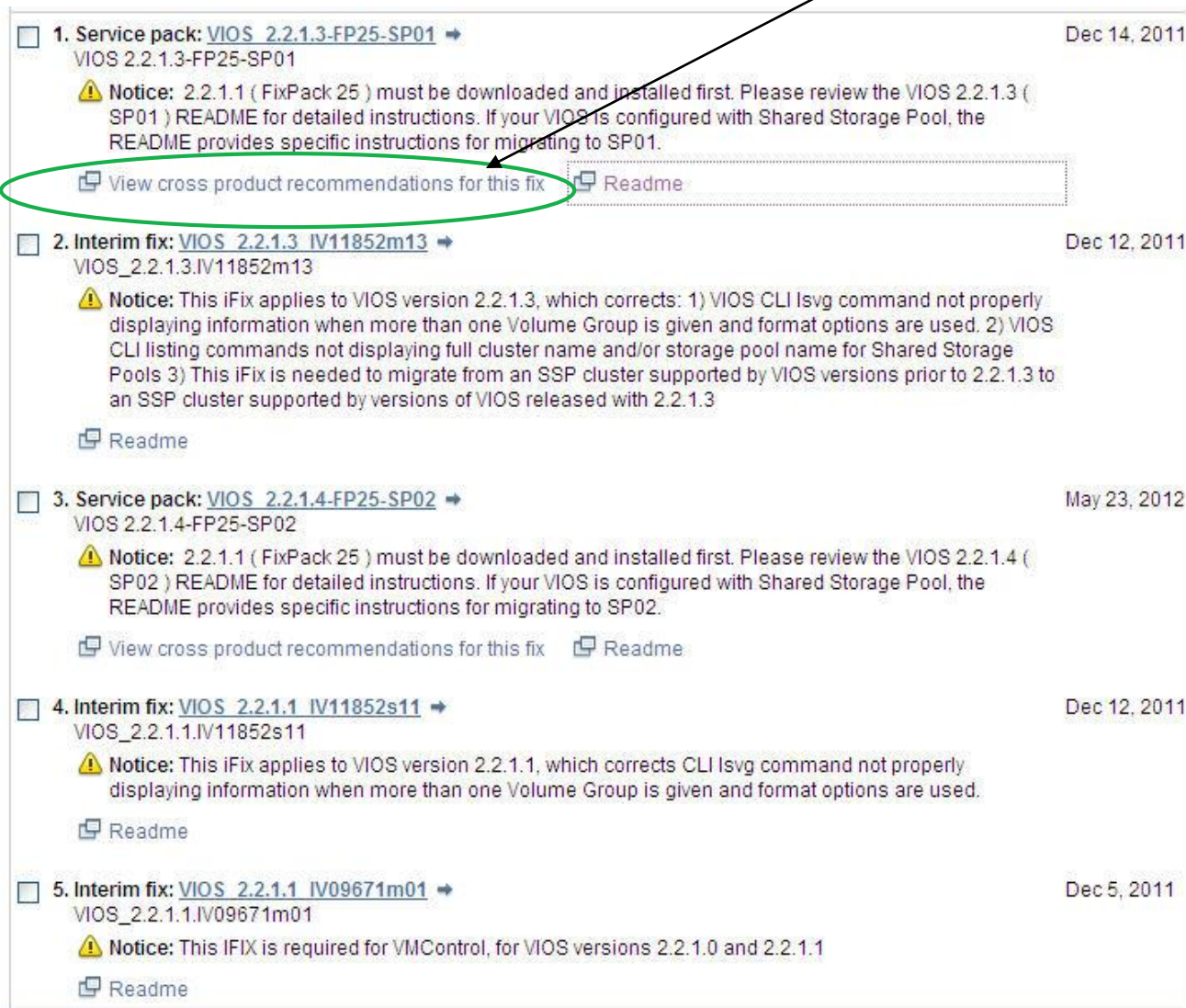
[Show fix details](#) | [Hide fix details](#)

1-3 of 3 results

- ☐ 1. [Interim fix: VIOS_2.2.3.4-rsctvios2](#) → Feb 20, 2015
 VIOS 2.2.3.4-rsctvios2
Notice: This interim fix applies to the VIOS 2.2.3.4 Service Pack and adds support required by PowerVC 1.2.2.1 and HMC V8R8.2.0. This ifix replaces and includes the previous ifix rsctvios1. Cluster services must be stopped on the node prior to installing the fix.
- ☐ 2. [Interim fix: VIOS_2.2.3.4-IV66758m4c](#) → Jan 12, 2015
 VIOS 2.2.3.4-IV66758m4c
Notice: This interim fix applies to the VIOS 2.2.3.4 Service Pack and adds support required by PowerVC 1.2.2.1 and PowerVC 1.2.2.2. This fix replaces and includes previous ifix IV66758m4b. This fix includes IV63331m4a with required Power 8 fixes.
- ☐ 3. [Interim fix: VIOS_2.2.3.4-IV63331m4a](#) → Nov 17, 2014
 VIOS 2.2.3.4-IV63331m4a
Notice: This interim fix applies to the VIOS 2.2.3.4 Service Pack and is required for support of IBM Power Systems E880 Server (9119-MHE) and IBM Power Systems E870 Server (9119-MME). The following issues are fixed: IV66430 - remote restart of client fails IV65338 - system crash on boot due to bad sas configuration IV65848 - handle disks with no reserve policy attr IV66048 - powervc deploy to thick-provisioned ssp disk fails

Sample downloads

Launches Fix Level
Recommendation Tool



☐ 1. Service pack: [VIOS 2.2.1.3-FP25-SP01](#) → Dec 14, 2011
VIOS 2.2.1.3-FP25-SP01
Notice: 2.2.1.1 (FixPack 25) must be downloaded and installed first. Please review the VIOS 2.2.1.3 (SP01) README for detailed instructions. If your VIOS is configured with Shared Storage Pool, the README provides specific instructions for migrating to SP01.
[View cross product recommendations for this fix](#) [Readme](#)

☐ 2. Interim fix: [VIOS 2.2.1.3 IV11852m13](#) → Dec 12, 2011
VIOS_2.2.1.3.IV11852m13
Notice: This iFix applies to VIOS version 2.2.1.3, which corrects: 1) VIOS CLI lsvg command not properly displaying information when more than one Volume Group is given and format options are used. 2) VIOS CLI listing commands not displaying full cluster name and/or storage pool name for Shared Storage Pools 3) This iFix is needed to migrate from an SSP cluster supported by VIOS versions prior to 2.2.1.3 to an SSP cluster supported by versions of VIOS released with 2.2.1.3
[Readme](#)

☐ 3. Service pack: [VIOS 2.2.1.4-FP25-SP02](#) → May 23, 2012
VIOS 2.2.1.4-FP25-SP02
Notice: 2.2.1.1 (FixPack 25) must be downloaded and installed first. Please review the VIOS 2.2.1.4 (SP02) README for detailed instructions. If your VIOS is configured with Shared Storage Pool, the README provides specific instructions for migrating to SP02.
[View cross product recommendations for this fix](#) [Readme](#)

☐ 4. Interim fix: [VIOS 2.2.1.1 IV11852s11](#) → Dec 12, 2011
VIOS_2.2.1.1.IV11852s11
Notice: This iFix applies to VIOS version 2.2.1.1, which corrects CLI lsvg command not properly displaying information when more than one Volume Group is given and format options are used.
[Readme](#)

☐ 5. Interim fix: [VIOS 2.2.1.1 IV09671m01](#) → Dec 5, 2011
VIOS_2.2.1.1.IV09671m01
Notice: This IFIX is required for VMControl, for VIOS versions 2.2.1.0 and 2.2.1.1
[Readme](#)

Download fixes

- Download fix package
 - Some use .iso files to burn to media
 - Some use packages of files to be FTP'd to VIOS

Download options

Virtualization software, PowerVM Virtual I/O Server (All releases, All platforms)

Select download options

Select the download method to be used to download fixes.

- ☒ Download using Download Director (requires Java enabled browser) [What is this?](#)
- ☐ Download using bulk FTP [What is this?](#)
- ☐ Download using your browser (HTTP)

Download files as an iso image.

☐ Download files as an iso image

CAUTION: Do not assume that Fix Central will show you all the prerequisites you need. Be sure to always click the **More information** link for additional prerequisite and other important fix information. Click [here](#) for an explanation of what prerequisites you can expect Fix Central to provide.

☐ Include prerequisites and co-requisite fixes (you can select the ones you need later)

Continue

Back

Use the read me instructions!!



<http://www.ibm.com/support/customercare/sas/f/vios/vios2231.readme.html>

Applying updates from a local hard disk

To apply the updates from a directory on your local hard disk, follow these steps.

The current level of the VIOS must be 2.2.2.1 or later if you use the Share Storage Pool, otherwise, it must be 2.1.0 or later.

1. Log in to the VIOS as the user padmin.
2. If you use one or more File Backed Optical Media Repositories, you need to unload media images before you apply the Update Release. [See details here.](#)
3. If you use Shared Storage Pools, then Shared Storage Pool Services must be stopped.
`$ clstartstop -stop -n <cluster_name> -m <hostname>`
4. Create a directory on the Virtual I/O Server.
`$ mkdir <directory_name>`
5. Using ftp, transfer the update file(s) to the directory you created.
6. Commit previous updates by running the updateios command
`$ updateios -commit`
7. Verify the updates files that were copied. This step can only be performed if the link to openssl was created.
`$ cp <directory_path>/ck_sum.bff /home/padmin`
`$ chmod 755 </home/padmin>/ck_sum.bff`
`$ ck_sum.bff <directory_path>`
If there are missing updates or incomplete downloads, an error message is displayed.
8. Apply the update by running the updateios command
`$ updateios -accept -install -dev <directory_name>`
9. Run the following command to set authorization for padmin.
`$ swrole - PAdmin`
10. To load all changes, reboot the VIOS as user padmin .
`$ shutdown -restart`
11. If cluster services were stopped in step 3, restart cluster services.
`$ clstartstop -start -n <cluster_name> -m <hostname>`
12. Verify that the update was successful by checking the results of the **updateios** command and by running the **ioslevel** command, which should indicate that the ioslevel is now 2.2.3.1.
`$ ioslevel`

Things to watch out for

- **Don't make assumptions on fix apply steps**
 - Follow the documented steps!
 - They change over time...
- **Pre-installation information and instructions**
 - Ensure that **rootvg** contains at least 30GB before update
 - Run **lsvg rootvg** command, and ensure there is enough free space.
 - Unmount/unload virtual media
 - Remember – always backup VIOS before update!!
 - Update to latest HMC & server firmware.
- **license –accept** command
 - Required on some fixes
 - When not entered can give very confusing messages
- Media problems messages can be cryptic
 - geninstall failures
- Fix content verification can show failure messages
 - Check read me documentation
 - **lssw** (list software) command is often used to check software levels



Adapter Firmware Updates

- Occasionally, adapter firmware updates will be recommended before a VIOS Update
 - Documented on Fix Level Recommendation Tool or VIOS Readme
- Use ***lsfware -all*** to see current firmware levels for system and adapters

```
sys0!system:AL730_060 (t) AL730_060 (p) AL730_060 (t)  
ent0!14104003.EP0170  
ent1!14104003.EP0170  
fcs0!df1000f114108a03.110305  
fcs1!df1000f114108a03.110305
```



Miscellaneous



VIOS File Systems

- VIOS is installed in several file systems and the available storage for each file system may need to be modified to ensure you have enough storage for files and data
 - Service packs and fixes for VIOS
 - File sets, products etc. that you will install on the client LPARs
- Available storage can be displayed on all mounted file systems with the `df` command
 - displayed as number of 512-byte blocks
 - to display in GBs, use `df -g`
 - command can be run from VIOS or the root shell



Changing the Size of a File System

- Increase or decrease file system storage with the `chfs` command
- Example: increase size of file system mounted on `/home` by 2GB
 - **`chfs -a size=+2G /home`**
- The `chfs` command must be run from the AIX root shell
 - **`oem_setup_env`** (to enter AIX shell)
- Increasing the size of a file system will increase the number of inodes available in that file system

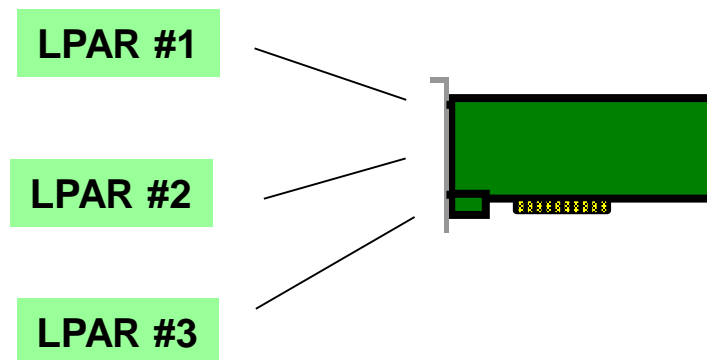


Virtualization without VIOS?

- IBM i hosting IBM i
- SR-IOV
 - IBM Power Systems SR-IOV Technical Overview and Introduction
 - <http://www.redbooks.ibm.com/redpapers/pdfs/redp5065.pdf>
 - Can use SRIOV with VIOS
- For Linux
 - PowerKVM
 - PowerNV



SR-IOV



- Single Root I/O Virtualization
- Runs “closer to the silicon” potentially offering some performance efficiencies
- Doesn’t require VIOS as a pre-req and thus can do simple virtualization under PowerVM without VIOS **BUT**.... VIOS continues to offer many additional advanced functions
- Architecturally can virtualize a resource like an Ethernet adapter and allocate/provide a user-defined minimum level of bandwidth to a partition ... Quality of Service (QoS)
- Ethernet NIC announced.
- **Could use VIOS & SR-IOV together**

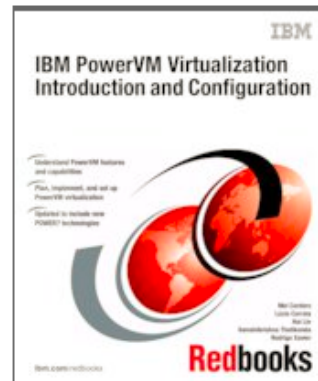
Useful References



The Updated Redbook

IBM PowerVM Virtualization Introduction and Configuration

An IBM Redbooks publication



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Publish Date
18 June 2013

Last Update
24 November 2015

Rating: ★★★★★
(based on 7 reviews)

Abstract

This IBM® Redbooks® publication provides an introduction to PowerVM™ virtualization technologies on Power System servers.

PowerVM is a combination of hardware, firmware, and software that provides CPU, network, and disk virtualization. These are the main virtualization technologies:

<http://www.redbooks.ibm.com/abstracts/sg247940.html?Open>

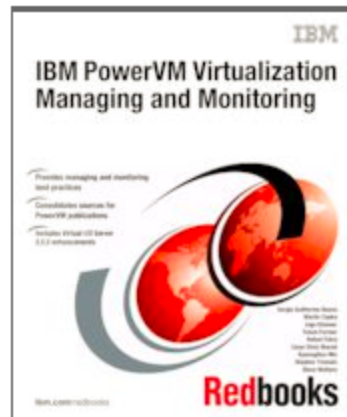


The Updated Redbook

IBM PowerVM Virtualization Managing and Monitoring

An IBM Redbooks publication

Updated Jun 2014



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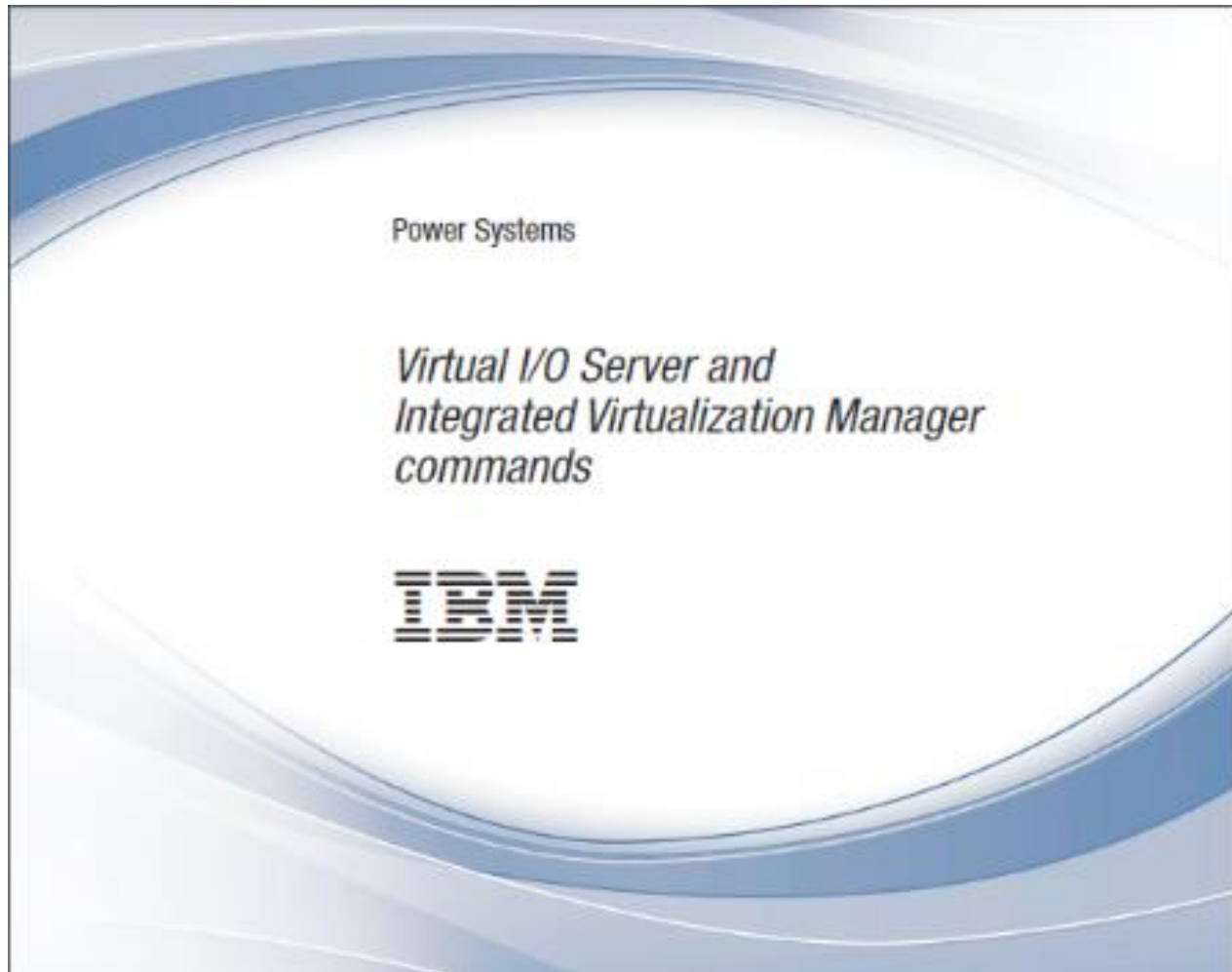
Last Update
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IBM PowerVM Virtualization Managing and Monitoring

<http://www.redbooks.ibm.com/abstracts/sg247590.html?Open>



VIO Command Reference (v2.2.4.20)



<http://public.dhe.ibm.com/systems/power/docs/hw/p8/p8hcg.pdf>



IBM i Virtualization and Open Storage Readme



<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/IBM%20i%20Virtualization%20and%20Open%20Storage>



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 - Power8 : from hands-on experience
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- Plus many more...





As an IT professional, you may have heard of IBM Power Systems (and PowerVM virtualization technologies) based around the IBM POWER processor. You may even have seen a presentation or two, but have you wondered:

- What is it like to actually use?
- What are the key features for POWER and AIX, Linux for Power and IBM i?
- How will it save me systems administration time and reduce weekend working?
- What do I need to run it and how do I get started?

What are we doing?

- Well ... best to let the product talk for itself via a series of live lectures and hands-on demos of these features.
- The sessions aim to be about 60-90 mins long

Who should attend?

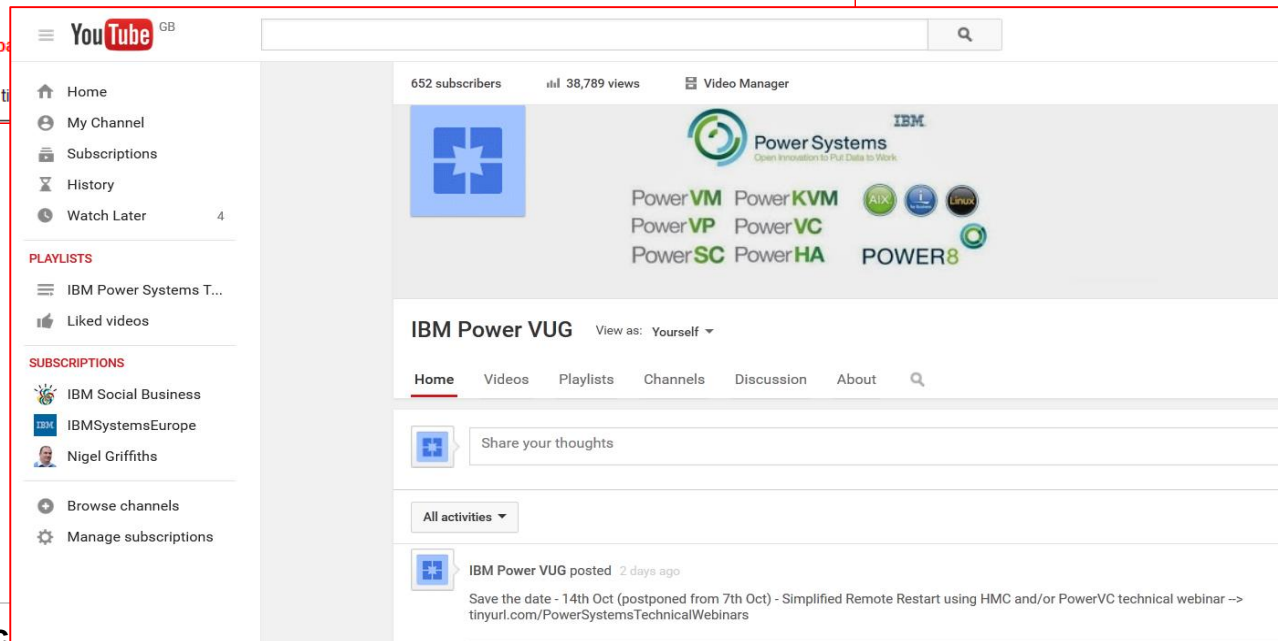
- These webinars are aimed at a technical audience (operators, systems administrators and technical specialists) - people using (or planning to use) IBM's Power based systems.
- Primarily IBM's customers, but also available to IBMers and IBM Business Partners.

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- get FLRT on your moby >> Video: Overview of the IBM i
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- PowerVC V1.2.3 Fixpack 2 added support for PowerVM
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- Build Real Teamwork in a Virtual Team
- QMGTOOLS now has an HMC menu, helping to gather

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- Are you using the correct disk driver for your Storwize storage?
- An interesting question about SSD performance scaling with size
- Sony Ends MQ Production--What Are Your Long-Term Archive Options Now?

Security stuff

- Fact or Fiction: Critical Security Flaws Are Found in
- RCAC in DB2 for i, Part 1: Row Access Permissions

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Development stuff

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- Don't Undersell Your World-Class System With a
- Excel and RPG: Sometimes Things Just Don't Add
- Overcoming Common IBM i Mobile Development
- Young RPG Talent: It Exists If You Make an Invest
- An Introduction to Processing XML With RPG, Part

IBM Redbooks News

- IBM Power Systems RAID Solutions Introduction a
- IBM PowerVP: Introduction and Technical Overview

POWER events, education or training stuff

- IBM Authorised Training - the complete 2015 Worldwide IBM i Schedule consisting of 37 courses (On-line & Classroom).
- 2015 IBM Technical Events and Conferences schedule
- IBM ITSO POWER8 Technology and Systems Technical Deep Dive Workshop (web based & self paced)

Replays

- AIX VUG: Tricks of the Masters - Gareth Coates

Q3 2015

- 3 Sept Webcast: Node.js, DB2, and RPG; talking at last
- NEW 6-9 Sept Nodeconf EU 2015 Waterford, Ireland
- 9-10 Sept International i-Power 2015, Wyboston Lakes Executive Centre, Wyboston, Bedfordshire, UK
- 17 Sept IBM SVC and Storwize Family Group of Products Customer User Group Meeting, IBM Austin, Texas, USA
- NEW 17 Sept WAS Liberty Profile, ILC Hursley, UK
- 23 Sept IBM Systems Storwize User Group for Customers and Business Partners, IBM Manchester, UK
- NEW 29 Sept FREE 1-day hands on POT: Rational Developer for IBM i, IBM Hursley, UK

Q4 2015

- 5-7 Oct COMMON 2015 Fall Conference and Expo Fort Lauderdale, Florida, USA
- 6-8 Oct IBM i DS8000 Copy Services Workshop, IBM Mainz, Germany
- NEW 7 Oct Power Systems Technical Webinar series: Session 49: Simplified Remote Restart using HMC and/or PowerVC
- 13-16 Oct VIOS with V7000 and IBM i - In-depth Workshop, IBM Mainz, Germany
- 13 Oct IBM Systems Storwize User Group for Customers, IBM Hursley, UK
- 18-20 Oct Data3 (COMMON Sweden) Fall Conference, Elite Marina Tower Hotel, Stockholm, Sweden
- 20-22 Oct RPG & DB2 Summit, Chicago, USA
- 12-30 Oct IBM Power Systems Technical University, Cannes, France
- 17-18 Nov IBM ProtecTIER Best Practices, ILO



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AIX VUG



- AIX Virtual User Group – USA
 - <https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Power+Systems/page/AIX+Virtual+User+Group+-+USA>
- Replay of VIOS Updates (James Nash) session
 - <http://youtu.be/wtckHoSg54o>



Reference

VIOS portal - https://www-947.ibm.com/support/entry/myportal/product/virtualization_software/powervm_virtual_i/o_server?productContext=422982772

Explore New Solutions with IBM PowerVM Enhancements (IBM Redbooks Solution Guide) -

<http://w3.itso.ibm.com/abstracts/tips1135.html>

VIOS support - <http://www-304.ibm.com/support/customer/sas/f/vios/home.html>

PowerVM Shared Ethernet Adapter simplification:

Get rid of Control Channel Adapter - <http://chmod666.org/index.php/powervm-shared-ethernet-apdater-simplification-get-rid-of-control-channel-adapter/>

PowerVM developerWorks - https://www.ibm.com/developerworks/community/wikis/home?lang=en_us#!/wiki/Power%20Systems/page/IBM%20PowerVM and <https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Power%20Systems/page/PowerVM>

Virtual IO and virtualization developer – wiki -

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Power%20Systems/page/Virtual%20IO%20and%20virtualization>

Virtualization Best Practices developer – wiki -

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Power%20Systems/page/Virtualization%20best%20practices>

VIO and IVM Command Reference - <http://public.dhe.ibm.com/systems/power/docs/hw/p8/p8hcg.pdf>

PowerVM Virtual I/O Server - Readme for Update Release 2.2.3.50 - <http://www-304.ibm.com/support/customer/sas/f/vios/vios22350.readme.html>

VIO 2.2.3.52 Release Notes - http://delivery04.dhe.ibm.com/sar/CMA/VA/05en0/2/VIOS_2.2.3.52.Readme.htm

IBM Systems Software Maps - <http://www-01.ibm.com/support/docview.wss?uid=ssm1maps>



Questions or Comments?

ithankyou

