

Technical Note

P/N 300-005-734

REV A03

April 14, 2009

This technical note contains information on these topics:

Executive summary	2
Introduction	2
Audience	2
Conventions used in this document.....	3
Using dynamic LUN addressing	3
Assigning LUNs manually	3
Assigning LUNs automatically using a device list.....	6
Assigning LUNs automatically using a device group	8
Assigning LUNs automatically using a device file	10
Using dynamic LUN addressing with Autoprovisioning Groups.....	13
Conclusion	21

Executive summary

With Enginuity™ 5772, dynamic LUN addressing provides new provisioning flexibility for Symmetrix® DMX-3, DMX-4, and V-Max™ arrays by eliminating the connection between the LUN that is assigned to a device on the FA and the LUN that is visible to the host. It allows specific LUN values to be assigned, either manually or automatically, to each Symmetrix device that is being masked to an HBA, regardless of what LUN was assigned when the device was mapped to the FA. This eliminates the potential impact of the 256 LUNs per target limit of many HBAs by allowing LUN addresses between 0 and 255 to be specified on a per HBA World Wide Name basis. It also allows any device to be addressed as LUN 0 if a host requires that a device be assigned that LUN value.

Introduction

This technical note describes the dynamic LUN addressing feature. The goals of this paper are:

- ♦ To summarize the functionality
- ♦ To provide examples showing how to use Solutions Enabler to set dynamic LUN addresses

Audience

This technical note is intended for the technology professional who works in an environment with Symmetrix arrays. It is specifically targeted at EMC field technical staff and EMC customers who need to understand how to implement dynamic LUN addressing.

Conventions used in this document

An ellipsis (...) appearing on a line by itself indicates that unnecessary command output has been removed.

Command syntax, output, and examples appear in the Courier New font.

An asterisk (*) appearing in command output indicates that unnecessary command output has been removed from within a line.

Using dynamic LUN addressing

Two terms are used in this document that relate to assigning Symmetrix devices so that they are available to attached hosts. The term “mapping” refers to the assignment of devices to an FA port; “masking” refers to the assignment of devices to specific host bus adapter World Wide Names. LUNs must be assigned to devices when they are mapped to an FA port. During masking, LUNs can be assigned using dynamic LUN addressing. If dynamic LUN addressing is not used during masking, the device will be presented with the LUN that was specified when the LUN was mapped.

With dynamic LUN addressing, the user has the option of allowing the SYMAPI to choose LUN values based on what LUNs are already assigned for that HBA. Specific LUN addresses can also be assigned by the user for each device.

Assigning LUNs manually

The following output from `syminq` shows the devices that are currently available to a host:

```
# syminq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c2t0d0s2		SYMMETRIX	5772	0000042000	92160
/dev/rdisk/c2t0d231s2	GK	SYMMETRIX	5772	0000062000	5760
/dev/rdisk/c2t0d232s2	GK	SYMMETRIX	5772	0000063000	5760
/dev/rdisk/c2t0d233s2	GK	SYMMETRIX	5772	0000064000	5760

This host sees the VCMDB, which is mapped to the FA as LUN 0, and three gatekeepers that are mapped as LUNs 231-233 (0xE7-0xE9).

It is important to note that when dynamic LUNs are assigned manually, the user can assign LUNs that are already defined on the channel. This is

significant because if the user dynamically assigns a device to this host as LUN 0, this host will lose access to the VCMDB, which was mapped to the FA as LUN 0.

```
# symmaskdb -sid 00 list devs -wwn 210000e08b12811b

Symmetrix ID           : 000190102000

Originator Port wwn : 210000e08b12811b
User-generated Name : licoa035-qla1/210000e08b12811b
```

Sym Dev Name	Dir:P	Physical Device Name	VBUS	TID	LUN		Attr	Cap(MB)
					SYMM	HOST		
0062	9A:1	/dev/rdsk/c2t0d231s2	0	0	e7	e7		5
0063	9A:1	/dev/rdsk/c2t0d232s2	0	0	e8	e8		5
0064	9A:1	/dev/rdsk/c2t0d233s2	0	0	e9	e9		5

The addresses seen by the host match the output from the `symmaskdb` command, which shows both the LUN assigned to the device on the Symmetrix FAs when the devices were mapped ("SYMM") and also the address assigned during masking ("HOST"). In this case, since dynamic LUN addressing has not yet been used, the SYMM and HOST LUN addresses in the `symmaskdb list devs` output are the same for all three masked devices. Masking new devices to the HBA using dynamic LUN addressing will have no effect on the LUNs assigned to these previously masked devices.

Note: The VCMDB does not appear in the `symmaskdb` output because it is available to all hosts without being masked when it is mapped to an FA that has the VCM director flag set.

The first group of devices that are to be assigned (460, 461, and 462) have already been mapped to FA 9A:1:

```
# symmaskdb -sid 00 list no_assignment -dir 9a -p 1

Symmetrix ID           : 000190102000
Director Identification : FA-9A
Director Port          : 1

Devices not yet assigned :
```

460
461
462
...

The Symm LUN addresses that were assigned to these devices when they were mapped to the FA can be viewed using `symcfg list`:

```
# symcfg list -SA 9a -P 1 -addresses -sid 00
```

```
Symmetrix ID: 000190102000
```

Director			Device Name		Attr	Address		
Ident	Symbolic	Port	Sym	Physical		VBUS	TID	LUN
FA-9A	09A	1	0042	/dev/rdsk/c2t0d0s2	VCM	0	00	000
			0460	/dev/rdsk/c2t0d44s2		0	00	02C
			0461	/dev/rdsk/c2t0d45s2		0	00	02D
			0462	/dev/rdsk/c2t0d46s2		0	00	02E
			...					

These three devices can be masked to the host bus adapter and given LUN addresses 1, 2, and 3. If a non-contiguous range of LUN addresses is desired, individual LUN values can be specified instead of only a starting LUN. Entering only the starting LUN will assign contiguous available LUNs to the other two devices in the device range:

```
# symmask -sid 00 -wwn 210000e08b12811b -dir 9a -p 1 add devs 460:462 -lun 001
```

```
# symmask -sid 00 refresh
```

```
Refresh Symmetrix FA directors with contents of SymMask database 000190102000
(y/[n]) ? y
```

```
Symmetrix FA directors updated with contents of SymMask Database 000190102000
```

The devices are now masked to the HBA with LUNs 1, 2, and 3 and the changes have been written to the FAs. After running the applicable host utility to scan the bus for new devices and install special device files, the Symmetrix devices are available to the operating system with the dynamically assigned LUNs.

The `symcfg discover` command should be run to update the SYMAPI database with the new host special device files assigned to the devices by the operating system:

```
# symcfg discover
```

```
This operation may take up to a few minutes. Please be patient...
```

```
# symmaskdb -sid 00 list devs -wwn 210000e08b12811b
```

Dynamic LUN addressing

```
Symmetrix ID          : 000190102000

Originator Port wwn : 210000e08b12811b
User-generated Name : licoa035-qla1/210000e08b12811b
```

Sym Dev Name	Dir:P	Physical Device Name	VBUS	TID	LUN SYMM HOST		Attr	Cap(MB)
0062	9A:1	/dev/rdisk/c2t0d231s2	0	0	e7	e7		5
0063	9A:1	/dev/rdisk/c2t0d232s2	0	0	e8	e8		5
0064	9A:1	/dev/rdisk/c2t0d233s2	0	0	e9	e9		5
0460	9A:1	/dev/rdisk/c2t0d44s2	0	0	2c	1		8630
0461	9A:1	/dev/rdisk/c2t0d45s2	0	0	2d	2		8630
0462	9A:1	/dev/rdisk/c2t0d46s2	0	0	2e	3		8630

```
# symlinq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c2t0d0s2		SYMMETRIX	5772	0000042000	92160
/dev/rdisk/c2t0d1s2		SYMMETRIX	5772	0000460000	8837760
/dev/rdisk/c2t0d2s2		SYMMETRIX	5772	0000461000	8837760
/dev/rdisk/c2t0d3s2		SYMMETRIX	5772	0000462000	8837760
/dev/rdisk/c2t0d231s2	GK	SYMMETRIX	5772	0000062000	5760
/dev/rdisk/c2t0d232s2	GK	SYMMETRIX	5772	0000063000	5760
/dev/rdisk/c2t0d233s2	GK	SYMMETRIX	5772	0000064000	5760

Assigning LUNs automatically using a device list

LUN addresses can also be assigned automatically by using the `-dynamic_lun` flag. This flag can be used when specifying a range or list of devices at the command line.

Unlike with manual assignment, when dynamic LUNs are assigned automatically using the `-dynamic_lun` flag, SYMAPI will not use LUNs that are already defined on the channel.

The next three available Symmetrix devices mapped to this FA but not masked are 463, 464, and 465, which were assigned LUNs 02F, 030, and 031 when they were mapped.

```
# symmaskdb -sid 00 list no_assignment -dir 9a -p 1
```

```
Symmetrix ID          : 000190102000
Director Identification : FA-9A
Director Port         : 1
```

```
Devices not yet assigned :
```

```
463
464
```

465

...

symcfg list -SA 9a -P 1 -addresses -sid 00

Symmetrix ID: 000190102000

Director			Device Name		Attr	Address		
Ident	Symbolic	Port	Sym	Physical		VBUS	TID	LUN
FA-9A	09A	1	0042	/dev/rdisk/c2t0d0s2	VCM	0	00	000
			0460	/dev/rdisk/c2t0d44s2		0	00	02C
			0461	/dev/rdisk/c2t0d45s2		0	00	02D
			0462	/dev/rdisk/c2t0d46s2		0	00	02E
			0463	/dev/rdisk/c2t0d47s2		0	00	02F
			0464	/dev/rdisk/c2t0d48s2		0	00	030
			0465	/dev/rdisk/c2t0d49s2		0	00	031

...

If the devices are mapped and the LUNs are dynamically assigned,
SYMAPI will give the group of LUNs the next three available addresses:

symmask -sid 00 -wwn 210000e08b12811b add devs 463:465 -dynamic_lun -dir 9A
-p 1 -nop

symmask -sid 00 refresh -nop

Symmetrix FA directors updated with contents of SymMask Database 000190102000

After scanning the bus for new devices and installing special device files,
the devices are available to the operating system with the dynamically
assigned LUNs:

symcfg discover

This operation may take up to a few minutes. Please be patient...

symmaskdb -sid 00 list devs -wwn 210000e08b12811b

Symmetrix ID : 000190102000

Originator Port wwn : 210000e08b12811b

User-generated Name : licoa035-qla1/210000e08b12811b

Sym Dev Name	Dir:P	Physical Device Name	VBUS	TID	LUN		Attr	Cap (MB)
					SYMM	HOST		
0062	9A:1	/dev/rdisk/c2t0d231s2	0	0	e7	e7		5
0063	9A:1	/dev/rdisk/c2t0d232s2	0	0	e8	e8		5
0064	9A:1	/dev/rdisk/c2t0d233s2	0	0	e9	e9		5
0460	9A:1	/dev/rdisk/c2t0d44s2	0	0	2c	1		8630
0461	9A:1	/dev/rdisk/c2t0d45s2	0	0	2d	2		8630

Dynamic LUN addressing

```
0462      9A:1  /dev/rdisk/c2t0d46s2      0    0    2e    3      8630
0463      9A:1  /dev/rdisk/c2t0d47s2      0    0    2f    4      8630
0464      9A:1  /dev/rdisk/c2t0d48s2      0    0    30    5      8630
0465      9A:1  /dev/rdisk/c2t0d49s2      0    0    31    6      8630
```

Devices 463, 464, and 465 are now available to the host with LUNs 4, 5, and 6.

```
# syminq -sym
```

Device		Product	Device		
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c2t0d0s2		SYMMETRIX	5772	0000042000	92160
/dev/rdisk/c2t0d1s2		SYMMETRIX	5772	0000460000	8837760
/dev/rdisk/c2t0d2s2		SYMMETRIX	5772	0000461000	8837760
/dev/rdisk/c2t0d3s2		SYMMETRIX	5772	0000462000	8837760
/dev/rdisk/c2t0d4s2		SYMMETRIX	5772	0000463000	8837760
/dev/rdisk/c2t0d5s2		SYMMETRIX	5772	0000464000	8837760
/dev/rdisk/c2t0d6s2		SYMMETRIX	5772	0000465000	8837760
/dev/rdisk/c2t0d231s2	GK	SYMMETRIX	5772	0000062000	5760
/dev/rdisk/c2t0d232s2	GK	SYMMETRIX	5772	0000063000	5760
/dev/rdisk/c2t0d233s2	GK	SYMMETRIX	5772	0000064000	5760

Assigning LUNs automatically using a device group

Solutions Enabler 6.3 added the ability for the user to perform LUN masking on devices within a device group or from a device file. This method is also valid with dynamic LUN addressing.

The next three unmasked devices on the channel are 46D, 46E, and 46F:

```
# symmaskdb -sid 00 list no_assignment -dir 9a -p 1
```

```
Symmetrix ID      : 000190102000
Director Identification : FA-9A
Director Port      : 1
```

```
Devices not yet assigned :
```

```
46D
46E
46F
...
```

The following shows the steps required to create, and add devices to, a Symmetrix device group:

```
# symdg create testdg
# symld -g testdg addall dev -range 46D:46F -sid 00
```

```
# symdg show testdg
```

```
Group Name: testdg
```

```

Group Type                : REGULAR
Device Group in GNS       : Yes
Valid                     : Yes
Symmetrix ID              : 000190102000
Group Creation Time       : Thu Nov  1 14:11:09 2007
Vendor ID                 : EMC Corp
Application ID            : SYMCLI

```

```

Number of STD Devices in Group      : 3
Number of Associated GK's           : 0
Number of Locally-associated BCV's  : 0
Number of Locally-associated VDEV's : 0
Number of Locally-associated TGT's  : 0
Number of Remotely-associated VDEV's(STD RDF) : 0
Number of Remotely-associated BCV's (STD RDF) : 0
Number of Remotely-associated TGT's(TGT RDF) : 0
Number of Remotely-associated BCV's (BCV RDF) : 0
Number of Remotely-assoc'd RBCV's (RBCV RDF) : 0

```

```
Standard (STD) Devices (3):
```

```
{
-----

```

LdevName	PdevName	Sym Dev	Att. Sts	Cap (MB)
DEV001	/dev/rdisk/c3t0d116s2	046D	RW	8631
DEV002	/dev/rdisk/c3t0d117s2	046E	RW	8631
DEV003	/dev/rdisk/c3t0d118s2	046F	RW	8631

```

}
```

The devices can now be masked to the HBA using dynamic LUN addressing. In this example, the starting LUN is specified so that the new devices start at LUN 10 (0xA):

```
# symmask -sid 00 -wwn 210000e08b12811b add -g testdg -lun A -dir 9A -p 1
```

After scanning the bus for new devices and installing special device files, the Symmetrix devices are available to the operating system with the assigned LUNs:

```
# symcfg discover
```

This operation may take up to a few minutes. Please be patient...

```
# symmaskdb -sid 00 list devs -wwn 210000e08b12811b
```

```
Symmetrix ID          : 000190102000
```

```
Originator Port wwn : 210000e08b12811b
```

User-generated Name : licoa035-qla1/210000e08b12811b

Sym Dev Name	Dir:P	Physical Device Name	VBUS	TID	LUN		Attr	Cap(MB)
					SYMM	HOST		
0062	9A:1	/dev/rdisk/c2t0d231s2	0	0	e7	e7		5
0063	9A:1	/dev/rdisk/c2t0d232s2	0	0	e8	e8		5
0064	9A:1	/dev/rdisk/c2t0d233s2	0	0	e9	e9		5
0460	9A:1	/dev/rdisk/c2t0d44s2	0	0	2c	1		8630
0461	9A:1	/dev/rdisk/c2t0d45s2	0	0	2d	2		8630
0462	9A:1	/dev/rdisk/c2t0d46s2	0	0	2e	3		8630
0463	9A:1	/dev/rdisk/c2t0d47s2	0	0	2f	4		8630
0464	9A:1	/dev/rdisk/c2t0d48s2	0	0	30	5		8630
0465	9A:1	/dev/rdisk/c2t0d49s2	0	0	31	6		8630
046D	9A:1	/dev/rdisk/c3t0d116s2	0	0	74	a		8630
046E	9A:1	/dev/rdisk/c3t0d117s2	0	0	75	b		8630
046F	9A:1	/dev/rdisk/c3t0d118s2	0	0	76	c		8630

syminq -sym

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c2t0d0s2		SYMMETRIX	5772	0000042000	92160
/dev/rdisk/c2t0d1s2		SYMMETRIX	5772	0000460000	8837760
/dev/rdisk/c2t0d2s2		SYMMETRIX	5772	0000461000	8837760
/dev/rdisk/c2t0d3s2		SYMMETRIX	5772	0000462000	8837760
/dev/rdisk/c2t0d4s2		SYMMETRIX	5772	0000463000	8837760
/dev/rdisk/c2t0d5s2		SYMMETRIX	5772	0000464000	8837760
/dev/rdisk/c2t0d6s2		SYMMETRIX	5772	0000465000	8837760
/dev/rdisk/c2t0d10s2		SYMMETRIX	5772	000046D000	8837760
/dev/rdisk/c2t0d11s2		SYMMETRIX	5772	000046E000	8837760
/dev/rdisk/c2t0d12s2		SYMMETRIX	5772	000046F000	8837760
/dev/rdisk/c2t0d231s2	GK	SYMMETRIX	5772	0000062000	5760
/dev/rdisk/c2t0d232s2	GK	SYMMETRIX	5772	0000063000	5760
/dev/rdisk/c2t0d233s2	GK	SYMMETRIX	5772	0000064000	5760

In the above example, the `-dynamic_lun` option could have been chosen, which would have mapped devices 46D, 46E, and 46F as LUNs 7, 8, and 9.

Assigning LUNs automatically using a device file

Because device files are used for other Solutions Enabler operations such as creating TimeFinder clones, the format of the device file requires that each line contains two devices. The first device listed on each line is the source device; the second is the target device. When performing device masking, the `symmask` command can act on either device or both, depending on whether the `-src` or `-tgt` keywords are specified. If neither keyword is entered, the command will act on the source by default.

In the following example, the next three mapped devices will be masked using the `-dynamic_lun` option, which will cause the devices to be assigned LUNs 7, 8, and 9, which are currently unused.

```
# symmaskdb -sid 00 list no_assignment -dir 9a -p 1

Symmetrix ID           : 000190102000
Director Identification : FA-9A
Director Port          : 1
Devices not yet assigned :

47A
47B
A10
...

# cat mask_devs
#####
#                               #
# Device File for Masking #
#                               #
#####
47A  710
47B  711
A10  712

# symmask -sid 00 -wwn 210000e08b12811b add -file mask_devs src -dynamic_lun
-dir 9A -p 1

# symmask -sid 00 refresh -nop

Symmetrix FA directors updated with contents of SymMask Database 000190102000
```

After scanning the bus for new devices and installing special files, the Symmetrix devices are available to the operating system with the dynamically assigned LUNs:

```
# symcfg discover
```

This operation may take up to a few minutes. Please be patient...

```
# symmaskdb -sid 00 list devs -wwn 210000e08b12811b
```

```
Symmetrix ID           : 000190102000

Originator Port wwn : 210000e08b12811b
User-generated Name : licoa035-qla1/210000e08b12811b
```

Sym Dev						LUN		
Name	Dir:P	Physical Device Name	VBUS	TID	SYMM	HOST	Attr	Cap(MB)
0062	9A:1	/dev/rdisk/c2t0d231s2	0	0	e7	e7		5
0063	9A:1	/dev/rdisk/c2t0d232s2	0	0	e8	e8		5
0064	9A:1	/dev/rdisk/c2t0d233s2	0	0	e9	e9		5

Dynamic LUN addressing

```

0460      9A:1  /dev/rdisk/c2t0d44s2      0    0    2c    1      8630
0461      9A:1  /dev/rdisk/c2t0d45s2      0    0    2d    2      8630
0462      9A:1  /dev/rdisk/c2t0d46s2      0    0    2e    3      8630
0463      9A:1  /dev/rdisk/c2t0d4s2       0    0    2f    4      8630
0464      9A:1  /dev/rdisk/c2t0d5s2      0    0    30    5      8630
0465      9A:1  /dev/rdisk/c2t0d6s2      0    0    31    6      8630
046D      9A:1  /dev/rdisk/c2t0d10s2     0    0    74    a      8630
046E      9A:1  /dev/rdisk/c2t0d11s2     0    0    75    b      8630
046F      9A:1  /dev/rdisk/c2t0d12s2     0    0    76    c      8630
047A      9A:1  /dev/rdisk/c2t0d7s2      0    0    77    7      8630
047B      9A:1  /dev/rdisk/c2t0d8s2      0    0    78    8      8630
0A10      9A:1  /dev/rdisk/c2t0d9s2      0    0    52    9      8630

```

```
# syminq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c2t0d0s2		SYMMETRIX	5772	0000042000	92160
/dev/rdisk/c2t0d1s2		SYMMETRIX	5772	0000460000	8837760
/dev/rdisk/c2t0d2s2		SYMMETRIX	5772	0000461000	8837760
/dev/rdisk/c2t0d3s2		SYMMETRIX	5772	0000462000	8837760
/dev/rdisk/c2t0d4s2		SYMMETRIX	5772	0000463000	8837760
/dev/rdisk/c2t0d5s2		SYMMETRIX	5772	0000464000	8837760
/dev/rdisk/c2t0d6s2		SYMMETRIX	5772	0000465000	8837760
/dev/rdisk/c2t0d7s2		SYMMETRIX	5772	000047A000	8837760
/dev/rdisk/c2t0d8s2		SYMMETRIX	5772	000047B000	8837760
/dev/rdisk/c2t0d9s2		SYMMETRIX	5772	0000A10000	8837760
/dev/rdisk/c2t0d10s2		SYMMETRIX	5772	000046D000	8837760
/dev/rdisk/c2t0d11s2		SYMMETRIX	5772	000046E000	8837760
/dev/rdisk/c2t0d12s2		SYMMETRIX	5772	000046F000	8837760
/dev/rdisk/c2t0d231s2	GK	SYMMETRIX	5772	0000062000	5760
/dev/rdisk/c2t0d232s2	GK	SYMMETRIX	5772	0000063000	5760
/dev/rdisk/c2t0d233s2	GK	SYMMETRIX	5772	0000064000	5760

Using dynamic LUN addressing with Autoprovisioning Groups

Introduced in Solutions Enabler version 7.0, Autoprovisioning Groups provides an easier, faster way to provision storage in Symmetrix V-Max arrays running Enginuity 5874. The `symaccess` command allows the user to create a group of devices (storage group), a group of director ports (port group), and a group of host initiators (initiator group), and associate them in a masking view. When the masking view is created, the devices are automatically mapped and masked.

Because `symaccess` provides all of the necessary functions to map and mask devices, it also fully supports dynamic LUN addressing.

Like with `symmask`, the `symaccess` command can assign dynamic LUNs when masking is performed. Both mapping (if the devices are not yet mapped) and masking are done when the masking view is created or when devices are added to an existing storage group that exists in a masking view. When the devices are mapped to the FA as part of the masking view creation, Symmetrix Enginuity assigns the next available LUNs to the devices in the storage group. If the `-lun` option is chosen when the masking view is created, dynamic LUN addressing will be used and the devices will be given the specified LUN values or a LUN range.

The following example shows a masking view being created for an existing initiator group, storage group, and port group.

The host initially sees only the ACLX database device, which is the Symmetrix V-Max equivalent of the VCM database device:

```
# syminq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c3t5000097*18d0s2	GK	SYMMETRIX	5874	5400054000	5760
/dev/rdisk/c4t5000097*19d0s2	GK	SYMMETRIX	5874	5400054000	5760

An initiator group, storage group, and port group have already been created for the host:

```
# symaccess list -sid 54 -detail
```

```
Symmetrix ID      : 000192601254
```

Group Name	Count	View	Type
		Count	

```

-----
proddb_init          2      0  Initiator
proddb_port          2      0   Port
proddb_stor          4      0  Storage

```

```
# symaccess show proddb_init -type initiator -sid 54
```

```
Symmetrix ID          : 000192601254
```

```
Last updated at       : 08:35:04 PM on Thu Feb 12,2009
```

```
Initiator Group Name  : proddb_init
```

```
Host Initiators
```

```
{
  WWN   :10000000c97683e0
  WWN   :10000000c97683e1
}
```

```
Masking View Names
```

```
{
  None
}
```

```
# symaccess show proddb_stor -type storage -sid 54
```

```
Symmetrix ID          : 000192601254
```

```
Last updated at       : 08:38:14 PM on Thu Feb 12,2009
```

```
Storage Group Name    : proddb_stor
```

```
Devices               : 07B0:07B3
```

```
Masking View Names
```

```
{
  None
}
```

```
# symaccess show proddb_port -type port -sid 54
```

```
Symmetrix ID          : 000192601254
```

```
Last updated at       : 08:36:51 PM on Thu Feb 12,2009
```

```
Port Group Name       : proddb_port
```

```
Director Identification
```

```
{
  FA-7E:0
  FA-7F:1
}
```

```
Masking View Names
```

```
{
  None
}
```

A masking view can now be created that will mask and map the four devices in the storage group (7B0 - 7B3) on the ports in the port group to the WWNs in the initiator group. When the mapping is done, the devices in the storage group will get the next four LUNs available on the FA port. By specifying a starting LUN value, in this case LUN 0, dynamic LUN addressing is used:

```
# symaccess create view -name proddb_view -storgrp proddb_stor -portgrp
proddb_port -initgrp proddb_init -lun 0 -sid 54
```

Because mapping is also being done, the prompt will take a few moments to return. After the command completes, the devices are mapped and masked and available to be configured by the host operating system. The devices have been dynamically assigned LUNs 000 – 003, which are displayed in the Host LUN column of the storage group:

```
# symaccess show view proddb_view -sid 54
```

```
Symmetrix ID           : 000192601254
```

```
Masking View Name      : proddb_view
```

```
Initiator Group Name   : proddb_init
```

```
Host Initiators
```

```
{
  WWN   : 10000000c97683e0
  WWN   : 10000000c97683e1
}
```

```
Port Group Name        : proddb_port
```

```
Director Identification
```

```
{
  FA-7E:0
  FA-7F:1
}
```

```
Storage Group Name     : proddb_stor
```

Sym Dev				Host		
Name	Dir:P	Physical Device Name		Lun	Attr	Cap(MB)
-----	-----	-----		----	----	-----
07B0	07E:0	Not Visible		0		4314
	07F:1	Not Visible		0		4314
07B1	07E:0	Not Visible		1		4314
	07F:1	Not Visible		1		4314
07B2	07E:0	Not Visible		2		4314
	07F:1	Not Visible		2		4314
07B3	07E:0	Not Visible		3		4314
	07F:1	Not Visible		3		4314

These LUN values differ from the LUNs actually assigned on the FA (0B1-0B4):

```
# symcfg list -address -FA 07E -P 0 -sid 54
```

Symmetrix ID: 000192601254

Director			Device Name			Attr	Address	
Ident	Symbolic	Port	Sym	Physical		VBUS	TID	LUN
FA-7E	07E	0	0054	c3t500009720139918d0s*	ACLX	0	00	000
			0055	Not Visible		0	00	001
			0056	Not Visible		0	00	002
			0088	Not Visible		0	00	003
			...					
			0091	Not Visible		0	00	0AF
			0092	Not Visible		0	00	0B0
			07B0	Not Visible		0	00	0B1
			07B1	Not Visible		0	00	0B2
			07B2	Not Visible		0	00	0B3
			07B3	Not Visible		0	00	0B4
			00B0	Not Visible		0	00	0C0
			00B1	Not Visible		0	00	0C1
			...					
			00A5	Not Visible		0	00	0F5
			00A6	Not Visible		0	00	0F6
			00A7	Not Visible		0	00	0F7
Total			----					
Mapped Devices:			205					
Including Metamembers:			205					
Available Addresses:			3884 (s)					

After running the host commands to configure the devices, they are now available to the operating system on two paths with LUNs 000 - 003:

```
# syminq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rds/c3t500009*18d0s2		SYMMETRIX	5874	54007B0000	4417920
/dev/rds/c3t500009*18d1s2		SYMMETRIX	5874	54007B1000	4417920
/dev/rds/c3t500009*18d2s2		SYMMETRIX	5874	54007B2000	4417920
/dev/rds/c3t500009*18d3s2		SYMMETRIX	5874	54007B3000	4417920
/dev/rds/c4t500009*59d0s2		SYMMETRIX	5874	54007B0000	4417920
/dev/rds/c4t500009*59d1s2		SYMMETRIX	5874	54007B1000	4417920
/dev/rds/c4t500009*59d2s2		SYMMETRIX	5874	54007B2000	4417920
/dev/rds/c4t500009*59d3s2		SYMMETRIX	5874	54007B3000	4417920

When adding devices to an existing storage group using a list of devices in the command line, both a starting LUN and specific LUNs for the devices in the list may be specified.

In the following example, an existing host has a group of devices assigned, but only sees the ACLX device. If gatekeepers are assigned, it might be desirable to give them high LUN numbers so that they appear at the end of the device list while also adding new devices that use the next LUNs available to the initiator. Devices 907 and 908 and gatekeepers 0AC and 0AD will be added to the storage group. The first two devices will be given LUNs 015 and 016 (21 and 22 in decimal); the second two devices will be given LUNs 0F0 and 0F1 (240 and 241):

```
# symaccess show view licoa057_1_view -sid 54

Symmetrix ID          : 000192601254

Masking View Name     : licoa057_1_view
Initiator Group Name  : licoa057_1_hba

    Host Initiators
    {
        WWN   : 10000000c9767816
    }

Port Group Name       : licoa057_1_port

    Director Identification
    {
        FA-7E:0
    }

Storage Group Name    : licoa057_1_stor
```

Sym Dev Name	Dir:P	Physical Device Name	Host Lun	Attr	Cap(MB)
07DB	07E:0	c3t5000097208139918d1s*	1		4314
07DC	07E:0	c3t5000097208139918d2s*	2		4314
07DD	07E:0	c3t5000097208139918d3s*	3		4314
07DE	07E:0	c3t5000097208139918d4s*	4		4314
0833	07E:0	c3t5000097208139918d5s*	5		4314
0834	07E:0	c3t5000097208139918d6s*	6		4314
0835	07E:0	c3t5000097208139918d7s*	7		4314
0836	07E:0	c3t5000097208139918d8s*	8		4314
0837	07E:0	c3t5000097208139918d9s*	9		4314
0838	07E:0	c3t5000097208139918d10*	a		4314
0839	07E:0	c3t5000097208139918d11*	b		4314
083A	07E:0	c3t5000097208139918d12*	c		4314
083B	07E:0	c3t5000097208139918d13*	d		4314
083C	07E:0	c3t5000097208139918d14*	e		4314
083D	07E:0	c3t5000097208139918d15*	f		4314
083E	07E:0	c3t5000097208139918d16*	10		4314
092A	07E:0	c3t5000097208139918d17*	11		4314
092B	07E:0	c3t5000097208139918d18*	12		4314
092C	07E:0	c3t5000097208139918d19*	13		4314
092D	07E:0	c3t5000097208139918d20*	14		4314

```
# symaccess -sid 54 -name licoa057_1_stor -type storage add devs
```

Dynamic LUN addressing

```
907,908,0AC,0AD -lun 015,016,0F0,0F1
```

The devices have been added to the storage group and are mapped and masked with the specified dynamic LUN addresses:

```
# symaccess show view licoa057_1_view -sid 54
```

```
Symmetrix ID          : 000192601254
```

```
Masking View Name     : licoa057_1_view
```

```
Initiator Group Name  : licoa057_1_hba
```

```
Host Initiators
```

```
{  
  WWN   : 10000000c9767816  
}
```

```
Port Group Name       : licoa057_1_port
```

```
Director Identification
```

```
{  
  FA-7E:0  
}
```

```
Storage Group Name    : licoa057_1_stor
```

Sym Dev Name	Dir:P	Physical Device Name	Host Lun	Attr	Cap(MB)
07DB	07E:0	c3t5000097208139918d1s*	1		4314
07DC	07E:0	c3t5000097208139918d2s*	2		4314
07DD	07E:0	c3t5000097208139918d3s*	3		4314
07DE	07E:0	c3t5000097208139918d4s*	4		4314
0833	07E:0	c3t5000097208139918d5s*	5		4314
0834	07E:0	c3t5000097208139918d6s*	6		4314
0835	07E:0	c3t5000097208139918d7s*	7		4314
0836	07E:0	c3t5000097208139918d8s*	8		4314
0837	07E:0	c3t5000097208139918d9s*	9		4314
0838	07E:0	c3t5000097208139918d10*	a		4314
0839	07E:0	c3t5000097208139918d11*	b		4314
083A	07E:0	c3t5000097208139918d12*	c		4314
083B	07E:0	c3t5000097208139918d13*	d		4314
083C	07E:0	c3t5000097208139918d14*	e		4314
083D	07E:0	c3t5000097208139918d15*	f		4314
083E	07E:0	c3t5000097208139918d16*	10		4314
092A	07E:0	c3t5000097208139918d17*	11		4314
092B	07E:0	c3t5000097208139918d18*	12		4314
092C	07E:0	c3t5000097208139918d19*	13		4314
092D	07E:0	c3t5000097208139918d20*	14		4314
0907	07E:0	Not Visible	15		4314
0908	07E:0	Not Visible	16		4314
00AC	07E:0	Not Visible	f0		5
00AD	07E:0	Not Visible	f1		5

The LUNs that are actually assigned on the FA are different from the dynamically assigned LUNs:

```
# symcfg list -address -FA 07E -P 0 -sid 54
```

Symmetrix ID: 000192601254

Director			Device Name		Attr	Address		
Ident	Symbolic	Port	Sym	Physical		VBUS	TID	LUN
FA-7E	07E	0	0054	c3t5000097208139918d0s*	ACLX	0	00	000
			0055	Not Visible		0	00	001
			0056	Not Visible		0	00	002
			0088	Not Visible		0	00	003
			...					
			00AA	Not Visible		0	00	0B7
			00AB	Not Visible		0	00	0B8
			00AC	c3t5000097208139918d24*		0	00	0B9
			00AD	c3t5000097208139918d24*		0	00	0BA
			00AE	Not Visible		0	00	0BB
			00AF	Not Visible		0	00	0BC
			0907	c3t5000097208139918d21*		0	00	0BD
			0908	c3t5000097208139918d22*		0	00	0BE
			00B0	Not Visible		0	00	0C0
			00B1	Not Visible		0	00	0C1
			...					
			00A4	Not Visible		0	00	0F4
			00A5	Not Visible		0	00	0F5
			00A6	Not Visible		0	00	0F6
			00A7	Not Visible		0	00	0F7
Total			----					
Mapped Devices:			215					
Including Metamembers:			215					
Available Addresses:			3874	(s)				

After configuring the devices to the host, the host special device files have been created using the dynamic LUN addresses:

```
# syminq -sym
```

Device		Product		Device	
Name	Type	ID	Rev	Ser Num	Cap (KB)
/dev/rdisk/c3t500009*8d0s2	GK	SYMMETRIX	5874	5400054000	5760
/dev/rdisk/c3t500009*8d1s2		SYMMETRIX	5874	54007DB000	4417920
/dev/rdisk/c3t500009*8d2s2		SYMMETRIX	5874	54007DC000	4417920
/dev/rdisk/c3t500009*8d3s2	BCV	SYMMETRIX	5874	54007DD000	4417920
/dev/rdisk/c3t500009*8d4s2		SYMMETRIX	5874	54007DE000	4417920
/dev/rdisk/c3t500009*8d5s2	R1	SYMMETRIX	5874	5400833000	4417920
/dev/rdisk/c3t500009*8d6s2	R1	SYMMETRIX	5874	5400834000	4417920
/dev/rdisk/c3t500009*8d7s2	R1	SYMMETRIX	5874	5400835000	4417920
/dev/rdisk/c3t500009*8d8s2	R1	SYMMETRIX	5874	5400836000	4417920

Dynamic LUN addressing

/dev/rdisk/c3t500009*8d9s2	SYMMETRIX	5874	5400837000	4417920
/dev/rdisk/c3t500009*8d10s2	SYMMETRIX	5874	5400838000	4417920
/dev/rdisk/c3t500009*8d11s2	SYMMETRIX	5874	5400839000	4417920
/dev/rdisk/c3t500009*8d12s2	SYMMETRIX	5874	540083A000	4417920
/dev/rdisk/c3t500009*8d13s2	SYMMETRIX	5874	540083B000	4417920
/dev/rdisk/c3t500009*8d14s2	SYMMETRIX	5874	540083C000	4417920
/dev/rdisk/c3t500009*8d15s2	SYMMETRIX	5874	540083D000	4417920
/dev/rdisk/c3t500009*8d16s2	SYMMETRIX	5874	540083E000	4417920
/dev/rdisk/c3t500009*8d17s2	SYMMETRIX	5874	540092A000	4417920
/dev/rdisk/c3t500009*8d18s2	SYMMETRIX	5874	540092B000	4417920
/dev/rdisk/c3t500009*8d19s2	SYMMETRIX	5874	540092C000	4417920
/dev/rdisk/c3t500009*8d20s2	SYMMETRIX	5874	540092D000	4417920
/dev/rdisk/c3t500009*8d21s2	SYMMETRIX	5874	5400907000	4417920
/dev/rdisk/c3t500009*8d22s2	SYMMETRIX	5874	5400908000	4417920
/dev/rdisk/c3t500009*8d240s2 GK	SYMMETRIX	5874	54000AC000	5760
/dev/rdisk/c3t500009*8d241s2 GK	SYMMETRIX	5874	54000AD000	5760

After running symcfg discover, the special device files appear in the symaccess show view output:

```
# symaccess show view licoa057_1_view -sid 54
```

```
Symmetrix ID          : 000192601254
```

```
Masking View Name     : licoa057_1_view
```

```
Initiator Group Name  : licoa057_1_hba
```

```
Host Initiators
```

```
{
  WWN   : 10000000c9767816
}
```

```
Port Group Name       : licoa057_1_port
```

```
Director Identification
```

```
{
  FA-7E:0
}
```

```
Storage Group Name    : licoa057_1_stor
```

Sym Dev			Host		
Name	Dir:P	Physical Device Name	Lun	Attr	Cap (MB)
-----		-----	----	----	-----
07DB	07E:0	c3t5000097208139918d1s*	1		4314
07DC	07E:0	c3t5000097208139918d2s*	2		4314
07DD	07E:0	c3t5000097208139918d3s*	3		4314
07DE	07E:0	c3t5000097208139918d4s*	4		4314
0833	07E:0	c3t5000097208139918d5s*	5		4314
0834	07E:0	c3t5000097208139918d6s*	6		4314
0835	07E:0	c3t5000097208139918d7s*	7		4314
0836	07E:0	c3t5000097208139918d8s*	8		4314
0837	07E:0	c3t5000097208139918d9s*	9		4314
0838	07E:0	c3t5000097208139918d10*	a		4314
0839	07E:0	c3t5000097208139918d11*	b		4314
083A	07E:0	c3t5000097208139918d12*	c		4314

083B	07E:0	c3t5000097208139918d13*	d	4314
083C	07E:0	c3t5000097208139918d14*	e	4314
083D	07E:0	c3t5000097208139918d15*	f	4314
083E	07E:0	c3t5000097208139918d16*	10	4314
092A	07E:0	c3t5000097208139918d17*	11	4314
092B	07E:0	c3t5000097208139918d18*	12	4314
092C	07E:0	c3t5000097208139918d19*	13	4314
092D	07E:0	c3t5000097208139918d20*	14	4314
0907	07E:0	c3t5000097208139918d21*	15	4314
0908	07E:0	c3t5000097208139918d22*	16	4314
00AC	07E:0	c3t5000097208139918d24*	f0	5
00AD	07E:0	c3t5000097208139918d24*	f1	5

More information about using initiator groups can be found in the *Storage Provisioning With EMC Symmetrix Autoprovisioning Groups Technical Note* available on EMC Powerlink®.

Conclusion

Prior to the introduction of dynamic LUN addressing, the LUN assigned to a Symmetrix volume when mapped to the FA was the LUN that was seen by the host. The only way to change this was to implement the LUN base/offset skip adjustment feature. This limited the user to a single base value and offset for all devices assigned to a host HBA. With dynamic LUN addressing, the user now has complete control over what LUN is assigned to each device masked to an HBA, regardless of what LUN that device was assigned when mapped to the Symmetrix FA.

Copyright © 2009 EMC Corporation. All Rights Reserved.

EMC believes the information in this publication is accurate as of its publication date. The information is subject to change without notice.

THE INFORMATION IN THIS PUBLICATION IS PROVIDED "AS IS." EMC CORPORATION MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THE INFORMATION IN THIS PUBLICATION, AND SPECIFICALLY DISCLAIMS IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Use, copying, and distribution of any EMC software described in this publication requires an applicable software license.

For the most up-to-date listing of EMC product names, see EMC Corporation Trademarks on EMC.com.

All other trademarks used herein are the property of their respective owners.