



## VIOS Maintenance

### PowerVM technical webinar #9 for customers/BPs/IBMer



Gareth Coates  
IBM Power Systems  
Advanced Technology Support, Europe

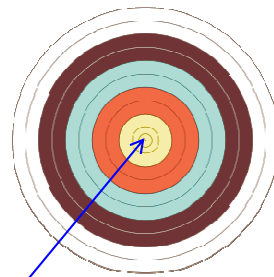
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## Aim of this session

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- Important observations
- Resources
- Dual VIOS
- Quickies
- Scripting
- VIOS Advisor
- Backup
- Updates
- Further information



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## Important Observations

### Assumptions and limitations

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- An understanding of the concept of a Virtual I/O server (VIOS)
- An understanding of Logical Partitioning in IBM Power Servers
  - Defining LPARs
  - virtualising resources
    - processors
    - memory
    - I/O
    - Shared Ethernet Adapter (SEA)
    - SEA Failover and Network Interface Backup (NIB)
- The following areas are beyond the scope of this session:
  - Active Memory Sharing (AMS)
  - Suspend/Resume
  - Multiple Server pools



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## Security

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- Consider the padmin password to be very sensitive
- padmin can gain root privileges
- can then read data from backing devices for all of its clients



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## Don't use smit

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- padmin cannot use smit
- smit is available in the oem\_setup\_env environment



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## Don't use smit

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- padmin cannot use smit
- smit is available in the oem\_setup\_env environment

• DO NOT USE IT !!!



smitty

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## Create System Plan Failure (mksysplan)

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- <https://www-304.ibm.com/support/docview.wss?uid=isg3T1010961>

If the ldc query command fails on the VIO server when run as padmin then there will be additional information about the failures in the `/home/ios/logs/ioscli_ldc.trace` file. However, before you start looking at that file you should first be prepared to **honestly** answer the following questions.

d. Has configuration been performed on the VIO server outside the padmin command line interface (CLI) after exiting the CLI using `oem_setup_env`?

(1) **This tech-note cannot begin to outline the extent of damage well meaning system administrations have inflicted on themselves by performing configuration steps outside of the VIOS CLI command shell.** If the answer is yes to the above question then the least of your worries is system plan and ldc query. You can check the `ioscli_ldc.trace` file to see if you can correct some errors, but the track record other users have had dealing with misuse of `oem_setup_env` is not very promising.

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## When to use oem\_setup\_env

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- So, what is oem\_setup\_env used for?
- It is an environment to setup OEM device drivers
- ONLY use it to install these device drivers as directed in the release notes and installation guides.



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## Resources

## Processor resources

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- If you have 10Gbit ethernet adapters in VIOS
  - consider using dedicated cpus
  - not essential, but guarantees that the cpu resource will be available to the LPAR
- If you are using shared processors
  - have a sensible CE:VP ratio
  - VP = minimum +1 or +2
  - use uncapped and have a high "weight"
  - I use 255
- For a 10Gbit NIC to pass 10Gbit
  - you will need 2 cores of a POWER7 cpu



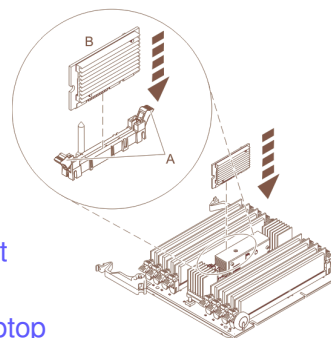
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## Memory resources

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- Make sure that you have enough memory in the VIOS
- High bandwidth adapters need extra RAM
  - 10Gbit NIC
  - 8Gbit FC HBA
- A good starting point:
  - 2 GB plus 512 MB per high speed adapter
  - This is NOT an IBM statement but my "best guess" given the information available.
  - How much memory do you have in your laptop computer?



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## Special case

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- 10Gbit HEA and only a few LPARs
- You will not need to work as hard to get good throughput
  - if you map the Ihea ports directly to the client LPARs
  - rather than
  - if you map the Ihea port to the VIOS and use it in an SEA
- See the replay of the 10Gbit Webinar for more details



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## Don't worry about the tea bags!

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- No one calculates the number of teabags they need per year
- In my house, we just have some in reserve and monitor the use of tea bags and then purchase more when needed
- Start with sensible VIOS resources and monitor the situation



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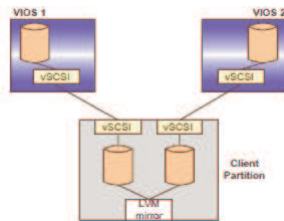




## Go dual VIOS

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- Use a pair of VIOS to allow VIOS upgrades
  - without outage for the clients
  - ensure that all paths (storage and network) are redundant
- In practice, we have very low failure rates in the VIOS
  - mostly because systems administrators are strongly recommended NOT to fiddle!



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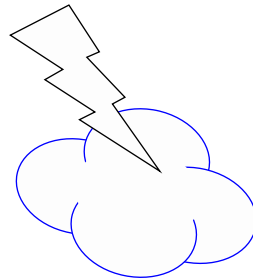
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## SEA Failback

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### Scenario

- SEA is configured
- Primary interface “goes away”
- SEA fails over
- Primary interface comes back
- Fail back takes a long time



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## SEA Failback

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### Action

- enable "portfast trunk" on the switch ports (before it was just portfast without "trunk")
- activate Dead Gateway Detection and use a ping time of 2 seconds

### Result

- failback times were up to 50 seconds now they are always below 10 seconds.

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## SEA Failback (background information)

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- [http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp?topic=/iphb1/iphb1\\_vios\\_configuring\\_sea.htm](http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp?topic=/iphb1/iphb1_vios_configuring_sea.htm)
- To ensure prompt recovery times, when you enable the Spanning Tree Protocol on the switch ports connected to the physical adapters of the Shared Ethernet Adapter, you can also enable the portfast option on those ports. The portfast option allows the switch to immediately forward packets on the port without first completing the Spanning Tree Protocol. (Spanning Tree Protocol blocks the port completely until it is finished.)
- The Shared Ethernet Adapter is designed to prevent network loops. However, as an additional precaution, you can enable Bridge Protocol Data Unit (BPDU) Guard on the switch ports connected to the physical adapters of the Shared Ethernet Adapter. BPDU Guard detects looped Spanning Tree Protocol BPDUs and shuts down the port. This helps prevent broadcast storms on the network. A **broadcast storm** is a situation where one message that is broadcast across a network results in multiple responses. Each response generates more responses, causing excessive transmission of broadcast messages. Severe broadcast storms can block all other network traffic, but they can usually be prevented by carefully configuring a network to block illegal broadcast messages.

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## Quickies

### What AIX command did that VIO command actually run?

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```
$ export CLI_DEBUG=33
```

```
$ lsmmap -vadapter vhost0
```

```
AIX: "lsdev -c adapter -t IBM,v-scsi-host -s vdevice -F "name" | wc -l -c"
```

```
AIX: "lsdev -c adapter -t IBM,v-scsi-host -s vdevice -F "name" "
```

```
AIX: "lsdev -C -l vhost0 -F "physloc" "
```

```
AIX: "lsdev -p vhost0 -F "name" | wc -l -c"
```

```
AIX: "lsdev -p vhost0 -F "name" "
```

```
SVSA Physloc Client Partition ID
```

```
-----  
vhost0 U8233.E8B.100271P-V2-C11 0x00000001
```

```
VTD NO VIRTUAL TARGET DEVICE FOUND
```

```
$
```



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## What commands have you run

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- `fc -l`

- `lsgcl`

```
Feb 20 2012, 07:01:16 padmin  mktcpip  -hostname peachvios1 -inetaddr
                               9.69.44.15 -interface en3 -start
                               -netmask 255.255.255.0 -gateway
                               9.69.44.98 -nsrvaddr 9.137.62.2
                               -nsrvdomain aixncc.uk.ibm.com
```

```
Feb 20 2012, 07:01:22 padmin  ping blue
```



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## Scripting

## Scripting for VIOS

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- padmin has a restricted shell
- so cannot redirect output to create a script,
- but can “vi g” and write it to \$HOME
- and can chmod 755
- home dir is on PATH



```
$ vi g
$ chmod 777 g
$ g
hello world
$
```

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## Scripting for VIOS

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- would not be able to redirect
- but if a command redirected eg COMMAND -o outputfile  
– that would work
- Some people just use oem\_setup\_env
- This is not the right way to do it



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## Scripting for VIOS

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- You can ssh commands onto the VIOS from another machine and capture the output

```
p550-gaz:/# ssh padmin@p550-vio1 '  
> ioscli ioslevel  
> date  
> ls -l  
> ' > /tmp/log
```

VIOS commands need to be prefixed by ioscli

- /tmp/log is on the remote machine NOT the VIOS

You can exchange ssh keys to prevent password prompt

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## Undocumented redirection

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```
$ ioslevel | tee ioslevel.out  
2.1.2.0  
$ ls ioslevel.out  
ioslevel.out  
$ cat ioslevel.out  
2.1.2.0  
$ whoami  
padmin  
$
```



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## Scripting for VIOS

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- there may already be keys on the VIO so do not overwrite them
- copy them to unix and add the public key and copy it back



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## Exchanging ssh keys

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```
p550-gaz:/# scp padmin@p550-vio1:~/.ssh/authorized_keys2
authorized_keys2.p550-vio1
padmin@p550-vio1's password:
authorized_keys2
100% 0 0.0KB/s 00:00

p550-gaz:/# cat .ssh/id_rsa.pub >> authorized_keys2.p550-vio1

p550-gaz:/# scp authorized_keys2.p550-vio1 padmin@p550-
vio1:~/.ssh/authorized_keys2
padmin@p550-vio1's password:
authorized_keys2.p550-vio1
100% 413 0.4KB/s 00:00

p550-gaz:/# ssh padmin@p550-vio1 '
> ioscli ioslevel
> date
> '
2.1.2.0
Fri Mar 4 07:11:26 CST 2011
p550-gaz:/#
```



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## VIOS Advisor

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- <http://www.ibm.com/developerworks/wikis/display/WikiPtype/VIOS+Advisor>
- runs within VIOS
- user specified amount of time
  - between 5 and 1440 minutes (24 hours)
- polls and collects key performance metrics
- analyzes results
- provides a health check report
- proposes changes to the environment or areas to investigate further.



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## Setup

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- Download `vios_advisor.zip` from the link provided
- Unzip `vios_advisor.zip` on a workstation
  - that has a web browser.
- ftp `vios_advisor` onto the VIOS you wish to monitor.
  - (place in any directory)
- `chmod +x vios_advisor`
- **DO YOU NEED `oem_setup_env`?**



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## Result

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- `vios_advisor.xml`
- Copy `vios_advisor.xml` file to the workstation
- Open the `vios_advisor.xml` file with a web-browser



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# Sample output

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PowerVM VIOS Performance Advisor

The ratings and recommendations in the table below were chosen with the following information:  
 Hostname: v4002.austin.ibm.com  
 PartNumber: 1  
 Monitoring Start Time: 08/17 13:14:23  
 Monitoring Stop Time: 08/17 13:14:23 Duration: 0 min  
 VIOS sizing tool WLE (Workload Estimator) link: <http://www.ibm.com/collocator>

SYSTEM - CONFIGURATION		VIOS - CPU						
Name	Value	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
Processor Family	POWER7	CPU Capacity	4.0 ent	-	08/17 13:14:23	-	n/a	n/a
Server Model	IBM9117-MMC	CPU Consumption	avg:26.0% (cores:1.1) high:26.4% (cores:1.1)	-	-	-	n/a	n/a
Server Frequency	3.820 GHz	Processing Mode	Shared CPU, (UnCapped)	-	08/17 13:14:23	-	n/a	n/a
Server - Online CPUs	16 cores	Variable Capacity Weight	128	129-255	08/17 13:14:23	-	1	5
Server - Maximum Supported CPUs	64 cores	Virtual Processors	4	-	08/17 13:14:23	-	n/a	n/a
VIOS level	3.2.3.0	SMT Mode	SMT4	-	08/17 13:14:23	-	n/a	n/a

VIOS - I/O ACTIVITY		SYSTEM - SHARED PROCESSING POOL						
Name	Value	Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest
Disk I/O Activity	avg: 1199 iops @ 11198 peak: 2217 iops @ 200B	Shared Pool Monitoring	enabled	-	08/17 13:14:23	-	n/a	n/a
Network I/O Activity	[ avgBand: 9942 iops @ 0.89Mbps , avgPkt: 72811 iops @ 0.87Mbps ] [ peakBand: 9949 iops @ 0.89Mbps , peakPkt: 78430 iops @ 1.02Mbps ]	Shared Processing Pool Capacity	10.0 ent	-	08/17 13:14:23	-	n/a	n/a
VIOS - DISK ADAPTERS		Free CPU Capacity	avg_Pea:10.0 ent, Inact_Pea:14.9 ent	-	-	-	n/a	n/a
Name	Measured Value	Recommended Value	First Observed	Last Observed	Risk 1=lowest 5=highest	Impact 1=lowest 5=highest		
FC Adapter Count	0	-	08/17 13:14:23	-	n/a	n/a		
FC Avg IOPS	avg: 179 iops @ 30B	-	08/17 13:14:23	08/17 13:14:23	n/a	n/a		
FC IOPS Per-1 sec	n/a	-	08/17 13:14:23	08/17 13:14:23	6	6		
FC Adapter Utilization	00%	-	-	-	n/a	n/a		
FC Host Status	running at speed	-	-	-	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 13:14:23	-	1	5
Available Memory	0.517 GB	1.5 GB Avail.	08/17 13:14:23	08/17 13:14:23	n/a	n/a

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# cpu screen

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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 13:14:23	-	n/a	n/a
⚠	CPU Consumption	avg:26.0% (cores:1.1) high:26.4% (cores:1.1)	-	-	-	n/a	n/a
⚠	Processing Mode	Shared CPU, (UnCapped)	-	08/17 13:14:23	-	n/a	n/a
!	Variable Capacity Weight	128	129-255	08/17 13:14:23	-	1	5
✓	Virtual Processors	4	-	08/17 13:14:23	-	n/a	n/a
✓	SMT Mode	SMT4	-	08/17 13:14:23	-	n/a	n/a

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## Overhead

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- Overhead for the VIOS Advisor is minimal.
- 0.1 cores was measured on a POWER7 server
- Memory consumption will vary
  - based on the number of physical I/O devices in the VIOS,
  - expect the advisor to consume 2MB-20MB of memory.



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**Backup**

## Backup

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- The following components make up a virtualized environment; a change to any one of these requires a new backup:
  - External device configuration,
    - for example, SAN and storage subsystem configuration.
  - Memory, CPU, virtual and physical devices.
  - The Virtual I/O Server operating system.
  - User-defined virtual devices
    - that couple the virtual and physical environments.
- The clients' data should be backed up separately



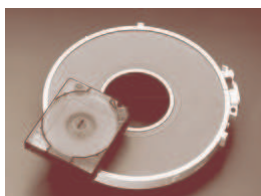
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## Backup - External device configuration

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- This information is beyond the scope of this session
  - we mention it here to make you aware that a complete DR solution for a physical or virtual server environment will have a dependency on this information.
  - The method to collect and record the information will depend not only on the vendor and model of the infrastructure systems at the primary site, but also what is present at the DR site.



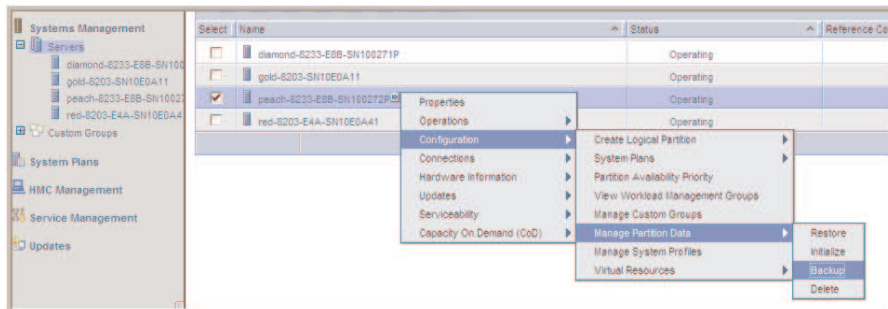
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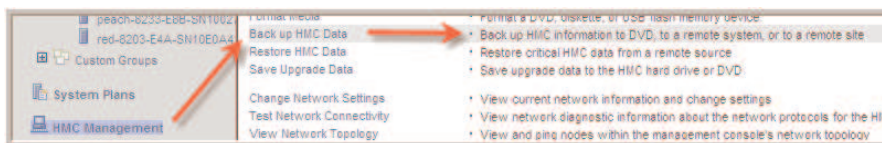
## Backup - Resources defined on the HMC

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- backup the partition information on the HMC



- Save Critical Console Data



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## Backup - The Virtual I/O Server operating system

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- The **backupios** command performs a backup of the Virtual I/O Server to a tape device, an optical device, or a file system (local or a remotely mounted Network File System, NFS, one).
- eg: an NFS export on a NIM server
- Virtual device mappings (customized metadata) is backed up by default.
  - Nothing special needs to happen.
- Client data is not backed up.



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## Backup - savevgstruct

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- `savevgstruct`
- command to back up user-defined disk structures.
- writes a back up of the structure of a named volume group
  - (and therefore storage pool)
  - to the `/home/ios/vgbackups` directory.
- The `savevgstruct` command is automatically called before the backup commences for all active non-rootvg volume groups or storage pools on a Virtual I/O Server when the `backupios` command is run.



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## Restore

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- The mechanism for restoring depends on:
  - Type of backup – eg: DVD or NIM
  - Whether restoring to
    - the same hardware
    - different hardware
- It is all covered in detail in the Redbook ...
- Recreate the LPAR
- Recreate the External Device Configuration
  - SAN, zoning, etc
- Restore backup
  - From DVD, `instalios` or NIM push of `mksysb`



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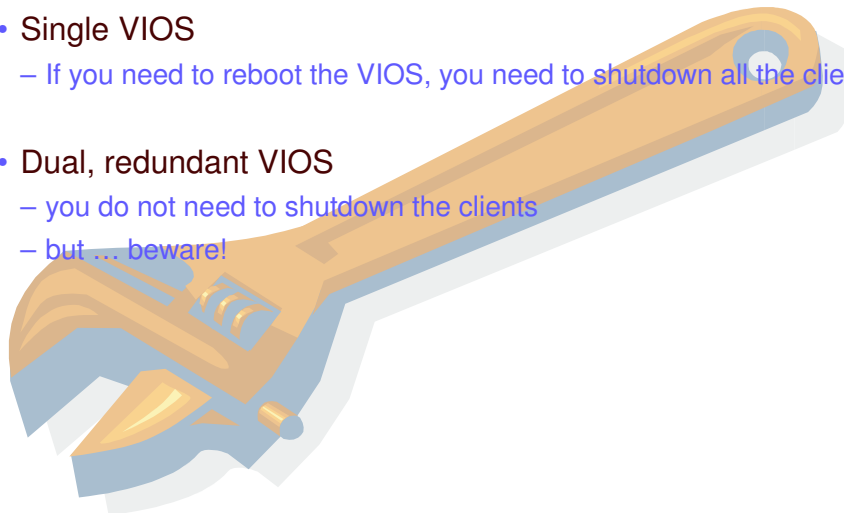
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# Updates

## Updating a VIOS

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- Single VIOS
  - If you need to reboot the VIOS, you need to shutdown all the clients
- Dual, redundant VIOS
  - you do not need to shutdown the clients
  - but ... beware!



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## Updating a VIOS

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**BACK UP  
THE VIOS  
FIRST**



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## Updating a VIOS

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- updates are available from FixCentral
  - <http://www-933.ibm.com/support/fixcentral/>
- DO READ THE INSTALLATION INSTRUCTIONS
- Ensure compatibility of HMC, FW, VIOS, AIX/IBM i/Linux
  - Fix Level Recommendation Tool (FLRT)
  - <http://www14.software.ibm.com/webapp/set2/flrt/home>



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## Updating a VIOS

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- You cannot necessarily upgrade directly from all releases to the latest
- It may be necessary to go through more than one step
- You need to keep your dual VIOS at compatible levels
  - so carry out each step to each VIOS in turn.
  - ensure that all paths are redundant before starting the other VIOS
  - eg: LVM mirrors are in sync

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## Updating a VIOS

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- Avoid complication
- Check/document the environment before upgrading
- Useful commands:



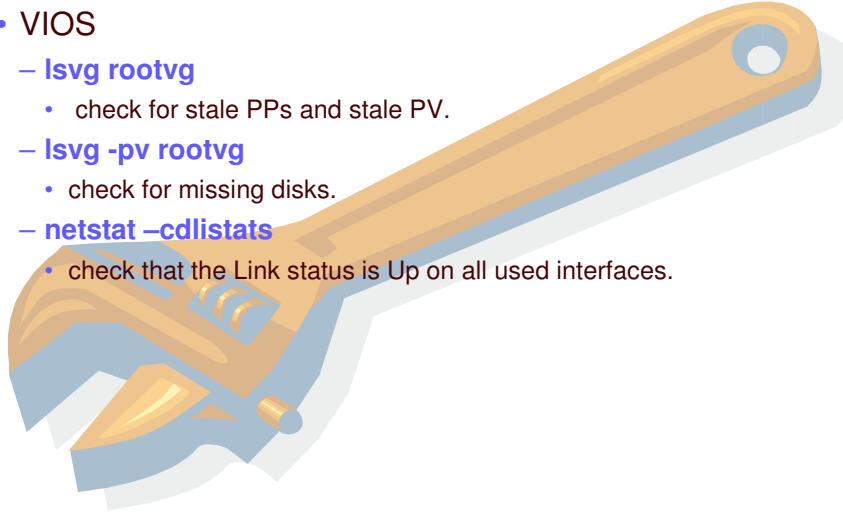
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## Updating a VIOS

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- VIOS
  - **lsvg rootvg**
    - check for stale PPs and stale PV.
  - **lsvg -pv rootvg**
    - check for missing disks.
  - **netstat -cdlistats**
    - check that the Link status is Up on all used interfaces.



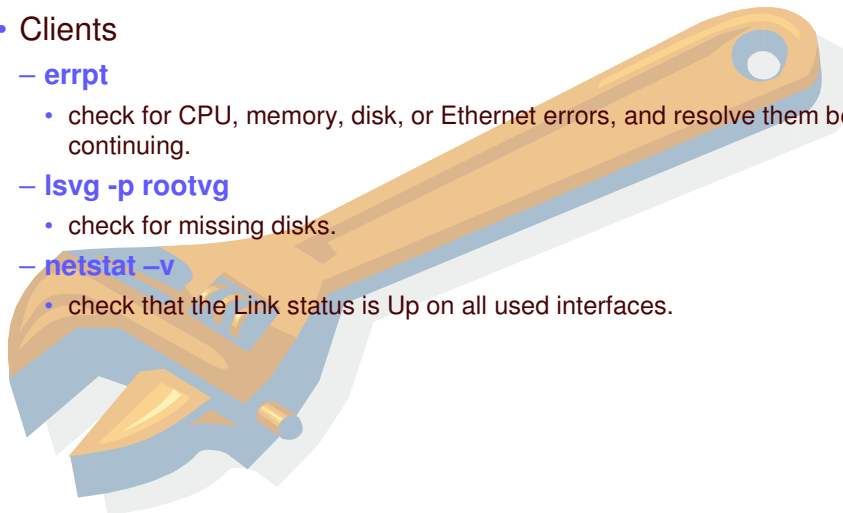
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## Updating a VIOS

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- Clients
  - **errpt**
    - check for CPU, memory, disk, or Ethernet errors, and resolve them before continuing.
  - **lsvg -p rootvg**
    - check for missing disks.
  - **netstat -v**
    - check that the Link status is Up on all used interfaces.



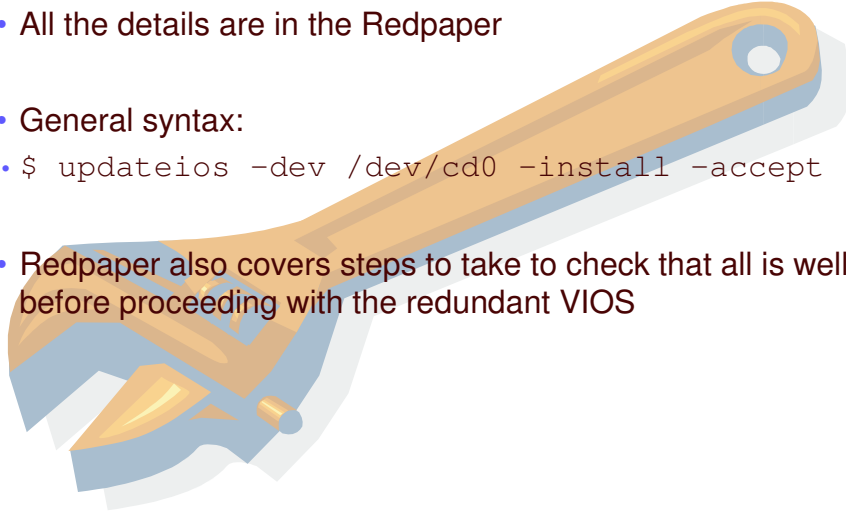
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## Updating a VIOS

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- All the details are in the Redpaper
- General syntax:
  - `$ updateios -dev /dev/cd0 -install -accept`
- Redpaper also covers steps to take to check that all is well before proceeding with the redundant VIOS



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**Further  
Information**



# AIXmovies

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Labels: (None)

### Welcome to the POWER6/POWER7 and AIX6 Hands-On Technical Product Demos

The idea is to provide the "cook book" information to get your started with these new interesting technologies and to answer some basic questions:

- What is it about?
- How do I get started?
- What are a few typical first good uses I could start with?
- How easy is it to use?
- How could this save me time or money?
- Where can I get more information?

We hope you find these movies interesting and let you make a flying start.

Currently, the movies add up to **21.9 hours of free education on the hottest topics.**

Quick links to the main sections:

1. [POWER7 Processor](#)
2. [AIX Workload Partitions](#)
3. [POWER7 Processor](#)

Notes on getting the movies to work on your PC:

- These movies are in Windows Movie Format (.wmv) to make them small enough to watch over the internet or download but this means some quality has been lost from the Audio Video Interleave (.avi) originals which are 60 MB to 90 MBs in size.
- When tested on some PCs it took 4 to 5 minutes to start the movie - please be patient and don't just assume its broken - some browsers download the entire movie before they start playing it.
- Other browsers handle the media file differently - some start Windows Media Player and some start it within the browser itself. Also I have found that some auto resize the movie to fit the window - so start the movie in a suitable sized browser window. The movies where first recorded at 1024x768 but later ones at 800x600 but higher resolution. Sorry but I rather create new movies than try to regenerate them all to one size. If the movie does not fit your screen the best fix is to upgrade your screen to at least 1280x1024.
- If all else fails try to download the .wmv file and play locally on your machine using the PowerBook link.

Related links:

- ISV resources
- alphaWorks (emerging technologies)
- IBM Academic Initiative
- IBM Virtual Innovation Center (Bus. Partners)

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# Redbooks

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IBM Redbooks search

New search

To refine search, use boolean operators (AND, OR, NOT) to separate keywords.

New search

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## IBM System p Advanced POWER Virtualization Best Practices

A collection of recommended practices created to enhance your use of the Advanced POWER Virtualization feature

Builds on the knowledge found in existing IBM System p publications

A valuable reference for experienced system administrators and architects

Stuart Devenish  
Ingo Dimmer  
Rafael Folco  
Mark Roy  
Jane Saleur  
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in Takizawa

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## Summary

- Don't use oem\_setup\_env for general admin
- Document your setup
- Backup properly and regularly
- Keep up to date
- Plenty of Redbooks

W5: Pillars of Star Formation © NASA

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