



# VIOS Shared Storage Pools

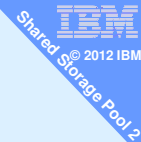
Phase 2 – from December 2011  
Presentation Version 17



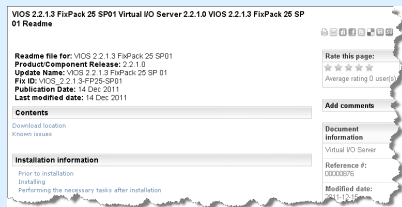
**Nigel Griffiths**  
IBM Power Systems  
Advanced Technology Support, Europe

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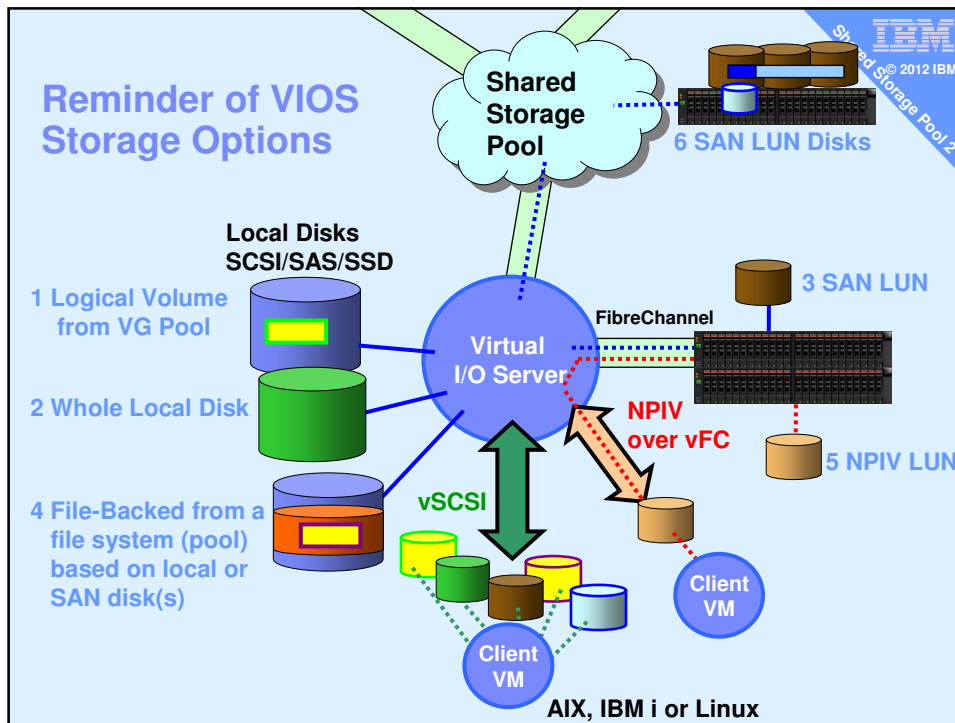
## VIO Shared Storage Pool phase 2



- **Announced** 14<sup>th</sup> Oct 2012  
<http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=AN&subtype=CA&htmlfid=897/ENUS211-354&appname=USN>
- **Available** 16<sup>th</sup> Dec 2012
- **Please read the Release notes:**  
<http://www-01.ibm.com/support/docview.wss?rs=0&uid=isg400000876>



- **Then read VIOS 2.2 User Guide:**  
<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hb1/p7hb1.pdf>
- **Technical Hands-On Movies**  
– <http://tinyurl.com/AIXmovies>



## Is vSCSI LUN or NPIV dead?

No, absolutely not  
Customers continue to use all 6 options

Some people have the idea NPIV is somehow a strategic direction with IBM - this is not true  
IBM equally supports all 6 disk options.

Are the SAN guys spreading this rumour?

- they like the extra control of NPIV
- don't care if it means 10 times the server setup work

## How is it paid for?

Shared Storage Pools is a feature of PowerVM Standard & Enterprise

## How is it installed?

Shared Storage Pool is a VIOS feature so just upgrade to VIOS 2.2.1.3 = FP25+sp1 December 2011 service pack

Note: This VIOS is AIX 6.1 TL7 based  
NIM server needs to be AIX 6.1 TL7 or AIX 7.1 TL1

Note: VIOS 2.2.1.4 is now available

## Why SSP? Nigel's Opinion here

- Fibre-Channel LUN & NPIV is complex
  1. SAN switch, SAN disk subsystem = hard work & weird GUI !!
  2. Typical LUN lead time: 4 minutes, 4 hours, 4 days, 4 weeks?
  3. With rapidly changing needs with mandatory responsiveness it is simply not good enough!
  4. Many smaller computer rooms have no dedicated SAN guy
  5. LPM hard work as most people don't pre-Zone the target so have to Zone before the move = complexity, slow, error prone
  6. LPM = zero outage for Hardware & Firmware upgrades
- Shared Storage Pool
  1. Allocate LUNs to the Virtual I/O Servers once
  2. One VIOS command to allocate space to a VM
    - Or use: cfgassist (VIOS's smitty)
    - Or use: HMC Virtual Storage Management GUI
  3. LPM any time you like

## Shared Storage Pool phase 2 Requirements

1 of 3



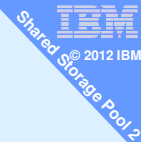
### Read the Release Notes

<http://www-01.ibm.com/support/docview.wss?rs=0&uid=isg400000876>

- Platforms: **POWER6 & POWER7** only (includes **Power Blades**)
- VIOS Storage Pool (minimums):
  - Direct fibre-channel attached LUNs:
    - **1 for repository ~10 GB (NEW INFO: 1GB is enough) &**
    - **1 or more for data, 10 GB → in practice lots more [like 1TB+]**
- Pool Storage Redundancy: Repository & pool storage must be **RAIDed**
- VIOS **name resolution** to resolve hostnames
- Virtual I/O Server(s):
  - **Minimum CPU: 1 (shared, uncapped is good)**
  - **Minimum Memory: 4 GB**
  - Nigel's recommendation: Please, no skinny VIOS
- To further VIOS upgrades
  - Client VM's must be stopped, plus cluster down (use clstartstop)

## Shared Storage Pool phase 2 Limits

2 of 3



- Max nodes: **4 VIOS nodes**
- Max physical disks in a pool: **256**
- Max virtual disks (LUs) in a cluster: **1024**
- Number of Client LPARs per VIOS **1 to 40**  
(that is, 40 clients per VIOS, or 40 clients per VIOS pair)



- Capacity of Physical Disks in Pool (each) **5GB to 4TB**
- Storage Capacity of Storage Pool (total) **10GB to 128TB**
- Capacity of each Virtual Disk (LU) in Pool **1GB to 4TB**
- Number of Repository Disks **1 to 1 (CAA limit)**

Read the Release Notes & README

## Shared Storage Pool phase 2 Restrictions

3 of 3

### Network

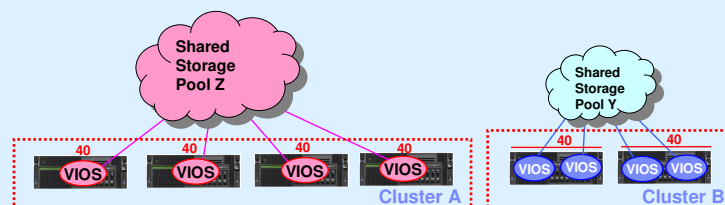
- Reliable & only IPv4
- No changes to hostname or IP address
- VIOS can't use VLAN tagging
- DNS should use local /etc/hosts first
- Hostnames must be fully qualified
- Forward & reverse lookup must work
- Recommended to synchronise clocks
- Restoring VIOS from viosbr – get the networks configured 1<sup>st</sup>
- SEA must use default threaded mode
- If cluster or pool name >16 characters add APAR IV11852m13

### Storage

- No interruption
- Can't resize a LUN
- SSP may take more CPU
- No SCSI reservations (Reserve/Release)
- HA SAN solutions used to mitigate outages
- SANCOM not supported
- Don't use vSCSI adapter "Any client partition can connect"
- AMS or Suspend/Resume can't use SSP for Paging Space

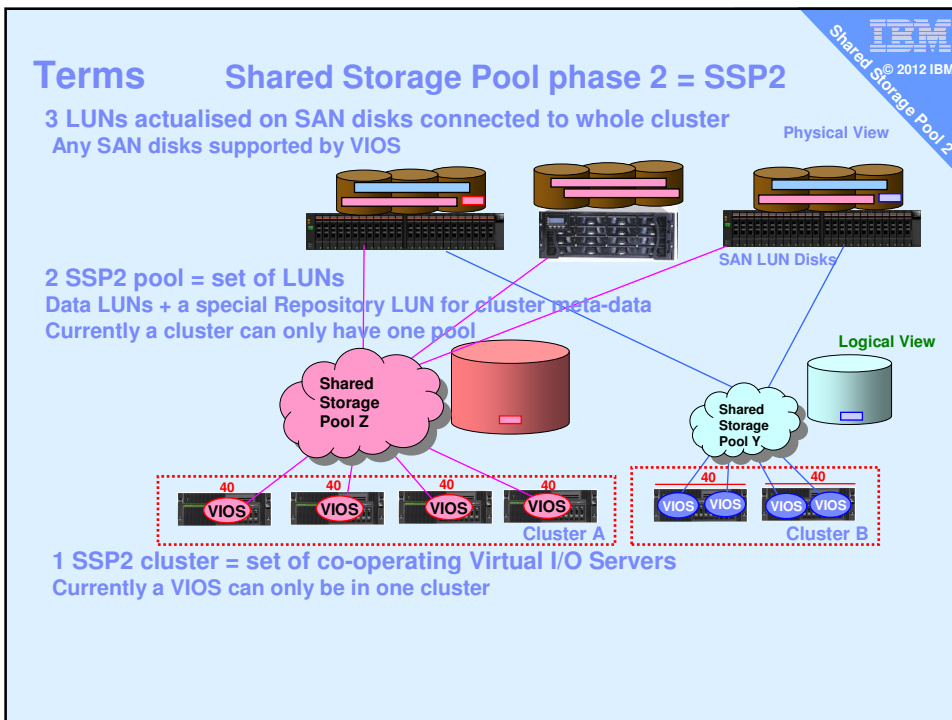
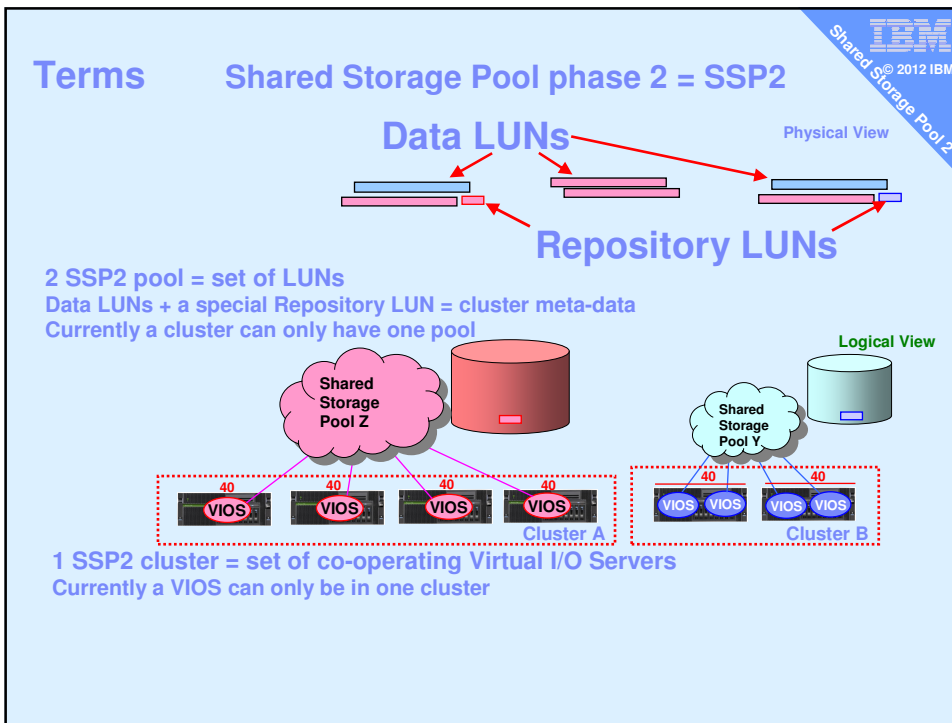
## Terms

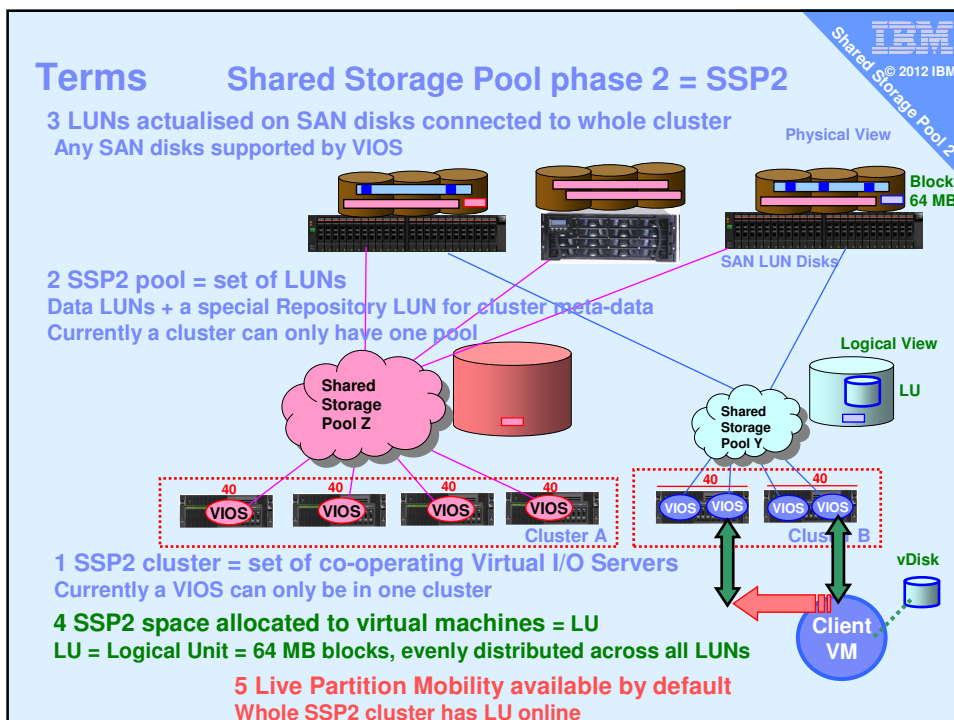
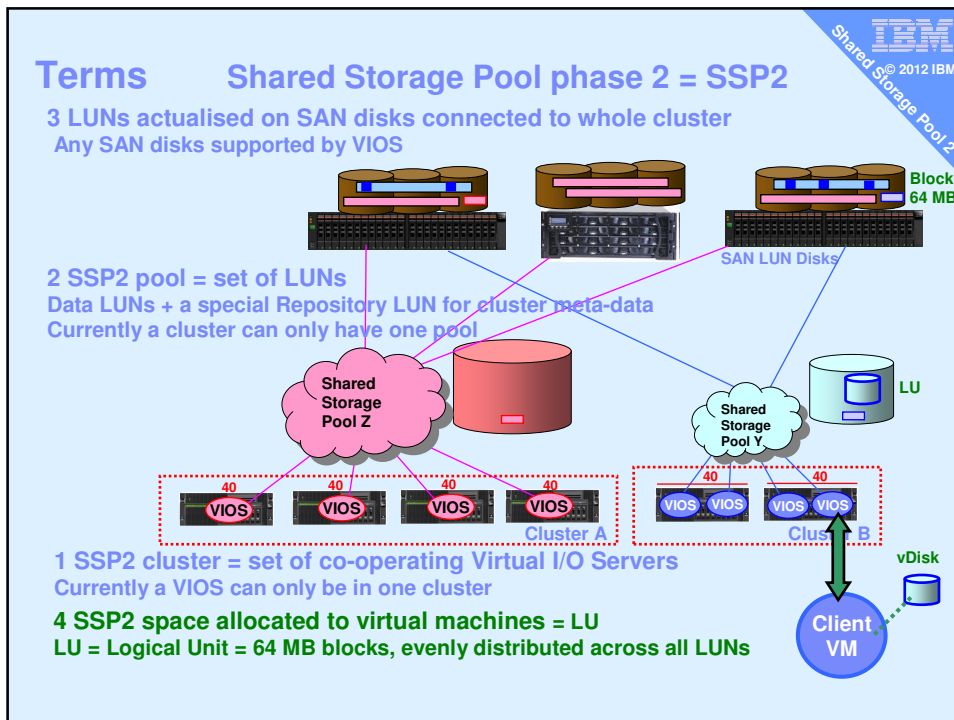
## Shared Storage Pool phase 2 = SSP2



1 SSP2 cluster = set of co-operating Virtual I/O Servers  
Currently a VIOS can only be in one cluster.

Here we show two clusters





## Preparation

- All the Cluster VIOSs need the LUNs online  
Make sure they are available = Zoned
- **BEFORE** you start the cluster for all LUNs  
`chdev -dev <device name> -attr reserve_policy=no_reserve`
- Don't forget this for extra disks that you add later
- Forgetting this = a real mess to make the  
low level disk attribute change



## Cluster Management

### Section Contents

- Create Cluster and Pool
- Find out information about the SSP
- Add node
- House Keeping



## Cluster full hostnames mandatory + DNS

1. Need full DNS working or /etc/hosts
2. 

```
$ hostname
redvios1.ibm.com
$ host redvios1.ibm.com - must work
$ host 9.123.456.99 - must work
```

Not just "redvios1" here

VIOS  
oem\_setup\_env  
smitty tcpip  
Example →

```
Minimum Configuration & Startup
To Delete existing configuration data, please use Further Configuration menus
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP] [Entry Fields]
* HOSTNAME [redvios1.aixncc.uk.ibm]
* Internet ADDRESS (dotted decimal) [9.69.44.50]
* Network MASK (dotted decimal) [255.255.255.0]
* Network INTERFACE en2
NAMESEPERVER
  Internet ADDRESS (dotted decimal) [9.137.62.2]
  DOMAIN Name [aixncc.uk.ibm.com]
Default Gateway
  Address (dotted decimal or symbolic name) [9.69.44.98]
  Cost [0] #
  Do Active Dead Gateway Detection? no +
[MORE...2]
F1=Help F2=Refresh F3=Cancel F4=List
F5=Reset F6=Command F7=Edit F8=Image
F9=Shell F10=Exit Enter=Do
```

## Cluster create on 1<sup>st</sup> node

Create cluster on one VIOS (here called bluevios1)

```
$ cluster -create -clustername galaxy \  
-repopvs hdisk2 \  
-spname atlantic -sppvs hdisk3 hdisk5 \  
-hostname bluevios1.ibm.com
```

...  
Cluster galaxy has been created successfully.

It will take a minute or two, then output Cluster created  
You will find a bunch of new daemons running.

If it complains the disks are "in use" check.  
If certain they are correct, wipe the disk content with:

```
# cleandisk -r hdiskX  
# cleandisk -s hdiskX
```

It may ask you to confirm y/n ?

## Then on that 1<sup>st</sup> node - add other nodes

On the first VIOS running the cluster

```
$ cluster -addnode -clustername galaxy \  
-hostname redvios1.ibm.com
```

Partition redvios1.aixncc.uk.ibm.com has been added to the galaxy cluster  
\$

Add other node(s) as necessary.

## List cluster & cluster nodes

```
$ cluster -list  
Cluster Name      Cluster ID  
galaxy            68c06102fc5311e093c8f6027171fc64  
$
```

```
$ cluster -status -clustername galaxy  
Cluster Name      State  
galaxy            OK
```

Node Name	MTM	Partition Num	State	Pool State
diamondvios1	8233-E8B02100271P	2	OK	OK
diamondvios2	8233-E8B02100271P	1	OK	OK
redvios1	8203-E4A0310E0A41	1	OK	OK

\$



Example of a 3 node cluster

## House keeping

You can remove a node from the cluster

- LPM any important client Virtual machines elsewhere
- Stop remaining VMs
- Remove the client VMs
- Remove their allocated virtual disks
- then

```
$ cluster -rmnode -clustername galaxy \  
-hostname redvios1.ibm.com
```

You can also remove the cluster completely

- Once all disk space unassigned & nodes removed

```
$ cluster -delete -clustername galaxy
```

## Pool Disk Space Management

### Content

- Allocate pool disk space and give to a VM
  - Ditto as two commands
- Removing the disk space
- Monitoring the pool

## Allocate disk space & assign to client VM

```
$ mkbdsp -clustername galaxy \  
-sp atlantic 16G -bd vdisk_diamond6a \  
-vadapter vhost2
```

```
Logical Unit vdisk_diamond6a has been created with udid:  
615af85de5acad39a8827e9cd01d6b36.  
Assigning file "vdisk_diamond6a" as a backing device.  
Vtscsi3 Available.  
$
```

### Notes:

- 16 GB is not actually allocated until written too
- vdisk\_diamond6a is just a name = reminder of the VM using it
- vhost2 is the virtual SCSI adapter for client VM diamond6

## Same but two steps

1) Create Logical Unit Note: no -vadapter option

```
$ mkbdsp -clustername galaxy -sp atlantic 10G -bd LU42  
Lu Name:LU42  
Lu Udid:374a609cb072e4015d558ff290b9f0bd
```

List the pool contents

```
$ lssp -clustername galaxy -sp atlantic -bd  
Lu Name      Size(mb) ProvisionType  Lu Udid  
LU42         10240    THIN                374a609cb072e4015d558ff290b9f0bd  
...
```

2) Example of two ways using "-bd LU42" or "-luudid <hexidecimal>"

- -bd only works if LU42 is unique
- Note: below **no Size argument** (or it creates another LU with same name!)

```
$ mkbdsp -clustername galaxy -sp atlantic -bd LU42 -vadapter vhost2  
Assigning file "LU42" as a backing device.  
VTD:vtscsi1
```

- or -

```
$ mkbdsp -clustername galaxy -sp atlantic \  
-luudid 374a609cb072e4015d558ff290b9f0bd -vadapter vhost2  
Assigning file "374a609cb072e4015d558ff290b9f0bd" as a backing device.  
VTD:vtscsi1
```

## Dual path via Two VIOSs

1 Setup virtual SCSI adapter pairs as normal

- client VM virtual SCSI adapter A ↔ VIOS C
- client VM virtual SCSI adapter B ↔ VIOS D

2 on VIOS C: use “lsmmap –all” to map slot to vhostN

- mkbdsp -clustername galaxy -sp atlantic 16G  
-bd vdisk\_red6a -vadapter vhostN

3 on VIOS D: use lsmmap –all to map slot to vhostM

- mkbdsp -clustername galaxy -sp atlantic  
-bd vdisk\_red6a -vadapter vhostM

4 On the client VM

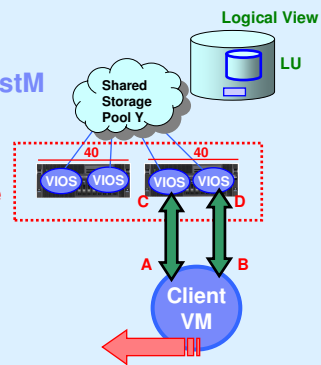
```
$ lspath
```

```
Enabled hdisk0 vscsi0
```

```
Enabled hdisk0 vscsi1
```

5 LPM still available – dual VIOS to dual VIOS

Note: No size (16G) 2<sup>nd</sup> time



## Removing an LU (Logical Unit)

Assuming it is NOT used !!

On the VIOS remove disk space

rmbdsp = remove backing device from storage pool

```
$ rmbdsp -clustername galaxy \  
-sp atlantic -bd vdisk_diamond6a
```

or via the LU hexadecimal name

```
$ rmbdsp -clustername galaxy -sp atlantic  
-luudid 858152297879adfe0d75b05f586d36ee
```

## House keeping

Add more physical LUNs to the Pool

```
$ chsp -add -clustername galaxy \  
-sp atlantic hdisk8
```

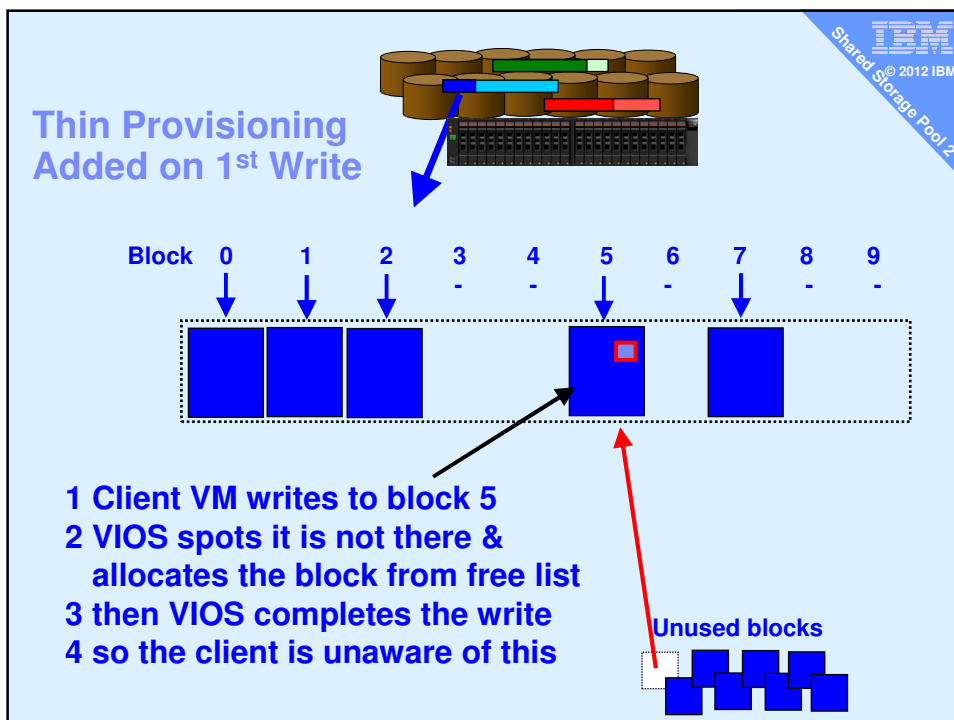
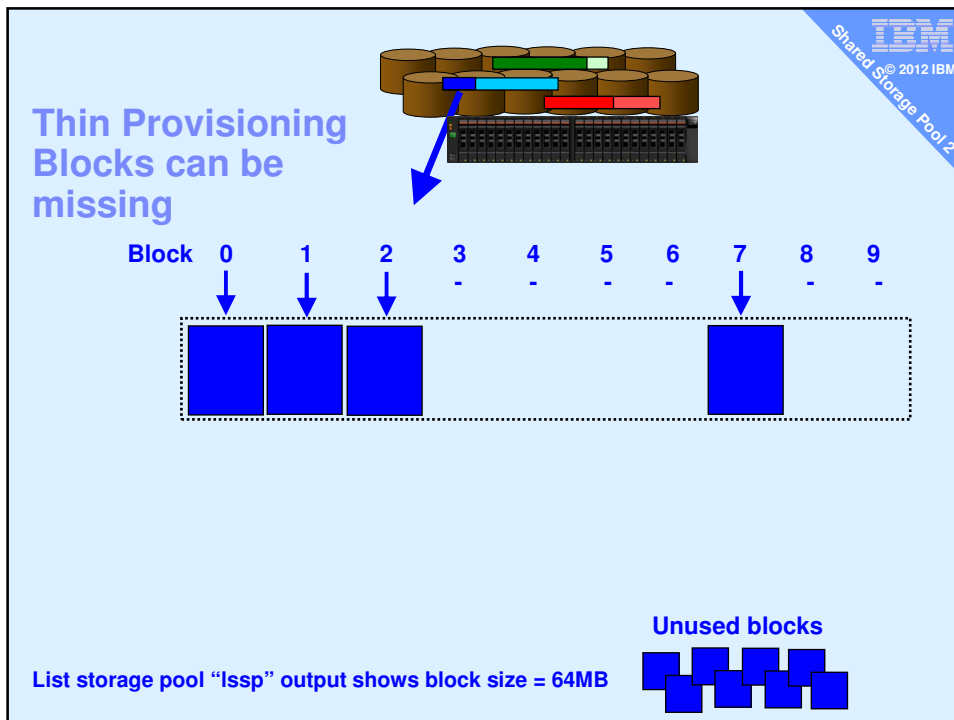
Remove a physical LUN from the Pool

- You can not .... with this release.
- We can replace a disk but not remove one
  - Replacement disk - equal or larger size

## Experiments in Thin provisioning

= Allocating disk blocks only when they are used i.e. written





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## Thin Provisioning

Size 16 GB is actually the max.

Only 3 GB Reduction of free space

FibreChannel

Virtual I/O Server

vSCSI

lspv hdisk0  
Disk 16GB

lsvg rootvg  
Free = 11GB  
Used = 5GB

Client VM

- mkbdsp states the "LU" size
- Blocks assigned only when written
- After installing AIX 7 (could be any supported OS)
- AIX sees 16 GB disk
- AIX has allocated 5 GB in rootvg
- But not actually written to all 5 GB
  - Paging space not used
  - Free space in filesystems not used
  - Sparse files have "holes"
- Brand new pool & AIX 7 only 3 GB used from the pool
- Instead of unused disk space in every VM, now it is SSP "pooled"

Complete guesswork: 20,000 machines \* 20 VMs \* 16 GB unused = 6 PetaBytes

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## Thick Provisioning

- Doh! A no-brainer!
- Like Thin but actually allocate all the disk space
- New option: **mkbdsp ... -thick**

The point is

- Avoids problems, if the free list empties
- Good for more important work/production or you prefer not to dynamically add blocks



## Monitoring: topas on VIOS then "D"

```

Topas Monitor for host:   diamondvios1Interval: 2   Fri Jan 14 14:46:00 2011
=====
Disk   Busy%  KBPS    TPS    KB-R    ART    MRT    KB-W    AWT    MWT    AQW    AQD
-----
cldisk2 41.0  17.6K  493.0   0.0    0.0  174.6  17.6K  1.1  14.6  0.0  0.0
cldisk3 34.0  20.0K  160.0   0.0    0.0  186.4  20.0K  2.9  13.1  0.0  0.0
cldisk1  3.0   24.0    6.0    0.0    0.0  112.0  24.0   0.6 158.8  0.0  0.0
hdisk0  0.0   8.0    2.0    0.0    0.0  10.2   8.0   4.1  64.2  0.0  0.0
caa_priva 0.0  17.0    5.0    9.0    0.1   2.1   8.0   0.5  6.9  0.0  0.0
hdisk1  0.0   0.0    0.0    0.0    0.0   0.0   0.0   0.0  7.2  0.0  0.0
cd0     0.0   0.0    0.0    0.0    0.0   0.0   0.0   0.0  0.0  0.0  0.0
  
```

One client VM running: yes >/tmp/x

Disk I/O spread across disks  
Allocation unit is 64MB (was in the lssp output)

## Monitoring Disk use with lssp

```

$ lssp -clustername galaxy -sp atlantic -bd
Lu(Disk) Name      Size(MB) ProvisionType Lu Udid
vdisk_diamond6a   16384    THIN           615af . . .
vdisk_diamond8a   16384    THIN           917c0 . . .
vdisk_diamond5a   8192     THICK          f1442 . . .
vdisk_diamond5b   8192     THICK          ebecd . . .
vdisk_diamond3a   10240    THIN           afcec . . .
$ lssp -clustername galaxy
POOL_NAME:        atlantic
POOL_SIZE:        47552
FREE_SPACE:       17945
TOTAL_LU_SIZE:    59392
TOTAL_LUS:        5
POOL_TYPE:        CLPOOL
POOL_ID:          000000009893EDD000000004F174D22
  
```

**47522 Pool Physical Size**  
**17945 Pool Physical Free**  
**29607 Pool Physical Used**  
**Pool use  $29607/47522 \times 100 = 62\%$**

**59392 Allocated**  
**Pool Over commit  $59392/47522 = 1.25$**   
**allocated 25% more than I have!**  
**= Thin provisioning**




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Thin provisioning risks pool free space = zero Ek!  
Next write needing a new SSP block, gets a disk error!  
Just don't go there – you need to be warned!

### Thin Provisioning Alerts

- Set alerts to warn on free pool space getting too low %  
**alert -set -clustername *galaxy* -sname *atlantic* -value 10**
- To list the alert threshold:
  - **alert -list -clustername *galaxy* -sname *atlantic***
  - \$ **alert -list -clustername *galaxy* -sname *atlantic***
  - PoolName: atlantic
  - PoolID: 0000000009893EDD000000004F174D22
  - ThresholdPercent: 35
- To remove the alert:
  - **alert -unset -clustername *galaxy* -sname *atlantic***
  - Threshold is set to 0 (zero) – it will not happen!!
- The default alert is free pool space below 35%



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## House keeping – Alert Reporting

- Reported on **any one of the VIOS cluster**
- padmin user: errlog
  - Like AIX errpt
  - \$ errlog | more

```
IDENTIFIER  TIMESTAMP  T C  RESOURCE_NAME  DESCRIPTION
0FD4CF1A   0215112612  I O  VIOD_POOL    Informational Message
...
```

2

- \$ errlog -ls | more

See example on the next page

- Can also be reported to high levels SM like Systems Director etc.



```
$ errlog -ls ...
LABEL:      VIO_ALERT_EVENT 1
IDENTIFIER: 0FD4CF1A
```

```
Date/Time:   Wed Feb 15 11:26:32 CST 2012
Sequence Number: 86
Machine Id:  00F602714C00
Node Id:     diamondvios2
Class:       O
Type:        INFO
WPAR:        Global
Resource Name: VIOD_POOL 2
```

```
Description
Informational Message 3
```

```
Probable Causes
Asynchronous Event Occurred
```

```
Failure Causes
PROCESSOR
```

```
Recommended Actions
Check Detail Data
```

```
Detail Data
Alert Event Message 4
25b8001
```

```
A Storage Pool Threshold alert event occurred on pool D_E_F_A_U_L_T_061310 pool id 92d2fd5f2ec45382 in cluster galaxy cluster id 00841e2a422711e194cbf60271715fc2 The alert event received is: Threshold Exceeded.
```

```
Diagnostic Analysis
Diagnostic Log sequence number: 250
Resource tested: sysplanar0
Menu Number:      25B8001
```

```
Description:
A Storage Pool Threshold alert event occurred on pool D_E_F_A_U_L_T_061310 pool id 92d2fd5f2ec45382 in cluster galaxy cluster id 00841e2a422711e194cbf60271715fc2 The alert event received is: Threshold Exceeded.
```

5



## House keeping - Thin Provisioning Alerts

- It is vital that you get these warning messages
- Suggest on ALL VIOS
  1. Email the Pool stats every night to the admin guys (cron as root)

```
. /home/padmin/.profile
lssp -clustername galaxy | /usr/bin/mailx -s "SSP stats" ops@acme.com
```

2. Script to check and if free space is low then email or send phone TEXT message or escalate
- Possible reactions are:
    - Add a new LUN to the pool,
    - Delete allocated space = unused LU or entire VM & space
    - Drop a Snapshot

## House keeping - Thin Provisioning Alerts

The screenshot shows the IBM Systems Director web interface. The main content area displays a table of active problems for the system 'goldvios1'. A tooltip is visible over the first row, providing details about a 'Storage Pool Threshold' alert.

Sel...	Name	Severity	System	Component	Category	Time Re...	Di
<input type="checkbox"/>	A Storage Pool Thres...	Warning	goldvios1	goldvios1	Hardware Status	15 Feb 201...	A

Tooltip text: A Storage Pool Threshold alert event occurred on pool D\_E\_F\_A\_U\_J\_T\_061310 pool id 92d2f5f2ec45382 in cluster galaxy cluster id 00941e2a422711e194cb60271715f62. The alert event received is: Threshold Exceeded.

## Alert bug fix

### Warning:

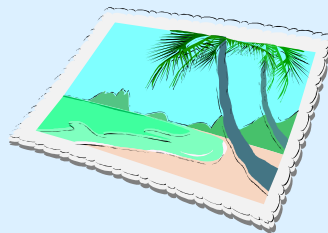
If running the initial Phase 2 release

= ioslevel: 2.2.1.3 = Fix Pack 25, service pack 1 + fix 1

You need a further efix to get Alerts working  
Details on my AIXpert blog

VIOS 2.2.1.4 is now available

## Snapshot



## Snapshots on VM disks and Cloning

Snapshot available using

- Advanced SAN disks or SAN Volume Controller (SVC)

but now VIOS admin can do this too!

Currently: no way to save the snapshot off-line

### Snapshot + Drop

- Very quick
- Allows point in time backup
- Later delete the original to reclaim the space

#### Examples:

- Backup VM stopped, quiesce, live

### Snapshot + Roll-back

- Very quick
- Useful for lots of reasons →
- Stop the client VM
- Restart on original copy
- Discard newer copy

#### Examples:

- Practice OS or App update
- Training & reset
- Benchmark & reset
- Failure & avoid recovery from tape
- Save points for batch runs

Supports single disk or a consistent set of disks

## Snapshot – create, list, delete or rollback

### Snapshot Usage:

```
snapshot -create <filename> -clustername galaxy -sname atlantic -lu LUs
```

```
snapshot -delete <filename> -clustername galaxy -sname atlantic -lu LUs
```

```
snapshot -rollback <filename> -clustername galaxy -sname atlantic -lu LUs
```

```
snapshot -list -clustername galaxy -sname atlantic
```

#### Notes:

- Alternatively swap “-lu LU\_name(s)” for “-luudid Hexadecimal”
- LUs means a space separated list disk names

## Snapshot – create and list

### Create

```
$ snapshot -create diamond5s.snap -clustername galaxy
  -spname atlantic -lu vdisk_diamond5a
```

### List

```
$ snapshot -list -clustername galaxy -spname atlantic
Lu Name      Size(mb)    ProvisionType  Lu Udid
vdisk_diamond5a  16384      THIN           b3f3a . . .
Snapshot
diamond5s.snap
```

### Also snap shots appear in the lssp output

```
$ lssp -clustername galaxy -sp atlantic -bd
Lu Name      Size(mb)    ProvisionType  Lu Udid
vdisk_diamond5a  16384      THIN           b3f3a . . .
Snapshot
diamond5s.snap

vdisk_diamond6a  16384      THIN           4c9e9 . . .
```

## Snapshot – delete or rollback

When sure you never want to rollback

Delete original & continue on the current blocks

```
$ snapshot -clustername galaxy -delete diamond5t.snap
  -spname atlantic -lu vdisk_diamond5a
```

Rollback to a snapshot

Stop the virtual machine/LPAR then

```
$ snapshot -clustername galaxy -rollback diamond5t.snap
  -spname atlantic -lu vdisk_diamond5a
```

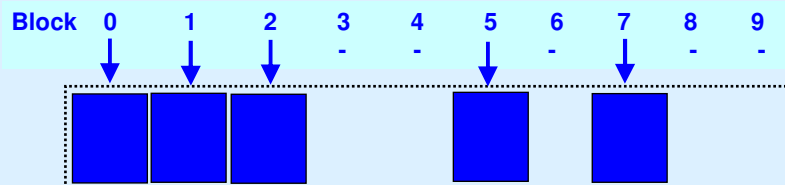
You loose any updated you made since the last snapshot

## Snapshot Model



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Original Set

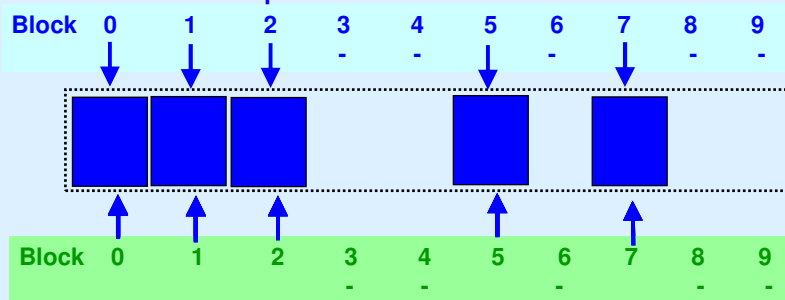


## Snapshot Model



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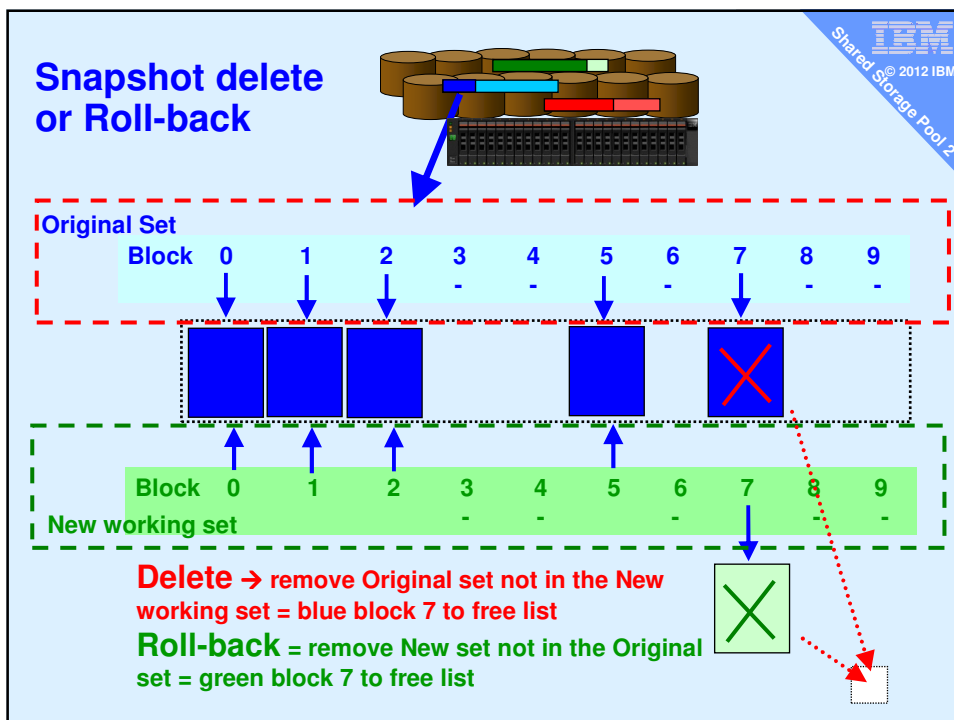
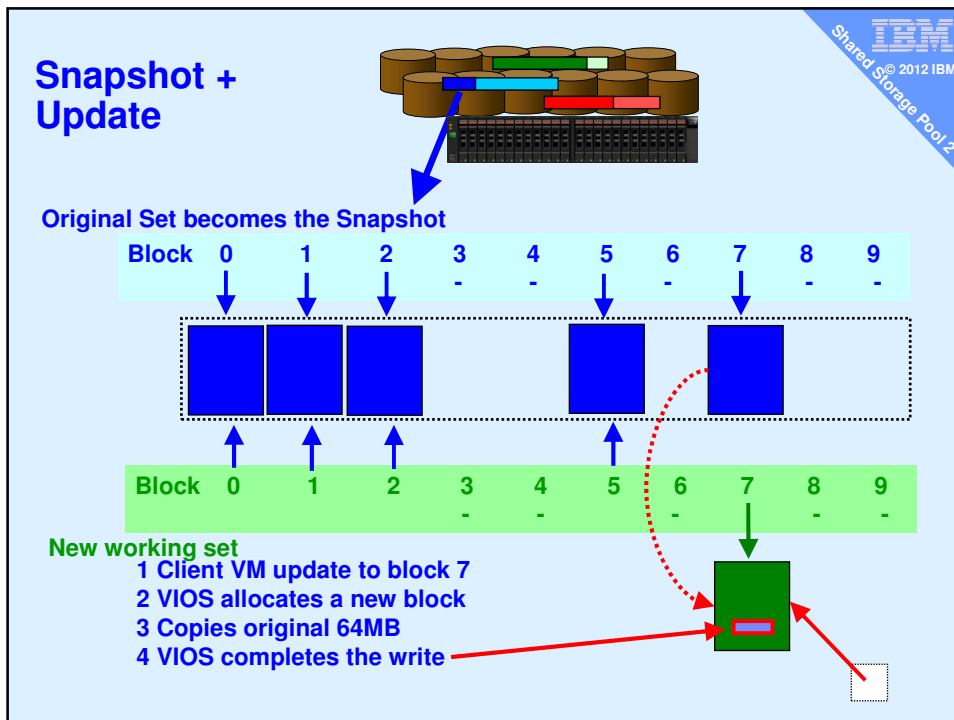
Original Set becomes the Snapshot



New working set

Creating a snap shot only involved copying the meta data  
i.e. list of the blocks within the LU (not the block themselves)





## Storage Management

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- Reminder currently,
  - One pool of large LUNs - syntax suggests multiple pools later
  - Pool can be on a mix of brands or generations of disk sub-systems
  - 64 MB chunks are spread as evenly as possible across LUNs

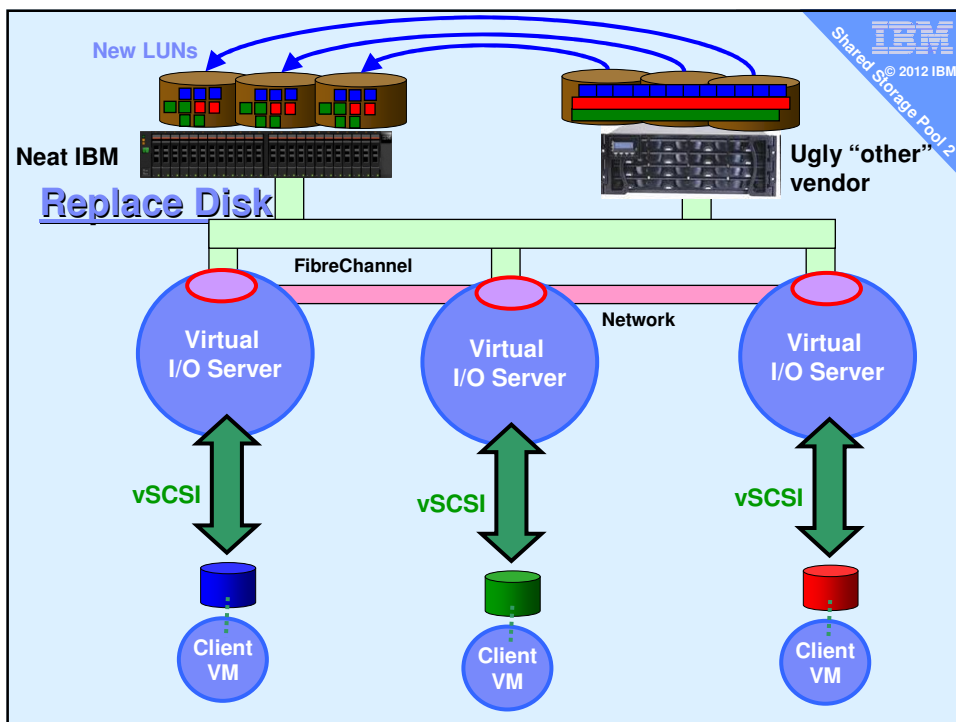
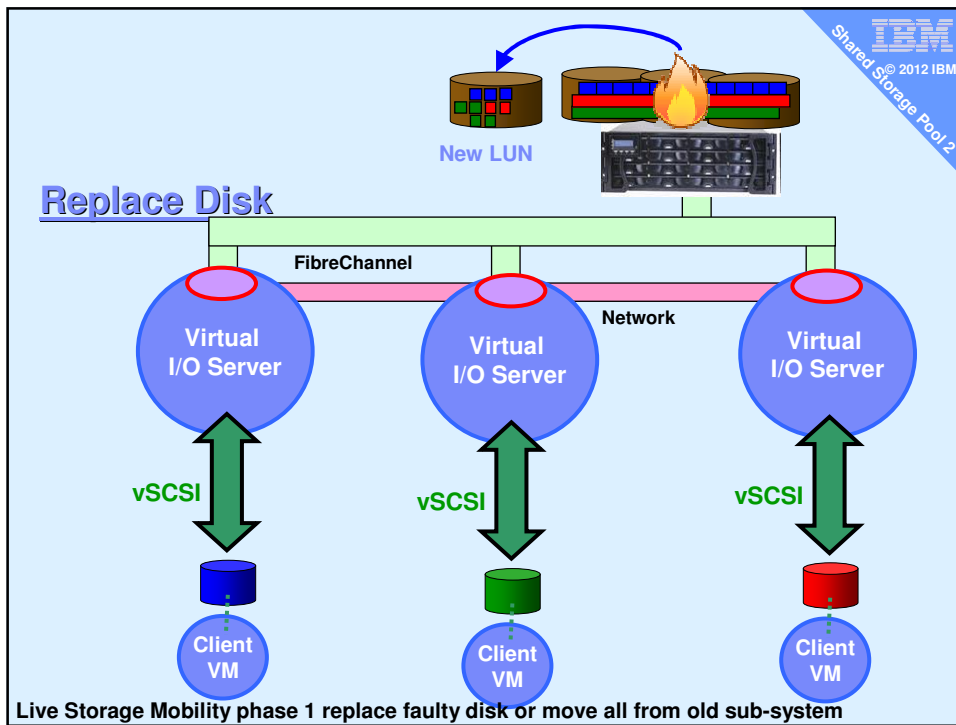
## Live Storage Mobility

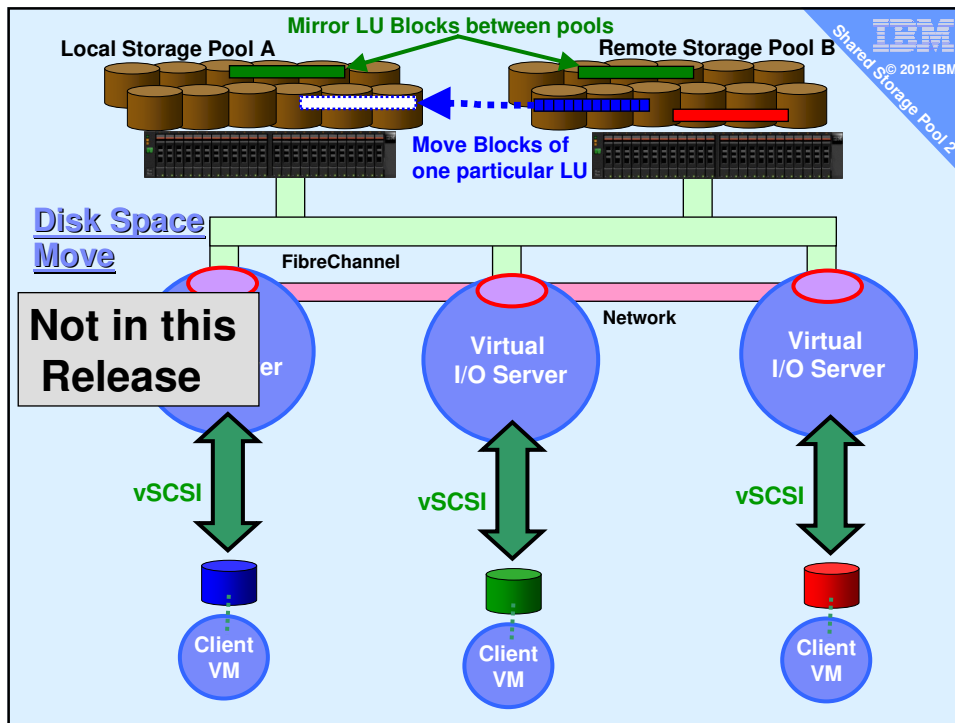
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Shared Storage Pool 2

Server Admin would like to :

- A. Replace a faulty LUN
- B. Move all blocks off one disk subsystem (retiring a disk subsystem)
- C. Recover from repository failure
- D. Select which disk subsystems a particular VM uses
- E. Ensure mirrors are on different subsystems (even different sites)

- A and B → via replace physical disk
  - `chsp -replace -clustername galaxy -sp atlantic -oldpv hdisk4 -newpv hdisk24`
- C → see `viosbr` command (later)
- D and E → in a later SSP release
  - Multiple pools is an obvious solution here (not in the current release)
  - Could use SVC now for lower level mirror (E)





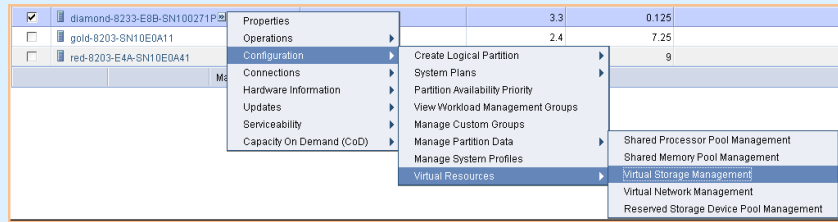
## User Interface

- Command line
  - Already shown in this presentation by example
  - Some feature will remain command line only → like: cluster -create
- cfgassist
  - This is the VIOS version of smitty
  - Menu driven interface for CLI
  - Fully covers SSP functions
- Graphical User Interface
  - HMC – now (note the don't have any VIOS vSCSI slots in "Any node")
- System Director - **Future release**
  - Already has Storage Pools concept and features
  - SSP is just another storage pool type
  - Then may adds new unique items – like VMControl appliance deploy to SSP disk space or cloning

# Hardware Management Console



- HMC from October 2011
  - for SSP support & LPM of SSP LPARs
  - Addition feature to Virtual Storage Management



- Shipped with HMC upgrade V7 R7.4 SP0+
  - Not part of the VIOS package

**HMC**

**Virtual Storage Management - diamond-8233-E8B-SN100271P**

Use virtual storage management tasks to manage your Shared Storage Pool (SSP) Devices. Select a query.

VIOS/SSP: [galaxy]

**Storage Details**

**Virtual Disks**

Virtual disks are logical entities on the VIOS partitions. To perform management tasks for virtual disks, select the task to perform. You also can create virtual disks.

Select	Name	Storage Pool	Assigned Partition	Size	Disk Type
<input type="checkbox"/>	vdisk_diamond5a	atlantic	diamond5-AIX7-SSP2(5)	16 GB	Thin
<input type="checkbox"/>	vdisk_diamond6a	atlantic	diamond6-AIX7-SSP2(3)	16 GB	Thin

**Create Virtual Disk - diamond-8233-E8B-SN100271P**

To create a virtual disk, enter a name and a size for the new disk, select a storage pool from which to create the new disk. You also select the new disk to a logical partition. This task can take several minutes to complete if you are creating a virtual disk in a file-based storage pool.

Virtual disk name: [disk\_diamond8a]  
 Storage pool name: [atlantic(galaxy) (46.6 GB free, 51.62 GB total)]  
 Virtual disk size: [16] GB  
 Assigned partition: [diamond8-AIX7 TL1 beta(8)]  
 Disk type: [Thick]  
 Map to VIOS(s):  **Virtual IO Server**  
 diamondvios1-SSP

**Virtual Storage Management - diamond-8233-E8B-SN100271P**

Use virtual storage management tasks to manage your Shared Storage Pool (SSP) Devices. Select a query.

VIOS/SSP: [galaxy]

**SSP Pool**

**HMC**

**Virtual Storage Management - diamond-8233-E8B-SN100271P**

Use virtual storage management tasks to manage virtual storage for your VIOS virtual servers and your Shared Storage Pool (SSP) Devices. Select a VIOS virtual server or an SSP Device to query.

VIOS/SSP:

**Storage Details**

Virtual Disks    Storage Pools    Physical Volumes    Optical Devices    Virtual Fibre Channel

Virtual disks are logical entities on the VIOS partition that provide storage for client partitions. To perform management tasks for existing virtual disks, select a virtual disk then select the task to perform. You also can create a new virtual disk.

--- Select Action ---

Storage Pool	Assigned Partition	Size
clientvg	None	25 GB
clientvg	None	256 MB
clientvg	None	16 GB
clientvg	None	16 GB
clientvg	None	16 GB
clientvg	None	16 GB
clientvg	diamond8-AIX7 TL1 beta(8)	16 GB

Show shared storage pool storage

Virtual Disks    Storage Pools    Physical Volumes    Optical Devices    Virtual Fibre Channel

Virtual disks are logical entities on the VIOS partition that provide storage for client partitions. To perform management tasks for existing virtual disks, select a virtual disk then select the task to perform. You also can create a new virtual disk.

--- Select Action ---

Select	Name	Storage Pool	Assigned Partition	Size
<input type="radio"/>	fslv00	clientvg	None	25 GB
<input type="radio"/>	loglv00	clientvg	None	256 MB
<input type="radio"/>	vdisk_diamond5a	atlantic(galaxy)	diamond6-AIX7 TL1 beta(8)	16 GB
<input type="radio"/>	vdisk_diamond6a	atlantic(galaxy)	diamond6-AIX616-SSP2(3)	16 GB
<input type="radio"/>	vdisk_diamond8a	atlantic(galaxy)	diamond8-AIX7 TL1 beta(8)	16 GB
<input type="radio"/>	xdiamond4_1lv	clientvg	None	16 GB
<input type="radio"/>	xdiamond7_2lv	clientvg	None	16 GB
<input type="radio"/>	xdiamond7_4lv	clientvg	None	16 GB
<input type="radio"/>	xdiamond8	clientvg	diamond8-AIX7 TL1 beta(8)	16 GB

Show shared storage pool storage

**What if you loose the VIOS?**

Shared Storage Pool 2

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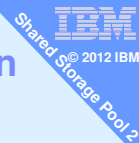
- Updated **viosbr** supports backup / restore of SSP config
  - Warning: this saves the config but not the data**
- Backup – will perform regular backups for you
 

```
viosbr -backup -clustername Name -file File \
[-frequency daily|weekly|monthly [-numfiles fileCount]]
```
- View
 

```
viosbr -view -file File -clustername Name [-type devType][-detail | -mapping]
```
- Restore
 

```
viosbr -restore -clustername N -file F -subfile NodeFile [-validate | -inter | -force][-type devType]
viosbr -restore -clustername N -file F -repopvs disks [-validate | -inter | -force][-type devType][-currentdb]
viosbr -recoverdb -clustername N [-file F]
viosbr -migrate -file F
```
- Can recover from
  - Repository Disk is corrupted (see -repopvs)
  - One SSP VIOS is reinstalled
  - SSP Database is corrupted
  - Restore to old configuration on the VIOS node
    - Changes done to SSP mappings on the node after a backup

## Shared Storage Pool phase 2 – Call to Action



As a result of this presentation: I want you to

### Do

1. Start negotiating with SAN team to hand-over a few TB
2. Get to VIOS 2.2.1.4 on all POWER6/7 ... ASAP

### Feel

- Excited with easy SAN disk management & LPM

### Think

- About how this technology could save you time, boost efficiency & increase responsiveness to users

## SSP2 command cheat sheet Reference Only



1. `chdev -dev <device name> -attr reserve_policy=no_reserve`
2. `cluster -create -clustername galaxy -repopvs hdisk2  
-spname atlantic -sppvs hdisk3 hdisk5 -hostname bluevios1.ibm.com`
3. `cluster -list`
4. `cluster -status -clustername galaxy`
5. `cluster -addnode -clustername galaxy -hostname redvios1.ibm.com`
6. `cluster -rmnode [-f] -clustername galaxy -hostname redvios1.ibm.com`
7. `cluster -delete -clustername galaxy`
8. `lscluster -s or -d or -c or -i = CAA commands`
9. `chsp -add -clustername galaxy -sp atlantic hdisk8 hdisk9`
10. `chsp -replace -clustername galaxy -sp atlantic -oldpv hdisk4 -newpv hdisk24`
11. `mkbdsp -clustername galaxy -sp atlantic 16G  
-bd vdisk_red6a -vadapter vhost2 [-thick]`
12. `rmbdsp -clustername galaxy -sp atlantic -bd vdisk_red6a`
13. `lssp -clustername galaxy -sp atlantic -bd`
14. `lssp -clustername galaxy`
15. `alert -set -clustername galaxy -spname atlantic -value 80`
16. `alert -list -clustername galaxy -spname atlantic`
17. `errlog -ls`
18. `snapshot -create name -clustername galaxy -spname atlantic -lu LU42`
19. `snapshot -delete name -clustername galaxy -spname atlantic -lu LU42`
20. `snapshot -rollback name -clustername galaxy -spname atlantic -lu LU42`
21. `snapshot -list -clustername galaxy -spname atlantic`
22. `viosbr -backup -clustername galaxy -file Daily -frequency daily -numfiles 10`
23. `viosbr -view -file File -clustername Name ...`
24. `viosbr -restore -clustername Name ...`