

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Contents [Hardware Arrays](#)

[Fibre Channel HBA's](#)

[iSCSI HBAs](#)

[Fibre Channel Switches](#)

[Comments](#)

[Notes](#)

[Revision History](#)

Hardware Arrays

Vendor	Array Model	DMP Mode	3rd Party Multipathing	Dynamic MultiPathing(DMP)							Notes	
				ASL's			DSM's					
				FC Port Drivers	SCSI Miniport	Storage Miniport	iSCSI Support	SAS Support	64-Bit Support	MPIO Support		
3PAR	InServ S200, 400, 800	A/A, AP/C		■	■	■				■	■	See Note 10
Dell	Equallogic PS5000 Series	A/A, AP/C				■	■					See Note 51
EMC	CLARiiON AX/CX/CX-3/CX-4 Ultrascale Series Arrays	A/P	PowerPath	■	■	■						See Note 10,14,23
EMC	Symmetrix 3000 Series	A/A, AP/C	PowerPath	■	■	■						See Note 2,3,14
EMC	Symmetrix 8000 Series	A/A, AP/C	PowerPath	■	■	■						See Note 2,3,10,14,34,35,41
EMC	Symmetrix DMX Series	A/A, AP/C	PowerPath	■	■	■						See Note 2,3,10,14,34,35,41
Hitachi	9500V Thunder Series	AP/C	HDLM 5.9	■	■	■						See Note 10,17,18,19
Hitachi	9900 Lightning Series (9900 & 9900V)	A/A, AP/C	HDLM 5.9	■	■	■						See Note 6,10,29,34,36,41
Hitachi	SANRISE2000 (SANRISE2200 and SANRISE2800)	A/A, AP/C	HDLM 5.9	■	■	■						See Note 6,10,29,34,36,41
Hitachi	SANRISE9900V (SANRISE9970V and SANRISE9980V)	A/A, AP/C	HDLM 5.9	■	■	■						See Note 6,10,29,35,06,41
Hitachi	Universal Storage Platform, Models USP100, USP600, USP1100	A/A, AP/C	HDLM 5.9	■	■	■						See Note 5, 10,29,34,36,41
Hitachi	Network Storage Controller, Model NSC55	A/A, AP/C	HDLM 5.9	■	■	■						See Note 10,29,34,36,41
Hitachi	Adaptable Modular Storage (AMS) Series	AP/C	HDLM 5.9	■	■	■						See Note 10,19,29
Hitachi	Adaptable Modular Storage (AMS) 2000 Series	A/A, AP/C	HDLM 5.9			■						See Note 10,19,29
Hitachi	Workgroup Modular Storage (WMS) Series	AP/C	HDLM 5.9	■	■	■						See Note 10,19,29
Hitachi	USP-V, USP-VM	A/A, AP/C	HDLM 5.9	■	■	■						See Note 10, 19, 29
HP	Proliant DL380 G5 Storage Server	A/A, AP/C					■					
HP	StorageWorks Enterprise Virtual Array EVA4x00, EVA6x00, EVA8x00	A/A, AP/C				■						See Note 10,34,38,41
HP	StorageWorks Enterprise Virtual Array EVA4400	A/A, AP/C				■						See Note 10,34,38,41
HP	StorageWorks Enterprise Virtual Array EVA3000, EVA5000	AP/C	SecurePath 4.0c	■	■							See Note 13
HP	StorageWorks Enterprise Virtual Array EVA3000, EVA5000	AA, AP/C				■						See Note 10,34,38,41,44
HP	StorageWorks MSA1000	AP/C	SecurePath 4.0c	■	■							See Note 13,25
HP	StorageWorks MSA1000, MSA1500	AA, AP/C				■						See Note 44, 45
HP	StorageWorks MSA2012/2212	AA, AP/C				■						See Note 50
HP	HP StorageWorks XP10000/XP12000/XP20000/XP24000 Disk arrays	A/A, AP/C	SecurePath 4.0c	■	■	■						See Note 10,13,34,39,41
HP	SureStore E Disk Array XP128/XP1024	A/A, AP/C	SecurePath 4.0c	■	■	■						See Note 10,13,34,39,41
HP	SureStore E Disk Array XP48/512	A/A, AP/C		■	■							
HP	SureStore E Disk Array XP256	A/A, AP/C		■	■	■						See Note 10,13,34,39,41
IBM	System Storage N3000, N5000, N7000 Series	A/A, AP/C				■						See Note 8,9,10,34,37,41
IBM	TotalStorage™ DS3200	AP/C						■				See Note 1,10,28,30
IBM	TotalStorage™ DS3300	AP/C				■						See Note 1,10,28,30
IBM	TotalStorage™ DS3400	AP/C				■						See Note 1,10,28,30
IBM	TotalStorage™ DS4000 Series (formerly FASTT Series)	AP/C	RDAC 9.10, 9.19	■	■	■						See Note 1,10,28,30
IBM	TotalStorage™ DS6000 Series	AP/C	SDD 1.6.2.0-1/2.1.3.0-1	■	■	■						See Note 8,10,42

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

IBM	TotalStorage™ DS8000 Series	A/A, AP/C	SDD 1.6.2.0-1/2.1.3.0-1	■	■	■	■	■	■	■	■	See Note 8, 10, 34, 42, 43
IBM	TotalStorage™ ESS800/ESS750	A/A, AP/C	SDD 1.6.2.0-1/2.1.3.0-1	■	■	■	■	■	■	■	■	See Note 8, 10, 34, 35, 41, 42
IBM	TotalStorage™ SAN Volume Controller	A/A, AP/C	SDD 1.6.2.0-1/2.1.3.0-1	■	■	■	■	■	■	■	■	See Note 4, 42
IBM	TotalStorage™ SAN Volume Controller	A/A, AP/C	SDDSM2.1.3.0-1									See Note 4, 42
IBM	XIV	A/A, AP/C										See Note 52
NetApp	F800 Series	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 31
NetApp	FAS3000/V3000 Series	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 10, 31, 34, 37, 41
NetApp	FAS6000/V6000 Series	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 10, 31, 34, 37, 41
NetApp	FAS2000/FAS900/FAS200 Series	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 10, 31, 34, 37, 41
NetApp	NearStore Series	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 10, 31, 34, 37, 41
NetApp	V-Series (GF980cm GF960c, GF270c, V3020, V3050, v6030, V6070)	A/A, AP/C		■	■	■	■	■	■	■	■	See Note 8, 10, 31, 34, 37, 41
Nihon	Unisys SANArena 2200 Series (SANArena 2200 and 2800)	A/A, AP/C	HDLM 5.9	■	■	■	■	■	■	■	■	See Note 6, 10, 29
Pillar Data	Axiom 300/500	AP/C										See Note 10
Sun	StorageTek FlexLine 200/300 Series Storage Systems	AP/C	RDAC 9.10	■	■	■	■	■	■	■	■	See Note 1, 10
Sun	StorEdge 6130 Array	AP/C		■	■	■	■	■	■	■	■	See Note 24
Sun	StorEdge 6130, 6140, 6540 Array	AP/C										See Note 10, 24
Sun	StorEdge SE9900 Series (StorEdge SE9910 and SE9960)	A/A, AP/C	HDLM 5.9	■	■	■	■	■	■	■	■	See Note 6, 10, 29, 34, 36, 41
Sun	StorEdge SE9900V Series (StorEdge SE9970V and SE9980V)	A/A, AP/C	HDLM 5.9	■	■	■	■	■	■	■	■	See Note 6, 10, 29, 34, 36, 41
Sun	StorEdge SE9990 Series	A/A, AP/C	HDLM 5.9	■	■	■	■	■	■	■	■	See Note 5, 10, 29, 34, 36, 41
Xiotech	Xiotech	A/A, AP/C	HDLM 5.9									See Note 5, 10, 29, 34, 36, 41

Fibre Channel HBA's

Vendor	HBA Model	Driver	Firmware	Dynamic MultiPathing(DMP)						Notes	
				ASL's		DSM's					
				FC Port Drivers	SCSI Miniport	Storport Miniport	iSCSI Support	64-Bit Support	MPIO Support		
Egenera	Control Blade™ ES	6.07.02e	2.02.06							See Note 19, 48	
EMC	LPe9802-E	1.30a9	1.92a1			■			■	■	See Note 48
Emulex	LPe1150, LPe11000, LPe11002	1.20a7	2.50a6			■			■	■	See Note 10, 33, 40, 48
Emulex	LP1050EX, LP10000ExDC	1.20a7	1.91a5			■			■	■	See Note 10, 33, 40, 48
Emulex	LP1150, LP11000, LP11002	1.20a7	2.10a10			■			■	■	See Note 10, 33, 40, 48
Emulex	LP1050, LP1050DC, LP10000, LP10000DC	2.41a1	1.91a5	■							See Note 47, 48
Emulex	LP1050, LP1050DC, LP10000, LP10000DC	5.30a2	1.91a5		■						See Note 22, 48
Emulex	LP1050, LP1050DC, LP10000, LP10000DC	1.20a7	1.91a5			■			■	■	See Note 10, 33, 40, 48
Emulex	LP952L, LP9002L, LP9002DC, LP9402DC	2.41a1	3.93a0	■							See Note 47, 48
Emulex	LP952L, LP9002L, LP9002DC, LP9402DC	5.30a2	3.93a0		■						See Note 22, 48
Emulex	LP952L, LP9002L, LP9002DC, LP9402DC	1.20a7	3.93a0			■			■	■	See Note 10, 33, 40, 48
Emulex	LP982, LP9802, LP9802DC	2.41a1	1.91a5	■							See Note 47, 48
Emulex	LP982, LP9802, LP9802DC	5.30a2	1.91a5		■						See Note 22, 48
Emulex	LP982, LP9802, LP9802DC	1.20a7	1.91a5			■			■	■	See Note 10, 33, 40, 48
HP	LP1050DC, LP10000, FCA2600	2.41a1	1.91a5	■							See Note 47, 48
HP	LP1050DC, LP10000, FCA2600	5.20a10	1.91a5		■						See Note 22, 48
HP	LP1050 (A7388A), LP1050DC (A7387A), LP10000	1.20a7	1.91a5			■			■	■	See Note 10, 33, 40, 48
HP	LP1050 (AB466A), LP1050DC (AB467A)	1.20a7	1.91a5			■			■	■	See Note 10, 33, 40, 48
HP	KGPSA-CB (Compaq #176479-B21)	5.20a10	3.90a7		■						See Note 48
HP	StorageWorks FCA2408, FCA2204, FCA2404, FCA2404DC	2.22a8	1.91a5	■							See Note 47, 48
HP	StorageWorks FCA2408, FCA2204, FCA2404, FCA2404DC	5.20a10	1.91a5			■					See Note 22, 48

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

HP	StorageWorks FCA2408, FCA2204, FCA2404, FCA2404DC	1.20a7	1.91a5								■	■	See Note 10,33,40,48
HP	StorageWorks FCA2214, FCA2214DC	9.1.2.14	1.45								■		See Note 48
HP	StorageWorks FCA2214, FCA2214DC	9.0.0.17	1.45								■	■	See Note 10,33,40,48
HP	StorageWorks FCA2101, FCA2355	5.20a10	3.91a1								■		See Note 48
HP	StorageWorks FC1142SR (AE311A), FC1242SR (AE312A)	9.1.2.19	1.18								■	■	See Note 10,33,48
HP	BL30p/BL35p Dual-Port Fibre Channel Adapter	9.1.2.14	1.5								■		See Note 48
HP	BL30p/BL35p Dual-Port Fibre Channel Adapter	9.1.2.19	1.5								■	■	See Note 10,33,40,48
HP	BL25p/BL45p Fibre Channel Adapter	9.1.2.14	1.5								■		See Note 48
HP	BL25p/BL45p Fibre Channel Adapter	9.1.2.19	1.5								■	■	See Note 10,33,40,48
HP	BL20p G2/G3 FC Mezzanine Card (ISP2312)	9.1.2.14	1.5								■		See Note 48
HP	BL20p G2/G3 FC Mezzanine Card (ISP2312)	9.1.2.19	1.5								■	■	See Note 10,33,40,48
HP	FC2143, FC2243	1.20a7	2.10a10								■		See Note 10,33,40,48
HP	FC2142SR, FC2242SR	1.20a7	2.50a6								■	■	See Note 10,33,40,48
IBM	BladeCenter HS20/LS20 FC Extension Option	9.1.2.14	1.5								■		
IBM	BladeCenter HS20/LS20 FC Extension Option	9.1.2.19	1.5								■	■	See Note 10,33,40,48
IBM	BladeCenter HS40 FC Extension Option	9.1.2.14	1.5								■		
IBM	BladeCenter HS40 FC Extension Option	9.1.2.19	1.5								■	■	See Note 10,33,40,48
IBM	Netfinity 2103, 2104	9.1.2.14	1.5								■		See Note 20,48
IBM	DS4000 HBA (IBM P/N 24P0960)	9.1.2.19	1.5								■	■	See Note 46,48
Qlogic	QLA2310, QLA2310F, QLA2310FL	9.1.2.14	1.5								■		See Note 11,48
Qlogic	QLA2310, QLA2310F, QLA2310FL	9.1.2.19	1.5								■	■	See Note 10,11,33,48
Qlogic	QLA2340, QLA2342, QLA2344, QLA2340L, QLA2342L	9.1.2.14	1.5								■		See Note 12,46,48
Qlogic	QLA2340, QLA2342, QLA2344, QLA2340L, QLA2342L	9.1.2.19	1.5								■	■	See Note 10,12,33,48
Qlogic	QLA2460, QLA2462	9.1.2.19	1.18								■	■	See Note 10,33,48
Qlogic	QLE2460, QLE2462, QLE2464	9.1.2.19	1.18								■	■	See Note 10,33,48

iSCSI HBAs

Vendor	HBA Model	Driver	FW/BIOS	Dynamic MultiPathing(DMP)						Notes	
				ASL's			DSM's				
				FC Port Drivers	SCSI Miniport	Storage Miniport	iSCSI Support	64-Bit Support	MPIO Support		
Qlogic	QLA4010	2.1.3.26	03.0.0.16				■				See Note 48
Qlogic	QLA4050, QLA4050C, QLA4052C	2.1.3.26	03.0.0.16				■				See Note 48
Microsoft	iSCSI Software Initiator	2.03	N/A				■				See Note 32

Fibre Channel Switches

Vendor	Model	Firmware	See Note 49
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Comments: Support is conditional according to the published notes corresponding to the individual device.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

The Veritas Storage Foundations & High Availability Solutions for Windows Hardware Compatibility List (HCL) applies to Fibre Channel and iSCSI based Storage Area Networks.

All hardware configurations listed have been qualified with the following products: Veritas Storage Foundation™ 5.0 for Windows®, Veritas Storage Foundation HA 5.0 for Windows® (SFW plus Veritas Cluster Server 5.0 for Windows®) and Veritas Cluster Server 5.0 for NetApp SnapMirror. The following options are also supported by this HCL list: Veritas Storage Foundation for Windows - Volume Replicator Option, Veritas Storage Foundation for Windows - FlashSnap Option, Veritas Storage Foundation for Windows - Dynamic Multi-pathing Option, Veritas Storage Foundation for Windows - Cluster Option for Microsoft® Cluster Server.

- Configurations using any multipathing software (Veritas Storage Foundation for Windows - Dynamic Multi-pathing Option (DMP) or third-party) are restricted to the Veritas HCL list. This includes Veritas DMP implementations based upon Veritas Array Support Libraries (ASLs) or MPIO Device Specific Modules (DSMs). For third party multipathing products only the versions listed on the HCL are supported.

- Configurations using Veritas Cluster Server (VCS) or Microsoft Cluster Server (MSCS) that are not on the Veritas HCL list are provided "best effort" support based on the Microsoft Cluster HCL. Best effort support allows for escalations based on unqualified hardware, but if a problem is determined to be hardware specific, the problem is not guaranteed to be resolved. -

- Best practices for zoning in a Storage Foundation for Windows 4.x and 5.x environment <http://library.veritas.com/docs/293014>

- For other configurations, hardware is supported based on the Microsoft Windows Catalog. Check the Microsoft Windows Catalog at <http://www.microsoft.com/windows/catalog/server/> for Microsoft Windows Server qualified equipment. Microsoft lists supported iSCSI equipment separately from the Windows Catalog and the latest Microsoft iSCSI H

The supported hardware list has been specifically qualified and approved by the Symantec Compatibility Lab (cLAB). Hardware that does not appear on this list is not supported when used with Veritas DMP or any 3rd-party multipathing solution. Employing a multipathing solution with Veritas Storage Foundation for Windows on non-certified hardware can result in unpredictable and possibly data-threatening behavior.

Certified hardware is selected by Symantec Product Management, based on market research and input from the field, including customer feedback. If a customer would like to have their hardware considered for inclusion on this HCL, simply submit your request to your Symantec Sales Representative.

All storage configurations shown in this HCL were tested with drivers and firmware supported by the storage array vendors. See the storage array vendor's recommendation for the driver and firmware levels, or contact the vendor for specific drivers and firmware supported, as well as the vendor's support for the stated Symantec products.

OEM versions of all listed HBAs and switches are also supported.

The Firmware/Driver columns show the most recent version tested by Symantec and are the minimum levels supported. Newer versions are not always tested but are supported. It may be necessary to downgrade the device firmware/drivers to ensure proper operation while an issue is resolved. Symantec recommends customers select a driver level from our HCL that is also array vendor approved and supported. If they do not coincide then a higher level than specified in the Symantec Storage Foundation & High Availability for Windows HCL can be used with the understanding that it has not been specifically tested by Symantec.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Support for Storport Miniport drivers requires installation of MPIO Device Specific Modules (DSMs) when the Veritas DMP Option is installed. MPIO column in the matrix specifies support using Veritas DMP with MPIO. Support for 3rd Party Multipathing solutions is limited to those products and versions listed.

Veritas DMP with MPIO Device Specific Modules (DSMs) support:

- Supported with Windows Server 2003 (32-bit, x64 & IA64) operating systems only
- Supported with FC Storport Miniport drivers, iSCSI HBAs, Microsoft iSCSI Software Initiator
- Basic disks are supported provided SCSI-3 registry support is not enabled in DMP DSM
- If SCSI-3 registry is enabled in a DMP DSM for an attached array any existing basic disks should be upgraded to dynamic disks before placing them under DMP control..
- Boot from SAN is supported with Dynamic and Basic disks provided customers follow Microsoft's Boot from SAN recommendations
- Boot and Data Volumes are supported on the same bus/HBA's for cluster and non-clustered servers
- Veritas DMP with MPIO DSMs **is not** supported with Windows 2000, FC Port drivers or FC SCSI Miniport drivers

Veritas DMP with Array Support Libraries (ASLs) support:

- Supported with Windows 2000 and Windows Server 2003 (32-bit only) operating systems only
- Supported with FC Port drivers, FC SCSI Miniport drivers and iSCSI HBAs
- Veritas DMP with ASLs **is not** supported with Windows Server 2003 (x64 & IA64), FC Storport Miniport drivers, the Microsoft iSCSI Software Initiator, Boot from SAN or Basic Disks.
- Any existing basic disks should be upgraded to dynamic disks before placing them under DMP (ASL) control.

DMP Modes are A/A = Active/Active and AP/C = Active/Passive Concurrent. Active/Active DMP support with clustering (VCS or MSCS) requires the use of SCSI-3 enabled storage arrays and MPIO Device Specific Modules (DSMs), see Notes 10, 34 and 35 for details.

Veritas DMP Device Specific Module (DSM) Release History:

- Device Driver Installation (DDI-2) Packages have been released for the WxRT 5.0. Download information is located here: <http://entsupport.symantec.com/docs/300827>

Notes

Note 1: IMPORTANT: These arrays require additional configuration steps in order to work properly with Veritas Storage Foundation for Windows. Before attempting to use any of these arrays with Veritas Storage Foundation for Windows DMP software, please contact the array hardware manufacturer for additional configuration instructions and updates. Several special settings must be enabled on these arrays to allow compatibility with DMP, including Auto Volume Transfer (AVT), also referred to as Auto Logical Drive Transfer (ADT). Specific firmware levels from the manufacturer for these arrays may also be required.

Note 2: EMC Symmetrix 8000 Series arrays include the 8230, 8430, 8530, 8730 and 8830 arrays. EMC Symmetrix 3000 Series arrays include the 3330, 3430, 3630, 3700, 3830 and 3930 arrays. EMC DMX Series arrays include the DMX800, DMX1000, DMX2000, DMX3000, DMX-3 and DMX-4 arrays.

Note 3: If you are using DMP ASLs, with the EMC Symmetrix 3000, 8000, and DMX-Series arrays then there are HBA driver limitations. Emulex HBA's are supported with FC Port Drivers only. Qlogic HBAs are supported provided that you use EMC recommended SCSI miniport drivers and the Microsoft SCSI Port hotfix Q883114. If you are using DMP MPIO DSMs, then the Emulex HBA Storport drivers are supported with the Symmetrix 8000 and DMX series arrays.

Note 4: Support for the IBM SVC is now available for Windows Server 2003 and Windows 2000 using Emulex and Qlogic HBAs.

<http://www.windowsservercatalog.com/item.aspx?idItem=0019b89f-5c72-3f3a-8a6c-eaf548851155> (x86)
<http://www.windowsservercatalog.com/item.aspx?idItem=9be687ab-679c-d689-566d-53ccef1ee4d5> (x64)

Note 5: Hitachi USP models 100, 600 & 1100 also applies to the SUN StorEdge SE9990 series.

Note 6: Hitachi 9900 Lightning series array (9910 and 9960) support also applies to the Hitachi SANRISE2000 series (SANRISE2200 and SANRISE2800), the Nihon Unisys SANArena 2000 series (SANArena 2200 and 2800), and the SUN StorEdge SE9900 series (StorEdge SE9910 and SE9960) arrays. Hitachi 9900V Lightning series array (9970V and 9980V) support also applies to the Hitachi SANRISE9900V series (SANRISE9970V and SANRISE9980V), SUN StorEdge SE9900V series (StorEdge SE9970V and SE9980V).

Note 7: Array detected and supported as JBOD using VERITAS DMP Array Support Libraries (ASLs) only. There is no specific array support module for this array

Note 8: If Network Appliance SnapDrive and SnapMirror applications are being used, then you must use Veritas Cluster Server 5.0 for NetApp SnapMirror. These applications do not support Windows dynamic disks at this time. Due to this NetApp application limitation Storage Foundation for Windows and Storage Foundation HA for Windows cannot be used with NetApp arrays if these applications are installed.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 9: IBM System Storage N3000, N5000, N7000 Series arrays include the N3700, N5200, N5500, N7600 and N7800 arrays.

Cross Reference to NetApp Models

- IBM System Storage N3700 = NetApp FAS270, FAS270c and GF270c
- IBM System Storage N5200 = NetApp FAS3020, FAS3020c, V3020 and V3020c
- IBM System Storage N5500 = NetApp FAS3050, FAS2050c, V3050 and V3050c
- IBM System Storage N7600 = NetApp FAS 6030, FAS6030c, V6030, V6030c
- IBM System Storage N7800 = NetApp FAS 6070, FAS6070c, V6070, V6070c

Note 10: Windows Server 2003 x32 Edition, Windows Server 2003 x64 Edition, Windows Server 2003 64-Bit for Itanium System and FC Storport miniport driver support for the following arrays is integrated into the WxRT 5.0 release and Device Driver Installation (DDI-2) Packages have been released for the WxRT 5.0. Download information is located here: <http://entsupport.symantec.com/docs/300827>

Note 11: The QLogic SAN Connectivity Kit 2000 includes a QLogic SANbox2-8 Fibre Channel Switch coupled with four (4) QLogic SANblade HBAs (QLA2310F) and all the necessary accessories including cables, GBICs and management software.

Note 12: The QLogic SAN Connectivity Kit 3000 includes a QLogic SANbox 5200 Fibre Channel switch coupled with four (4) QLogic SANblade HBAs (QLA2340) and all the necessary accessories including cables, SFPs and SANsurfer software.

Note 13: Also tested with HP SecurePath (4.0C or later) with HP XP128/1024/12000, EVA5000, EVA3000 and MSA1000/1500 Arrays. HP Securepath supports SFW and SFW-HA (VCS) on Windows 2000 only, there is no Securepath support for Windows Server 2003.

Note 14: Also tested EMC PowerPath with EMC DMX Series, EMC Symmetrix 8000, Symmetrix 3000 Series, EMC CLARiiON AX Series, EMC CLARiiON CX Series and EMC CLARiiON CX-3 Ultrascale Series Arrays. Please check the EMC Interoperability Support Matrices (<http://www.emc.com/interoperability/index.jsp>) for details on the specific versions of PowerPath supported.

Note 15: NEC iStorage S1000 Series arrays include S100, S1100, S1200 and S1300 arrays.

Note 16: Hitachi 9200 Thunder array support also applies to the Hitachi SANRISE1000 series (SANRISE1100 and SANRISE1200) and the Nihon Unisys SANArena 1000 series (SANArena 1100 and 1200).

Note 17: Hitachi 9500V Thunder series array (9520V, 9530V, 9570V, 9580V and 9585V) support also applies to the Hitachi SANRISE 9500V series and the Nihon Unisys SANArena 1500 series.

Note 18: During a Hitachi online format of new LUNS, certain SCSI commands are disabled which may temporarily suspend data access. Contact Hitachi for a list of these commands.

Note 19: Disabling both paths at the same time may cause the cluster service groups to not failover to the other node when using Storage Foundation HA for Windows with these arrays. Do not change the Product ID (PID) of these arrays as this is one of the fields that Symantec software uses to identify and claim the array.

Note 20: IBM HBA Cross-Reference: IBM 2103 TotalStorage FAStT FC-2 Host Bus Adapter, Part Number 19K1246 = Qlogic QLA2310. IBM 2104 TotalStorage FAStT FC-2 133 Host Bus Adapter, Part Number 24P0960 = Qlogic QLA2312.

Note 21: DMP DSM support for the StorageTek Flexline 300 Series Storage Systems includes the FLX380 array only. DMP ASL support for the StorageTek FlexLine 200/300 Series Storage Systems includes the FLX210, FLX240 (formerly OPENstorage D240), FLX280 (formerly OPENstorage D280) and FLX380 models, This DMP ASL support also applies to the BladeCtrlr BC84, B210, B220, B280 and OPENstorage D173, D178 and 9176 models.

Note 22: Emulex SCSI Miniport driver support applies to Hitachi and HP arrays only.

Note 23: EMC CLARiiON CX Series arrays supported include the CX200, CX300, CX400, CX500, CX600 and CX700. EMC CLARiiON CX-3 Ultrascale Series arrays supported include the CX3-10, CX3-20, CX3-40 and CX3-80 arrays. EMC CLARiiON AX Series arrays supported include the AX100 and AX150. VERITAS DMP (ASL or DSM) supports only EMC and Dell Failover Mode 1.

Note 24: IMPORTANT: The Sun StorEdge 6130 array requires additional configuration steps in order to work properly with Veritas Storage Foundation for Windows. Before attempting to use the Sun StorEdge 6130 array with Veritas Storage Foundation for Windows DMP software, please contact the array hardware manufacturer for additional configuration instructions and updates. Several special settings must be enabled on these arrays to allow compatibility with DMP. Specific firmware levels from the manufacturer for these arrays may also be required.

Note 25: There is NO DMP ASL support for the HP MSA1000 or MSA1500 arrays using DMP ASL's.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 26: NEC iStorage S1000 Series arrays include S100, S500, S1100, S1200, S1300, S1400, S1500, S1800 arrays. NEC iStorage S2000 Series arrays include S2100, S2200, S2300, S2400, S2500, S2800 arrays.

Note 27: Egenera arrays have been tested and are supported.

Note 28: DMP DSM - support is available for the DS4200, DS4300, DS4700 and DS4800 Arrays.

DMP ASL - support is available for the IBM TotalStorage Series DS4100 (formerly FAStT100), DS4300 (formerly FAStT600), DS4400 (formerly FAStT700), DS4500 (formerly FAStT900), DS4800 and the FAStT200/FAStT500 array models.

Note 29: Hitachi HDLM 5.9 are supported with the Hitachi 9200 Freedom Series, Hitachi 9500V Thunder Series, Hitachi 9900 Lightning Series (9900 & 9900V), Hitachi SANRISE2000 (SANRISE2200 and SANRISE2800), Hitachi SANRISE9900V (SANRISE9970V and SANRISE9980V), Hitachi USP models 100, 600 & 1000, Hitachi Network Storage Controller (NSC55), Hitachi Adaptable Modular Storage, Models AMS200/AMS500, Hitachi Workgroup Modular Storage, Model WMS100, Hitachi USP-V, USP-VM, Nihon Unisys SANArena 2200 Series (SANArena 2200 and 2800), Sun StorEdge SE9900 Series (StorEdge SE9910 and SE9960), Sun StorEdge SE9900V Series (StorEdge SE9970V and SE9980V) and Sun StorEdge SE9900V Series model families.

Note 30: IBM RDAC v9.10 and v9.19 are also supported with IBM FAStT Arrays.

Note 31: Veritas DMP support for NetApp arrays with the Microsoft iSCSI Software Initiator or with the NetApp CFO Option requires the use of the Veritas DMP - MPIO DSM based multipathing.

Note 32: The Microsoft iSCSI Software Initiator is supported on any Ethernet NIC card that is supported by the Microsoft iSCSI Software Initiator. Recommended Microsoft iSCSI Software Initiator setting for adding a new target is to specially select the adapter and port of the NIC configured for the iSCSI connection instead of selecting the default adapter. There is no Veritas DMP support for the Microsoft iSCSI Software Initiator unless an MPIO DSM is available for the specific array.

Note 33: Microsoft has also released an updated Storport storage driver (version 5.2.3790.2723 Released 11-Aug-2006) which is available for Windows Server 2003, see <http://support.microsoft.com/Default.aspx?kbid=916048> for details. It is highly recommended that customers install this updated Storport driver prior to opening any MPIO related support calls.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 34: Array requirements to support Active/Active DMP DSM in a cluster (MSCS/VCS)

- EMC Symmetrix/DMX Arrays
 - EMC Symmetrix 8000 Series requires FW 5568.67 or higher
 - EMC Symmetrix DMX Series requires FW 5670.73 or higher
- IBM TotalStorage Arrays
 - IBM TotalStorage™ ESS800/ESS750 requires FW 2.3.2.71 or higher
 - IBM TotalStorage™ DS6000 Series requires FW 6.1.600.46 or higher
 - IBM TotalStorage™ DS8000 Series requires FW 6.1.600.46 or higher
 - IBM System Storage N3000, N5000, N7000 Series requires ONTAP v7.0.2 or higher)
- Hitachi Arrays
 - Hitachi USP models 100, 600, and 1000 requires FW 50-05-22-00/00 or higher
 - Hitachi Network Storage Controller (NSC55) requires FW 50-05-22-00/00 or higher
 - Hitachi 9900 Lightning Series requires FW 01-19-83-00/00 or higher
 - Hitachi 9900V Lightning Series requires FW 21-10-13-00/00 or higher
- HP StorageWorks XP Arrays
 - HP StorageWorks XP 10000/12000 Disk Array requires FW 50-01-40-00/00 or higher
 - HP SureStore E Disk Array XP128/XP1024 requires FW 21-09-15 or higher
 - HP StorageWork+A141s Enterprise Virtual Array EVA4x00, EVA6x00, EVA8x00 requires FW 5030 or higher
 - HP StorageWorks Enterprise Virtual Array EVA3000, EVA5000 requires FW 4.004 or higher
- SUN StorEdge Arrays
 - Sun StorEdge Series (StoreEdge SE9910, SE9960, SE9970V, SE9980V and SE9990) Please check with Storage Array Manufacturer's Hardware Compatibility Support Matrices for required FW
- Network Appliance Arrays (all require NetApp ONTAP v7.0.2 or higher)
 - Network Appliance F800 Series / Network Appliance FAS200 Series (FAS250, FAS270)
 - Network Appliance FAS900 Series (FAS920, FAS940, FAS960, FAS980)
 - Network Appliance FAS3000 Series (FAS3020, FAS3050)
 - Network Appliance FAS3000 Series (FAS6030, FAS6070)

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 35: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP DSM in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- EMC Symmetrix 8000 Series
- EMC Symmetrix DMX Series

Use:

- EnableSupportSCSI3Emc.reg to enable SCSI-3 PGR
- DisableSupportSCSI3Emc.reg to disable SCSI-3 PGR

For storage array type:

- IBM TotalStorage™ ESS800/ESS750

Use:

- EnableSupportSCSI3Ibm.reg to enable SCSI-3 PGR
- DisableSupportSCSI3Ibm.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs.

Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Note 36: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- Hitachi USP models 100, 600, and 1100
- Hitachi Network Storage Controller (NSC55)
- Hitachi Adaptable Modular Storage (AMS200 and AMS500)
- Hitachi Workgroup Modular Storage (WMS100)
- Hitachi 9900 Lightning Series (9900 and 9900V)
- Sun StorEdge SE9900 Series (StoreEdge SE9910, SE9960, SE9970V, SE9980V and SE9990)

Use:

- EnableSupportSCSI3Hds.reg to enable SCSI-3 PGR
- DisableSupportSCSI3Hds.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs.

Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 37: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP DSM in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- Network Appliance F800 Series
- Network Appliance FAS200/FAS2000/FAS900 Series
- Network Appliance FAS3000 Series (FAS3020, FAS3050)
- Network Appliance NearStore Series
- NetApp V-Series (GF980c, GF960c, V3050c, V3020c, GF270c)
- IBM System Storage N3000, N5000, N7000 Series

Use:

- EnableSupportSCSI3Netapp.reg to enable SCSI-3 PGR
- DisableSupportSCSI3Netapp.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs. Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Note 38: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP DSM in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- HP StorageWorks Enterprise Virtual Array EVA4x00, EVA6x00, EVA8x00
- HP StorageWorks Enterprise Virtual Array EVA3000, EVA5000

Use:

- EnableSupportSCSI3HPEVA.reg to enable SCSI-3 PGR
- DisableSupportSCSI3HPEVA.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs. Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Note 39: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP DSM in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- HP StorageWorks XP10000/XP12000/XP20000/XP24000 Disk arrays
- HP SureStore E Disk Array XP128/XP1024

Use:

- EnableSupportSCSI3HPXP.reg to enable SCSI-3 PGR
- DisableSupportSCSI3HPXP.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs. Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Note 40: This note applies to all Emulex HBAs when used with Emulex StorPort Miniport Drivers. When Dynamic Multipathing (DMP) is used, you must Select Driver Parameters and set the Topology Value to 1 in the Emulex HBA settings.

Note 41: If using Active/Active DMP DSM and have SCSI-3 PGR enabled, Microsoft has a KB article and QFE hotfix available for the problem of "A cluster node failover does not work when you use SCSI-3-compliant persistent reservations in Windows Server 2003 SP1". See Microsoft KB Article 911030 (<http://support.microsoft.com/kb/911030/en-us>) for more details.

Note 42: Please reference the IBM Flash Notice on use of IBM SDD with Veritas Storage Foundation for Windows at <http://www-1.ibm.com/support/docview.wss?rs=540&uid=ssg1S7001350#WindowsSDD> Download SDDDSM at <http://www-1.ibm.com/support/docview.wss?rs=540&uid=ssg1S7001350#WindowsSDDDSM>

Note 43: Enabling SCSI-3 PGR on Your Array to Support Active/Active DMP DSM in a Cluster (MSCS/VCS)

You must enable SCSI-3 PGR before using the Active/Active DMP setting for MPIO DSMs in Clustering (MSCS/VCS) environments (SCSI-3 PGR is disabled by default.) The following files are provided on the product CD and in VERITAS DMP DSM Packages to enable or disable SCSI-3 PGR for the type of storage array supported. Run the appropriate .reg for your storage array. A reboot is required after running the appropriate .reg file.

For storage array type:

- IBM TotalStorage™ DS8000 Series

Use:

- EnableSupportSCSI3IBMDS.reg to enable SCSI-3 PGR
- DisableSupportSCSI3IBMDS.reg to disable SCSI-3 PGR

Note: You must ensure that your storage array meets the requirements described in the section above before using the Active/Active setting for MPIO DSMs. Also check to see if your array manufacturer requires any special settings for a LUN to be enabled for SCSI-3 PGR.

Note 44: For the HP StorageWorks Enterprise Virtual Arrays (EVA3000, EVA5000) and the HP StorageWorks Modular Storage Arrays (MSA1000, MSA1500), Active/Active array firmware is required. Contact your local HP representative for more information.

Note 45: At the time of the 5.0 release, SCSI-3 support for the HP StorageWorks MSA 1000/1500 has not been fully qualified by Symantec. Therefore, SCSI3 support cannot be used and must be disabled in the system registry when an HP StorageWorks MSA 1000/1500 array, by itself or in combination with other arrays, is connected to a host. For DMP DSM support the HP MSA arrays must be set to use the "Windows" profile within the MSA array configuration.

Note 46: This note applies to all Emulex HBAs when used with Emulex Port Drivers. When Dynamic Multipathing (DMP) is used, you must set "UseResetForRetry=0" on the Emulex HBA.

Note 47: If Network Appliance SnapDrive and SnapMirror applications are being used, then you must use Veritas Cluster Server 5.0 for NetApp SnapMirror. These applications do not support Windows dynamic disks at this time. Due to this NetApp application limitation Storage Foundation for Windows and Storage Foundation HA for Windows cannot be used with NetApp arrays if these applications are installed.

Note 48: The Firmware/Driver columns show the most recent version tested by Symantec and are the minimum levels supported. For DMP ASL, HBA models are restricted to Emulex/Qlogic HBAs only. Newer versions are not always tested but are supported. All 2Gb HBAs and higher (except iSCSI HBAs) that are supported by OS and Storage Array Manufacturer's, are supported unless otherwise explicitly stated. Please check with OS and Storage Array Manufacturer's Hardware Compatibility Support Matrices for required Bios/Firmware and driver versions for the HBAs.

Note 49: All FC Switches that are supported by OS and Storage Array Manufacturer's listed on this HCL, are supported unless otherwise explicitly stated. Please check with OS and Storage Array Manufacturer's Hardware Compatibility Support Matrices for required Bios/Firmware and driver versions for the Switches. We will use this section to add only exceptions for Switch models which are known to have issues and hence not supported with the Storage Foundation products listed on the HCL.

Note 50: MSA2212 is only supported in Fibre Channel Switch Attach Loop mode, Direct Attach configuration is not supported yet.

Note 51: There is a known problem of IO hang sometimes when a NIC port is disabled on the Switch. Also, it is recommended to use 2 NICs for private heartbeat and 1 public mix use or client only use for MSCS environments due to a known issue when Private NICs are used for private heartbeat and other types of traffic.

Note 52: IBM XIV is currently not tested in Clustering environments.

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®

Revision History

V1.5

Hardware Array Changes:

- Dell Equallogic, Hitachi AMS(2000), HP MSA 2012/2212, IBM Ds3200, DS3300, DS3400, IBM XIV, Xiotech arrays added for DDI-3

HBA Changes:

- None

Switch Changes:

- None

Other Changes

- Note 50,51,52 added.

V1.4

Hardware Array Changes:

- Added SDDDSM 2.1.3.0-1 support for 32bit and 64bit

HBA Changes:

- None

Switch Changes:

- None

Other Changes

- Note 4 and 32 added SDDDSM download and WHQL links

V1.3a

Hardware Array Changes:

- Added DMX-4
- Added EVA 4100, 6100 & 8100
- Added XP24K support
- Added USP-VM support

HBA Changes:

- See Note 48
- Changed HP FCA 2214 FW from 1.5 to 1.45

Switch Changes:

- See Note 49

Other Changes

- Note 34, added FW version for SUN Storage
- Added Note 48 & 49
- Added HDLM 5.9 support
- Added RP1a support
- Dropped "TagmaStore" from HDS line
- Added FAS6000 / V6000, FAS3000 / V3000, FAS2000 / FAS900 / FAS200 series
- Added Best Practice link

Hardware Compatibility List (HCL) for Veritas Storage Foundation™ & High Availability Solutions 5.0 & 5.0 RP1a for Windows®**V1.2****Hardware Array Changes:**

- Added Hitachi USP-V, USP-VM
- Added 3PAR InServS200, 400, 800
- Added Pillar Data System
- Added CX3-10

HBA Changes:

- Added EMC LPe9802

Switch Changes:

- Added QLogic SANbox 9000, 1400, 3050

Other Changes

- Added HDLM support for USP-V, USP-VM
- Added Microsoft iSCSI Software Initiator v2.03

V1.1 Final**Hardware Array Changes:**

- Added HP Proliant DL380 G5 Storage Server support
- Added IBM RDAC v9.19 support to IBM DS4000 Arrays
- Added IBM SDD v1.6.2.0-1 support to IBM ESS, DS8000, DS6000 and SVC Arrays

HBA Changes:

- Added QLA4050c/QLA4052C iSCSI HBA support
- Removed the requirement to enable LIP Reset for Qlogic HBAs (Note 46)

Switch Changes:

- None

Other Changes

- Modified DMP DSM/ASL Support Note

V1.0 December 15, 2006: 1st Release.