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VIOS Shared Storage Pools

(SSP3) Phase 3 → Q4 2012
Presentation Version 18



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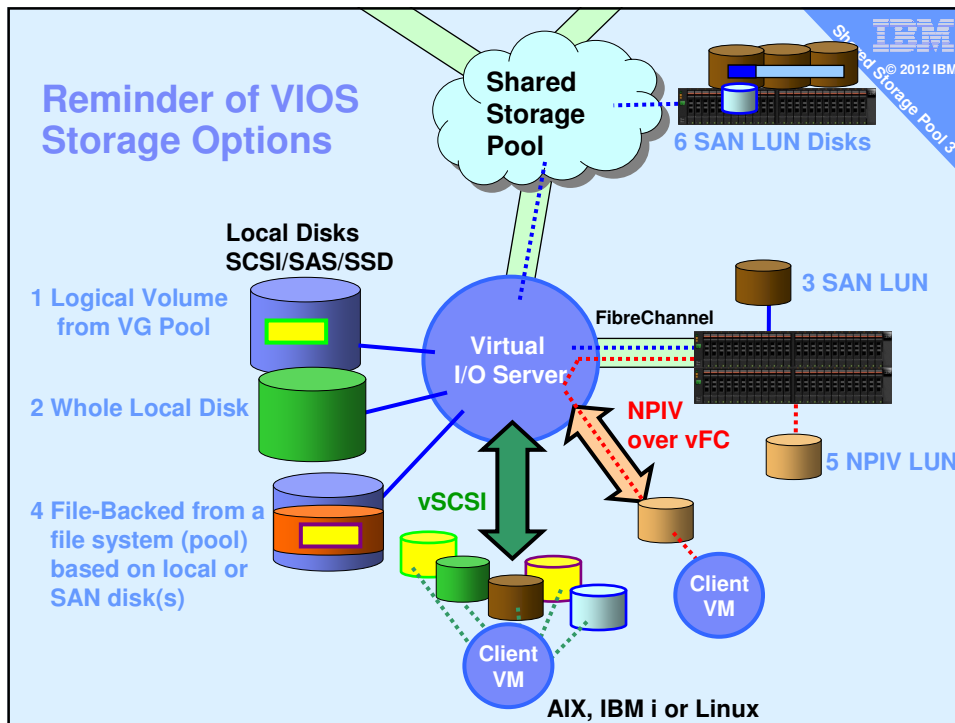
VIO Shared Storage Pool phase 3



- **Announced: 3rd Nov 2012**
<http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=AN&subtype=CA&htmlfid=897/ENUS211-354&appname=USN>
- **Please read the Readme notes:**
<http://www.ibm.com/support/docview.wss?uid=hpc1vios117f5701>



- **Then read VIOS 2.2.2 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 2.2.2.1+ (FP26)

Note for NIM installing VIOS:
This VIOS is AIX 6.1 TL8 based
NIM server needs to be AIX 6.1 TL8 or AIX 7.1 TL2

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 3 Requirements

1 of 3

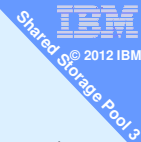


Read the Readme Notes

- Platforms: **POWER6 & POWER7** only (includes **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: Entitlement=1+, VP=1+** (shared, uncapped is OK)
 - **Minimum Memory: 4+ GB** (no skinny VIOS)
- When upgrading:
 - Client VM's must be stopped
 - SSP cluster down (use clstartstop)

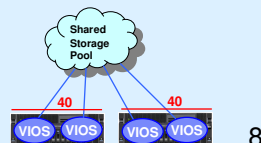
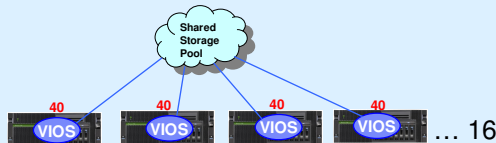
Shared Storage Pool phase 2 Limits

2 of 3



- Max VIOS nodes: **16**

(was 4)



- | | | |
|--|-------------------------------|-------------|
| ▪ Max physical disks (LUNs) in a pool: | 1024 | (was 256) |
| ▪ Max virtual disks (LUs) in a cluster: | 8192 | (was 1024) |
| ▪ Number of Client LPARs per VIOS (or pair) | 200 | (was 40) |
| ▪ Capacity of Physical Disks in Pool (each) | 16TB | (was 4TB) |
| ▪ Storage Capacity of Storage Pool (total) | 512TB | (was 128TB) |
| ▪ Capacity of each Virtual Disk (LU) in Pool | 1GB to 4TB | (same) |
| ▪ Number of Repository Disks | 1 (CAA limit) | (same) |
| | → new recovery options | |

Shared Storage Pool phase 2 Restrictions

3 of 3



Network

- Reliable & not congested
- DNS should use local /etc/hosts first
- Forward & reverse lookup must work
- Recommended to synchronise clocks
- SEA must use default threaded mode

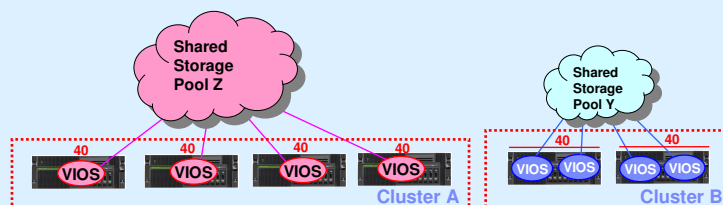
Storage

- 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

Lots of restrictions were dropped for this release

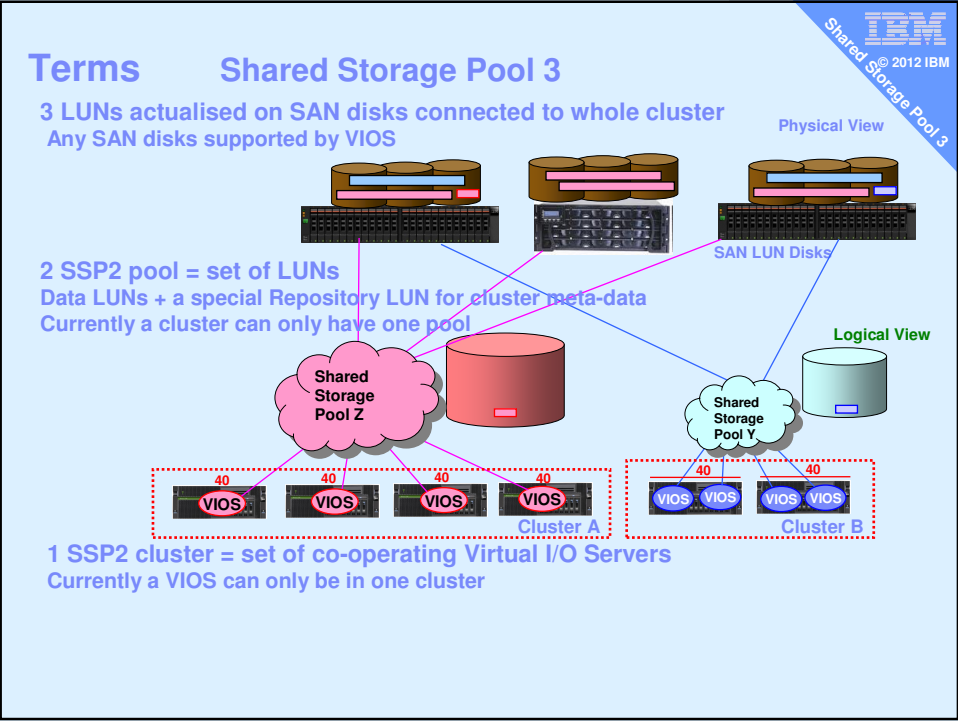
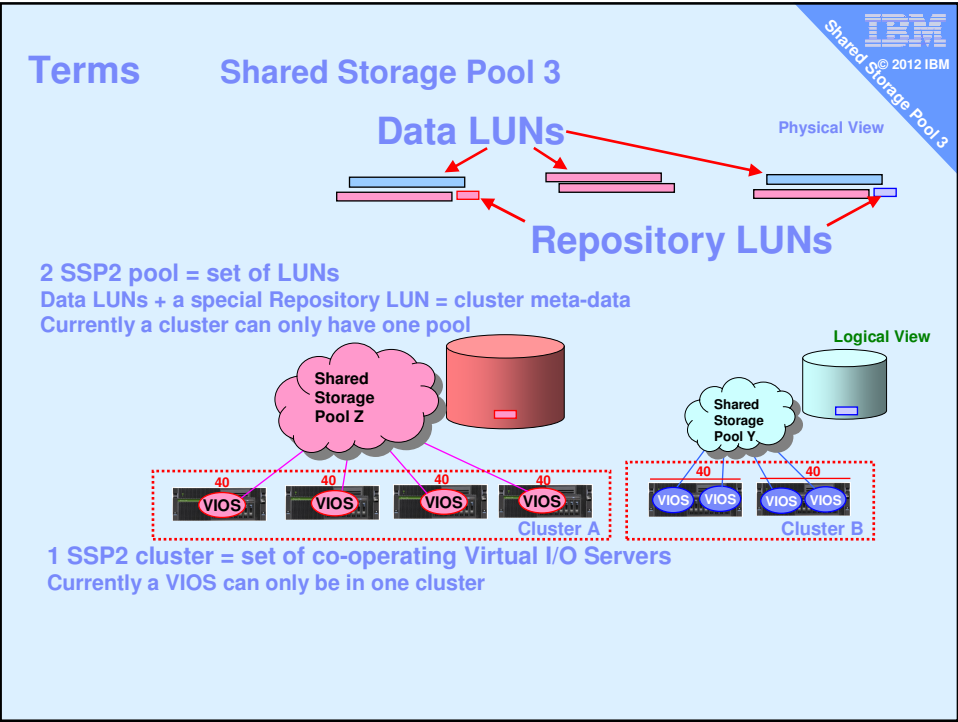
Terms

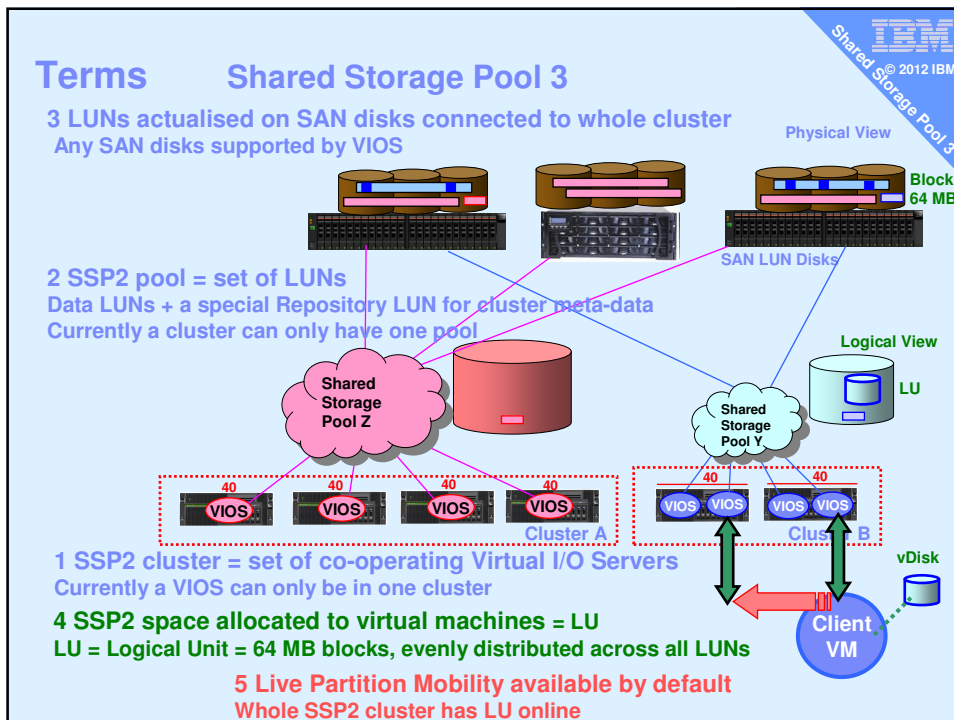
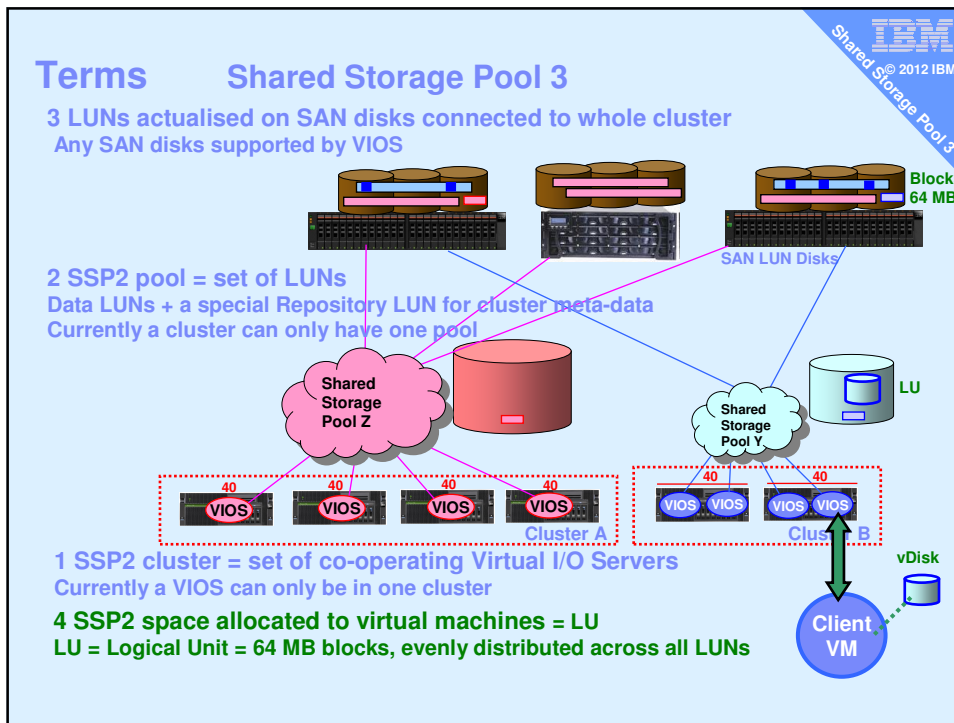
Shared Storage Pool 3



1 SSP2 cluster = set of co-operating Virtual I/O Servers
The 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 menu  
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 1st 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 1st 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: galaxy  
CLUSTER_ID: 64517962b01c11e1ac6aba367e934e03  
$
```

```
$ 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 client VMs
- Remove 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 2 steps (create LU then assign it)

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 “lsmap -all” to map slot to vhostN

- mkbdsp -clustername galaxy -sp atlantic 16G
-bd vdisk_red6a -vadapter vhostN

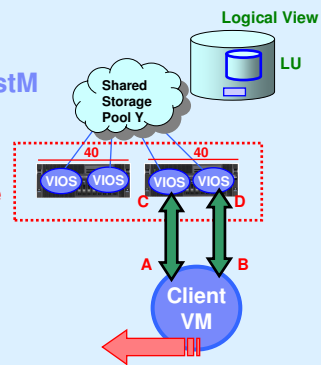
3 on VIOS D: use lsmap -all to map slot to vhostM

- mkbdsp -clustername galaxy -sp atlantic
-bd vdisk_red6a -vadapter vhostM

4 On the client VM

```
$ lspath
Enabled hdisk0 vscsi0
Enabled hdisk0 vscsi1
```

Note: No size (16G) 2nd time



5 LPM still available – dual VIOS to dual VIOS

Removing an LU (Logical Unit)

Assuming it is NOT used !!

On the VIOS remove disk space
rmbdsp = remove backing device from storage pool

By name

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

By LU hexadecimal id

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

House keeping

Add more physical LUNs to the Pool

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

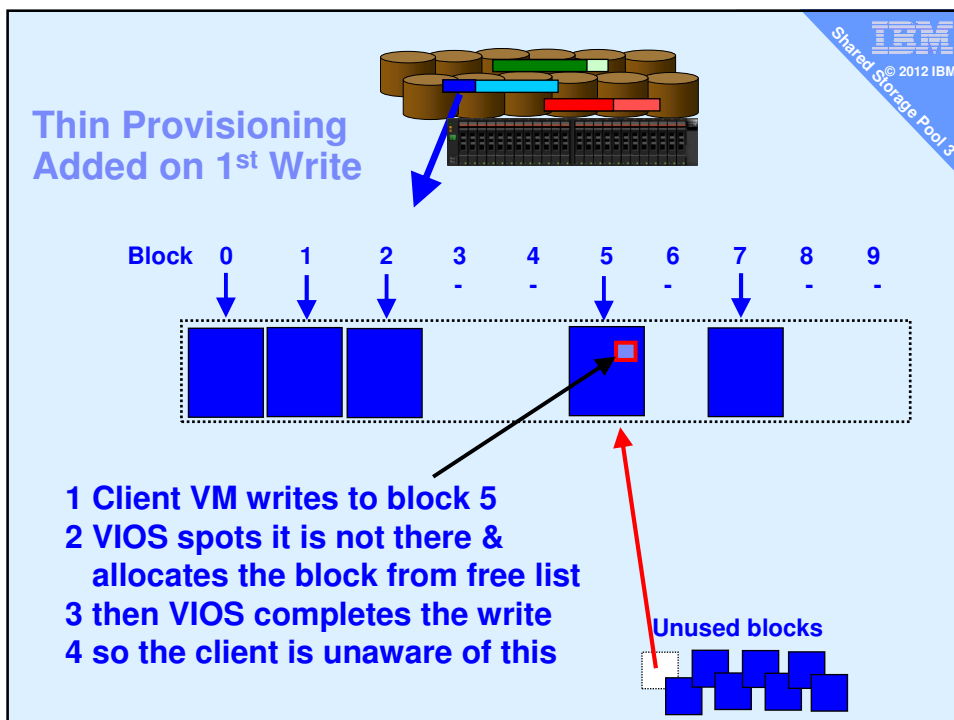
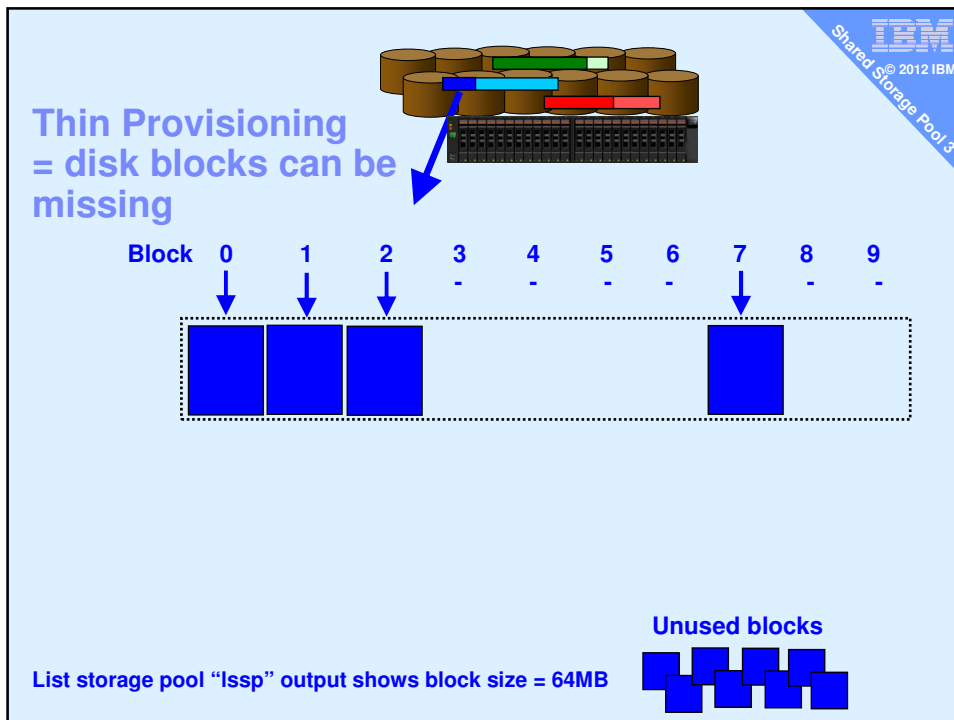
Remove a physical LUN from the Pool

- 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

- No problem, 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:  diamondvioslInterval:  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 – SSP3

```

$ lssp -clustername stars -sp atlantic -bd
Lu Name      Size(mb) ProvisionType %Used Unused(mb) Lu Udid
orange7a    32768 THIN           9% 29615 7d58538152 ...
orange7b    32768 THIN           0% 32770 76136907aa ...

$ lssp -clustername stars
POOL_NAME:      atlantic
POOL_SIZE:      130944
FREE_SPACE:     125514
TOTAL_LU_SIZE:  65536
OVERCOMMIT_SIZE: 0
TOTAL_LUS:      2
POOL_TYPE:      CLPOOL
POOL_ID:        000000009893E510000000050740962
  
```

See who is using most disk & who might run out


Over-commit
Good to know the "worst case"



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Thin provisioning risks running out of space → 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



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- To list the alert threshold:
 - **alert -list -clustername galaxy -spname atlantic**
 - \$ **alert -list -clustername galaxy -spname atlantic**
 - PoolName: atlantic
 - PoolID: 0000000009893EDD000000004F174D22
 - ThresholdPercent: 35 ←these are the defaults
 - OverCommitPercent: n/a
- Set alerts to warn on free pool space getting too low %
 - **alert -set -clustername galaxy -spname atlantic -type threshold -value 10**
- Set alerts to warn on overcommit getting too large %
 - **alert -set -clustername galaxy -spname atlantic -type overcommit -value 30**
- To remove the alert:
 - **alert -unset -clustername galaxy -spname atlantic -type threshold**
 - Threshold is set to 0 (zero) – it will not happen!!

House keeping – Alert Reporting

- Reported on **any one of the VIOS cluster**

- padm user: errlog

- Like AIX errpt
- \$ errlog | more

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



- \$ 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.
```



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
 - Look and check the larger VM really need the space.

House keeping - Thin Provisioning Alerts

IBM Systems Director captures these events

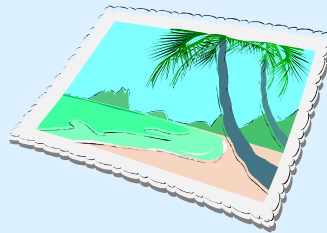
- Discover, access and Inventory all VIOS.

The screenshot shows the IBM Systems Director web interface. The 'Problems' tab is active, displaying a table of active problems for the system 'goldvios1'. A tooltip is shown over the first row of the table, providing details about a Storage Pool Threshold alert event.

Sel...	Name	Severity	System	Component	Category	Time Re...	Dx
<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_061910 pool id 92d2f5f2ec45362 in cluster galaxy cluster id 00841e2a422711e194cbf60271715fc2 The alert event received is: Threshold Exceeded.

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 -spname atlantic -lu LUs

snapshot -delete <filename> -clustername galaxy -spname atlantic -lu LUs

snapshot -rollback <filename> -clustername galaxy -spname atlantic -lu LUs

snapshot -list -clustername galaxy -spname 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

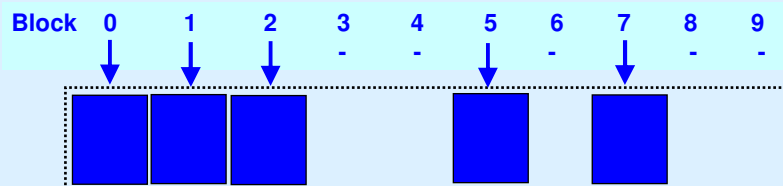
```
$ snapshot -clustername galaxy -rollback diamond5t.snap
  -spname atlantic -lu vdisk_diamond5a
```

Warning:
You loose any updates you made since that snapshot
Any snapshots since that snapshot are removed

Snapshot Model



Original Set

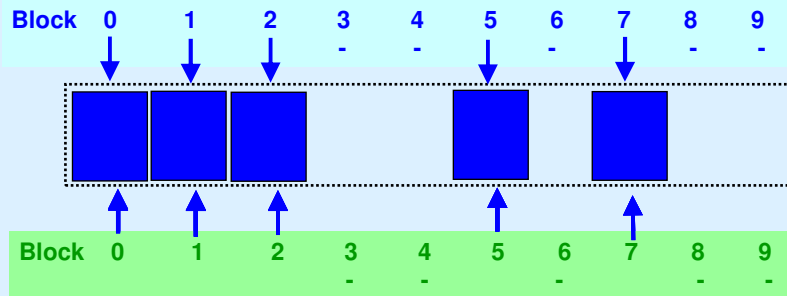


Snapshot Model



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Original Set becomes the Snapshot



New working set

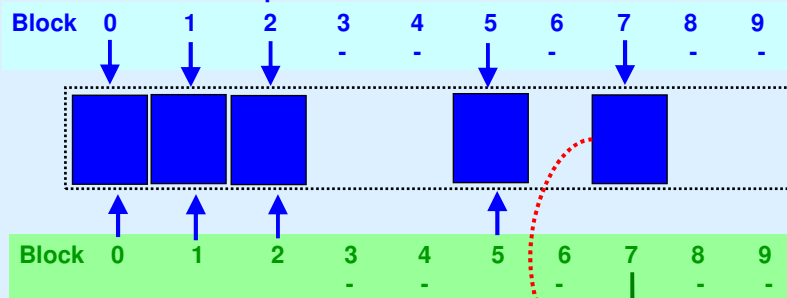
Creating a snapshot only involved copying the meta data
i.e. list of the blocks within the LU (not the block themselves)

Snapshot + Update



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Shared Storage Pool 3

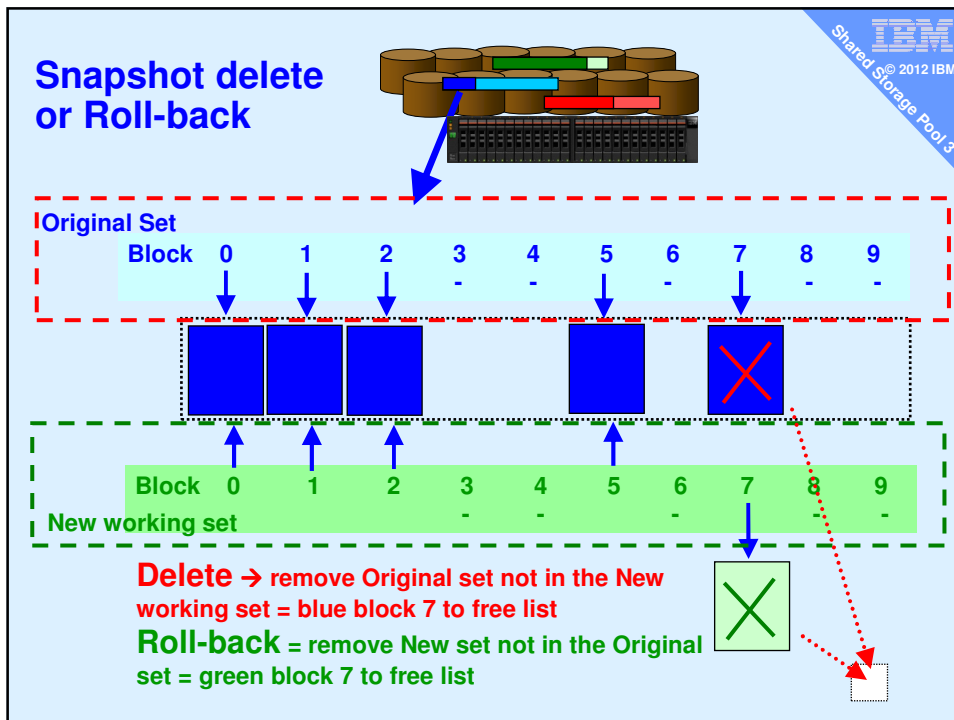
Original Set becomes the Snapshot



New working set

- 1 Client VM update to block 7
- 2 VIOS allocates a new block
- 3 Copies original 64MB
- 4 VIOS completes the write





Storage Management

- Reminder currently,
 - One pool of large LUNs
 - 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

IBM
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Shared Storage Pool 3

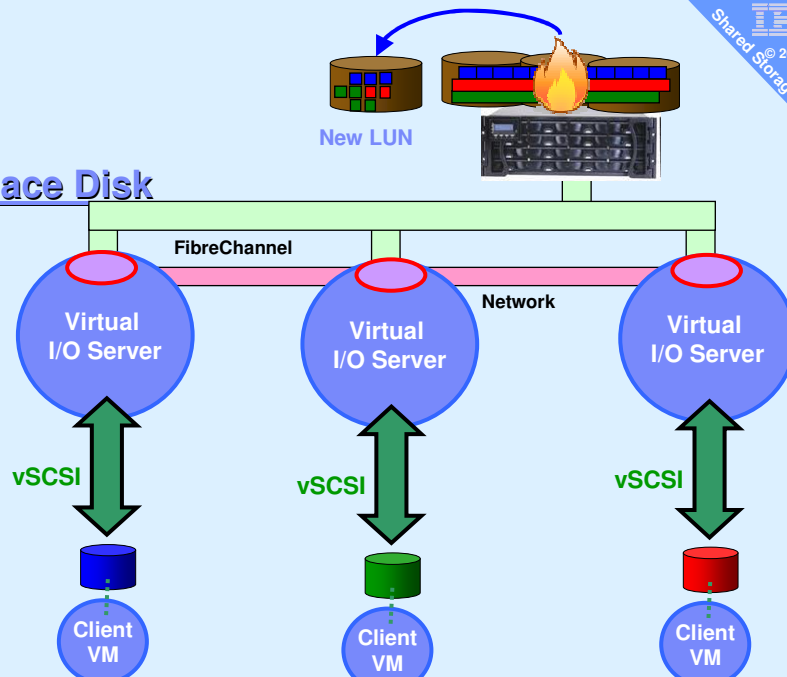
Live Storage Mobility

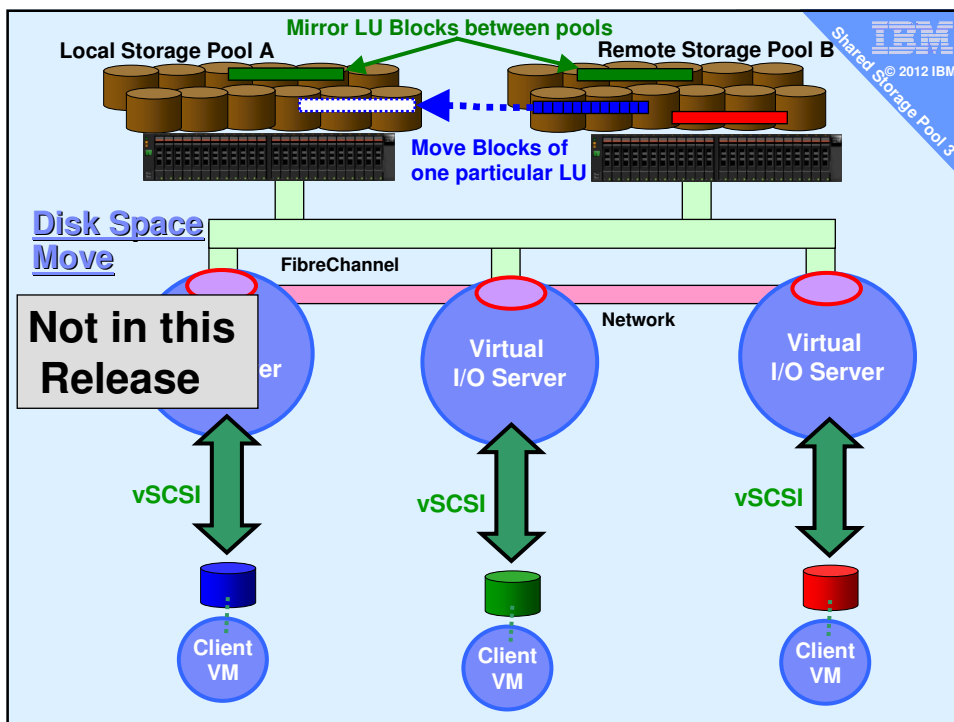
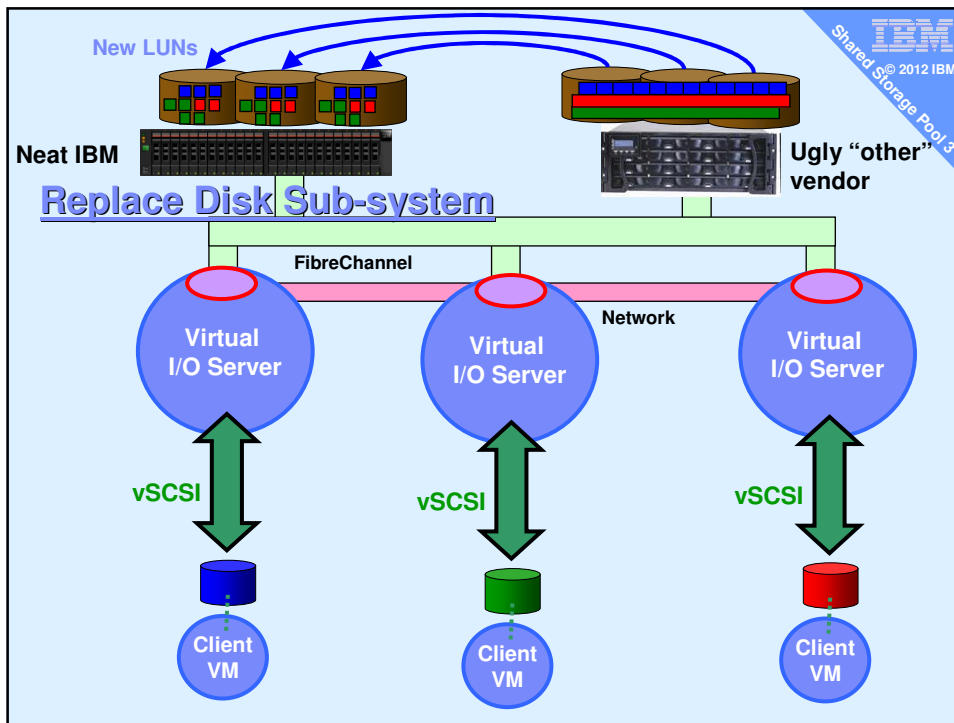
Server Admin would like to :

- 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
 - Could use SVC now for lower level mirror (E)

Replace Disk



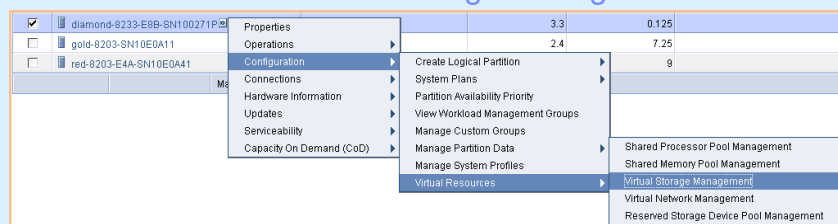


User Interface

- VIOS Command Line
 - Already shown in this presentation by example
 - Some feature may remain command line only → like: cluster -create
- VIOS cfassist menu
 - This is the VIOS version of smitty
 - Menu driven interface for CLI
 - Fully covers SSP functions
- HMC Graphical User Interface
 - SSP virtual disk list, create and connect to your VMs
 - Note: don't have any VIOS vSCSI slots in "Any node"
 - See screen shots ...
- System Director – **New in SSP3**
 - 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 Linked-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

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

Select	Name	Storage Pool	Assigned Partition	Size	Disk Type
<input type="radio"/>	vdisk_diamond5a	atlantic	diamond5-AIX7-SSP2(5)	16 GB	Thin
<input type="radio"/>	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. You also 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:

Storage pool name:

Virtual disk size: GB

Assigned partition:

Disk type:

Map to VIOS(s):

diamondvios1-SSP

SSP Pool

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 applications. 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

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)	diamond5-AIX7-SSP2(5)	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

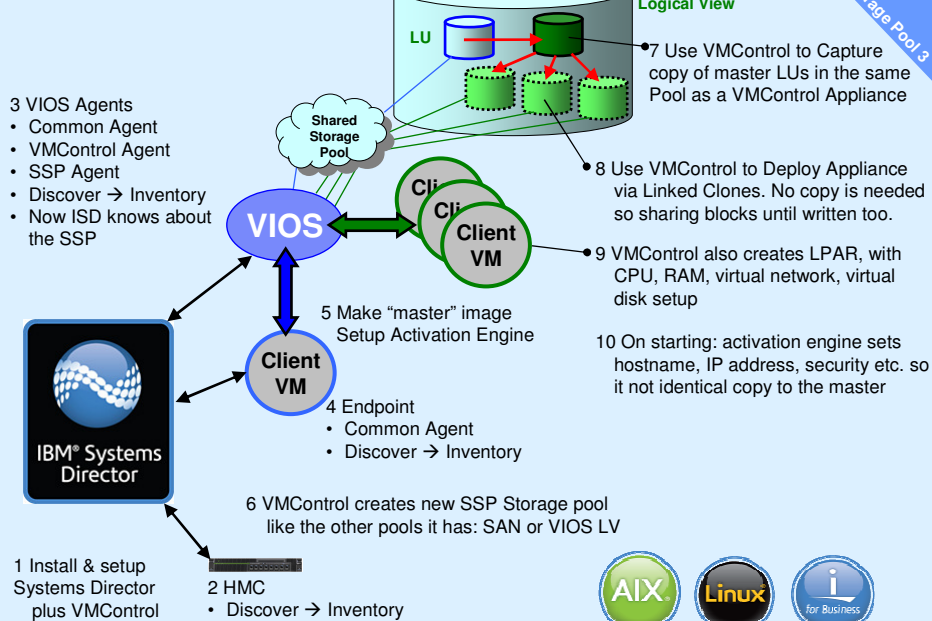
SSP3 and Systems Director

- **System Director – New in SSP3**
 - 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 with Linked-Cloning = deployed OS shared disk blocks with the original copy

- **Also new for SSP3**
 - Better pool stats – see who is “eating” the pool
 - New alert for over-commit
 - Increased RAS
 - Can use dedicated network for SSP3 traffic

Note: LPM of SSP VM have to be to SSP target

SSP3 & ISD 6.3.2+



What if you loose the VIOS?

- 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 -restore -clustername N -file F -subfile NodeFile -xmlvtds
viosbr -recoverdb -clustername N [-file F ]
viosbr -migrate -file F
```
- Can recover from
 1. Repository Disk is corrupted (see -repopvs)
 2. One SSP VIOS is reinstalled
 3. SSP Database is corrupted
 4. Restore to old configuration on the VIOS node
 - Changes done to SSP mappings on the node after a backup

Shared Storage Pool phase 3 – 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 2.2.2.1 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 -type threshold -value 10
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 ...
```