

Asia Pacific Processing Centre

Technical Services- Storage Operations (Mid Range)

VOLUME: **PROCEDURES & WORK INSTRUCTIONS**

DOCUMENT: **EMC SOLUTION ENABLER IMPLEMENTATION/ADMINISTRATION**

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1. INTRODUCTION

APPC initially had the two datacenters within Singapore using Synchronous replication technologies by EMC and HDS across the datacenters. With the proximity risk identified with this setup having two datacenters in Singapore, there was a project initiated and completed during 2007 to have the COB datacenter to be setup in Hong Kong. There are separate storage management workstations (Sun servers) in each location connected to frames situated in respective location. Regional storage operations supports all storage related activities including Device masking, Time finder mirror/clone operations, SRDF synchronous and asynchronous operations, which are explained in rest of the document.

1.1 Objective

The objective of this document is to cover current SE host setup and establish procedure to perform storage related activities like Device masking, BCV operations, SRDF operations using Solution Enabler application.

1.2 Scope

The scope is limited to the environment listed below.

- Applies only to a SAN Control Workstations running SOE version of Solaris
- Applies to EMC Solutions Enabler CLI only.

1.3 Roles and Responsibilities

The Regional Storage operations supports all the activities pertaining to storage to support the symmetrix configuration changes, Disk allocations, Time Finder/Clone operations, SRDF operations. Here is some of the major responsibilities which storage team is adhering with.

- System side changes like OS upgrades, hardware upgrades, VTM patching, Monitoring of filesystems, Monitoring of hardware and other system services, faulty component replacements, alert configurations will not be taken by storage operations. Platform will be responsible for these activities..
- Storage operation ensures correct version of Solution enabler and other SE related parameters are in place in accordance with GDSE document.
- Regional storage operations maintains the EMC storage frame inventory and ensures frames added and old frames removed from SE servers. This will be reviewed and updated on a monthly basis. Also this would be updated in between if these are major changes happening within the specified period.
- Regional Storage operations are responsible for ensuring the frames are connected to appropriate SE servers in accordance with environment (PRD/COB/UAT).
- Users created under storageonly group will be owned by storage operations. It is Storage operation's responsibility to get User IDs removed right after team member is relieved from team/organisation.
- Regional storage operations ensures HA servers are in sync with primary SE servers in terms of configurations, connectivity to use in case primary server is not accessible.
- In hosts, other than storage management stations, installed with Solution enabler, storage operations is not responsible for any above mentioned activities. Platform SA is held responsible.

2 INSTALLATION PREPARATION

At this time, All existing SAN control management stations are upgraded to SE 6.4. Following is the procedure to install/upgrade to SE 6.4.

2.1 Host

An SOE Solaris version 8 or 10 host is required to install SE 6.4. The host should be connected to the SAN fabrics to which the Symmetrix storage arrays that are to be managed are connected. For redundancy, there should be a minimum of two hosts managing the same set of Symmetrix storage arrays. These hosts do NOT require shared storage (clustering configuration) from the SAN; At least two gatekeeper devices should be zoned and masked to the host from every Symmetrix array that is to be managed. The SE application can also be installed on hosts running business applications. The SA of such hosts would be able to use Timefinder/clone functionality on the Symmetrix devices assigned to the host without requiring any assistance from the Storage operations.

2.2 Symmetrix Security

2.2.1 SYMACL Permissions

Not implemented at this time.

2.2.2 VCMDB Access

Before a SAN management server can issue LUN masking commands such as symmask or symmaskdb, it must have access to the VCMDB device for each Symmetrix storage array that it will manage. Application hosts using SE to manage clones will also need to have VCMDB access.

Although the “VCMDB_restricted_access” parameter, which enables you to restrict access to the device-masking database, is still supported on older Symmetrix architecture, it will no longer be the recommended method to secure the VCMDB (not supported). In case of symmetrix boxes running with 5771 and above, we need to dedicate one pair of FAs for a SE host’s VCM device by default assigned to all FAs so need to unmap VCM device from all other that dedicated FAs connected to the SE hosts. VCMDB restrict access “is not applicable from 5771 code onwards.

3.3 Licensing

Citigroup does not have a blanket license agreement for all components of SE. Hence, only the license keys for basic licensed functions are bundled in the install package. The license keys for the following functionality are provided as a baseline in the default symapi_licenses.dat file:

BASE: Enables the Base component
 Configuration Mgr: Enables the Symmetrix Configuration Change component.
 DevMasking: Enables the Device Masking component

DeltaMark: Enabled ChangeTracker
 SYMAPI Server: Enables the Remote SYMAPI Server (network) operations

If we purchased any of your Symmetrix with the Citigroup “High Availability” bundle, then we will also need to install license keys for certain SRDF and TimeFinder products.

We will need to install any of the following additional license keys¹ that we obtained from EMC for our site by using the “symlmf” SYMCLI command. Alternatively, keys for an existing management server can be edited into the symapi_licenses.dat file.

SRDF or SRDF/Synchronous: Enables the SRDF component
 SRDF/A: Enables the SRDF/A component
 SRDF/DM: Enables the SRDF/Data Mover component
 SRDF/Consistency Groups Enables SRDF/Consistency Groups (needed for MSC)
 TimeFinder/Consistency Group Enables TF/Consistency Groups
 TimeFinder/Mirror: Enables the TimeFinder (BCV control) component
 TimeFinder/Clone: Enables the TimeFinder (Clone control) component

¹

3. INSTALLATION

3.1 Installing SE 6.4 on Solaris 8 and 10

3.1.1 System Requirements

Minimum amount of disk space needed: 383 MB

Minimum PowerPath Version: v4.5.0

- Run the following command to get the PowerPath version on your system:

```
# powermt version
```

Verify semaphore settings in the /etc/system file (reboot required if changes are made)

```
set semsys:seminfo_semmni=600
set semsys:seminfo_semmns=600
set semsys:seminfo_semume=600
set semsys:seminfo_semmnu=600
set shmsys:shminfo_shmmax=1048576
set shmsys:shminfo_shmmni=600
```

3.1.2 Pre-Installation Procedure

Before installing the Solutions Enabler software on the server, verify the following:

1. The host must be properly zoned to the Symmetrix storage array that it will manage. Once zoned, the host should be configured to see the VCMDB device (e.g. For Solaris 8 hosts, persistent bindings set in lpfc.conf and entries to discover LUN 0 in sd.conf).
2. Ensure VCM device is assigned (mapped) to only those FAs connected to host, but not to rest of FAs.

3.1.3 Package Installation

1. If this is an upgrade, run the following command to update the configuration database:

```
# symcfg discover
```

If this is a new installation, proceed to Step 9 in this section.

2. Create a backup of the VCMDB:

```
# symmaskdb -sid SymmID backup -file BackupFilename
```

3. Check to see if GNS is enabled on the server by looking in the options file in the /var/symapi/config directory. If not, ensure that device groups and composite groups defined on this server are restored after Solutions Enabler is upgraded. See the post-installation instructions for the procedure.

4. Stop all Solutions Enabler daemons:

```
# stordaeon shutdown all -immediate
```

5. Stop the symapi server:

```
# symapisrv stop
```

6. Make a backup copy of the /var/symapi/db directory:

```
#find /var/symapi/db -print -depth|cpio -pcvmud /var/tmp/symapi_bk/db_old
```

7. Make a backup copy of the **/var/symapi/config** directory:

```
#find /var/symapi/config -print -depth|cpio -pcvmud /var/tmp/symapi_bk/config_old
```

8. Perform a backup of the system if possible.

9. Run the following commands to create the installation directory:

```
# mkdir /export/opt/emc
# cd /opt
# ls emc
```

10. Run the install script on the network share:

```
# cd /net/stealth/export1/home1.localhost/sw/PKG/emcsolen642
# ./se6423_install.sh -install
#-----
# EMC Installation Manager
#-----
Copyright 2007, EMC Corporation
All rights reserved.
The terms of your use of this software are governed by the
applicable contract.
Solutions Enabler Native Installer[RT] Kit Location :
/net/stealth/export1/home1.localhost/sw/PKG/emcsolen642

Install root directory of previous Installation : /opt/emc
Do you want to change Install root Directory. [N] :
Install root directory : /opt/emc ☐ ☐ /opt/emc should always be specified.
Working root directory : /opt/emc ☐ ☐ /opt/emc should always be specified.
Checking for OS version compatibility.....
Checking for previous installation of Solutions Enabler.....
Checking for previous installation version.....
There is a previous version of SYMCLI installed on this host
named [/opt/emc/SYMCLI/V6.4.2]
Do you want to save /SYMCLI/V6.4.2? [N]:n
Checking for active processes.....
Checking for /usr/symcli/storbin/cimserver...
Checking for /usr/symcli/bin/symapisrv...
Checking for active SYMCLI components...
Install All EMC Solutions Enabler Shared Libraries and Run Time Environment ? [
```

```

Y]:y
Install EMC Solutions Enabler 64-bit Shared Libraries ? [N]:n
Install Symmetrix Command Line Interface SYMCLI ? [Y]:y
Install EMC Solutions Enabler SRM Database Run Time Components ? [N]:y
SRM ORACLE Database Components ? [N]:n
SRM INFORMIX Database Components ? [N]:n
SRM SYBASE Database Components ? [N]:n
SRM UDB Database Components ? [N]:n
Install Option to Enable JNI Interface for EMC Solutions Enabler APIs ? [N]:n
Install Option to Enable EMC Solutions Enabler Star Component ? [N]:y
Install Option to Enable EMC Solutions Enabler SYMRECOVER Component ? [N]:y
Do you want to change default permission on /var/symapi directory from [755]? [
N]:y
Valid permission mask for /var/symapi directory is [7][01457][01457].
Enter the permission mask to be set for /var/symapi directory :775
Checking for disk space availability....
Persistent data files exist in directory[/usr/emc/API/symapi]...
Do you want to MOVE this data to /usr/emc/API/symapi_old? [N]: n ☐ ☐ Specify N to preserve existing config
and data files (e.g. daemon_options, symavoid, options)
Uninstalling previous installation of Solutions Enabler.
It may take some time. Please wait...
Uninstallation of previous installation of Solutions Enabler was successful.
A copy has been saved to [/opt/emc/SYMCLI/symcli_old].
Non interactive installation using pkgadd.
Installing SYMdcore.....
Installing SYMdbase.....
Installing SYMcore.....
Installing SYMstrbse.....
Installing SYMstrful.....
Installing SYMsrbse.....
Installing SYMsymcli.....
Installing SYMstarp.....
Installing SYMsymrec.....

The previous version of SYMCLI that was saved during this installation
now exists in [/opt/emc/SYMCLI/symcli_old]
Do you want to remove the symcli_old directory [y]: n
Enabling stordaeamon...
Do not forget to run 'symcfg discover' if this is your first
install or whenever your configuration changes.
You may need to manually rediscover remotely connected
arrays. Please see the installation notes for more

#-----
# The following HAS BEEN INSTALLED in /opt/emc via the pkgadd utility.
#-----
ITEM PRODUCT VERSION
01 EMC Solutions Enabler V6.4.2.3
RT KIT
#-----

```

3.1.4 Post-Installation Configuration

1. Set the following in the **.profile** file:

```
# vi .profile
PATH=$PATH:/usr/storapi/bin:/usr/storapi/storbin:.
MANPATH=$MANPATH:/usr/storapi/man:/usr/storapi/storman
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/storapi/shlib:.
export PATH MANPATH LD_LIBRARY_PATH
```

Before using the SYMCLI, create the “symcli.sh” file and include these below lines as given in the sample. These are basically to set the executable paths and to have some of the environmental variables for symcli to work smoothly and also to set the MANPATH for commands help.

Sample:

```
#cd /usr/symcli
#pwd
/usr/symcli
#vi symcli.sh ( include the following lines in the file)
export PATH=$PATH:/usr/symcli/bin:
MANPATH="${MANPATH}:/usr/symcli/man"
export MANPATH
BCV_LOG=/usr/symcli/bcv.log
export BCV_LOG
SYMCLI_WAIT_ON_DB=1
export SYMCLI_WAIT_ON_DB
SYMCLI_WAIT_ON_GK=1
export SYMCLI_WAIT_ON_GK
# #cat symcli.sh
export PATH=$PATH:/usr/symcli/bin:
MANPATH="${MANPATH}:/usr/symcli/man"
export MANPATH
BCV_LOG=/usr/symcli/bcv.log
export BCV_LOG
SYMCLI_WAIT_ON_DB=1
export SYMCLI_WAIT_ON_DB
SYMCLI_WAIT_ON_GK=1
export SYMCLI_WAIT_ON_GK
```

2. The **symapi_licenses.dat** file should be created in the **/var/symapi/config** directory with the following entries (if this was an upgrade, the prior symapi_licenses.dat file should’ve been preserved):

```
# cat symapi_licenses.dat
```

License Key: 7FBE-9150-E0BC-9CCD SYMAPI Feature: BASE / Symmetrix
 License Key: C7B7-B992-1954-4D99 SYMAPI Feature: DeltaMark / Symmetrix
 License Key: A97E-6602-DABA-9E2A SYMAPI Feature: DevMasking / Symmetrix
 License Key: A936-39CD-A0FF-CDC5 SYMAPI Feature: ConfigChange / Symmetrix

3. If any additional licenses need to be registered, run the following command to register them:

symlmf

4. Assign gatekeepers and vcm device to the server if that hasn't already been done.

5. Run the following command to build the configuration (SYMAPI) database:

symcfg discover

6. Start the **storevntd** and **storsrvd** daemons:

7. Run the following command to start the storevntd and storsrvd automatically after a system reboot.

3.1.5 Uninstall Procedure

To completely remove SE on the server, do the following:

```
# ./se6423_install.sh -uninstall
#-----
# EMC Installation Manager
#-----
Copyright 2007, EMC Corporation
All rights reserved.
The terms of your use of this software are governed by the
applicable contract.
Solutions Enabler Native Installer[RT] Kit Location : /net/stealth/export1/home
1.localhost/sw/PKG/emcsolen642
Checking for OS version compatibility.....
Checking for previous installation of Solutions Enabler.....
Checking for previous installation version.....
Checking for active processes.....
Checking for /usr/symcli/storbin/cimserver...
Checking for /usr/symcli/bin/symapisrv...
Checking for active SYMCLI daemons...
WARNING: Daemon[storapid] is running.
WARNING: Daemon[storwatchd] is running.
Do you want to shutdown SYMCLI daemons [Y] or Exit setup [X]? [Y] : y
Disabled SE Daemons restarts for 10 minutes
```

storapid Told to shutdown

Waiting for daemon(s) to shutdown. This may take several seconds. sangs2# stordaeon install storevntd - autostart sangs2# stordaeon install storsrvd -autostart sangs2# stordaeon start storevntd Waiting for daemon to start. This may take several seconds. [/var/symapi/config] sangs2# stordaeon start storsrvd Waiting for daemon to start. This may take several seconds. [/var/symapi/config] sangs2#

storwatchd Told to shutdown

Checking for active SYMCLI components...

Uninstalling SYMsymcli.....

Uninstalling SYMstrful.....

Uninstalling SYMsrmbs.....

Uninstalling SYMstrbse.....

Uninstalling SYMcore.....

Uninstalling SYMdsbase.....

Uninstalling SYMdcore.....

Solutions Enabler successfully uninstalled from your system.

#

3.2 Backing Out of an Upgrade

If it is needed to back out of a SE upgrade, do the following:

1. Verify that a backup copy of the old version in the **/opt/emc/SYMCLI/symcli_old/** directory.
2. Uninstall the current version of the SE:
3. Install the prior version of SE that was installed on the server before the upgrade.
4. If GNS was not enabled on the server, copy the backup copy of the SYMAPI database into the **/var/symapi/db**
5. Copy the old **symapi_licenses.dat** file back to the **/var/symapi/db** directory:

```
# cp /var/tmp/symapi_bk/config_old/var/symapi/config/symapi_licenses.dat /var/symapi/config
```

6. Copy the backup copy of the **options** and **daemon_options** file back to the **/var/symapi/config** directory.
7. Run the following command to rebuild the configuration (SYMAPI) database:

```
# symcfg discover
```

\

4. CURRENT HOST SETUP

Two servers with SOE Solaris version 10 in each location (TPK, CINTECH, and HK) are zoned with to all symmetrix boxes that are to be managed.

For redundancy ,there are two hosts managing same set of symmetrix storage arrays in each location (Telepark,Cintech,HK).These hosts do NOT require shared storage (clustering configuration) from the SAN.Atleast two gatekeeper devices are zoned and masked to the host from every symmetrix array that is to be managed .Note that Gatekeeper management provided by (GK_MGMT = ENABLE in options file) Base daemon for all SYMAPI/CLI clients that require access to symmetrix arrays. This alleviates contention when there are limited Gatekeeper resources available and also eliminates the need for every client to constantly select, open, lock, and ping for an available gatekeeper device for online function.

Solution enabler also installed on hosts (both HP and SUN), other than storage management servers , running business applications. Platform is responsible to take care of Time finder/clone operations on devices assigned to these hosts.

4.1 Telepark Setup

There are two hosts ssunsmm02 and ssunacs4 (SOE Solaris version 10) are zoned with to all symmetrix boxes located in TPK.

Environment	Symmetrix Box	Model
PRD	287891012	3000-M2
PRD	287891013	3000-M2
PRD/COB	290101153	DMX3-24
PRD/COB	290102246	DMX3-24
PRD	290102849	DMX4-24
PRD	290102881	DMX4-24
PRD	290102928	DMX4-24
PRD/COB	290103426	DMX4-24
PRD	287460986	1000S-M2
PRD	287890647	3000-M2
PRD/COB	287890702	3000-M2

At least two gatekeeper devices are zoned and masked to the host from every symmetrix array that is to be managed

4.2 Cintech Setup

4.2.1 Production/COB Environment

There are two hosts ssunsmm01 and ssunacs2 (SOE Solaris version 10) are zoned with to all PRD/COB symmetrix boxes located in Cintech.

Environment	Symmetrix Box	Model
COB	287752087	2000S-M2
COB	287752095	2000S-M2
PRD/COB	290101923	DMX3-24
PRD/COB	290102337	DMX3-24
COB	290102770	DMX4-24
COB	290102906	DMX4-24
COB	290102933	DMX4-24
PRD	290103119	DMX4-24
COB	290103388	DMX4-24
PRD/COB	290103429	DMX4-24
PRD/COB	287751452	2000S-M2

4.2.2 UAT Environment

There are two hosts ssunu45 and ssun4d (SOE Solaris version 10) are zoned with to all UAT symmetrix boxes located in Cintech.

Environment	Symmetrix Box	Model
UAT	290100937	DMX3-24
UAT	287750833	2000S-M2
UAT	287751170	2000S-M2
UAT	287890720	3000-M2

4.3 HK setup

There are two hosts hsunsmm02 and hsunacs04 (SOE Solaris version 10) are zoned with to all COB symmetrix boxes located in HK.

Environment	Symmetrix Box	Model
COB	290101048	DMX3-24
COB	290101102	DMX3-24
COB	290101144	DMX3-24
COB	290101205	DMX3-24
COB	290101320	DMX3-24

COB	290101389	DMX3-24
COB	290101429	DMX3-24
COB	290101456	DMX3-24
COB	290101517	DMX3-24
COB	290101587	DMX3-24
COB	290101739	DMX3-24
COB	290102340	DMX3-24
COB	290103014	DMX4-24
COB	290103030	DMX4-24
COB	290103064	DMX4-24
COB	290103575	DMX4-24

5. DEVICE MASKING

With the growing complexity in the storage arena, it is always possible that each of the storage connection ports are connected to many hosts. With some control implementations in place, it is possible for all the hosts to see all the devices allocation to the respective fibre adapter/scsi adapter. This may cause potential risk and the control could be in place using the devmasking feature of the solution enabler. This feature configures the specific WWN of the host HBA to see the specific devices on the storage frame EMC through a specific FA ports.

The primary requisite for this is to have a host connected to the Symmetrix on which the base solution enabler is installed and the devmasking feature is enabled which is the control station host. The first host connection to whichever FA on the new/existing Symmetrix frame, the corresponding FA should be VCMBIT turned on which means masking feature ON on the EMC frame FA. Then the VCMDB device (volume control manager database) on the frame needs to be initialised using the control station host, and then devmasking is to be configured for hosts connected to the Symmetrix (for those FA which are vcmbit turned on).

5.1 Device Masking – Addition

1. Solution enabler BASE must be installed as a pre-requisite as per the installation procedure as above.
2. Devmasking license should be installed using the symmlf command as in the installation procedure stated above.
3. Make sure the connectivity is established to the control host. Check with storage team/vendor for the connection details. The devmasking configuration for Cintel frames should be done from ssunsmm01 and for Telepark frames should be done from ssunsmm02 server.
4. Initialise the VCMDB database on the required Symmetrix using symmaskdb command. The sample is shown below

```
$pbrun symmaskdb -sid <SymmID> [-noprompt] -file <FileName> init
```

The database is successfully initialised by this command.

5. You can list the database entries using the following command. A sample output is as below.

```
bash-3.00$ pbrun symmaskdb -sid 2881 list database
```

Symmetrix ID : 000290102881

Database Type : Type6

Last updated at : 09:04:06 PM on Wed Jun 18,2008

Director Identification : FA-3A

Director Port : 0

Identifier	Type	User-generated Node Name	Port Name	Devices
50060b000010503a	Fibre	shpp04	pathA	01FC
			03C2	
			03C6	
			03CA	
			03CE	
			03D2	
			03D6	
			03DA	
			03DE	

6. Create a directory /etc/hostcfg/XXXX/YY where XXXX is the last four digits of the symmetrix Serial number and YY is platform. The sample of the directories is as below.

```
bash-3.00$ pwd
/etc/hostcfg/Masking/2881
bash-3.00$ ls
HP
```

7. Create a file with the hostname.add to add the device configurations using the symmask command and execute to add the devices. The sample is as below.

```
bash-3.00$ ls -lrt
-rwxrwxr-- 1 pr72496 storageonly 437 Jan 14 18:17 shpp19.add
-rwxrwxr-- 1 pr72496 storageonly 692 Jan 14 21:37 shpp29ia.add
-rwxrwxr-- 1 pr72496 storageonly 843 Jan 14 21:41 shpp28ia.add
-rwxrwxr-- 1 pr72496 storageonly 1426 Jan 14 23:01 shpp30ia.add
-rwxrwxr-- 1 pr72496 storageonly 358 Jan 19 22:02 shpp21.add
-rwxrwxr-- 1 pr72496 storageonly 773 Jan 19 22:54 shpp20.add
-rw-r--r-- 1 ns95937 storageonly 279 Feb 17 19:50 shpp03.add
-rw-rwxr-- 1 pr72496 storageonly 895 Mar 16 18:39 shpp31.add
```

```

-rwxrw-r-- 1 pr12282 storageonly 3068 Apr 15 13:31 shpp10.add
-rwxrwxr-- 1 pr72496 storageonly 803 Apr 27 19:55 shpp18.add
-rw-rwxr-- 1 pr72496 storageonly 14795 May 18 12:41 shpp80.add
-rwxrw-r-- 1 pr12282 storageonly 11482 May 18 12:43 shpp81.add
-rwxrw-r-- 1 pr12282 storageonly 13587 May 18 12:44 shpp82.add
-rwxrw-r-- 1 pr12282 storageonly 12528 May 18 12:48 shpp83.add
-rw-rwxr-- 1 pr72496 storageonly 7138 May 18 12:53 shpp04.add
-rw-rwxr-- 1 pr72496 storageonly 1398 Jun 9 15:31 shpp92.add
bash-3.00$ cat shpp92.add
##5001438001109592 7aA/8aA
##50014380011098d2 9aA/10Aa
## LUN Duplication request .. 203 (Shared with shpp86)
pbrun symmask -sid 2881 -wwn 5001438001109592 -dir 7a -p 0 add dev 2CC,2CF,2D3,2D7,2DB -nop
pbrun symmask -sid 2881 -wwn 5001438001109592 -dir 8a -p 0 add dev 2CC,2CF,2D3,2D7,2DB -nop
pbrun symmask -sid 2881 -wwn 50014380011098d2 -dir 9a -p 0 add dev 2CC,2CF,2D3,2D7,2DB -nop
pbrun symmask -sid 2881 -wwn 50014380011098d2 -dir 10a -p 0 add dev 2CC,2CF,2D3,2D7,2DB -nop
####SMS:1182 :DEVICES added ::on 13th April,2008
#pbrun symmask -sid 2881 -wwn 5001438001109592 -dir 7a -p 0 add dev 07B6,07BA,07BE,07C2
#pbrun symmask -sid 2881 -wwn 5001438001109592 -dir 8a -p 0 add dev 07B6,07BA,07BE,07C2
#pbrun symmask -sid 2881 -wwn 50014380011098d2 -dir 9a -p 0 add dev 07B6,07BA,07BE,07C2
#pbrun symmask -sid 2881 -wwn 50014380011098d2 -dir 10a -p 0 add dev 07B6,07BA,07BE,07C2

```

Note : The information required such as FA names, HBA WWNs, and EMC device numbers are taken from corresponding SMS request .Platform raise SMS request providing server,hba,frame,FA and other system related details and storage operations process the request and update device details in SMS.For further details abt disk allocation procedure ,please refer PCM “[Disk allocation procedure](#)”

8. Use the following command to backup the vcmdb database backup onto a file for any recovery purposes. The sample command is as below.

```

bash-3.00$ pbrun symmaskdb -sid 2881 -file xxx backup
Backup Symmetrix SymMask database on Symmetrix 000290102881 to backup file
xxx (y/[n])? y
Symmetrix SymMask database backed up to file xxx
from Symmetrix 000290102881

```

6. TIME FINDER OPERATIONS

6.1 Time Finder /Mirror Operations

Symmetrix Time Finder is a business continuance solution that allows you to use special Symmetrix devices called business continuance volumes (BCVs). A BCV device contains a copy of data from a standard Symmetrix device that is online for regular I/O operation from its host(s). Uses for the BCV copies can include backup, restore, decision support, and applications testing. Each BCV device has its own host address, and is configured as a stand-alone Symmetrix device. A business continuance sequence first involves establishing the BCV device as a mirror of a specific standard Symmetrix device. As a result, the BCV device becomes inaccessible via its original device address while it is in an established pair. Once the BCV device is synchronized, it may be separated (split) later from the standard device with which it is paired. Once split, the

BCV device with the synchronized data becomes available for backup or other host processes through its original device address. Once host processing on the BCV device is complete, the BCV may again be mirrored to a standard Symmetrix device, which can either be the same

This covers Time finder /Mirror configurations available on solution enabler hosts (storage management stations) for midrange symmetrix boxes only. This covers only symm-5 and symm-6 frames only. It covers only time finder /mirrors operations on R2-BCVs only.

Procedure

1. The implementation will be done for Symmetrix 5 configurations and above and does not cover for any lower configuration of storage frames
2. The management of the devices in terms of Time finder /Mirror operations will be done centralized for all the platforms for Midrange
3. This implementation is covering only the servers, which are connected through Fabric SAN switches and does not cover any servers/devices using the SCSI connections
4. Create a directory /etc/hostcfg/COB/XXXX/COB-<location> ,where XXXX is four digit symmetrix serial number and location (Cintech/TPK/HK)

```
bash-3.00$ pwd
/etc/hostcfg/COB/1923/COB-Cintech
```

5. Create a file with <date>r2tobcv ,where date is in dd-month-yy format

```
bash-3.00$ cat 16sep2007r2tobcv
C1B 1039
C1E 103C
```

6. Create R2-BCV and do full establish using this file

```
bash-3.00$ pbrun symmir -sid 1923 -f 16sep2007r2tobcv est -full -nop
ssunsmm01
```

'Full Establish' operation execution is in progress for the device list in device file '16sep2007r2tobcv'. Please wait...

'Full Establish' operation successfully initiated for the device list in device file '16sep2007r2tobcv'.

```
bash-3.00$ pbrun symmir -sid 1923 -f 16sep2007r2tobcv query
ssunsmm01
```

Device File Name : 16sep2007r2tobcv
 Device's Symmetrix ID : 000290101923

Standard Device			BCV Device		State
Logical	Inv. Sym	Tracks	Logical	Inv. Sym	Tracks STD <=> BCV
N/A	0C1B	0	N/A	1039	759470 SyncInProg
N/A	0C1E	0	N/A	103C	259580 SyncInProg
Total	-----			-----	
Track(s)		0		1019050	
MB(s)		0.0		31845.3	

Legend:

(*): The paired BCV device is associated with this group.

7. These BCVs should always be in sync and will be split only if requested for COB drill .For further detail abt COB drill procedure ,refer "COB document"

6.2 Time Finder clone operations

Time Finder Clone software for EMC DMX allows the creation of one or more point-in-time copies of a source volume within the same storage array. The copies can be onto standard protected storage and hence are an attractive alternative to using BCVs. Also, clones are not subject to mirror position limitations, which permits their usage in certain SRDF environments (e.g. concurrent SRDF source volumes) where BCVs cannot be used. Use of clone technology requires a TimeFinder Clone license for the DMX.

Procedure

At the moment, Time finder clone operations are used in Flexicube (For BO reporting) and Trasactors (for online backups) .These operations are carried out only by platform .It is not within scope of Storage operations.

7 .SRDF OPERATIONS

SRDF provides comprehensive business continuity and restart capabilities for both planned and unplanned outages. This online, host-independent, mirrored data solution duplicates production site data on one or more physically separate target Symmetrix systems. Systems can be across the room, across the globe, or anywhere in between. Primarily, it works in two modes – synchronous and asynchronous mode SRDF Synchronous Mode is used primarily in SRDF campus environments. In this mode of operation, Symmetrix maintains a real-time mirror image of the data of the remotely mirrored volumes. Data on the source (R1) volumes and the target (R2) volumes are always fully synchronized at the completion of an I/O sequence through a first-in, first-out queue (FIFO) model. All data movement is at the block level with synchronized mirroring. SRDF/Asynchronous (SRDF/A) is a remote mirroring solution for the Symmetrix DMX series. It uses a Delta Set architecture to maintain a consistent point-in-time target (R2) image with only a slight lag behind the source (R1) side, resulting in minimal data loss if the R1 is lost. SRDF/A allows one to configure an SRDF environment in which R1 devices transfer data to R2 devices in chunk cycles

APPC initially had the two datacenters within Singapore using Synchronous replication technologies by EMC and HDS across the datacenters. With the proximity risk identified with this setup having two datacenters in Singapore, there was a project initiated and completed during 2007 to have the COB datacenter to be setup in Hong Kong. The long distance replication could not be done synchronously due to the latency which could put production servers at performance risks for write I/Os, the asynchronous long distance replication technologies such as SRDF/A are being used to accomplish this. There is an RPO of 2 MS with this kind of setup, which is agreed by the business with this kind of long distance replication.

7.1 SRDF – SYNC LEG

1. Solution enabler BASE Must be installed as a pre-requisite as per the installation procedure as above.
2. SRDF license should be installed using symlmf command as in the installation stated below
3. If it is new setup, identify RA ports and get zoning done between PRD frame and COB frame
4. Create RDF group with RDF grp “1” and label “GRP-S”

```
bash-3.00$ pbrun symrdf addgrp -label GRP-S -rdfg 1 -sid 1012 -dir 7d,8d,9d,10d -remote_rdfg 1 -remote_sid 000287752087 -remote_dir 7d,8d,9d,10d
```

Execute a Dynamic RDF Addgrp operation for group
'GRP-S' on Symm: 000287891012 (y/[n]) ? y

Successfully Added Dynamic RDF Group 'GRP-S' for Symm: 000287891012

5. Create pair and add devices in newly created RDF group (RDG grp 1)

```
bash-3.00$ pbrun symrdf createpair -f 7thJan2008r1tor2 -sid 1012 -rdfg 1 -type rdf1 -invalidate r2
```

Execute an RDF 'Create Pair' operation for device file
'bootdevices_1012' (y/[n]) ? y

An RDF 'Create Pair' operation execution is in progress for device
file 'bootdevices_1012'. Please wait...

```
Create RDF Pair in (1012,01).....Done.
Mark target device(s) in (1012,01) to refresh from source.....Started.
Devices: 044E-0451 in (1012,01)..... Marked.
Devices: 02C3-02C7, 0440-0444 in (1012,05)..... Marked.
Devices: 0257-025B, 02A5-02A8 in (1012,05)..... Marked.
Mark target device(s) in (1012,05) to refresh from source.....Done.
Mark target device(s) in (1012,05) for full copy from source....Started.
Devices: 0247-024B, 0295-0299 in (1012,05)..... Marked.
Devices: 02B3-02B7, 0430-0434 in (1012,05)..... Marked.
Devices: 043E-0441 in (1012,05)..... In Progress.
Devices: 043E-0441 in (1012,05)..... Marked.
Mark target device(s) in (1012,05) for full copy from source....Done.
```

The RDF 'Create Pair' operation successfully executed for device
file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 1 query
```

```
Symmetrix ID          : 000287891012
Remote Symmetrix ID   : 000290101102
RDF (RA) Group Number : 5 (04)
```

Source (R1) View				Target (R2) View				MODES	
-----				-----					
ST	LI	ST		ST	LI	ST			
Standard	A	N	A	Standard	A	N	A		
Logical	T R1 Inv	R2 Inv	K	Logical	T R1 Inv	R2 Inv	K	RDF Pair	
Device Dev	E Tracks	Tracks	S	Device Dev	E Tracks	Tracks	S	MDA	STATE
-----				-----					
N/A	0430 RW	0 1381050	NR 0440 WD	0	80 S..	Suspended			
N/A	0247 RW	0 1381050	NR 0257 WD	0	182 S..	Suspended			
N/A	043E RW	0 1104840	NR 044E WD	0	366 S..	Suspended			
N/A	0295 RW	0 1381050	NR 02A5 WD	0	64 S..	Suspended			
N/A	02B3 RW	0 1381050	NR 02C3 WD	0	314 S..	Suspended			
Total									
Track(s)	0 6629040		0 1006						
MB(s)	0 207158		0 31						

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy
D(omino) : X = Enabled, . = Disabled
A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

bash-3.00\$

6. By default, RDF pair state will be in "suspended" state and mode will be in sync mode no need to change to Adaptive copy mode and establish.

bash-3.00\$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 set mode acp_disk

Execute an RDF Set 'ACp Disk Mode ON' operation for device
file 'bootdevices_1012' (y/[n]) ? y

An RDF Set 'ACp Disk Mode ON' operation execution is
in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'ACp Disk Mode ON' operation successfully executed
for device file 'bootdevices_1012'.

bash-3.00\$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 query

Symmetrix ID : 000287891012
Remote Symmetrix ID : 000290101102
RDF (RA) Group Number : 5 (04)

Source (R1) View				Target (R2) View				MODES	
-----				-----				-----	
ST	LI	ST		ST	LI	ST			
Standard	A	N	A						
Logical	T R1 Inv	R2 Inv	K	T R1 Inv	R2 Inv			RDF Pair	
Device	Dev E Tracks	Tracks	S Dev E Tracks	Tracks	MDA	STATE			

N/A	0430 RW	0	1381050 NR	0440 WD	0	80 C.D	Suspended		
N/A	0247 RW	0	1381050 NR	0257 WD	0	182 C.D	Suspended		
N/A	043E RW	0	1104840 NR	044E WD	0	366 C.D	Suspended		
N/A	0295 RW	0	1381050 NR	02A5 WD	0	64 C.D	Suspended		
N/A	02B3 RW	0	1381050 NR	02C3 WD	0	314 C.D	Suspended		
Total -----									
Track(s)	0	6629040		0	1006				
MB(s)	0	207158		0	31				

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy
D(omino) : X = Enabled, . = Disabled

A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 establish
```

Execute an RDF 'Incremental Establish' operation for device file
'bootdevices_1012' (y/[n]) ? y

An RDF 'Incremental Establish' operation execution is in progress for device
file 'bootdevices_1012'. Please wait...

```
Suspend RDF link(s) for device(s) in (1012,05).....Done.
Merge track tables between source and target in (1012,05).....Started.
Devices: 0247-024B, 0295-0298 in (1012,05)..... Merged.
Devices: 02B3-02B7, 0430-0434 in (1012,05)..... Merged.
Devices: 043E-0441 in (1012,05)..... Merged.
Merge track tables between source and target in (1012,05).....Done.
Resume RDF link(s) for device(s) in (1012,05).....Started.
Resume RDF link(s) for device(s) in (1012,05).....Done.
```

The RDF 'Incremental Establish' operation successfully initiated for device
file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 query
```

```
Symmetrix ID          : 000287891012
Remote Symmetrix ID   : 000290101102
RDF (RA) Group Number : 5 (04)
```

Source (R1) View				Target (R2) View				MODES		
-----				-----				-----		
ST	LI	ST		ST	LI	ST				
Standard	A	N	A							
Logical	T R1 Inv	R2 Inv	K	T R1 Inv	R2 Inv			RDF Pair		
Device	Dev	E Tracks	Tracks	S Dev	E Tracks	Tracks	MDA	STATE		
-----				-----				-----		
N/A	0430 RW	0	1301555 RW	0440 WD	0	74 C.D	SyncInProg			
N/A	0247 RW	0	1289723 RW	0257 WD	0	54 C.D	SyncInProg			
N/A	043E RW	0	1023028 RW	044E WD	0	346 C.D	SyncInProg			
N/A	0295 RW	0	1254808 RW	02A5 WD	0	58 C.D	SyncInProg			
N/A	02B3 RW	0	1280942 RW	02C3 WD	0	288 C.D	SyncInProg			
Total										
Track(s)	0	6150056		0	820					
MB(s)	0	192189		0	26					

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy
D(omino) : X = Enabled, . = Disabled
A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

7. After invalid tracks <30000, change replication mode from adaptive mode to sync mode.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 set mode sync
```

Execute an RDF Set 'Asynchronous Mode' operation for device file 'bootdevices_1012' (y/[n]) ? y

An RDF Set 'Asynchronous Mode' operation execution is in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'Asynchronous Mode' operation successfully executed for device file 'bootdevices_1012'.

7.2 SRDF – ASYNC LEG

1. Solution enabler BASE Must be installed as a pre-requisite as per the installation procedure as above.
2. SRDF license should be installed using symlmf command as in the installation stated below
3. If it is new setup, identify RA ports and get zoning done between PRD frame and COB frame
4. Create RDF group with RDF grp “5” and label “GRP-A”

```
bash-3.00$ pbrun symrdf addgrp -label RDF-A -rdfg 5 -sid 1012 -dir 7c,8c,9c,10c -remote_rdfg 5 -remote_sid 1102 -remote_dir 7d,8d,9d,10d
```

Execute a Dynamic RDF Addgrp operation for group 'unixboot' on Symm: 000287891012 (y/[n]) ? y

Successfully Added Dynamic RDF Group 'RDF-A' for Symm: 000287891012

To add devices to existing RDF group .There is limitation in SRDF/A that devices shd be operated in grp.Need to disable consistency and changed mode to acp_disk mode and than createpair as mentioned above.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 disable -rdfg 5
```

Execute an RDF 'Disable' operation for device file 'bootdevices_1012' (y/[n]) ? y

An RDF 'Disable' operation execution is in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'Disable' operation successfully executed for device file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 set mode acp_disk -rdfg 5
```

Execute an RDF Set 'ACp Disk Mode ON' operation for device file 'bootdevices_1012' (y/[n]) ? y

An RDF Set 'ACp Disk Mode ON' operation execution is in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'ACp Disk Mode ON' operation successfully executed for device file 'bootdevices_1012'.

5. Create pair and add devices in newly created RDF group (RDG grp 1)

```
bash-3.00$ pbrun symrdf createpair -f bootdevices_1012 -sid 1012 -rdfg 5 -type rdf1 -invalidate r2
```

Execute an RDF 'Create Pair' operation for device file 'bootdevices_1012' (y/[n]) ? y

An RDF 'Create Pair' operation execution is in progress for device file 'bootdevices_1012'. Please wait...

```
Create RDF Pair in (1012,05).....Done.
Mark target device(s) in (1012,05) to refresh from source.....Started.
Devices: 044E-0451 in (1012,05)..... Marked.
Devices: 02C3-02C7, 0440-0444 in (1012,05)..... Marked.
Devices: 0257-025B, 02A5-02A8 in (1012,05)..... Marked.
Mark target device(s) in (1012,05) to refresh from source.....Done.
Mark target device(s) in (1012,05) for full copy from source....Started.
Devices: 0247-024B, 0295-0299 in (1012,05)..... Marked.
Devices: 02B3-02B7, 0430-0434 in (1012,05)..... Marked.
Devices: 043E-0441 in (1012,05)..... In Progress.
Devices: 043E-0441 in (1012,05)..... Marked.
Mark target device(s) in (1012,05) for full copy from source....Done.
```

The RDF 'Create Pair' operation successfully executed for device file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 query
```

```
Symmetrix ID          : 000287891012
Remote Symmetrix ID    : 000290101102
RDF (RA) Group Number  : 5 (04)
```

Source (R1) View				Target (R2) View				MODES	
ST	LI	ST		ST	LI	ST			
Standard	A	N	A						
Logical	T R1 Inv	R2 Inv	K	T R1 Inv	R2 Inv			RDF Pair	
Device Dev	E Tracks	Tracks	S Dev	E Tracks	Tracks	MDA	STATE		

```

-----
N/A  0430 RW    0 1381050 NR 0440 WD    0   80 S.. Suspended
N/A  0247 RW    0 1381050 NR 0257 WD    0  182 S.. Suspended
N/A  043E RW    0 1104840 NR 044E WD    0  366 S.. Suspended
N/A  0295 RW    0 1381050 NR 02A5 WD    0   64 S.. Suspended
N/A  02B3 RW    0 1381050 NR 02C3 WD    0  314 S.. Suspended

```

```

Total      -----
Track(s)    0 6629040          0 1006
MB(s)       0 207158          0   31

```

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy
D(omino) : X = Enabled, . = Disabled
A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

6. By default, RDF pair state will be in “suspended” state and mode will be in sync mode .So need to chane to Adaptive copy mode and establish.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 set mode acp_disk
```

Execute an RDF Set 'ACp Disk Mode ON' operation for device
file 'bootdevices_1012' (y/[n]) ? y

An RDF Set 'ACp Disk Mode ON' operation execution is
in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'ACp Disk Mode ON' operation successfully executed
for device file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 query
```

```

Symmetrix ID           : 000287891012
Remote Symmetrix ID    : 000290101102
RDF (RA) Group Number  : 5 (04)

```

Source (R1) View				Target (R2) View				MODES	
ST	LI	ST		ST	LI	ST			
Standard	A	N	A	Standard	A	N	A		
Logical	T R1 Inv	R2 Inv	K	Logical	T R1 Inv	R2 Inv	K	RDF Pair	
Device	Dev E Tracks	Tracks	S Dev E Tracks	Tracks	MDA	STATE			
N/A	0430 RW	0	1381050 NR 0440 WD	0	80 C.D	Suspended			
N/A	0247 RW	0	1381050 NR 0257 WD	0	182 C.D	Suspended			
N/A	043E RW	0	1104840 NR 044E WD	0	366 C.D	Suspended			
N/A	0295 RW	0	1381050 NR 02A5 WD	0	64 C.D	Suspended			

```
N/A 02B3 RW 0 1381050 NR 02C3 WD 0 314 C.D Suspended
```

```
Total -----
Track(s) 0 6629040 0 1006
MB(s) 0 207158 0 31
```

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy
D(omino) : X = Enabled, . = Disabled
A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 establish
```

Execute an RDF 'Incremental Establish' operation for device file
'bootdevices_1012' (y/[n]) ? y

An RDF 'Incremental Establish' operation execution is in progress for device
file 'bootdevices_1012'. Please wait...

```
Suspend RDF link(s) for device(s) in (1012,05).....Done.
Merge track tables between source and target in (1012,05).....Started.
Devices: 0247-024B, 0295-0298 in (1012,05)..... Merged.
Devices: 02B3-02B7, 0430-0434 in (1012,05)..... Merged.
Devices: 043E-0441 in (1012,05)..... Merged.
Merge track tables between source and target in (1012,05).....Done.
Resume RDF link(s) for device(s) in (1012,05).....Started.
Resume RDF link(s) for device(s) in (1012,05).....Done.
```

The RDF 'Incremental Establish' operation successfully initiated for device
file 'bootdevices_1012'.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 -rdfg 5 query
```

```
Symmetrix ID : 000287891012
Remote Symmetrix ID : 000290101102
RDF (RA) Group Number : 5 (04)
```

Source (R1) View				Target (R2) View				MODES	
ST	LI	ST		ST	LI	ST			
Standard	A	N	A	Standard	A	N	A		
Logical	T R1 Inv	R2 Inv	K	Logical	T R1 Inv	R2 Inv	K	RDF Pair	
Device	Dev	E Tracks	S Dev	Device	Dev	E Tracks	S Dev	MDA	STATE
N/A	0430 RW	0 1301555	RW 0440 WD	0	74 C.D	SyncInProg			
N/A	0247 RW	0 1289723	RW 0257 WD	0	54 C.D	SyncInProg			
N/A	043E RW	0 1023028	RW 044E WD	0	346 C.D	SyncInProg			
N/A	0295 RW	0 1254808	RW 02A5 WD	0	58 C.D	SyncInProg			
N/A	02B3 RW	0 1280942	RW 02C3 WD	0	288 C.D	SyncInProg			
Total	-----			-----					
Track(s)	0 6150056		0 820						

MB(s) 0 192189 0 26

Legend for MODES:

M(ode of Operation): A = Async, S = Sync, E = Semi-sync, C = Adaptive Copy

D(omino) : X = Enabled, . = Disabled

A(daptive Copy) : D = Disk Mode, W = WP Mode, . = ACp off

7. After invalid tracks <30000, change whole grp from adaptive copy mode to async mode

```
bash-3.00$ pbrun symrdf -sid 1012 -f 1012_rdfg_5 -rdfg 5 set mode async
```

Execute an RDF Set 'Asynchronous Mode' operation for device
file 'bootdevices_1012' (y/[n]) ? y

An RDF Set 'Asynchronous Mode' operation execution is
in progress for device file 'bootdevices_1012'. Please wait...

The RDF 'Asynchronous Mode' operation successfully executed
for device file 'bootdevices_1012'.

8. Enable consistency on RDF group.

```
bash-3.00$ pbrun symrdf -sid 1012 -f bootdevices_1012 enable -rdfg 5
```

Execute an RDF 'Enable' operation for device file
'bootdevices_1012' (y/[n]) ? y

An RDF 'Enable' operation execution is in progress for device
file 'bootdevices_1012'. Please wait...

The RDF 'Enable' operation successfully executed for device
file 'bootdevices_1012'.

9. Update master files .

```
#!/etc/hostcfg/RDF-A/update.sh
```

9 SECURITY CONFIGURATION

9.1 PowerBroker configuration

PowerBroker has been a standard security product at Citigroup for a number of years. Powerbroker main functionalities include user access control as well as audit capabilities at a user level. Given the above functionalities, GDSE has chosen Powerbroker as the tool to enhance security and logging capabilities of Command-line products such as EMC Solutions Enabler, HDS Device Manager and EMC Centera CLI. EMC Solutions Enabler is a tool that is used to manage all the Symmetrix storage arrays. HDS Device Manager is a tool that is used to manage the USP storage arrays. Centera CLI is a tool used to manage EMC Centera storage arrays. PowerBroker is a Client/Server architecture design where the client must authenticate to a master server in order to gain access to define commands. Furthermore, keystrokes logging can be enabled where all commands and arguments are sent to a log server in real-time.

9.1.1 Power Broker client configuration

1. Get the Powerbroker client installed on SAN control workstation (SE servers) by platform.
2. Platform to setup swsa script (to **switch** to storage **admin**) to run in rsh (restricted shell) in all SAN control workstations.

```
##### This script is for Storage Engineers to switch to Powerbroker background session #####
#####
#ID: @(#)swsa 1.11 Last 28/06/2007 Rev:1
##### Initialization of variables #####
#!/usr/bin/ksh
org_user=$LOGNAME
export TERM=vt100
tput clear
access=0

## Checking for no of pbrun background id sessions for a given login
## More than two pbrun root sessions from same login not allowed
DATE=`date +%d%b%Y`
LOGCNT=`ps -eaf|grep "pbrun ksh"|grep $LOGNAME|grep -v grep|wc -l`
if [ $LOGCNT -ge 2 ];then
echo "\n\nMore than TWO sessions with same login {$LOGNAME} not allowed.\n\n"
ret1=1
else

#Get Reference Number and Description -----
echo "\nEnter Reference Number (Max 50 Chars) : \c"
read cn_no
if [ -z "$cn_no" ]
then
echo "\nBlank Reference Number Not Allowed"
ret1=1
else
echo "\nComments (Max 80 chars) : "
read desc
```

```

if [ -z "$desc" ]
then
    echo "\nBlank Comments Not Allowed"
    ret1=1
else
    ##-----

    DATE=`date +%d%b%Y`
    access=1
    ST_LOG=/home/storage/$LOGNAME.$DATE
    TTY=`who -m|awk '{print $2}'`
    STN=`who -T|grep $LOGNAME|grep $TTY|cut -c50-80`
    ST_DATE=`date "+DATE: %d/%m/%Y" `
    TIME:
    %H:%M:%S`
    hname=`hostname`
    echo
    "~~~~~" >$ST_LOG
    echo " $LOGNAME Logged in from $STN workstation">> $ST_LOG
    echo "\n $ST_DATE" >>$ST_LOG
    echo
    "~~~~~" >$ST_LOG
    echo "\nHost name : `hostname` " >> $ST_LOG
    echo "Your reference number : $cn_no" >> $ST_LOG
    echo "Comments (Max 80 Chars) : $desc\n" >> $ST_LOG
    echo
    "~~~~~" >$ST_LOG
    ret1=0
fi
fi

### Added for Powerbroker
#
if [ $access = 1 ]
then
    /usr/local/bin/pbrun ksh /home/storage/log.ksh
else
    echo "\n\nUnauthorised Usage."
fi
fi
return $ret1
#
~~~~~
~~~~~
#---- End --

```

9.1.2 Power Broker server configuration

1. Platform to setup storage.conf and storageonly.conf on all master servers including HA pb master servers to grant access to powerbroker client.

```
#cat storage.conf

#=====
runhost = submithost;
admingrp = {"storageonly"};
adminprog = {"ksh"};
rview_pgm = {"pbreplay"};
if (group in admingrp && command in adminprog) {
    runuser = user;
    rungroup = group;

    if (pbrunsysname in {"SunOS"}) {
        runconfirmuser=user;
    }
    if (pbrunsysname in {"AIX"}) {
        runconfirmuser=user;
    }
    if (pbrunsysname in {"HP-UX"}) {
        # runconfirmuser=user;
    }

    iolog = mktemp("/powerpaklog/scripts_log_storage/" + runhost + "." + getenv("LOGNAME") + "." +
strftime("%d%B%Y") + ".");
    print ("Your request will be logged into : SSUNACS7",iolog);
}

accept;
#=====

#cat storageonly.conf

# All EMC and HDS related commands
####
runtimeout = 1800;
runhost = submithost;
admingroup = {"storageonly"};
Commands = {"fpath", "fcompare", "fconfig", "vcfind", "srdf", "symacl", "symapierr", "symbcv", "symcfg",
"symcg", "symchg", "symchksum", "symcli", "symconfigure", "symdev", "symdg", "symdrv", "symgate",
"symhostfs", "syminq", "symioctl", "symlabel", "symld", "symlmf", "symlv", "symmir", "symerase", "symhost",
"sympd", "symqos", "symrdb", "symrdf", "symreplicate", "symreturn", "symrslv", "symstat", "symvg",
"syaudit", "symclone", "symdisk", "symevent", "symmask", "symmaskdb", "symoptmz", "symsnap", "powermt",
"inq", "hc", "HC", "HCLI.sh", "hcli.sh", "HiCommandCLI.sh", "raidscan", "paircreate", "pairevtwait",
"pairedisplay", "pairresync", "pairsplit", "pairmon", "pairvolchk", "paircurchk", "pairsyncwait", "horcmstart.sh",
"horcmshutdown.sh", "horcctl", "inqraid", "mkconf", "horctakeover", "raidvchkset", "raidvchkdsp",
"raidvchkscan","CTICenteraCLI"};
```

```
setenv("PATH",  
"/usr/symcli/bin:/bin:/usr/bin:/usr/sbin:/export/opt/emc/SYMCLI/V5.5.0/bin:/export/opt/Navisphere/bin:/export/opt/HiCommandCLI:/export/opt/HORCM:/export/opt/EMC/Centera/3_0/SystemOperator/bin");  
  
if (group in admingroup && basename(command) in Commands) {  
  runuser = "root";  
  rungroup = "!g!";  
  rungroups = {"!G!"};  
  runcommand = basename(command);  
  accept;  
}
```