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Report of Successful Completion of Qualification Testing

International Business Machines Corporation has successfully completed compatibility and interoperability testing of the IBM DS8880 at code level 88.0.143.0 in the following IBM zEnterprise z13 environment:

IBM hereby confirms that testing for the support of FICON® and FCP connectivity of the following has been successfully completed:

CPU	IBM zEnterprise z13 2964-N30 Driver 22H level in LPAR mode
OS&GDPS®	z/OS V2.2
	GDPS 3.12
Functions	GDPS/PPRC HyperSwap Manager <ul style="list-style-type: none"> • Freeze/run • Planned HyperSwap • Unplanned HyperSwap • HyperSwap Failover/Failback
	GDPS/PPRC <ul style="list-style-type: none"> • Freeze/run • Planned HyperSwap • Unplanned HyperSwap • HyperSwap Failover/Failback • FlashCopy V2, FlashCopy Space Efficient and Remote Pair FlashCopy
	GDPS/XRC <ul style="list-style-type: none"> • FlashCopy Zero suspend for FlashCopy V2 and FlashCopy Space Efficient • SDM clustering
Storage Devices	IBM DS8880 <ul style="list-style-type: none"> • PPRC and XRC volumes • FlashCopy V2

More detailed testing results are available from IBM on request.

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 IBM Distinguished Engineer
 z Systems
 International Business Machines Corporation

Attachment A -- Test Matrix

<u>GDPS/PPRC</u>		
<u>HyperSwap Manager</u>		
Test Case Suite	Successfully Completed	Test Case Suite Description
<ul style="list-style-type: none"> • Initial Tests 	✓	Basic remote copy operations using panels Basic Freeze tests (GO/STOP/COND)
<ul style="list-style-type: none"> • Planned Actions 	✓	Remote copy operations using HYPERSW command Simulate Site maintenance (Site 1) and (Site 2)
<ul style="list-style-type: none"> • Unplanned Actions 	✓	GDPS reacts to a failure, depending on the FREEZE option (GO / STOP / COND / SWAP&GO / SWAP & STOP) Test failures were generated by PPRC links unplug, Chpid unplug, DASD control Unit power off and elongated I/O response times
<ul style="list-style-type: none"> • Disruptive Testing (aka Config Testing) 	✓	GDPS reacts to a failure, depending on the FREEZE policy. Failures were generated by Control Unit Emergency power off and control unit internal failures
<ul style="list-style-type: none"> • HyperSwap Stress test 	✓	Run a planned HyperSwap, with the application systems and the controlling system having CPU contention
<ul style="list-style-type: none"> • Miscellaneous 	✓	HyperSwap extension (checking of secondary PPRC status – failure, XRC session, Concurrent Copy, etc.)

Attachment A -- Test Matrix

<u>GDPS/PPRC</u>		
Test Case Suite	Successfully Completed	Test Case Suite Description
<ul style="list-style-type: none"> • Initial Tests 	✓	Basic remote copy operations using panels Basic Freeze tests (GO/STOP/COND)
<ul style="list-style-type: none"> • Planned Actions 	✓	Remote copy operations using scripts (START/STOP SECONDARY, Flashcopy, HyperSwap (Resync & Suspend), etc.) Simulate Site maintenance (Site 1) and Site 2)
<ul style="list-style-type: none"> • Unplanned Actions 	✓	GDPS reacts to a failure, depending on the FREEZE option (GO / STOP / COND / SWAP&GO / SWAP & STOP) Failures were generated by PPRC links unplug, Chpid unplug, DAsD control Unit power off and elongated I/O response times
<ul style="list-style-type: none"> • Disruptive Testing (aka Config Testing) 	✓	GDPS reacts to a failure, depending on the FREEZE policy. Failures were generated by Control Unit Emergency power off and control unit internal failures
<ul style="list-style-type: none"> • HyperSwap Stress test 	✓	Run a planned HyperSwap, with the application systems and the controlling system having CPU contention
<ul style="list-style-type: none"> • Miscellaneous 	✓	HyperSwap extension (checking of secondary PPRC status – failure, XRC session, Concurrent Copy, etc.)
<ul style="list-style-type: none"> • FlashCopy 	✓	Prior FlashCopy limitations (Space Efficient, Remote Pair) are removed. Note that the traditional FlashCopy testcases are executed as part of Planned Actions and Unplanned Actions.

<u>GDPS/XRC</u>		
Test Case Suite	Successfully Completed	Test Case Suite Description
<ul style="list-style-type: none"> • Initial Tests 	✓	Basic remote copy operations using panels. Tests using single SDM and coupled SDMs
<ul style="list-style-type: none"> • Planned Actions 	✓	Remote copy operations using scripts (START/STOP, SUSPEND session, etc.) Simulate Site maintenance (Site 1) and Site 2) Simulate Site 1 failure and restart Production in recovery site.
<ul style="list-style-type: none"> • FlashCopy 	✓	Prior FlashCopy limitation (Space Efficient) is removed. Note that the traditional FlashCopy testcases are executed as part of Planned Actions.