

SHC-OSD

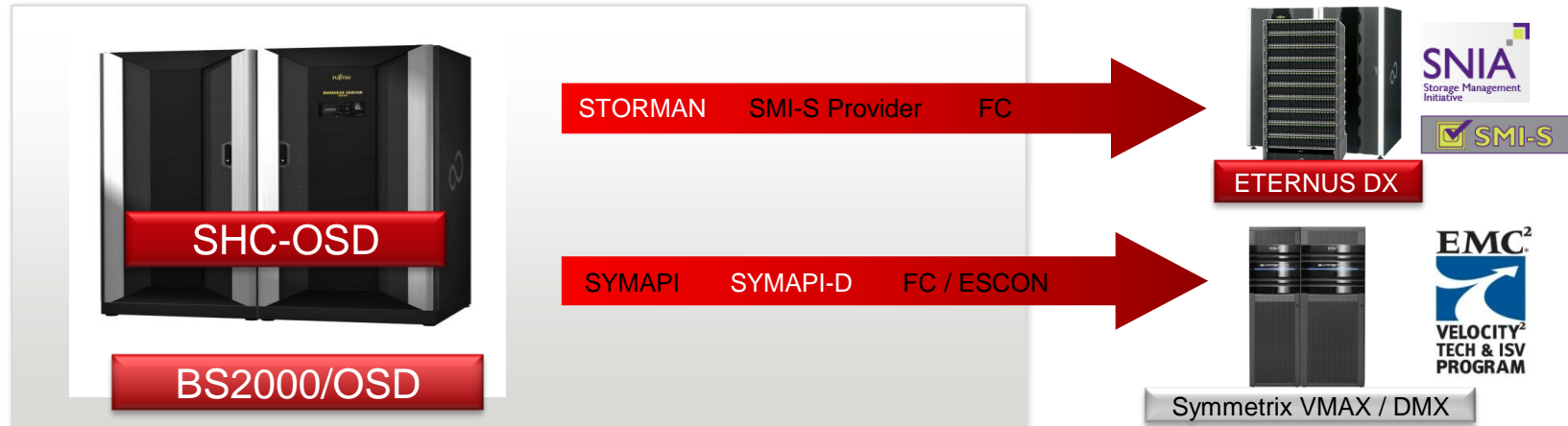
Storage Host Component for BS2000/OSD

March 2013

Agenda

- SHC-OSD Overview & Functions
- SHC-OSD ETERNUS DX Support
- SHC-OSD Symmetrix Support
- SHC-OSD V11.0

SHC-OSD = **Storage** Host Component ...



- SHC-OSD V10.0 supports the whole Storage Portfolio on BS2000 servers
 - Integration for the models ETERNUS DX8700 S2 / DX4x0 S2 as well as DX4x0 / DX8x00
 - Current models and functions of Symmetrix VMAX and DMX-4
- SHC-OSD V10.0 with StorMan V5.0 and SYMAPI V7.5: released since 03.2013

EMC Symmetrix:

- Models:
 - VMAX
 - DMX4
- Enginuity versions
 - 5874, 5875, 5876
 - 5x71, 5773
- Where appropriate configuration changes and licenses required for
 - Remote Copy (SRDF/S, SRDF/A, SRDF/DM)
 - TimeFinder family

ETERNUS DX:

- Models:
 - DX400 / DX8000
 - DX400 S2
 - DX8700 S2
- FW versions
 - as of V20L70
 - as of V10L40 (for S2)
- Where appropriate configuration changes and licenses required for
 - REC → Product SHC-CM-RR
 - EC/SnapOPC+ → Product SHC-CM-LR

Functions for ETERNUS DX storage

■ Information about

■ ETERNUS DX

- Global configuration
- all logical and physical volumes

■ Mapping to the BS2000/OSD generation

■ Remote Equivalent Copy (REC)

■ Equivalent Copy (EC) aka CLONES

■ SnapOPC+ aka Snapshots

■ Event Monitoring

■ Thin Provisioning

■ EC control (CLONES)

- Dynamic creation and termination
- Split
 - consistent
 - Integrated redefine

■ SnapOPC+ control (Snapshots)

- Dynamic creation
- Creation is consistent
 - Integrated redefine
- Reconstruction and termination

■ REC control

- Dynamic creation and termination of REC pairs
- Disaster Recovery
- Disaster Recovery tests

Functions for EMC Symmetrix storage

■ Information about

■ Symmetrix

- Global configuration
- All logical and physical Volumes

■ Mapping to the BS2000/OSD generation

■ Remote Copy (SRDF)

■ TimeFinder

- CLONEs, SNAPs , BCVs,

■ Event Monitoring

■ Thin Provisioning

■ Control SRDF/S, SRDF/A, SRDF/AR

■ Copy-Mode, Attribute

■ Disaster Recovery

■ Disaster Recovery test

■ Control TimeFinder

■ Die complete ,family':

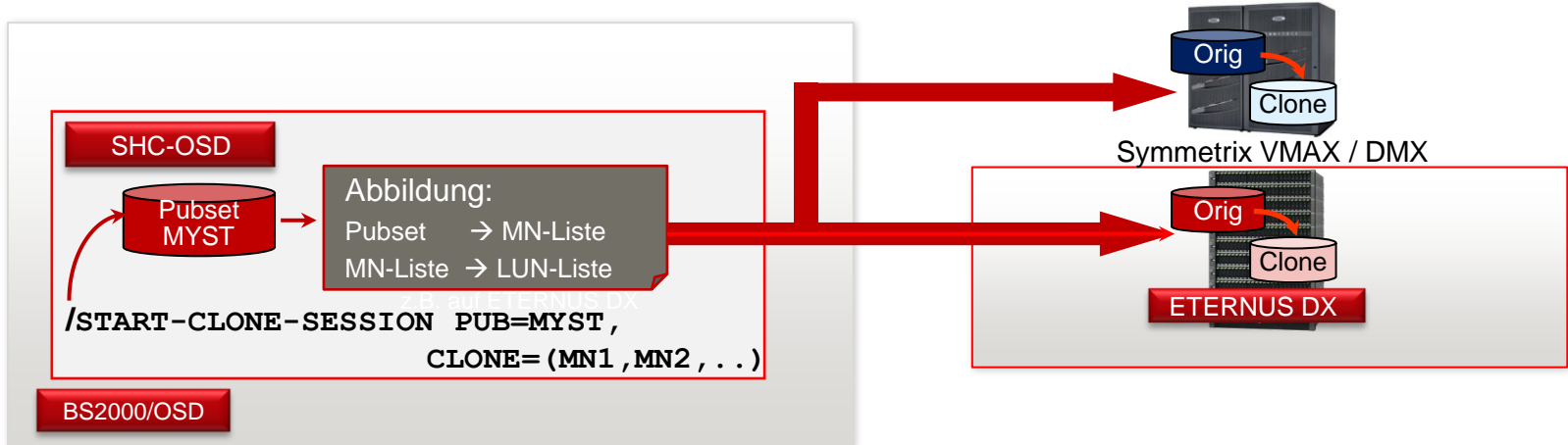
- CLONEs
- SNAPs
- BCVs

■ Split

- consistent
- Integrated redefine

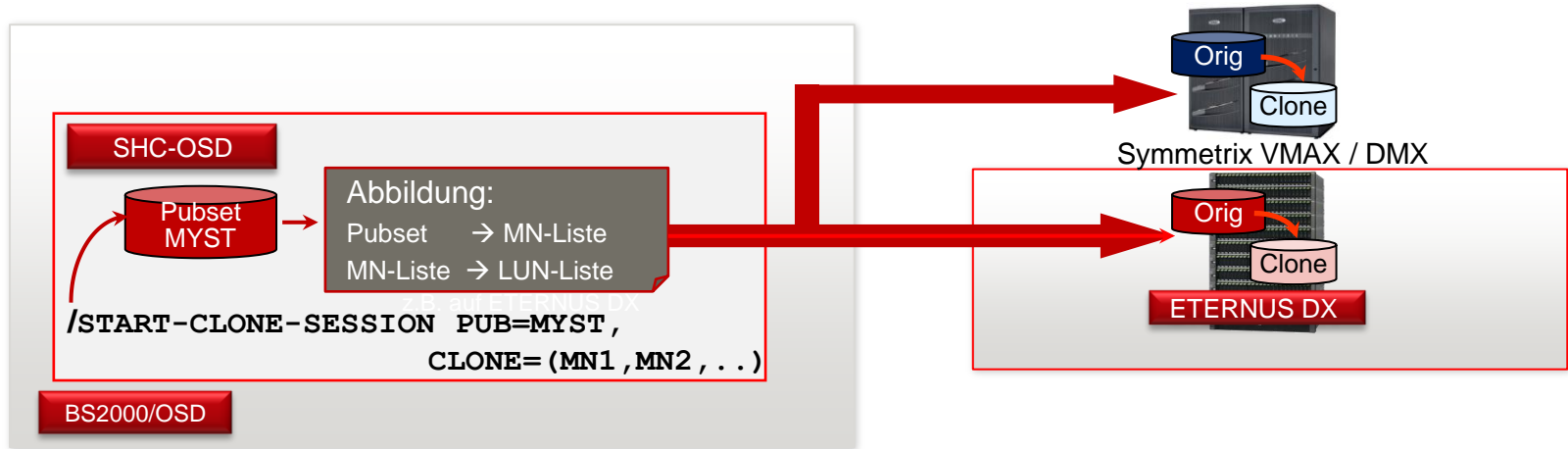
- All functions realized with SDF command interfaces
- /SHOW commands supply output into S variables for processing in SDF-P procedures
- Seamless integration into existing processes by BS2000 typical administration units: pubset/volume/MN
- Action commands wait for the end of synchronization processes
- Event monitoring
 - status changes are logged on the console
 - automated monitoring is possible (e.g. with PROP-XT)

Szenario 1: Administration of mirrored Pubsets independent on the Storage-System (1)



- BS2000/OSD system administrator
 - Provides free volumes for local replication (Clones) for the BS2000 data pubset, on the same storage system like the data pubset, e.g. ETERNUS DX or Symmetrix
 - Administration by using SHC-OSD command: `/ START-CLONE-SESSION PUB=MYST , CLONE-UNIT=...`
- SHC-OSD ...

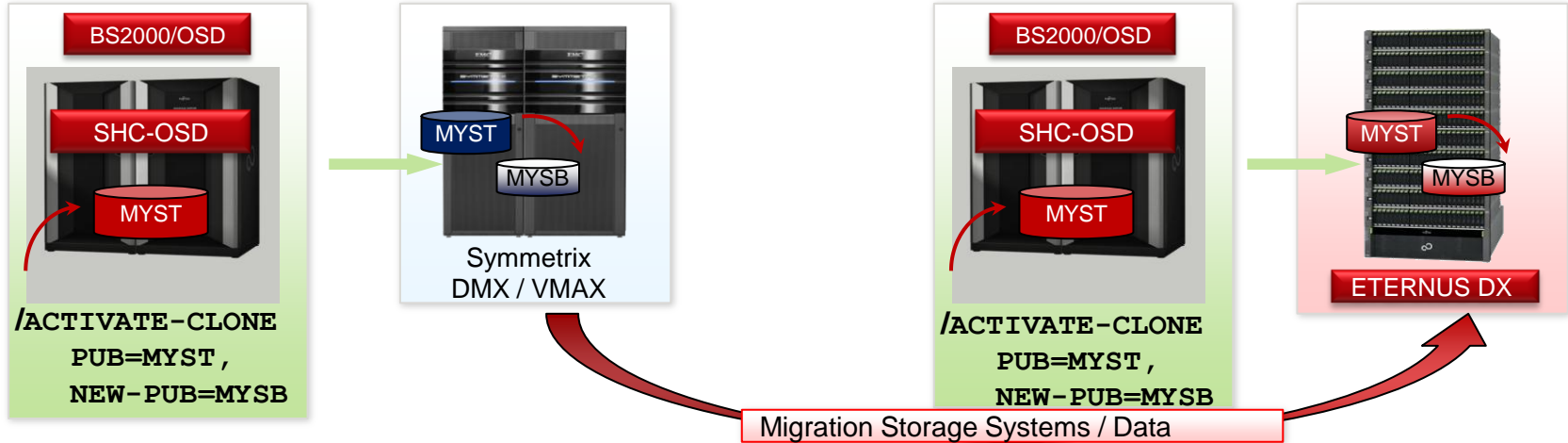
Szenario 1: Administration of mirrored Pubsets independent on the Storage-System (2)



■ SHC-OSD

- Identifies and verifies number, type and size of volumes of the pubset of the BS2000 configuration
- Identifies the related storage system e.g. ETERNUS DX or Symmetrix
- Automatically sends the corresponding action to the appropriate storage system

Szenario 2: Administration of migration / change of storage system (1)



- Data migration necessary on change of the storage system
- Storage processes can be transferred and further used by SHC-OSD integration
- Portability of the BS2000 processes, integrated with SHC-OSD ..

Szenario 2: Administration of migration / change of storage system (2)

- Data migration necessary on change of the storage system
- Storage processes can be transferred and further used by SHC-OSD integration
- Portability of the BS2000 processes, integrated with SHC-OSD ..

Example:

- Backup scenarios of Clones (e.g. with HSMS or integrated with HSMS/CCOPY)
- Periodic creation of consistent StandBy Pubsets
- Support of HA- and DR-scenarios on base of remote replication
- Customer-specific, proprietary procedures / integration on base of SHC-OSDD

Intention:

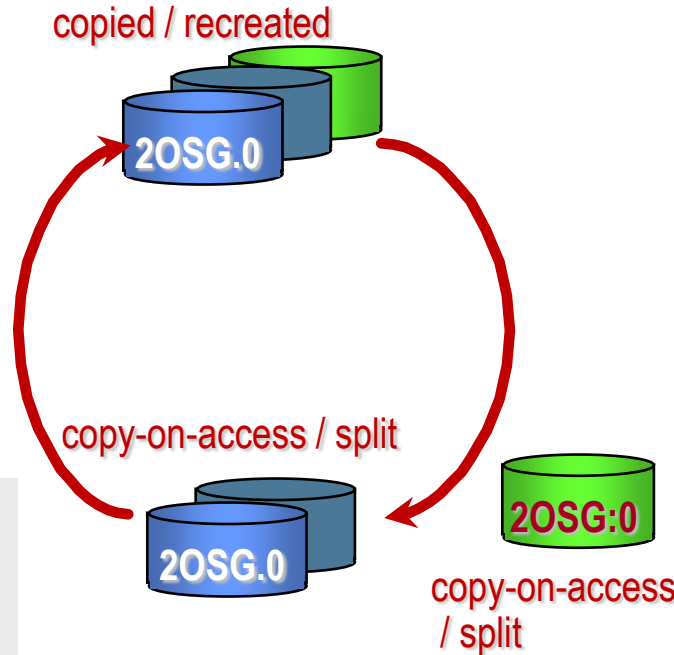
Creation and usage of **consistent copies** of the productive data in parallel to the normal process.

- Benefit:
 - Point-in-time backup
 - E.g. transparent because integration in HSMS/CCopy
 - multiple ‚point-in-time‘
 - ‚real‘ data for test:
 - Introduction of new software
 - Creation of ‚Standby‘-Pubset
 - Creation of ‚shadow‘-DBs
 - Migration of applications
- Method:
 - Clones:
 - Complete 1:1-Copies
 - Snapshots:
 - Space-saving ‚snapshot images‘

Clone Integration in HSMS/CCOPY

BACKUP-FILES ... CCOPY=*YES (WORK-FILE=*BY-CLONE-UNIT)

(1) Local replication of Pubsets



(3) Resumption of local replication after backup done (optional)

(2) Backup with HSMS/CCOPY:

- From the separated Clone-Volumes
- Pubset-consistent, automatic split
- uninterruptible
- No additional CPU-usage
- Restart-able

Snapsets used for backup of Pubsets

- BS2000 Snapsets are based on the Snap functionality of the storage system and SHC-OSD
- Snapsets are copies of the Pubset on Snapshots of the storage system
 - Snapsets are promptly available, without advance and without IOs
 - Point-in-time: at the same time backup between and in files
 - Snapsets cannot be imported or overwritten as backup
- Simplest usage: Integration in DMS
 - For privileged and unprivileged users
 - For restoration of files and JVs from a Snapset backup

Intention:

Rapid data availability after planned or unplanned events (catastrophe) e.g. like:

Maintenance

Power failure

Flooding

Fire

...

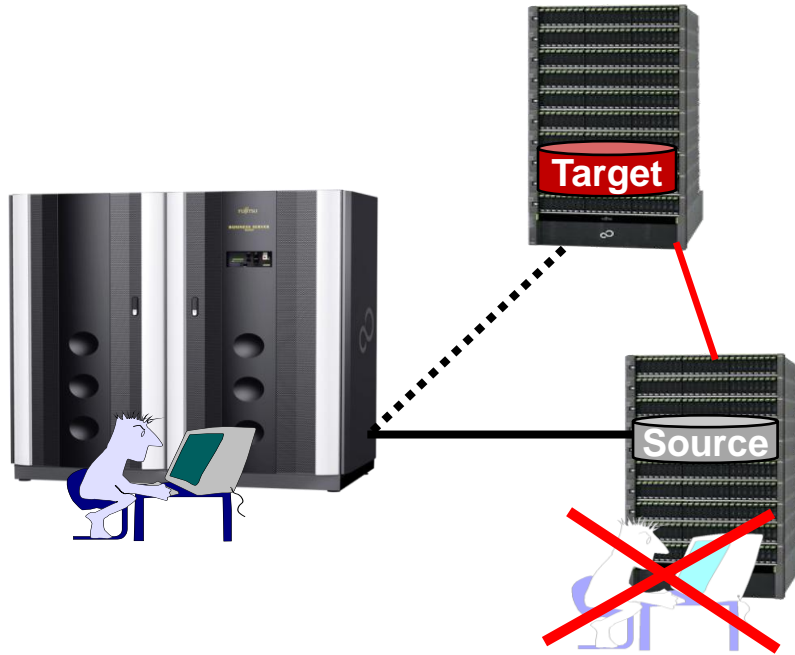
Benefit:

- Secure and rapid switching on remote storage system in case of disasters
- Easy testing of switching scenarios (failover/fallback)
- Temporary suspending for parallel operation (if data locally redundant in addition)

Method:

- Clones:
 - full 1:1 copies
- Snapshots:
 - Space-saving ,snapshot images‘

Remote Copy - added Value by use of SHC-OSD



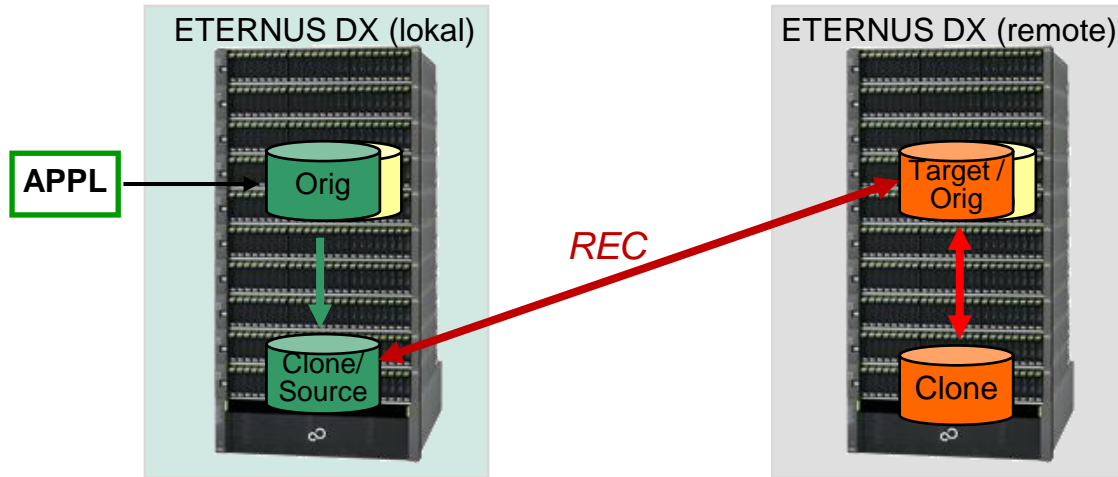
- Administration
- Information
 - Remote Copy pairs: Sources, Targets
 - Copy mode
 - Remote links
 - Synchronization
- Disaster recovery
 - Failover (Targets available)
 - Fallback (back to source)
- Disaster recovery test
 - „Simulation“ of crash situation
- Remote Copy mode (for SRDF)
 - synchronous or consistent or asynchronous
 - Secure or rapid?

HA/DR e.g. with Data Mobility Concept

Objective: Maintaining a consistent online copy of the production data on a remote site with automatic periodic update

Basis configuration using the example of ETERNUS DX is a combination of EC and REC:

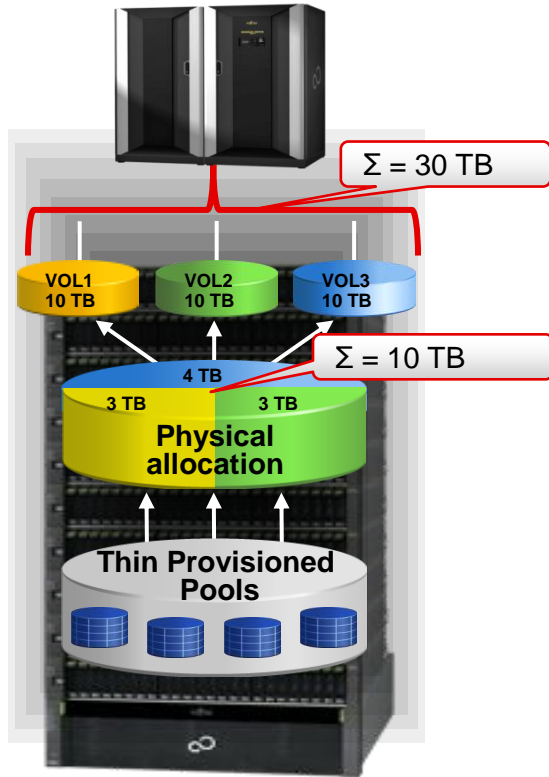
- local EC replication onto Clone Unit
- local EC Clone-Unit is mirrored remotely with REC
- REC mirror (Target-Unit) is mirrored onto EC Clone-Unit



Support for BS2000/OSD

- Thin Provisioning is transparent for the applications
 - BS2000 System/application ,views‘ the virtual, configured size
 - Good useable by BS2000 components and SW products
 - Without monitoring the real allocation → CRASH danger
- Configuration of Thin Pools and Thin Volumes
 - Basic functionality done via Storage Subsystem
- Integration in SHC-OSD
 - Passive management → essential for a save BS2000 usage
 - Information functions to attributes and status of Thin Pools and Thin Volumes
 - Monitoring: Dynamic monitoring of filling degree of Thin Pools
 - Actions for local and remote replication also for Thin Volumes

Thin Provisioning (example ETERNUS DX)



- For ETERNUS DX S2
- Server ,views‘ Thin Devices
 - In the configured size
 - Assignment of real resources as required
- Real storage resources are managed in max. 256 Thin Provisioned Pools
 - Consisting of 1 or more RAID groups
- supports
 - RAID1, RAID5 and RAID6 (different RAID groups)
 - All storage tiers (SSD, FC, SATA)
 - Local and Remote replication
- Monitoring + Information via SHC-OSD
- External Management + Monitoring via
 - ETERNUS WebUI
 - ETERNUS SF

SHC-OSD = Storage Host Component for BS2000/OSD

- presentation and control of storage systems for the BS2000 system management
- Automation of storage management in data centre
- Integration of storage functionality in BS2000/OSD
- control of local and remote Replication functions of storage systems
- Monitoring and Information functions
- Performance monitoring

SHC-OSD ETERNUS DX support

Qualified for the BS2000/OSD Server Portfolio: S, SQ and SX Servers

the High-End segment
DX8700 S2



the Midrange segment
DX410 S2 / DX440 S2



Release for BS2000/OSD:

- S-Server as of OSD V7.0
- SQ-/SX-Server as of OSD V8.0
- SHC-OSD V10.0 since 03.2013

Models:

- DX410 S2 / DX440 S2 / DX8700 S2
- DX410 / DX440 / DX8400 / DX8700

CAPACITY AND PERFORMANCE SCALABILITY

Product range ETERNUS DX400 S2



BS2000 and SHC-OSD Support

with embedded SMI-S Provider

ETERNUS DX410 S2

- Max. no. of drives: 480
- Max. cache capacity: 16 GB
3,5" Modell

2,5" Modell



ETERNUS DX440 S2

- Max. no. of drives: 960
- Max. cache capacity: 96 GB
3,5" Modell

2,5" Modell



		ETERNUS DX410 S2		ETERNUS DX440 S2		Comments
Maximum number of drives		480		960		If 2.5" drives are installed
Maximal storage capacity (physical)	SAS	432 [TB]		864 [TB]		If 2.5" SAS 900 GB drives are installed
	Nearline SAS	720 [TB]		1440 [TB]		If 3.5" Nearline SAS 3 TB drives are installed
Maximum cache capacity		16 [GB]		96 [GB]		
Host interfaces (No. of ports per device)		FC 4/2/8G	(16-Port)	FC 4/2/8G	(32-Port)	
		FCoE 10G	(8-Port)	FCoE 10G	(16-Port)	
		iSCSI 1/10G	(8-Port)	iSCSI 1/10G	(16-Port)	
Max. configuration size (CE size)		5 HE (3HE)		5HE (3HE)		CE: Controller housing

ETERNUS DX8700 S2

BS2000 and SHC-OSD support



Min. configuration: 8 drives

Max. configuration: 3.072 drives

Connectivity

- FC (max. 128 ports)
- iSCSI (max. 64 ports)
- FCoE (max. 64 ports)

Capacity

- Max. 2,7 PB SAS or
- Max. 4,6 PB NL-SAS
- Max. 2.760 drives
- Max. 768 GB global Cache

Drive technology

- SSD, SAS, NL-SAS

SHC-OSD V10.0 for ETERNUS DX S2

Configuration

BS2000 Server



LAN

Management Server



StorMan



LAN

FJ SMI-S

DX8700 S2

ETERNUS DX Storage

LAN

FJ SMI-S

DX400 S2

Product structure

- SHC-OSD
 - As BS2000/POSIX Subsystem
- StorMan
 - On any Server native or VM (Windows / Linux / MARS)
- FUJITSU SMI-S Provider
 - for DX8700 S2 / DX410 S2 / DX440 S2:
 - ,embedded' in Firmware of ETERNUS DX Storage System

License

- Via Products SHC-OSD, SHC-CM-LR, SHC-CM-RR
- SW License necessary for every Storage System

SHC-OSD V9.0 für ETERNUS DX

Configuration

BS2000 Server



LAN

Management Server



LAN

FC

LAN



DX400 / DX8000



DX400 S2

ETERNUS DX Storage

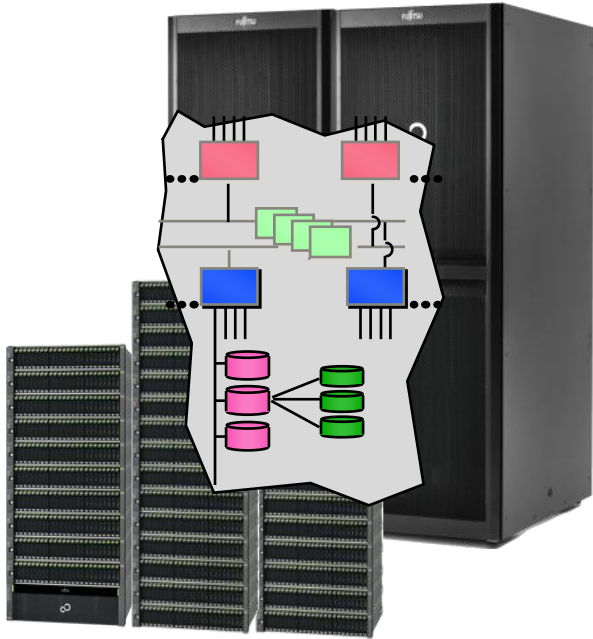
Product-Structure

- SHC-OSD
 - as BS2000/POSIX Subsystem
- StorMan
 - on ETERNUS DX Mgmt Server (Windows)
- FUJITSU SMI-S Provider
 - For DX400 / DX8000: as ,proxy' version on ETERNUS DX Management Server
 - As of DX410 / DX440 S2 /DX8700 S2: ,embedded' in Firmware of ETERNUS DX Storage System

License

- Via Products SHC-OSD, SHC-CM-LR, SHC-CM-RR
- SW License necessary for every Storage System

ETERNUS DX – Information



- Global
 - Cache, Model, FW status
 - Serial number
- Logical device configuration
 - RAID protection, state
 - Mapping to physical disks
- REC (Remote Equivalent Copy)
 - REC pairs / states
- EC (Equivalent Copy)
 - EC pairs / states
- SnapOPC+
 - Snap pairs / states
- Thin Provisioning
 - Attributes and states for Thin Pools / Thin Volumes

ETERNUS DX offers widespread copy functions

- E.g. for backup scenarios, HA and DR configurations
- Selected for BS2000 integration with SHC-OSD according to usage scenarios

EC (Equivalent Copy)



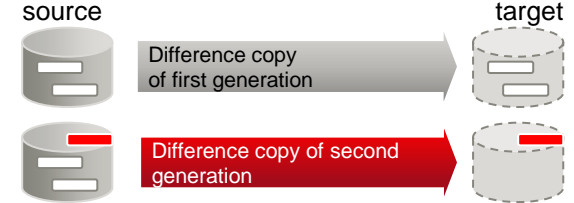
Having initially copied all source files, all the remaining changes are made in the local mirror

REC (Remote Equivalent Copy)



Having initially copied all source files, all the remaining changes are made in the remote mirror.

SnapOPC+



Only copies the updated data.

EC

- Copies all source data.
- Consistent copies for parallel operations are created by interrupting the mirror.
- Suitable to avoid conflicts in high workload operations such as copy / batch processing.

REC

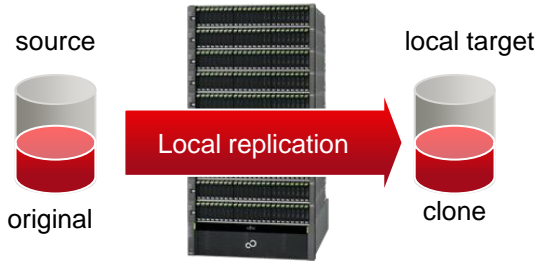
- Copies all source data.
- Consistent copies at another location are created by interrupting the mirror.
- Suitable for backup between various systems HA and DR configurations.

SnapOPC+

- Copies only the deltas between source and target.
- Enables a reduction in capacity on target drive
- Offers parallel management of several generations
- Suitable for backup scenarios.

Local replication with EC (Equivalent Copy)

EC (Equivalent Copy)



Having initial copied all source data, all other changes are made on the local mirror.

- replication within an ETERNUS DX system
- Complete copy of data, available having completed the initial copy process
- No specially configured devices required
- Any units, of same size are used
- When recovering the mirror only the modified data is copied back from the original to the clone
- Max. 32 clone units per original
- Restore copies from clone to original via swap function
- cascaded clones

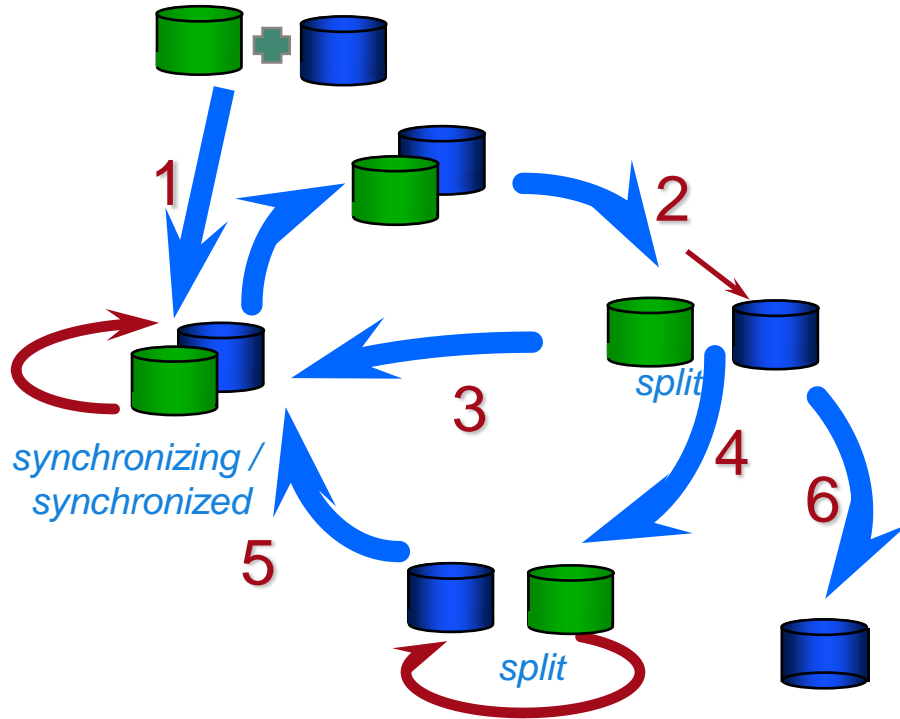
Basis-Integration SHC-OSD

- Map on the SHC-OSD commands for CLONE management
- Cycle for daily EC automation in data centers
- Consistent split function for BS2000 shared pubsets
- Integrated renaming for BS2000/OSD pubsets

Integration in BS2000

- Integration in standard backup products: HSMS/CCOPY, FDDRL
- Integration with database products (SESAM, UDS, ORACLE)

EC/Clones – operating sequences

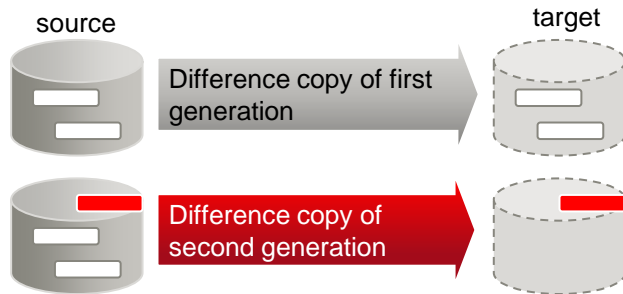


(4 + 5 = step-by-step restore from clone)

- 1 /START-CLONE-SESSION**
Pairing independent on volumes
Status: *synchronizing / synchronized*
- 2 /ACTIVATE-CLONE**
Split, optionally renaming for separate operation
Status: *split*
- 3 /RESTART-CLONE-SESSION**
Copy changes data from original
Status: *synchronizing / synchronized*
- 4 /SWAP-CLONE-SESSION**
Interchanges character of original and clone
Status: *split*
- 5 /RESTART-CLONE-SESSION**
copies changed data onto original (from original clone before swap)
Status: *synchronizing / synchronized*
- 6 /STOP-CLONE-SESSION**
Finishes clone replication; Status: -

Local mirroring with Snap OPC+

Snap OPC+



Only copies the updated data

- Creates storage-space-saving ,Snapshot'-copies of application data within the ETERNUS DX Systems.
- ,Snapshots' are immediately accessible after creation.
- Only copies delta between source and target.
- Enables a reduction in capacity on target drive (less than 30% additional amount on disc capacity).
- Offers parallel management of multiple generations (up to 256)
- Offers multiple reconstruction of the Snapshots
- Suitable for backup scenarios.
- Ideal for applications with little change volume

Basis-Integration SHC-OSD

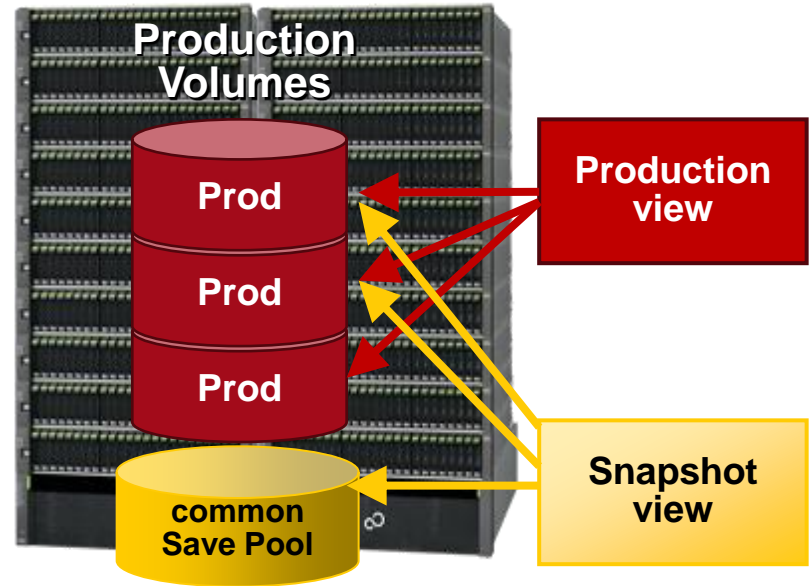
- Mapping to the SHC-OSD commands for the CLONE management
- Cycle for the daily EC automation in data centers
- Consistent Snapshot creation for BS2000/OSD Shared Pubsets
- Integrated renaming for BS2000/OSD-Pubsets

Integration in BS2000

- Integration with BS2000 Snapsets
- Integration in Standard-Backup products: HSMS/CCOPY, FDDRL

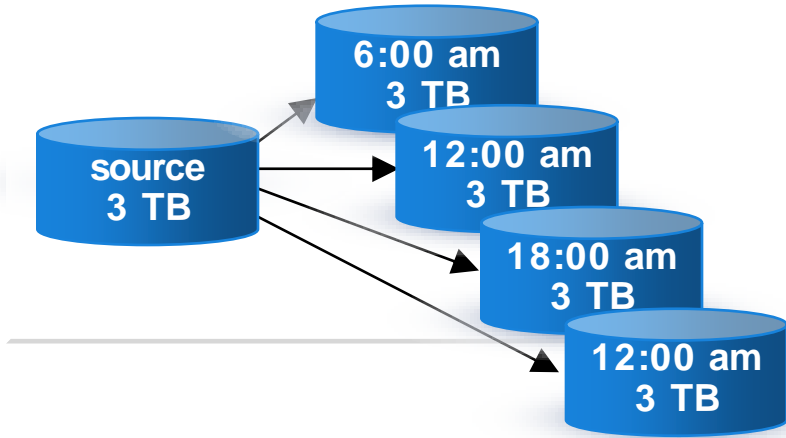
Snap OPC+

- Snapshots are logic so-called **,point-in-time'** copies of the productive data
 - Pointer-based
 - on volume-level
 - ,copy-on-first-write'
- The server ,views' the Snapshot as complete volume
- Properties:
 - Only requires so about 10 – 30 % of the original capacity
 - Available at once for
 - Read and write access
 - Read-only access
 - Max. 256 Snapshots of 1 original



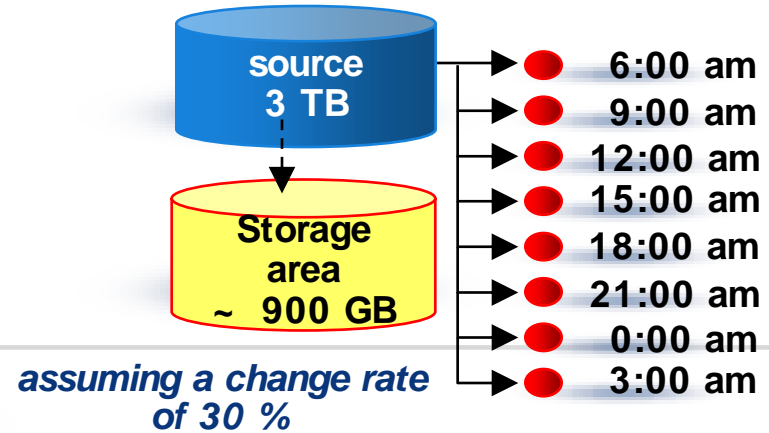
Snap OPC+ Capacity Economy

Copies of complete Volumes



12 TB additional capacity required

Snapshots



~ 900 GB additional capacity required

Requirements for use in ETERNUS DX

- Licensing of the product SnapOPC+
- Configuration of the necessary / estimated disk capacity in a sufficient quantity of SNAP Data Volumes (SDVs) for the Snap usage
 - qualified engineers on the ETERNUS DX
- Configuration of Snap Data Pool Volumes (SDPVs) in the Snap Data Pool for supply of additional temporary storage for the SDVs
 - qualified engineers on the ETERNUS DX

Requirements for use in BS2000/OSD

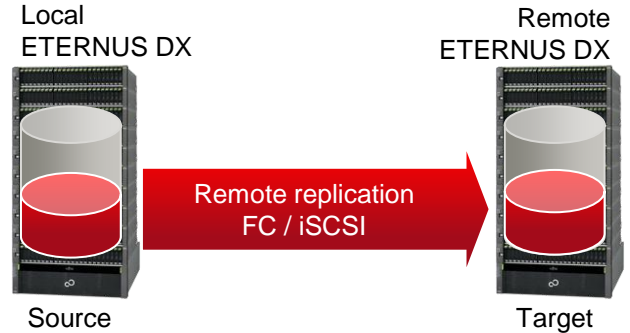
- BS2000/OSD as of V9.0 and SHC-OSD as of V10.0
- Configuration of Virtual Devices (VDEVs) as MNs in BS2000/OSD
 - BS2000 System management
- Use of SHC-OSD
 - BS2000 System management

- SDF commands for the control of SNAP functionality:
 - Integration analog to TimeFinder/Clone
 - `/START-SNAP-SESSION` create and activate Snap pairs
 - `/RESTORE-FROM-SNAP` reconstruct original from Snap
 - `/STOP-SNAP-SESSION` dissolve Snap pair
 - Display of the Snap pairs and states with:
 - `/SHOW-SNAP-SESSION-STATUS`
- Snapsets in BS2000/OSD are based on the SHC-OSD integration of SnapOPC+ if the storage system ETERNUS DX is used (SHC-OSD as of V10.0 and BS2000/OSD as of V9.0)

Remote replication with REC (Remote Equivalent Copy)



REC (Remote Equivalent Copy)



Having initially copied all source data, all further changes are made on the remote mirror.

- Synchronous replication between 2 ETERNUS DX systems or 2 locations via FC or iSCSI
- Dynamic administration for remote pairs (start/stop)
- Complete copy of data, available having completed the initial copy process
- No specially configured devices required
- Any units, of same size are used
- When recovering the mirror, only the modified data is copied from the original to the target
- Maximum 32 target units per original
- Restore copies from target to original via swap function

Basis-Integration SHC-OSD

- Map to the SHC-OSD commands for REMOTE-COPY management
- Dynamic management for concurrent and switched remote copy configurations
- Combined EC and REC configurations
- Integrated renaming for BS2000/OSD pubsets

Integration in BS2000

- Catastrophe protection concepts for BS2000

REC integration in BS2000/OSD

- Dynamic creation of REC pairs direct from BS2000/OSD
- REC disaster recovery and disaster recovery - test tools
- Remote administration of REC configurations
- Ease of use for combined configurations:
 - Clones and/or Snaps on REC-Source and/or REC-Target
 - Clones as REC-Source
- Professional Service solutions

Control of supported variants

- EC replication on a REC-Source
 - ,Normal' use for Clone
- EC mirror is at the same time also REC-Source
 - The REC alignment can be started by the user for Clones in activated status
- EC replication on a REC-Target
 - Clone: Remote control via TCP-IP connection to ETERNUS DX supported
 - Operand: SELECT = *TARGET-UNIT
 - Specification of CATID of REC-Source
 - Splits Clone on REC-Target
 - Requirement: REC Status ACTIVE, Source (and possibly Clone) connected



Comfortable control with SHC-OSD on Source and Target !

Implementation of Data Mobility Concept for BS2000/OSD with SHC-OSD

- For selected BS2000/OSD applications
 - extensible also for ,Not'-BS2000/OSD applications
- All processes in BS2000/OSD are realized with SHC-OSD and automated in SDF-P procedures
- Process on a local server with running application
 - ensures optimal definition of the consistency point
 - No external trigger, no servers \leftrightarrow server communication required
- Disks on remote location are
 - local configured \rightarrow the action happens directly or
 - not local configured \rightarrow the action happens remote

SHC-OSD Symmetrix support

Cooperation with EMC Corporation

- Continuous cooperation in the BS2000/OSD area
 - own QA team and knowhow for BS2000/OSD within the EMC Corporation HQ in Hopkinton/Mass. USA
 - ,e-Lab‘ configuration with all supported BS2000 servers (S, SQ and SX servers) and the current BS2000/OSD versions incl. piloting.
 - final acceptance tests at Fujitsu Technology Solutions in Munich
 - short term BS2000/OSD release in mainframe quality for new products and versions
- Integration und Innovation in the terms of EMC Velocity2 Tech & ISV Program
 - EMC Solutions Enabler (SYMAPI) ported on BS2000/POSIX
 - for the SHC-OSD and SCCA-BS2 products
- Cooperation of the development areas for
 - EMC SMI-S Provider usage in StorMan
 - SYMAPI usage in SHC-OSD



EMC Symmetrix VMAX Familie on BS2000/OSD

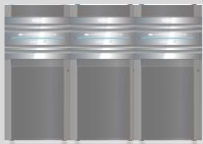
Qualified for the BS2000/OSD Server Portfolio: S- und SQ-Server

Symmetrix VMAX 20K and VMAX 40K with Enginuity 5876

- S-Server as of BS2000/OSD V7.0
- SQ-Server as of BS2000/OSD V8.0
- Integration as of SHC-OSD V9.0 and SYMAPI V7.4

Performance

VMAX 10K



up to now VMAXe
1 - 4 Engines

VMAX 20K



Up to now Symmetrix VMAX
1 - 8 Engines

VMAX 40K

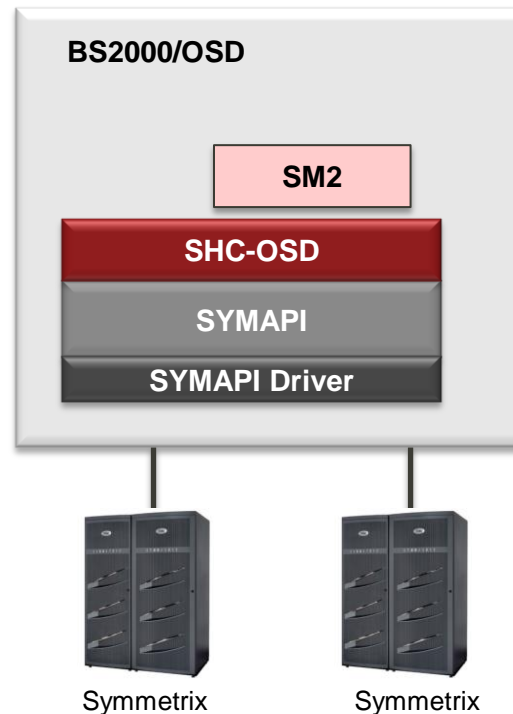


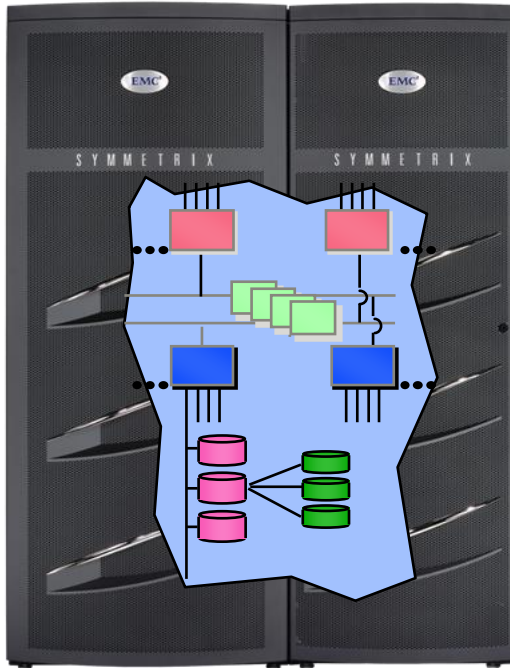
1 - 8 Engines

Capacity

Architecture for Symmetrix Support

- **BS2000 applications**
 - SHC-OSD: Host Component
 - SM2: System Performance Monitor
- **SYMAPI full client (EMC)**
 - BS2000/POSIX program
- **SYMAPI Driver**
 - Subsystem SYMAPI-D
 - I/O interface for ESCON/FC

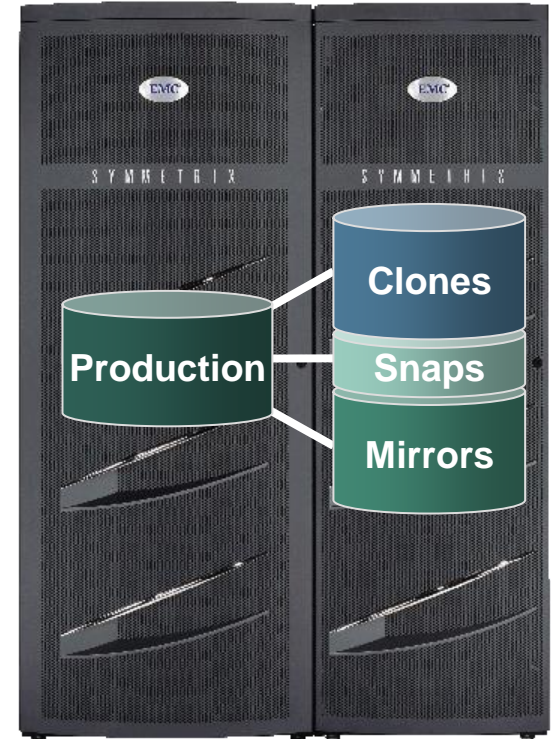




- Symmetrix global
 - Cache, Model, Enginuity
 - Serial number
- Logical device configuration
 - RAID protection, status
 - Mapping to physical disks
- SRDF
 - SRDF pairs and states
 - SRDF links
- TimeFinder
 - TimeFinder pairs
 - States
- Virtual Provisioning
 - Attributes and states
 - Thin Pools, Thin Devices

TimeFinder family

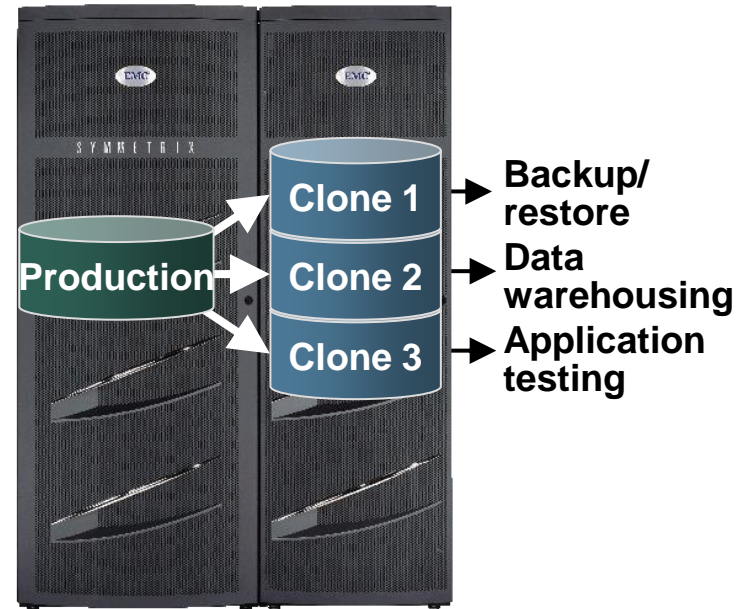
- TimeFinder/Clone
 - Instantly available, high-performance logical copy
 - ‘Full volume’ and ‘Pointer-based’
 - 100 % additional capacity
- TimeFinder/Snap
 - Space-saving ,snapshot images‘
 - Typically need less than 30% additional capacity
- TimeFinder/Mirror
 - High-available ‘full-volume’ mirror
 - 100 % additional capacity
 - As of V-Max only available in form of Clone emulation



Quelle: EMC Corporation

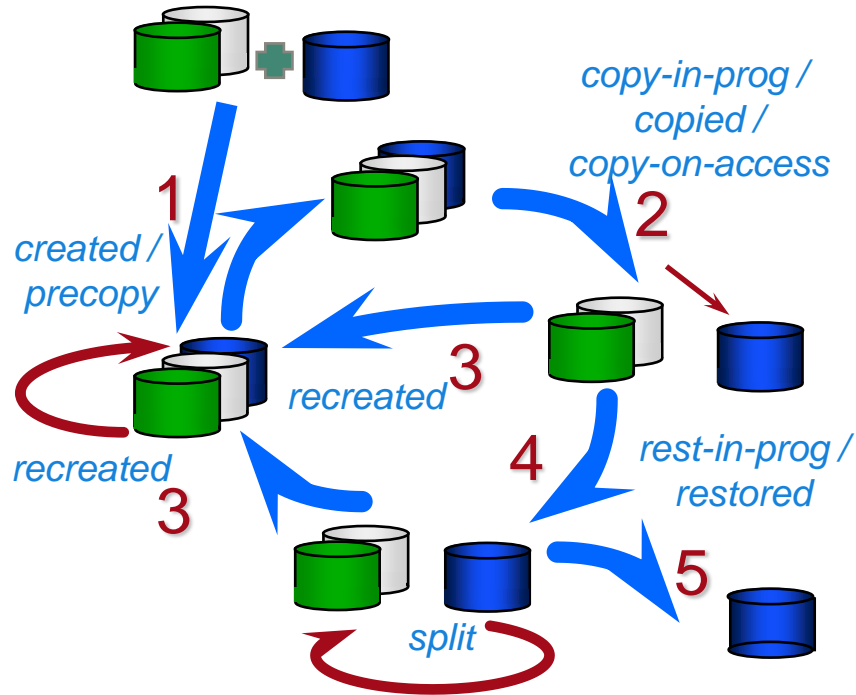
TimeFinder/Clone

- High-performance ‘full-volume’ copies
 - Pointer-based
 - Volume level
- Highly flexible
 - No internal Symmetrix mirror used
 - No pre-configuration within the Symmetrix necessary
 - Instantly available (no copy in advance)
 - ‘Swap’ option
- usable as ‘Mirror’ or ‘Snap’ (NOCOPY option)
 - Up to 16 copies of an original instantly available for Read and Write
 - TimeFinder/Mirror emulation



Quelle: EMC Corporation

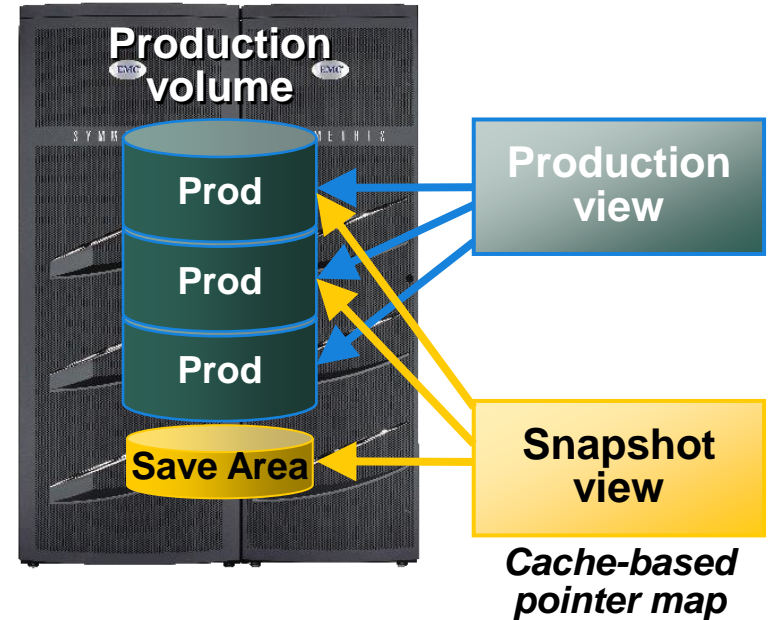
TimeFinder/Clone Operating Sequence



- 1 /START-CLONE-SESSION**
Pairing of independent volumes
Status: *created / precopy*
- 2 /ACTIVATE-CLONE**
Split, optionally renaming for separate operation
Status: *copy-in-prog / copied / copy-on-access*
- 3 /RESTART-CLONE-SESSION**
copies changed data from original
Status: *recreated*
- 4 /RESTORE-FROM-CLONE**
copies changed data onto original
Status: *restore-in-prog / restored / split*
- 5 /STOP-CLONE-SESSION**
finishes clone mirroring
Status: -

TimeFinder/Snap

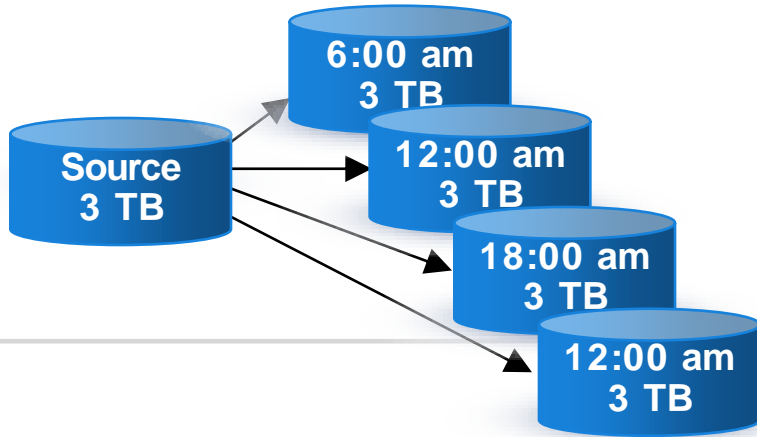
- Snapshots sind logische sog. **„point-in-time“** Abbildungen der Produktivdaten
 - Pointer-basiert
 - Auf Volume-Ebene
- Der Server ‚sieht‘ den Snapshot als komplettes Volume
- Eigenschaften:
 - Benötigen nur ca. 10 – 30 % der Original Kapazität
 - Sofort verfügbar für
 - Read und Write Zugriffe
 - Read-only Zugriffe
 - Max. 127 Snapshots von 1 Original
 - Ergänzen TimeFinder/Clone
 - Begrenzt für Hochverfügbarkeit geeignet



Quelle: EMC Corporation

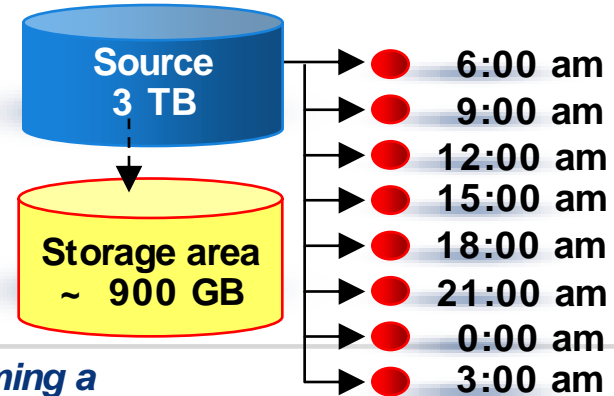
TimeFinder/Snap Capacity Economy

Copies of complete Volumes



12 TB additional capacity required

Snapshots



assuming a change rate of 30 %

~ 900 GB additional capacity required

Quelle: EMC Corporation

Requirements for use in Symmetrix DMX / V-Max

- Licensing EMC product TimeFinder/Snap
- Configuration of the necessary / estimated disk capacity in SNAP SavePools for the Snap usage
 - EMC engineer or EMC Management SW
- Configuration of Virtual Devices (VDEVs) in Symmetrix
 - EMC engineer or EMC Management SW

Requirements for use in BS2000/OSD

- Configuration of the Virtual Devices (VDEVs) as MNs in BS2000/OSD
 - BS2000 System management
- Use of SHC-OSD
 - BS2000 System management

TimeFinder/Snap in SHC-OSD

■ SDF commands for the control of the Snap function

■ Integration analogous to TimeFinder/Clone

<code>/START-SNAP-SESSION</code>	Create Snap pair
<code>/ACTIVATE-SNAP</code>	Activate Snap
<code>/RESTART-SNAP-SESSION</code>	Restart Snap pair
<code>/RESTORE-FROM-SNAP</code>	Reconstruct original from Snap
<code>/STOP-SNAP-SESSION</code>	Dissolves Snap pair

■ `/ACTIVATE-SNAP` supports

- Consistent activation for a complete pubset
- Integrated renaming function for pubsets

■ Display of the Snap pairs and states with

`/SHOW-SNAP-SESSION-STATUS`

■ Snapsets as of BS2000/OSD V7.0 are based on the SHC-OSD integration of TimeFinder/Snap

SRDF integration in BS2000/OSD

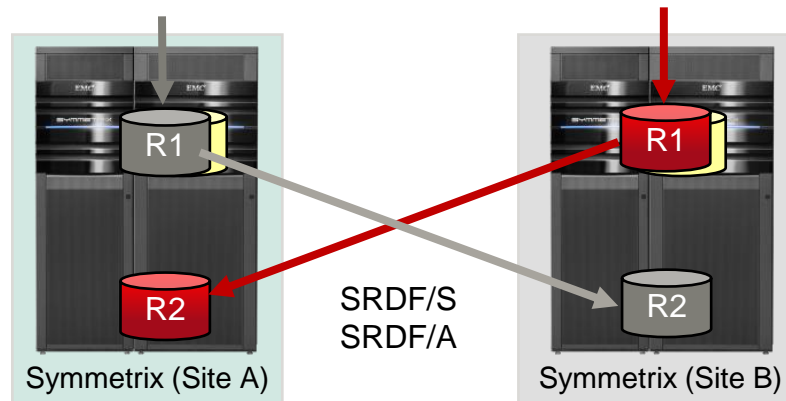
- Dynamic creation of SRDF pairs direct from BS2000/OSD
- SRDF disaster recovery and disaster recovery test tools
- Remote administration of SRDF configurations
- Ease of use for combined SRDF and TimeFinder configurations:
 - Clones/Snaps/BCVs on source (R1) and/or target (R2)
 - Clones/BCVs as source (R1)
- Integration in the HIPLEX-AF cluster product with automatic failover/fallback, AutoSwap function
- Professional Service solutions for the complete SRDF family
- Disaster recovery concepts in BS2000/OSD (White Paper)

Symmetrix VMAX: Dynamic SRDF Support

SRDF pairs are managed dynamically with SHC-OSD (1)

■ Background / usage scenarios

- SRDF configuration is increasingly dynamic, no longer static via EMC
- SRDF/A configurations increasingly require dynamic SRDF administration



SRDF pairs are managed dynamically with SHC-OSD (2)

- SHC-OSD offers functions for flexible changes in the SRDF configuration
 - As of SHC-OSD V8.0:
Dynamic administration of SRDF pairs in existing RA groups using the commands:
`/START-` or **`/STOP-REMOTE-COPY`**
 - As of SHC-OSD V9.0:
Dynamic administration of RA groups with new commands: **`/xxx-RA-GROUP`**

Control of supported variants

- TimeFinder mirroring on a SRDF-Source
 - ,Normal' use for Clone / Snap and BCV
- TimeFinder mirror is at the same time also SRDF-Source (e.g. on SRDF/Data Mobility configurations)
 - The SRDF alignment can be started by the user for Clones and/or BCV in activated status
 - Snaps CANNOT be used as SRDF-Source-Units
- TimeFinder mirroring on a SRDF-Target
 - Clone / Snap / BCV: Remote control via SRDF supported
 - Operand: SELECT = *TARGET-UNIT
 - Specification of CATID of the SRDF-Source
 - Splits BCV / Clone / Snap on SRDF-Target
 - Requirement: SRDF ACTIVE, Source (and possibly BCV) connected

 **Comfortable control with SHC-OSD on Source and Target !**

View forwards

Strategy: Optimal and compatible integration of storage systems in BS2000/OSD

Storage Integration in BS2000

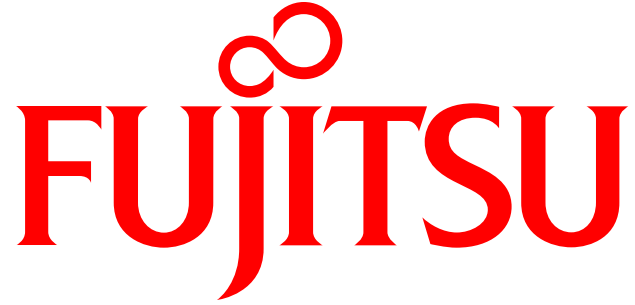
SHC-OSD V11.0 and StorMan V6.0 planned for 2014

ETERNUS DX

- Continuation of integration in SHC-OSD for further functions
 - new Models, Firmware- and SMI-S versions
 - Asynchronous replication with REC
 - Automated Storage Tiering
 - Advanced support of HA/DR concepts
 - Integration of new innovative functions
 - ...

EMC Symmetrix

- Support and qualification of new Models, Enginuity and SYMAPI versions in BS2000 and SHC-OSD in common with EMC
- Integration of new selected functions in SHC-OSD



shaping tomorrow with you