



EMC VisualSAN

Version 4.1

Support Matrix

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This document provides detailed information concerning which devices VisualSAN supports, in what capacity they are supported, and their degrees of interoperability. Tables in this document provide information about supported models and versions of storage systems, hosts, switches, and so on.

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EMC's Policies and Requirements for the VisualSAN Support Matrix

This section describes EMC's policies and requirements for this document.

Purpose and Limitations of This Document

This document is being provided for informational purposes only and may change at any time. This version supersedes and replaces all previous versions. The information is to serve only as a guide for those configurations/products that EMC has qualified. This document identifies and lists various vendor host systems and integral components that have been tested and qualified by EMC for use with EMC products. Vendor components include, but are not limited to, host operating systems, HBAs (host bus adapters) and associated drivers, firmware and BIOS, FC (Fibre Channel) switches, hubs and bridges. This document also lists various vendors, tape hardware, storage-system boot procedures, and configurations that EMC has tested and/or qualified for use with EMC products.

The information included in this document is intended as a guide in the configuration of systems for EMC's products. It is not intended to be the sole resource for system configuration. For more information or answers to questions not found in this document, please see EMC's website, other EMC documentation, such as EMC's Host Connectivity guides, *EMC Networked Storage Topology Guide*, *EMC CLARiiON Open Systems Configuration Guide*, relevant vendor documentation, or contact your EMC Sales or EMC Customer Support representative.

Policies for Qualifying Systems

Policies and procedures for support of EMC products are set forth in the customer's applicable agreements. EMC's publication of information relating to system configurations covers only those outlined in this document or by approval from EMC engineering. Other system configurations not found in this document are not qualified without EMC engineering approval. EMC has qualified hardware and software provided only by the vendors listed in this document, and host systems, hardware and software from other vendors are not qualified, and may never be. Please contact your EMC Sales or EMC Customer Support representative for updates or information not included in this document.

EMC maintains a large collection of the products listed above as well as third-party application software for qualification with EMC's storage systems and to simulate customer environments, but you must consult the vendors for information about their system internals, such as hardware and associated drivers.

Policy for Future Qualification of Operating System Software Releases

The information in this document is maintained by EMC and EMC strives to update this document with new releases of hardware, operating systems, firmware, BIOS, switch software, etc., as they become available from the vendors. EMC works with the vendors during their development and release processes in order to be fully informed at the time the vendors release new versions. EMC does not announce qualification prior to vendors' General Availability (GA). In some cases, EMC may choose to perform regression testing following the vendors' GA; in these cases and in cases where advance preparation is not possible, EMC may test and qualify vendors' products as appropriate after they have been released. For early support of such products, including vendor beta participation, contact your EMC Sales or EMC Customer Support representative.

Policy for End-of-Life Support

EMC strives to continue support for any installed platforms, but may remove support from this host matrix for new installations within three months after the vendor has announced that this platform has reached the end of life. EMC will continue support for existing installations of hardware, operating systems, and components that the vendor has officially declared to have reached end of life as long as support is available from the vendor.

VisualSAN Requirements

This section describes the system and support requirements for VisualSAN[®] components including the management station, the web client interface, and agents.

Management Station Support

The VisualSAN management station includes the VisualSAN console (graphical user interface) and its set of associated services. The management station locally runs services that provide information and support management of SAN devices via the application user interface (console).

Hardware Table 1 provides the minimum and recommended hardware requirements for running both on the same computer.

Table 1 Hardware Requirements

Category	Minimum Requirements for a VisualSAN Management Station Based on the SAN Configuration		
Approximate SAN Size	Small: <ul style="list-style-type: none"> • 8 Hosts • Two 16-port switches • One 1 TB storage system 	Medium: <ul style="list-style-type: none"> • 12 Hosts • Two 32-port switches • Two 1.5 TB storage systems 	Large: <ul style="list-style-type: none"> • 40 Hosts • Four 32-port switches • Four 1.5 TB storage systems
Processor	Intel Pentium 4, 1.0 GHz	Intel Pentium 4, 2.0 GHz	Intel Pentium 4, 2.6 GHz
Memory	512 MB RAM	1024 MB RAM	1536 MB RAM
Disk space	400 MB of disk space. If MSDE or Microsoft SQL Server is already present, 250 MB of disk space is required.	4 GB total free space	6 GB total free space

Operating Systems The EMC[®] VisualSAN management station Setup program supports installation on the following operating systems:

- ◆ Microsoft Windows 2000 Professional Service Pack (SP4)
- ◆ Windows 2000 Server (SP4)
- ◆ Windows 2000 Advanced Server (SP4)
- ◆ Windows XP Professional (SP1)

- ◆ Windows Server 2003 Standard Edition
- ◆ Windows Server 2003 Enterprise Edition

The Windows SNMP service and SNMP Trap service must be configured (including set to Automatic startup) and running on the VisualSAN management station.

The Navisphere[®] CLI application versions 6.5, 6.6, 6.7, or 6.8 must reside on the management station and its version must be equal to or greater than the version level of any Navisphere host-based or storage system-based agent that will be monitored.

Foreign Language Support

The VisualSAN Management Station has been certified to operate properly on the Japanese version of supported Microsoft Windows Operating Systems. However, VisualSAN is not localized in the Japanese language.

Web Interface Support

VisualSAN's optional Web client interface accesses VisualSAN services from the management station remotely. VisualSAN runs under the following Web services:

- ◆ Microsoft Internet Information Services (IIS) version 5.0 or 6.0
- ◆ Apache Web Server V1.3.20 and 1.3.22

If you intend to support Web access, you need to install one of these services (not included in the VisualSAN setup media).

The VisualSAN management station must reside on the computer running the Web service.

Table 2 lists the requirements for support of the VisualSAN Web interface.

Table 2 Browser and Web Client Support

Processor	RAM	Operating System	Browser	Other Software
Intel Pentium III 600 MHz	256 MB	<ul style="list-style-type: none"> • Windows NT Server (SP6a) • Windows NT Server, Enterprise Edition (SP6a) • Windows NT Workstation (SP6a) • Windows Server 2003 Standard Edition • Windows Server 2003 Enterprise Edition • Windows Server 2003 Web Edition • Windows 2000 Professional (SP4) • Windows 2000 Server (SP4) • Windows 2000 Advanced Server (SP4) • Windows XP Professional (SP1) 	<ul style="list-style-type: none"> • Microsoft Internet Explorer Version 6.0 SP1 or later • Netscape Navigator Version 6.2 or later 	<p>Java Runtime Environment (JRE) 1.4.2</p> <hr/> <p>If the JRE is not installed, the VisualSAN Web client software prompts to download it. You must have Internet access to download this plug-in from the Sun website (http://java.sun.com).</p> <hr/>

Database Server Support

The following database applications are supported for use as the VisualSAN database:

- ◆ MSDE 1.0
- ◆ MSDE 2000
- ◆ Microsoft SQL Server 7.0
- ◆ Microsoft SQL Server 2000

If MSDE 1.0, SQL Server 7.0, or SQL Server 2000 are not loaded on the management station, VisualSAN installs MSDE 2000 SP3 before installing VisualSAN 4.1.

Application Support

VisualSAN and VisualSRM™ can co-exist on the same management station. For information about installing VisualSRM, refer to the *EMC VisualSAN 4.1 Installation and Upgrade Guide*.

Before installing both applications on a single system, verify that the system is a dedicated server that meets the following minimum requirements:

- ◆ Pentium 4 processor, 2 GHz or greater

- ◆ 1 GB RAM
- ◆ 4 GB of free disk space

VisualSAN and Related Agent Support

Agents run services on SAN-attached hosts, providing further information and management functionality to the management station.

Tables in this section that describe agent support include:

- ◆ Table 3, *Agent Support for VisualSAN Functions* on page 8
- ◆ Table 4, *VisualSAN Agent Hardware Requirements* on page 11
- ◆ Table 6, *Supported Operating Systems and Associated Supported Agents* on page 12
- ◆ Table 7, *Supported HBAs with the Navisphere Agent* on page 14
- ◆ Table 8, *Supported HBAs with the VisualSAN Host Agent* on page 15

VisualSAN Functions Supported with Agents

Table 3 details the functionality provided by VisualSAN for host systems containing a supported HBA, a supported operating system, and, if applicable, a supported agent. Additionally, the table details the VisualSAN functionality for unsupported HBAs and operating systems.

Table 3 Agent Support for VisualSAN Functions

VisualSAN Performs These Functions	With Only These Host Components
Displays host's operating system and version.	Supported operating system
<ul style="list-style-type: none"> • Discovers the supported HBA but does not associate the host to the HBA (you can manually associate it in VisualSAN). • Displays the HBA's manufacturer provided by the switch name server. 	Supported HBA
Provides capacity for all CLARiiON volumes.	<ul style="list-style-type: none"> • Supported operating system • Supported HBA • Navisphere Host Agent^a

Table 3 Agent Support for VisualSAN Functions (continued)

VisualSAN Performs These Functions	With Only These Host Components
Provides a list of applications that utilize CLARiiON-based storage.	<ul style="list-style-type: none"> • Supported operating system • Supported HBA • Navisphere Agent • VisualSAN Application Agent^b
<ul style="list-style-type: none"> • Provides path visualization with the HP EVA and HSG80 family of storage systems. • Automatically associates the host to the HBA in the topology map and tree view. • Displays OS logical units and LUNs for third-party storage systems. • Returns the HBA's status and detailed property information, including the model, manufacturer, driver, and firmware. • Discovers unmanaged devices connected to a fabric. 	<ul style="list-style-type: none"> • Supported operating system • Supported HBA • VisualSAN SNIA Agent^c or SNIA Device Manager
<ul style="list-style-type: none"> • Provides path visualization for CLARiiON storage systems. • Displays volumes, OS logical units, and LUNs. • Automatically associates the host to the HBA in the topology map and tree view. • Returns the HBA's status and limited property information, including the HBA model and manufacturer.^d 	<ul style="list-style-type: none"> • Supported operating system • Supported HBA • Navisphere Agent
<ul style="list-style-type: none"> • Provides path visualization for CLARiiON storage systems. • Displays volumes, OS logical units, and LUNs for CLARiiON storage systems. • Automatically associates the host to the HBA in the VisualSAN topology map and tree view. • Returns <i>partial</i> HBA status and property information. 	<ul style="list-style-type: none"> • Unsupported operating system • Navisphere-supported HBA • Navisphere Agent
Discovers and displays an unsupported HBA through the switch name server; however, only limited property information is available.	Unsupported HBA
Discovers host but does not manage or monitor it for SAN status, displaying the host as an "Unknown Host."	Unsupported operating system

a. The Navisphere Agent may be either host-based or storage-system-based; either one is an integral software component of CLARiiON storage systems. VisualSAN obtains host and HBA correlation information from either the Navisphere or VisualSAN host agent types.

b. The VisualSAN Application Agent can be installed using the **Manage Remote Agents** menu option in VisualSAN.

c. The VisualSAN SNIA Agent can be installed using the **Manage Remote Agents** menu option in VisualSAN.

d. For access to more extensive information, install the VisualSAN SNIA Agent.

VisualSAN Discovery

VisualSAN uses the following methods to automatically discover devices in the SAN.

These methods operate independently of each other, and while they may discover the same device twice, VisualSAN reconciles these findings and provides a single representation of each device.

SNMP — VisualSAN attempts to automatically discover most SNMP-enabled devices (aside from CLARiiON[®] storage systems) within the IP address discovery range. If the device or host is shown as supported in this document, VisualSAN automatically renders the device in VisualSAN and obtain property information on that device. If the device is not supported, VisualSAN still renders that device, but gives it an "Unknown" designation.

CLARiiON Storage Systems — CLARiiON storage systems are discovered using a proprietary method that does not involve SNMP. For more information about discovery of CLARiiON systems, refer to *Supported CLARiiON Storage Systems* on page 20.

Switch Name Server — If VisualSAN discovers a supported switch, VisualSAN will automatically query the switch for the devices it has discovered and added to its name server, and correlate that information against its own repository of SNMP discovered devices. The Switch Name Server can provide additional connectivity information, the manufacturer's name, and device's type.

If a device is discovered by the Switch Name Server and not via SNMP or through CLARiiON discovery, VisualSAN will not be able to monitor that device by providing event or status information. Also, devices discovered in-band by the Switch Name Server that are not explicitly supported by VisualSAN may not be rendered correctly (or at all) in the VisualSAN management console.

HSG80 Storage Systems — HSG80 storage systems are discovered using a proprietary method that does not involve SNMP. For more information about discovery of HSG80 storage systems, refer to *Supported Open Storage Systems* on page 24.

EVA Storage Systems — EVA storage systems are discovered through the HPQ Appliance. After VisualSAN discovers the HPQ Appliance, VisualSAN discovers the EVA storage systems the appliance is managing. For more information about discovery of EVA storage systems, refer to *Supported Open Storage Systems* on page 24.

Removing Discovered Devices

VisualSAN attempts to discover all devices in the discovery range you enter during configuration; all discovered devices then appear in the Topology Map and the Devices tree. If the discovery range entered exceeds the range of your SAN, VisualSAN might discover and display unwanted devices. To remove the devices from the display, you must modify your discovery range, eliminating the IP addresses corresponding to the unwanted devices. Then restart discovery so that VisualSAN rediscovers the devices in your SAN based on the updated IP address discovery range and properly displays your SAN in the Topology Map and SAN Devices tree.

VisualSAN Agent Requirements

The VisualSAN agents should be installed on all SAN-attached hosts to be managed by VisualSAN. The minimum hardware requirements follow in Table 4, while the Emulex and QLogic HBA driver requirements are in Table 5. Both sets of requirements must be met for the host agent to operate correctly.

Table 4 VisualSAN Agent Hardware Requirements

Processor	RAM	Disk Space
Intel Pentium III 600 MHz	256 MB	50 MB
Sun UltraSPARC 400 MHz	256 MB	120 MB

Requirements for HBA driver libraries follow.

Table 5 HBA Drive Library Requirements

Vendor	Platform	Path and filename
Emulex	Windows	<i>windows_directory</i> \system32\emulexhbaapi.dll
	Solaris	/usr/lib/libemulexhbaapi.so
	Linux	/usr/src/linux_release/drivers/scsi/lpfc/libemulexhbaapi.so
QLogic	Windows	<i>windows_directory</i> \system32\qlsdrm.dll
	Solaris	/usr/lib/libqlsdrm.so
	Linux	/usr/lib/libqlsdrm.so

Supported Agents with Supported Operating Systems

The following supported host operating systems are automatically discovered by VisualSAN if SNMP services are enabled on those hosts. Further, if these hosts include supported HBAs (Table 6) and either the VisualSAN SNIA Agent or SNIA Device Manager, or the Navisphere Agent, VisualSAN will auto-associate the HBA to the host and provide detailed HBA property information.

Table 6 Supported Operating Systems and Associated Supported Agents

Vendor	Supported ^a	Navisphere Agent	VisualSAN Host Agent ^b	VisualSAN SNIA Agent	VisualSAN Application Agent	VisualSAN SNIA Device Manager ^c
Microsoft	<ul style="list-style-type: none"> Windows 2000 Professional, Server, Advanced Server (SP4) Windows Server 2003, Standard, Enterprise, Web Editions 	Versions 6.5, 6.6, 6.7, 6.8	Version 1.1	Version 1.1	Version 1.1	—
	<ul style="list-style-type: none"> Windows XP (SP1) 	—	Version 1.1	Version 1.1	Version 1.1	—
Red Hat ^d	<ul style="list-style-type: none"> Linux Advanced Server 2.1 Linux Advanced Server 3.0 	Versions 6.5, 6.6, 6.7, 6.8	—	—	—	Version 4.1
Novell	<ul style="list-style-type: none"> NetWare 5.1 NetWare 6.0 NetWare 6.5 	Versions 6.5, 6.6, 6.7, 6.8	—	—	—	—
Sun	<ul style="list-style-type: none"> Solaris 7 Solaris 8 Solaris 9 Solaris 10 	Versions 6.5, 6.6, 6.7, 6.8	—	—	—	Version 4.1
HP	<ul style="list-style-type: none"> HP-UX 11 HP-UX 11i 	Versions 6.5, 6.6, 6.7, 6.8	—	—	—	—
IBM	<ul style="list-style-type: none"> AIX 5.1 AIX 5.2 AIX 5.3 	Versions 6.5, 6.6, 6.7, 6.8	—	—	—	—

a. SNMP must be installed, properly configured, and running.

b. May be installed using the VisualSAN **Manage Remote Agents** menu option, or manually from the VisualSAN CD. The VisualSAN Host Agent is used only by the VisualSAN management station. VisualSAN obtains host and HBA correlation information from either the Navisphere or VisualSAN host agent types.

c. Must be installed manually from the VisualSAN CD.

- d. For Red Hat Linux, make sure that your installation has been updated to use the following Red Hat Package Module (RPM) for SNMP: net-snmp-5.0.6-8.80.2.src.rpm. This updated package version contains a fix that enables VisualSAN to discover SAN hosts running Red Hat Linux. To obtain this update, connect to: <http://www.redhat.com/archives/redhat-watch-list/2002-December/msg00007.html> and click the FTP link (<ftp://updates.redhat.com/8.0/en/os/i386/net-snmp-5.0.6-8.80.2.i386.rpm>) to download the RPM file. Install the module according to the documentation provided.

It is recommended that you set up persistent binding for UNIX and UNIX hosts. Doing so prevents occurrence of an occasional problem with incorrect drive mapping. Unless you set up persistent binding, it is possible for the mapping between your host's local disk device name and the SAN storage to change between reboots.

To create persistent LUN binding, refer to the appropriate document for the HBAs in use. For QLogic, refer to *EMC Fibre Channel with QLogic Host Bus Adapters in the Linux x86 Environment* dated August 2003. Part number: 300-001-139 Rev A02. For Emulex: <http://www.emulex.com/ts/docoem/emc/pdfs/lin0803.pdf> (*Enabling Persistent Binding* is on p. 2-15).

Navisphere Agent and Unsupported Operating Systems

For hosts with operating systems not listed in Table 6, VisualSAN will not monitor that host or provide detailed operating system information for it. However, if the Navisphere Agent exists on that host and that system conforms to the *EMC Support Matrix* as per the *CLARiiON CX Series -> Fibre Connectivity: Switch* section, then VisualSAN will auto-associate the HBA to the host and provide limited HBA property information.

Navisphere Agent with Supported HBAs

Table 7 identifies how to determine support for HBAs used with the Navisphere agent, based on the section as listed in the *EMC Support Matrix*.

Table 7 Supported HBAs with the Navisphere Agent

Vendor	Operating System	VisualSAN/Navisphere Compatible HBAs, Driver, Firmware Requirements
Emulex	Windows 2000	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Microsoft Windows 2000</i>
	Windows Server 2003	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Microsoft Windows 2003</i>
	Solaris	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Sun Solaris</i>
	Red Hat Linux Advanced Server 2.1 Red Hat Linux Advanced Server 3.0	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Red Hat [xxx]</i>
	Novell NetWare 5.1 Novell NetWare 6.0 Novell NetWare 6.5	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Novell NetWare</i>
QLogic	Windows 2000	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Microsoft Windows 2000</i>
	Windows Server 2003	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Microsoft Windows 2003</i>
	Solaris	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Sun Solaris</i>
	Red Hat Linux Advanced Server 2.1 Red Hat Linux Advanced Server 3.0	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> Red Hat [xxx]</i>
	HP-UX 11 HP-UX 11i	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> HPQ HP-UX</i>
	AIX 5.1 AIX 5.2 AIX 5.3	Refer to <i>CLARiiON CX Series -> Fibre Connectivity: Switch -> IBM AIX</i>

VisualSAN Host Agent and Supported HBAs

The HBAs listed in Table 8 are supported by VisualSAN with the VisualSAN SNIA Agent and VisualSAN SNIA Device Manager, while those in Table 7 are supported with the Navisphere Agent. Combined with a supported operating system, VisualSAN provides a full set of functionality and information for the HBA as described in Table 3 on page 8.

If a host with a supported HBA and supported operating system does not have a VisualSAN SNIA Agent or Navisphere Agent installed, VisualSAN will not automatically auto-associate the host to the HBA. However, the user can make the association manually from within VisualSAN. For information on required firmware versions, refer to your vendor documentation.

Table 8 Supported HBAs with the VisualSAN Host Agent

Vendor	Operating System	VisualSAN SNIA Agent / Device Manager Compatible HBAs	Driver Requirements
Emulex	Windows NT	LP9002L-E	2.20a12
		LP982-E	
		LP9802-E LP9802DC-E	
	Windows 2000	LP9002L-E	2.22a8
		LP982-E LP9802-E LP9802DC-E	
		LP1050-E LP1050DC-E LP10000-E LP10000DC-E	

Table 8 Supported HBAs with the VisualSAN Host Agent (continued)

Vendor	Operating System	VisualSAN SNIA Agent / Device Manager Compatible HBAs	Driver Requirements
Emulex	Windows Server 2003 (SCSI PORT)	LP9002L-E	2.22a8
		LP982-E	
		LP9802-E	
		LP9802DC-E	
		LP1050-E	
		LP1050DC-E	
	Windows Server 2003 (STOR PORT) (Hot Fix #Q823728)	LP9002L-E	1.02a3
		LP982-E	
		LP9802-E	
		LP9802DC-E	
		LP1050-E	
		LP1050DC-E	
Sun Solaris	LP9002L-E	V5.02c	
	LP9802-E	V5.02c	
	LP10000-E LP10000DC-E	V5.02c	
Red Hat Linux Advanced Server 2.1 Red Hat Linux Advanced Server 3.0	LP9002L-E	V2.01g	
	LP9802-E LP9802DC-E		
	LP982-E		

Table 8 Supported HBAs with the VisualSAN Host Agent (continued)

Vendor	Operating System	VisualSAN SNIA Agent / Device Manager Compatible HBAs	Driver Requirements
QLogic	Windows NT	QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	8.1.5.21
	Windows 2000 (SCSI PORT)/Windows XP	QLA2200F-E-SP	8.1.5.20
		QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	9.0.0.12
	Windows Server 2003 (STOR PORT)	QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	
	Windows Server 2003 (Hot Fix #Q823728)	QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	9.0.0.17
	Sun Solaris	QLA2200F-E-SP QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	4.13
	Red Hat Linux Advanced Server 2.1 Red Hat Linux Advanced Server 3.0	QLA2200F-E-SP QLA2310F-E-SP QLA2340-E-SP QLA2342-E-SP	7.00.03

Storage-System Support

VisualSAN 4.1 supports EMC CLARiiON storage systems and storage systems in the HP HSG80 and EVA family. Note the following:

- ◆ Direct-attached storage is not supported.
- ◆ A multibus failover-mode configuration is not supported for storage systems in the HSG80 family.
- ◆ Support for CLARiiON disk-array enclosures (DAEs) in a loop requires that the enclosure address on each DAE has a unique number *and* that each enclosure is numbered consecutively, starting from the storage processor enclosure. For more information about setting the enclosure address (EA), refer to the *EMC 2-Gigabit Disk-Array Enclosure (DAE2) Setup and Cabling Guide* on the DAE2 hardware documentation CD.

Table 9 details the CLARiiON functionality provided by VisualSAN and associated prerequisites.

Table 9 VisualSAN Functions Supported with CLARiiON Storage Systems

VisualSAN Function	CLARiiON Prerequisites
Discovery, monitoring	<ul style="list-style-type: none"> • Navisphere Array Agent (SP), and the Navisphere Base with Access Logix on the storage system^a • Navisphere CLI on the management station^b • Navisphere Agent on a SAN-attached host
Host LUN-to-storage system LU (LUN) correlation	VisualSAN SNIA Agent (not required if using Navisphere Agent)
Property information	No prerequisites
SAN topology display	No prerequisites
Receiving and sending of alerts	No prerequisites
Trap formatting	No prerequisites
VisualSAN Configuration Manager support	No prerequisites
VisualSAN Performance Manager support	Not supported

a. For detailed information regarding the availability of the Navisphere Agent for CLARiiON-supported operating systems, refer to <http://powerlink.emc.com>.

b. VisualSAN can render and receive detailed status and property information about the discovered CLARiiON storage systems if Navisphere CLI is installed on the management station (the computer running VisualSAN). Without the Navisphere CLI, VisualSAN discovers the storage system through the switch name server but only a limited set of information is available to VisualSAN.

VisualSAN Discovery and CLARiiON Storage Systems

CLARiiON storage systems are discovered using a proprietary method that does not involve SNMP.

When the CLARiiON storage system acts as a proxy, VisualSAN will automatically query any CLARiiON storage system it finds for devices that the CLARiiON storage system has registered. These devices can include HBAs registered with the CLARiiON storage system. Even if these HBAs are not discovered through SNMP, through an agent, or through the Switch Name Server, they will be displayed in VisualSAN. However, these CLARiiON-discovered HBAs will not be monitored or managed by VisualSAN.

CLARiiON Trap Handling

VisualSAN can receive SNMP traps from CLARiiON arrays, if those devices are configured to send traps to VisualSAN. Corresponding trap descriptions are then propagated to the VisualSAN event log.

VisualSAN traps are formatted with variable bindings as listed in Table 10.

Table 10 VisualSAN SNMP Trap Variable Binding List

Alert Type	Variable Binding Details		
	Order	Type	Value
Device Status Policy	First	Octet string	The host from which the Event Queue event was sent
	Second	Octet string	Display name of the device
	Third	Integer	Device status as follows: 1 for Unknown or Information 2 for OK 3 for Warning or Minor 4 for Critical or Major
	Fourth	Octet string	Event description
All Others	First	Octet string	The hostname of the VisualSAN management station which sent the SNMP trap
	Second	Octet string	VisualSAN Java classname for the type of alert triggered
	Third	Void	Not applicable
	Fourth	Void	Not applicable

Supported CLARiiON Storage Systems

Table 11 details the CLARiiON models supported by VisualSAN, as well as associated prerequisites. Note that VisualSAN supports the following CLARiiONs only in a SAN-attached configuration.

Access Logix™ must be installed on the CLARiiON storage system if the system is to obtain information about HBAs and storage processor ports.

Table 11 Supported CLARiiON Storage Systems

Vendor	Model	Prerequisite Storage System Management Software	Supported Configuration
EMC	CLARiiON CX200	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 12: AccessLogix/Base V.02.05.1.20.5.xxx • Release 13: Access Logix V.01.01.5.001 • Release 13: Base V.02.06.200.5.xxx • Release 14: v.02.07.200.4.xxx • Release 16: v02.16.200.5.xxx • Release 17: v02.17.200.5.xxx • Navisphere Array Agent (SP) 	SAN-attached only
	CLARiiON CX300	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 13: Access Logix V01.01.5.001 • Release 13: Base V.02.02.300.5.xxx • Release 14: Base v.02.07.300.4.xxx • Release 16: v02.16.300.5.xxx • Release 17: v02.17.300.5.xxx • Navisphere Array Agent (SP) 	

Table 11 Supported CLARiiON Storage Systems (continued)

Vendor	Model	Prerequisite Storage System Management Software	Supported Configuration
EMC	CLARiiON CX400	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 12: Access Logix/Base V.02.05.1.40.x.xxx • Release 13: Access Logix V.01.01.5.001 • Release 13: Base V.02.06.400.5.xxx • Release 14: Base v.02.07.400.4.xxx • Release 16: v02.16.400.5.xxx • Release 17: v02.17.400.5.xxx • Navisphere Array Agent (SP) 	SAN-attached only
	CLARiiON CX500	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 13: Access Logix V01.01.5.001 • Release 13: Base V.02.06.500.5.xxx • Release 14: Base v.02.07.500.4.xxx • Release 16: v02.16.500.5.xxx • Release 17: v02.17.500.5.xxx • Navisphere Array Agent (SP) 	
	CLARiiON CX600	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 12: Access Logix/Base V.02.05.1.60.5.xxx • Release 13: Access Logix V.01.01.5.001 • Release 13: Base V.02.06.600.5.xxx • Release 14: Base v.02.07.600.4.xxx • Release 16: v02.16.600.5.xxx • Release 17: v02.17.600.5.xxx • Navisphere Array Agent (SP) 	

Table 11 Supported CLARiiON Storage Systems (continued)

Vendor	Model	Prerequisite Storage System Management Software	Supported Configuration
EMC	CLARiiON CX700	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 13: Access Logix V.01.01.5.001 • Release 13: Base V.02.06.700.x.xxx • Release 14: Base v.02.07.700.4.xxx • Release 16: v02.16.700.5.xxx • Release 17: v02.17.700.5.xxx • Navisphere Array Agent (SP) 	SAN-attached only
	CLARiiON FC4500	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Access Logix V.6.32.18 • Navisphere Host-based Agent 	
	CLARiiON FC4700	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Release 12: V.8.50.53 • Navisphere Array Agent (SP) 	
	CLARiiON FC5300	Navisphere Base and Access Logix: <ul style="list-style-type: none"> • Access Logix V.6.24.08 • Navisphere Host-based Agent 	

Supported CLARiiON NAS Systems

Table 12 details the CLARiiON NAS storage system models supported by VisualSAN, as well as associated prerequisites.

Table 12 Supported CLARiiON NAS Systems

Vendor	Controller Model	Prerequisite Storage System Management Software	Supported Configuration
EMC	Celerra NS60xG	V5.1.25.0, 5.2.14.0	SAN-attached gateway only
	Celerra NS70xG	V5.2.14.0, 5.3.14	
	Celerra CNS	V5.3.14	
	Celerra NSX Gateway	V5.4.14	

Supported Open Storage Systems

VisualSAN discovers any standard SCSI and FC connected disk storage systems in-band, through SNIA Host Agent if the OSLU is configured on the host system. VisualSAN displays all disk storage systems discovered in-band as a standard storage system device with one (or multiple) controllers, ports, and LUNs.

The following table details the open storage system models supported by VisualSAN, as well as associated prerequisites. Note that VisualSAN supports the following open storage systems only in a SAN-attached configuration.

Table 13 Supported Open Storage Systems

Vendor	Controller Model	Array Models	Prerequisite Storage System Management Software	Supported Configuration
HP	HSG80	Modular Array (MA) 6000	The STEAM agent must reside on a host discovered by VisualSAN.	SAN-attached only
		MA 8000		
		Enterprise Modular Array (EMS) 12000		
		EMA 16000		
		RAID Array (RA) 8000		
	Enterprise Storage Array (ESA) 12000 storage systems			
EVA 3000	Enterprise Virtual Array (EVA) 3000	HP SSSU V3.0 must be installed running on the VisualSAN Management Stations.		
EVA 5000	EVA 5000			

Supported Applications

VisualSAN supports discovery of the following applications through its application agent. Applications are associated with volumes that are discovered by VisualSAN. These currently include volumes discovered by the Navisphere Agent.

Table 14 **Supported Applications**

Vendor	Application and/or Version
Microsoft	Exchange Server 5.5, Exchange 2000 Server, Exchange Server 2003
Microsoft	SQL Server 7.0, SQL Server 2000
Oracle	8i, 9i

Server Clusters

VisualSAN supports Microsoft Cluster Service on Windows 2000 Advanced Server and on Windows Server 2003 Enterprise Edition. For information about installing Cluster Service, refer to the manufacturer's documentation. For information about configuring VisualSAN with server clusters, refer to the *EMC VisualSAN 4.1 Installation and Upgrade Guide*.

Switches

Table 15 describes the functions supported for switches in VisualSAN, along with factors limiting that support.

Table 15 Functions Supported on Switches

VisualSAN Function	Supported without Prerequisites
Discovery, monitoring, property information, SAN topology display, performance ^{a,b}	Brocade, Cisco, McDATA
Receiving and sending of alerts Trap formatting	Brocade, Cisco, McDATA
Configuration Manager support Performance Manager support	Brocade, Cisco, McDATA
Zone visualization	Brocade, Cisco, McDATA
Zone control (create, edit, delete aliases, zones, or zone sets)	Brocade
Zone control (create and edit zones or zone sets)	McDATA

- a. VisualSAN Performance Manager receives performance and error statistics from all VisualSAN-supported switches.
- b. The switch must comply with the firmware specifications in Table 16.

Table 16 lists switches that VisualSAN supports for zone visualization, or zone visualization and control. Note the following limitations for switch support by VisualSAN:

- ◆ VisualSAN does not discover McDATA switches that do not use an IETF-compliant MIB.
- ◆ For switches not controlled by a service processor, you cannot use a management application that communicates with the switch via the McDATA SWAPI library while also running VisualSAN. However, you can communicate with the switch using Telnet or the switch Web interface.

Brocade and McDATA Switch Trap Handling

VisualSAN can receive SNMP traps from Brocade and McDATA switches, if those devices are configured to send traps to VisualSAN. Corresponding trap descriptions are then propagated to the VisualSAN event log. Simultaneously, VisualSAN will initiate an SNMP poll to the switch that sent the trap. For information about VisualSAN trap format, refer to *VisualSAN Discovery and CLARiiON Storage Systems* on page 19.

Table 16 lists switches that VisualSAN supports for zone visualization, or zone visualization and control.

Table 16 Supported Switches

Vendor	Model	Firmware / Software Requirements	Zoning
EMC/Brocade	Connectrix [®] DS-8B/Brocade 2400 Series	2.6.1a, 2.6.2a, 2.6.2b	Zone control ^a
EMC/Brocade	Connectrix DS-16B/Brocade 2800 Series	2.6.1a, 2.6.2a, 2.6.2b	Zone control ^a
EMC/Brocade	Connectrix DS-8B2/Brocade 3200 Series	3.1.2a, 3.1.3, 3.2	Zone control ^a
EMC/Brocade	Connectrix DS-16B2/Brocade 3800 Series	3.1.2a, 3.1.3, 3.2	Zone control ^a
EMC/Brocade	Connectrix DS-32B2/Brocade 3900 Series	4.2.0b, 4.2.2, 4.40b	Zone control ^a
EMC/Brocade	Connectrix ED-12000B/Brocade 12000	4.2.0b, 4.2.2, 4.40b	Zone control ^a
EMC/Brocade	Connectrix DS-8B3/3250	4.2.0b, 4.2.2, 4.40b	Zone control ^a
EMC/Brocade	Connectrix DS-16B3/3850	4.2.0b, 4.2.2, 4.40b	Zone control ^a
EMC/Brocade	Connectrix DS-4100B/ Brocade SilkWorm 4100	4.40b	Zone control ^a
EMC/Brocade	Connectrix ED-24000B/ Brocade SilkWorm 2400	4.40b	Zone control ^a
EMC/Cisco	Cisco 9120	1.3.3, 1.3.4, 2.0.1	Zone visualization ^b
EMC/Cisco	Cisco 9140	1.3.3, 1.3.4, 2.0.1	Zone visualization ^b
EMC/Cisco	Cisco 9216 ^c	1.3.3, 1.3.4, 2.0.1	Zone visualization ^b
EMC/Cisco	Cisco 9509 ^c	1.3.3, 1.3.4, 2.0.1	Zone visualization ^b
EMC/McDATA	Connectrix DS-16M/McDATA ES-3016	6.01, 6.02, 7.00	Zone control ^d
EMC/McDATA	Connectrix DS-32M/McDATA ES-3032	6.01, 6.02, 7.00	Zone control ^d
EMC/McDATA	Connectrix DS-16M2/McDATA ES-3216	6.01, 6.02, 7.00	Zone control ^d

Table 16 Supported Switches (continued)

Vendor	Model	Firmware / Software Requirements	Zoning
EMC/McDATA	Connectrix DS-32M2/McDATA ES-3232	6.01, 6.02, 7.00	Zone control ^d
EMC/McDATA	Connectrix DS-24M2/McDATA ES-4500	6.01, 6.02, 7.00	Zone control ^d
EMC/McDATA	Connectrix DS-24M2/ McData 4500v2 fibre channel switch	6.02	Zone control ^d
EMC	Connectrix ED-64	6.01; requires FibreZoneBridge V2.02.13 with Connectrix Manager V7.02 (Service Processor)	Zone control
EMC	Connectrix ED-140M	6.01; requires FibreZoneBridge V2.02.13 with Connectrix Manager V7.02 (Service Processor)	Zone control

- a. VisualSAN supports viewing, creating, editing, and deleting any alias, zone, or zone set for Brocade switches.
- b. The following types of Cisco zoning are unsupported: LUN-based zoning, domain-port zoning, symbolic node name zoning, interface zoning, domain and interface zoning, IP address zoning. If you use an unsupported zoning type, VisualSAN does not report any zoning information from the switch or from other logical fabrics on the same switch, even if they have supported zoning configurations. WWN zoning and FWWN (switch port WWN) zoning are supported.
- c. Only switches with FC blades are supported, VisualSAN does not support iSCSI and FCIP blades.
- d. VisualSAN supports viewing, creating, editing, and deleting the active zone or zone set for McDATA switches.

For Brocade switches, ensure that all appropriate MIBs are enabled. Using Telnet, run the **snmpmibcapset** command to enable MIBs as needed. If all necessary MIBs are not enabled, VisualSAN might not report all available information about the switch. For more information, refer to the switch documentation.

Supported Gateways

VisualSAN supports the gateways listed in Table 17.

Table 17 **Supported Gateways**

Vendor	Model	Firmware/Software Requirements
McDATA	Eclipse 1620 ^a	4.93

- a. VisualSAN supports use of the Eclipse 1620 with McDATA fabrics only. Brocade fabrics are not supported with this device.

Other Devices

Table 18 lists support requirements for other devices such as gateways, routers, tape drives, and JBODs.

Table 18 Support for Other Devices

Device Type	Vendor	Firmware	Software Requirements
Gateway / router	Crossroads 4250	3.06.2005	None
	CNT Edge Storage Router	1.2.1.1	None
	Generic	Not applicable	Unsupported routers are discovered by the switch name server, but only limited information is provided.
Tape Drives	Generic	Not applicable	Device must have visibility from a SAN-attached host installed with the VisualSAN SNIA agent.
JBODs	Generic	Not applicable	Device must have visibility from a SAN-attached host installed with the VisualSAN SNIA agent.

VisualSAN will discover any standard SCSI and FC tape drives, changers and libraries in-band through the SNIA Host Agent, if they are configured on host system. VisualSAN displays all tape devices and tape libraries as separate devices.

For example, the Dell PV130 tape library with two tape drives will be presented separately as one tape changer device and two tape devices connected to the SCSI-FC router or host. If a tape library is fibre-channel-connected, VisualSAN discovers all tape changer or loader and tape drive components along with the SCSI-FC router/bridge which is also a subcomponent library.

All internal SCSI connections appear in the Devices and Topology Map views. All tape library components can be manually grouped within the Devices rollup and on the Topology Map after discovery. Properties of the tape drives include manufacturer, model, and serial number.

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