



Global Distributed Storage Engineering
Citi Architecture & Technology Engineering

SRDF/A Reserve Capacity and 5772 testing

GDSE-07039-PS

Project Scope

Version 1.0

1 Version Control

Version	Date	Author	Reviewed	Comments
1.0	7 th Sep 07	Chris Clayton		

2 Legal Notice

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3 Contact

Please address any comments or questions regarding the information contained in this document via email to the “*GT Global Distributed Storage Engineering” distribution list or alternatively to gdse@citigroup.com.

4 Latest Versions

It is recommended that the latest version of the document be used from the GDSE website <http://engineering.ti.citigroup.net/gdse/>. Newer versions may include certification on additional platforms, or comments on issues discovered after deployment.

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6 Introduction

SRDF/A reserve capacity is a set of new features that improves SRDF/A's 'self-healing' capability by breaking the deterministic relationship between the state of the network link and SRDF/A's state. It is implemented via two new functions:

SRDF/A Transmit Idle. Transmit Idle allows SRDF/A to seamlessly ride out a transient link failure. This feature provides an extra level of protection from sessions dropping when the RDF link cannot transmit data. If the link recovers, SRDF/A can pick up operations where it left off.

SRDF/A Delta Set Expansion. Before 5772, SRDF/A has used cache to buffer host I/Os and shield applications from the remote replication process in the array. These cache resources can be fully consumed, if there are unplanned spikes in workloads or reduced bandwidth in the backend network pipeline, therefore causing SRDF/A to either drop or throttle. With Delta Set Expansion (DSE) rather than storing all pending data in SRDF/A cycles in cache (Global Memory), this feature allocates a portion of disk storage as the temporary storage location. This allows SRDF/A to be more resilient and flexible to handle the situations where host application throughput outpaces the RDF throughput.

For further information on these features, see the **SRDF/A Solutions Guide** at the following URL:

<http://engineering.citigroup.net/gdse/products/platforms/symmetrix/stdsdocs/05002-sg.pdf>

The present document summarizes the test plan for these two new features. The testing also covers the testing of the increased number of RDF groups per DMX and per port now supported in 5772 and general SRDF/A functioning with 5772 SRDF/A.

The test plan is based on EMC's Beta test plan, with additional test topics identified by Citigroup.

7 Test Plan

7.1 Link Resilience – Basic Testing

Task	SYMCLI Command
Create Dynamic SRDF Pairs	
Choose a group of 2-Way-Mir devices to be used for this test	# symdev list -sid <sid> egrep "2-Way Mir"
Create a dynamic SRDF Group	# symrdf addgrp -label <GrpLabel> -rdfg <GrpNum> -sid <SymmID> -dir <dir #> - remote_rdfg <GrpNum> - remote_sid <SymmID> -remote_dir <dir #>
Add the RDF group to all available FA ports	# symrdf modifygrp -label <label> -sid <sid> -add -dir <#> -remote_dir <dir #>
Create dynamic SRDF pairs	# symrdf -file Filename -sid SymmID -rdfg GrpNum createpair -type <R1 R2>
Monitor the pairs until they are synchronized	# symrdf -file Filename query

Create a Symmetrix Device Group or Groups	
Create a Symmetrix device group of the appropriate type	# symdbg create <dg_name> -type <rdf1 rdf2>
Add all devices from an RDF group to the device group	# symld -g <dg_name> addall -rdfg <#> -sid <sid>
Change Mode to SRDF/A	
Check if the pairs are consistent and in async mode	# symrdf -g <dg_name> query
If required, change SRDF Mode to Asynchronous	# symrdf -g <dg_name> set mode async
If required, enable rdfa consistency	# symrdf -g <dg_name> enable
Simulate Link Failure - Transmit Idle Not Set	
Determine local RDF port that RDFG is associated with	# symcfg list -RA ALL -sid <sid>
Link Limbo Settings	
Check current Link Limbo (LL) setting	# symcfg list -rdfg <#> -sid <sid>
Set link limbo parameter to 10 for RDFG, if required	# symrdf -sid <sid> -rdfg <rdfg_#> set link_limbo 0
Monitor SRDF status - Verify that the rdfa session is active	# symrdf -g <dg_name> query -rdfa
Generate I/O to devices	
Disable the RDF link between the source and target arrays	
Monitor SRDF status for several minutes - Check to see if the rdfa session is active or suspended and note amount of invalids.	# symrdf -g <dg_name> query -rdfa, symcfg list -rdfg ALL -rdfa
Resync the source and target arrays	
Disable consistency mode	# symrdf -g <dg_name> disable
Set mode to Adaptive Copy - Disk	# symrdf -g <dg_name> set mode acp_disk
Establish the RDF pairs	# symrdf -g <dg_name> establish
Monitor the pairs until they are within 30,000 invalid tracks	# symrdf -g <dg_name> query -rdfa
Change SRDF Mode to Asynchronous	# symrdf -g <dg_name> set mode async
Enable rdfa consistency	# symrdf -g <dg_name> enable
Monitor SRDF status until SRDF pairs are consistent	# symrdf -g <dg_name> query -rdfa, symcfg list -rdfg ALL -rdfa
Enable Transmit Idle	
Check the state of Transmit Idle on both the Source and Target arrays	# symcfg list -rdfg <# ALL> -rdfa
Change the Transmit Idle state to ENABLED on both arrays	# symconfigure -sid <sid> -f <cmd_file> commit
Simulate Link Failure - Transmit Idle Set	
Generate I/O to devices	
Disable the RDF link between the source and target arrays	

Monitor SRDF status - Verify that the rdfa session is still active, note amount of invalids, and check transmit idle time	# symrdf -g <dg_name> query -rdfa, symcfg list -rdfg ALL -rdfa
Enable the RDF link between the source and target arrays	
Monitor SRDF status - Verify that the rdfa session is still active, note amount of invalids, and check transmit idle time	# symrdf -g <dg_name> query -rdfa, symcfg list -rdfg ALL -rdfa

7.2 Delta Set Expansion – Basic Testing

Task	SYMCLI Commands
Configure DSE Devices and Pools	
Create DSE SAVE devices	# symconfigure -sid <sid> -f <cmd_file> commit
Create a DSE device pool	# symconfigure -sid <sid> -f <cmd_file> commit
Assign the DSE SAVE devices the DSE device pool and enable the devices.	# symconfigure -sid <sid> -f <cmd_file> commit
Enable DSE	
Set a DSE threshold of 20% and enable autostart	# symconfigure -sid <sid> -f <cmd_file> commit
Examine DSE Devices	
Examine the DSE devices, pool, and threshold setting.	# symcfg show -pool <pool_name> -rdfa_dse, symcfg list -pool -rdfa_dse, symcfg list -rdfg <#> -rdfa
Repeat for Target Array	
Repeat steps 4.1 through 4.3 for the target array	
Activate DSE	
Activate DSE - Command is run once from either side	# symrdf -g <dg_name> activate -rdfa_dse
Generate I/O to the Devices in the SRDF Group	
Generate I/O the SRDF R1 devices	
Watch the DSE information in query output and insure that it is using a significant amount of cache, but not spilling over. Adjust the workload as necessary.	# symrdf -g <dg_name> query -rdfa -i 10
Create a second workload simulating a burst or bursts of I/O activity	
Monitor SRDF and Spillover Devices	
Monitor the group for tracks spilling over on both sides of the link.	# symrdf -g <dg_name> query -rdfa -i 10
Check the total percent full of the SAVE devices in the DSE pool	# symrdf -sid <sid> monitor -svp <PoolName> [-i Interval] [-c Count]

When the burst activity stops, monitor until SRDF/A recovers and is no longer spilling over.	# symrdf -g <dg_name> query -rdfa, # symrdf -sid <sid> monitor -svp <PoolName> [-i Interval] [-c Count]
Deactivate RDFA Spillover	
Deactivate SRDF/A DSE	# symrdf -g <dg_name> deactivate -rdfa_dse
Remove Spillover Devices and Spillover Pool	
Disable all devices from one of the pools	# symconfigure -sid <sid> -f <cmd_file> commit
Remove all devices from one of the pools and place them in the default pool	# symconfigure -sid <sid> -f <cmd_file> commit
Remove the spillover pool	# symconfigure -sid <sid> -f <cmd_file> commit

7.3 Increased RDF group number support – Basic Testing

Task	SYMCLI Commands
Create 250 RDF Groups	
Examine the number of existing RDF groups, if any	# symcfg list -RA ALL
Create additional RDF groups so the total number of groups on a single RDF equals 64.	# symrdf addgrp -label <GrpLabel> -rdfg <GrpNum> -sid <SymmID> -dir <Dir> -remote_rdfg <GrpNum> -remote_sid <SymmID> -remote_dir <Dir>
Create additional RDF groups so the total number of groups in the array equals 250	# symrdf addgrp -label <GrpLabel> -rdfg <GrpNum> -sid <SymmID> -dir <Dir> -remote_rdfg <GrpNum> -remote_sid <SymmID> -remote_dir <Dir>
Assign Devices to each SRDF group	
Assign an RDF device to each RDF group	# symrdf -file Filename -sid <SymmID> -rdfg <GrpNum> createpair -type <R1 R2> [-establish]
Confirm RDF Functionality	
Run a full establish against all RDF devices if the -establish option was not chosen in step 6.2.1	# symrdf -file Filename -sid <SymmID> -establish -full

7.4 Additional Citigroup Advanced Testing

Task	Notes
DSE	
Performance – when running just a single RDF session	Checking performance of Delta Set Transfer acceptable when DSE invoked

Performance – with multiple RDF groups	Checking performance of Delta Set Transfer acceptable when DSE invoked
Performance - Best Practice to set up performant DSE pool	Note BP is given on how to set up a DSE pool that is performant and of the right size
Operational model – initial configuration steps	Confirm actual configuraton steps
Operational model – expanding pools	Confirm process for expanding a pool
Operational model – adding an RDF group; extra steps	Confirm process for adding an RDF group to an existing pool
Operational model – compatibility with Cache Partitioning	Check if DSE and Cache Partitioning can be enabled at the same time
Operational model – alerting when DSE invoked	Check that symevntd sends alerts when DSE invoked
Operational model – pool usage monitoring via event daemon	Check that exhaustion of pool can be automatically monitored
Recoverability – after peaks	Check DSE can recover after large IO peaks
Recoverability – after network outage	Check DSE can recover after network outages
Recoverability – after pool exhaustion	Check impact of pool exhaustion on DSE
Transmit Idle	
Confirm functioning of Transmit Idle with DSE enabled	Confirm DSE and Transmit idle work together
Operational model – Initial configuration for an RDF group	Confirm Transmit idle steps when adding an RDF group
Operational model – monitoring via event daemon	Confirm entering and exiting transmit idle state can be monitored
250 RDF groups	
Impact on performance of multiple RDFGs on same RF – Empty RDFGs	Confirm that the existence of empty RDF groups does not impact SRDF throughput
Impact on performance of multiple RDFGs on same RF – Active SRDF/A RDFGs	Confirm that the existence of multiple active RDF groups does not impact SRDF throughput
Other	
RAID-5 SRDF performance	Confirm on issues with Delta-set

	transfer speeds with RAID-5 devices
RAID-6 SRDF performance	Confirm on issues with Delta-set transfer speeds with RAID-6 devices
Bi-directional SRDF performance	Confirm that Bi-directional SRDF does not have an impact on SRDF throughput
Symptomz migrate testing	Test functioning of CLI symptomz migrate feature

8 Other Project Scope Information

8.1 Project Classification

This is a Script Lite project for the Symmetrix Storage Array Product. The WTS work effort number is 5386.

8.2 Project Deliverables

This project will result the delivery of the following documentation, as a minimum:

- New: SRDF/A Reserve Capacity and 5772 testing – Project Scope (GDSE-07039-PS)
- New: SRDF/A Reserve Capacity and 5772 testing – Release Notes (GDSE-07039-RN)
- Update: SRDF/A for Long Distance Replication – Solutions Guide (GDSE-05002-SG)

8.3 Project pre-requisites

- Access to the GDSE test lab, specifically two Symmetrix storage arrays running 5772 and management servers.

8.4 Project Risks

- Lack of access to the GDSE test lab, specifically two Symmetrix storage arrays running 5772 and management servers.