Compaq SANworks

Release Notes -
Enterprise Volume Manager
Version 1.1A for Sun Solaris

This document summarizes features and characteristics of Enterprise Volume Manager (EVM) Version 1.1A for Sun Solaris that are not covered elsewhere in the EVM documentation. This release of the product supports two array controllers: the HSG80 in the RA8000, ESA12000, MA8000, EMA12000 StorageWorks subsystems; and the HSG60 in MA6000 StorageWorks subsystems. The HSG80 controller requires the use of array controller software (ACS) Versions 8.5F, 8.5S, or 8.5P. The HSG60 controller requires the use of ACS version 8.5L.

For the latest version of these Release Notes and other EVM documentation, visit the Compaq storage website at:

> http://www.compaq.com/products/storageworks/Storage-Management-Software/evmindex.html

Compaq SANworks

Release Notes Contents

These release notes cover the following major topics:

Intended Audience

This document is intended for customers who purchased the *Compaq SANworks* Enterprise Volume Manager (EVM) Version 1.1A for Sun Solaris, and for Compaq authorized service providers responsible for installing, configuring, and maintaining systems that include EVM.

Other EVM Documentation

The EVM kit also includes:

■ Online Help/User Guide (accessible via the Web browser interface)

■ Installation Guide

Additional documentation, including white papers and best practices documents, are available via the Compaq website at http://www.compaq.com.

Hardware and Software Compatibility

The following sections identify hardware and operating system software that support the use of EVM for Sun Solaris.

Supported Compaq StorageWorks Controllers

EVM supports the Compaq StorageWorks HSG80 array controller in RA8000, ESA12000, MA8000, and EMA12000 configurations, and the HSG60 array controller in an MA6000 configuration. No other StorageWorks controllers are supported.

EVM requires array controller software (ACS) Version 8.5. Older versions of ACS are not supported. ACS Version 8.5 includes five different versions; EVM supports four of these versions, as specified in Table 1.

> **NOTE:** The HSG80 controller requires the use of ACS Versions 8.5F, 8.5S, or 8.5P. The HSG60 controller requires the use of ACS version 8.5L.

Table 1 EVM Support of ACS Functions

ACS Version	EVM Support
8.5F	Cloning only
8.5S	Cloning and snapshot
8.5P	Cloning and snapshot
8.5L	Cloning only
8.5V	Not supported

Supported Host Operating Systems

EVM Version 1.1A requires a homogeneous environment. For a given EVM Network, the EVM Server and all associated EVM Clients must be of the same operating system type. EVM can be used in a heterogeneous storage area network (SAN) by installing multiple EVM Networks, as long as the computer and storage resources used by each EVM Network are not shared between other EVM Networks.

EVM Version 1.1A supports the following operating systems under the Sun Sparc hardware platform:

■ Sun Solaris Version 2.6, 32-bit mode

■ Sun Solaris Version 2.7, 32-bit mode

■ Sun Solaris Version 2.7, 64-bit mode

■ Sun Solaris Version 2.8, 32-bit mode

■ Sun Solaris Version 2.8, 64-bit mode

Sun Solaris on Intel platforms is not supported.

Support for Microsoft Windows NT 4.0, Windows 2000, and Tru64 UNIX Version 4.0f/g is also available.

Supported Host Fibre Channel (FC) Adapters

This EVM release supports the Jaycor (JNI) FC adapters in Table 2.

Table 2 Host Fibre Channel Adapters				
Adapter	**Model**	**Driver Version**	**Compaq Part No.**	**DEC Part No.**
JNI 32-bit PCI	FCI–1063	2.5.9	380576–001	SWSA4–PC
JNI 32-bit Sbus	FC–1063	2.5.9	380575–001	SWSA4–SB
JNI 64-bit Sbus	FC64–1063	2.5.9	123503–001	SWSA4–SC

Supported Host Application Software

EVM provides the means to integrate its storage replication capabilities with leading database and backup applications. Detailed information and examples in the online Help and SANworks White Papers illustrate how to create EVM jobs that interact with database and backup applications.

Supported applications include:

■ Legato NetWorker 5.5 for Solaris

■ VERITAS NetBackup 3.2 for Solaris

■ Oracle Corporation Oracle8

Supported Configuration Guidelines

By design, EVM allows nearly limitless configuration possibilities. Online Help contains an EVM Network Planning Section that provides detailed information on how to construct a supported configuration. However, some configuration elements either are not supported, or are only partially supported. The following guidelines identify specific configuration issues.

Controller Cabling

Many SAN configurations allow some leeway in how the HSG controllers are cabled. EVM is especially sensitive to controller cabling and may not work correctly if the controllers, host adapters, and hubs or switches are not properly cabled. Cable the controllers according to the guidelines shown in the HSG subsystem ACS Version 8.5 documentation. Before installing EVM, as a precaution, always review cabling schemes and ensure they conform to documented guidelines.

Secure Path

EVM Version 1.1A is compatible with Secure Path for Sun Solaris Version 2.1a and higher. However, the current versions of Secure Path for Solaris do not support the EVM dynamic mount feature. As a result, EVM cannot perform dynamic mount operations on any host that is running Secure Path.

EVM excludes Secure Path enabled computers from the list of available mount-on hosts in the EVM Create Job page. This exclusion prevents the possibility of inadvertently choosing a Secure Path enabled computer as the mount-on host during EVM job creation.

Despite this limitation, EVM can be used in a Secure Path environment with one restriction: Secure Path cannot be running on the host where the BCVs (clones or snapshots) will be mounted.

The simplest configuration involves two hosts: an application server and a utility server. EVM and Secure Path can both run on the application server. Except for the ability to mount, all other EVM functions remain available on the application server, including application handling functions. Since dynamic mounts are not usually performed on the application server, this limitation is acceptable. If the utility server is running EVM, but Secure Path is not installed on this server, then EVM can perform dynamic mount operations. This configuration model can be scaled out, as necessary, to achieve the required number of application and utility servers.

Another option involves creating EVM jobs that do not involve a mount step. Step 5 in the EVM Create Job page defines which server the BCV mounts on. The BCV is held at the controller level with the Access parameter set to "None." Perform a manual mount by setting the BCV Access parameter to the desired host connections, then restarting the appropriate host.

> **IMPORTANT:** Step 5 in the EVM Create Job page is the mount step and is optional. This step does not need to be specified in order to create a job. Jobs that do not involve a mount step create BCVs just like any other job, but do not present them to a host.

This limitation will be addressed in a future release of Secure Path.

Data Replication Manager (DRM)

This release of EVM provides the ability to create clones or snapshots of target-side Remote Copy Sets (RCSs) only. BCVs of initiator-side RCSs cannot be created. Additionally, the DRM configuration must use the synchronous transfer mode to ensure that all application data is written to the target-side disks before the creating a clone or snapshot. Refer to the DRM documentation for more information on how to enable synchronous mode.

Dynamic Host Configuration Protocol (DHCP)

EVM and the StorageWorks Command Console (SWCC) HS-Series Agent are not compatible with DHCP. To ensure proper operation of the EVM network, assign a static internet protocol (IP) address to each EVM node.

Snapshot Requirements and Limitations

The EVM snapshot feature utilizes the hardware level snapshot functionality provided by the HSG80 controller and enabled by the ACS. To support snapshot, the HSG80 controller and the ACS require the following configuration attributes:

- ACS Version 8.5S or 8.5P
- FC switched fabric topology
- Dual HSG80 controllers in transparent or multibus failover mode
- 512 MB of cache per controller
- Mirrored cache

The ACS imposes rules on the creation of snapshots. EVM contains logic to work within these rules so that the user does not need to worry about them. If EVM indicates that a snapshot is not possible or if an EVM job involving a snapshot fails, snapshot limitations may be the reason. These limitations include:

■ No more than 4 snapshots are allowed per controller pair

■ A snapshot of a snapshot is not allowed

■ Each unit is allowed only one snapshot

■ A snapshot and the source unit must be online to the same controller

■ A snapshot and the source unit must be in the same unit number range (0 to 199 or 100 to 199 for transparent failover only)

Host Configuration Requirements

EVM Version 1.1A requires the use of the *Compaq StorageWorks RA8000/ESA12000 and MA8000/EMA12000 Fibre Channel Solution Software V8.5c for Sun Solaris* (part number: QB–65RAG–SA/380554–001). Older versions of the solution software are not supported. Before installing EVM, install the necessary software and make sure the StorageWorks subsystem, as well as the host connection to the subsystem, operates properly.

SWCC HS-Series Agent Requirements

EVM requires SWCC HS-Series Agent Version 2.3.1 (build 79 or higher). This software is included in the *Compaq StorageWorks RA8000/ESA12000 and MA8000/EMA12000 Fibre Channel Solution Software V8.5c for Sun Solaris* as described in the "Host Configuration Requirements" section on page 9.

When installing the HS-Series Agent, keep the following requirements in mind:

■ One step of the installation process allows specifying which hosts will have access to the agent. Be sure to include the name of the EVM Server node, as well as the name of the EVM node that the agent is being installed on.

■ Another step of the installation process allows specifying an alias for the supported storage subsystems (the default is "subsys1"). Make sure to *write down* the name entered here, because this name is required during the EVM Server installation.

Other requirements pertaining to the HS-Series Agent are addressed in the following sections.

Using Multiple HS-Series Agents

Before installing EVM on a new node, always ensure that there are no partially removed or inactive HS-Series Agent installations on any host. When installing EVM, the software scans the startup drive for any current installations of the HS-Series Agent. If files or directories remain from a previous installation, EVM may detect them and interpret them as an active agent.

If this occurs, the EVM Network View page and Storage View page will likely either be blank or report "No SANworks subsystems detected."

To prevent this problem, check for and remove any partially removed or inactive HS-Series Agent installations on any host that EVM will be installed on.

EVM Cannot Recover Dynamically from Agent Failures

If the HS-Series Agent stops running, EVM must also be stopped and restarted after restarting the Agent. Otherwise, EVM will not be able to re-establish the socket connection with the Agent. The most common symptom of this problem is the message: "No subsystems detected" in the EVM Network View page.

Improving Agent Bandwidth

The HS-Series Agent communicates with the HSG controllers via send/receive diagnostic commands that are sent in-band over the FC connection. The actual communication takes place between the agent and a "communication LUN" that is specified at agent installation time. This communication LUN may be a CCL or a raw physical device.

If the device that the agent is using for this communication is subjected to heavy I/O from the host, all SWCC or EVM commands sent to the agent may take a long time to complete and can result in sluggish EVM performance.

To prevent this, configure the HS-Series Agent to use the CCL as the communication LUN or use a device that will not be subjected to heavy I/O loads. Refer to SWCC documentation for details on how to configure the HS-Series Agent.

EVM Changes

The changes to EVM are grouped into two categories:

- New Functionality
- Bug Fixes

New Functionality

The following features were added to EVM:

- Ability to create clones and snapshots of DRM targets.

- Support for up to 128 entries in the HSG60/HSG80 connection table.

- Support for subsystems with 84 devices.

- Job sequencing was changed so that all mount operations happen after the POST step is executed. This change significantly reduces the amount of time between the PRE and POST steps—a requirement for SQL Server 7 support.

- Support for the HSG60 controller and changed the controller icon in the EVM Network View page accordingly.

- Support for Sun Solaris Version 2.8 (32-bit and 64-bit) operating system platforms.

- Support for Secure Path Versions 2.1a, 2.1b, and 2.1c.

  NOTE: A Secure Path host running EVM 1.1A does not appear in the "mount on" list on the EVM Jobs View page.

- Ability to clone three-member mirrorsets and three-member striped-mirrorsets, even when no disk resources are available.

- Ability to use mixed-case host names.

- Support for Fibre Channel Solution Software Version 8.5c for Sun Solaris platform kit. Version 8.5b is no longer supported.

Bug Fixes

Bug fixes include the following:

- No StorageWorks subsystems detected

  EVM Version1.1A now waits up to 60 sec for the SWCC HS-Series Agent to respond before timing out. The previous time-out value of 20 sec was not long enough in some cases and resulted in this error.

■ Three-member mirrorsets shown as not clonable

Mirror units (RAID1 and RAID0+1) that have two or more redundant members are now always shown as clonable in the Storage View page, even if there are no available disks on the subsystem.

■ Slow storage refreshes if controller partitions are present

Modified the EVM partition handling to speed data refreshes in cases where partitions are present on the subsystem.

   NOTE: Clones and snapshots of array controller partitions are not yet supported.

■ Elm security issue

Elm, the HTTP server software that provides the EVM graphical interface, was upgraded to Version 2.2.1 to correct a potential security problem.

■ Job naming conventions problem

Disallowed the use of non-alphanumeric characters (such as ", ', :, etc.) in job names to fix a problem that occurred when creating job names.

■ Deleted "pre-release" messages

Before adding or deleting a snapshot, set the preferred-path to match the source units online controller. Added a CLI command called "preferonline" and a option called "snapsetprefer."

■ Memory leak problem

Fixed the memory leak which caused segmentation faults and core dumps after running more than 80 jobs.

■ Lack of Sun Solaris Version 2.8 and Secure Path functionality

Fixed the "findHbas.sh" script to allow functionality with Sun Solaris Version 2.8 and Secure Path.

■ Solaris Version 2.6 library usage issue

EVM installations on Sun Solaris Version 2.6 now properly use the native Solaris Version 2.6 library (librt.so.1).

■ Heterogeneous operating system name information

Created ability to use heterogeneous operating system name information in the storage subsystem connection table.

■ Default pathing in the pre/post/backup commands

Removed the default paths from the pre/post/backup commands. EVM was only looking to one path.

■ Hanging "done" response messages

To prevent the server from getting stuck waiting for an answer in the event of a network "glitch." The last "done" message is now being resent to the EVM Server in case the original message did not get through.

■ HSG80 indicator issue

In the SAN View, the "HSG80" indicator change to reflect "HSG." This change supports the use of EVM in HSG60 controller subsystems, in addition to the HSG80 controller subsystems.

■ Matching version and build numbers issue

Allow only matching version and build numbers to work together for EVM Server and EVM Client. Lower versions will not execute with higher versions.

■ "dl" naming problem on EVM jobs

Corrected the case sensitivity attribute to eliminate a "dl" naming problem on EVM jobs.

■ EVM hangs if the RA8000/ESA12000 subsystem has more units than disks

Corrected the problem to allow EVM to recognize more units than disks.

Configuration and Troubleshooting Tips

The information in this section can help avoid problems when using EVM.

Run EVM from *$EVM_HOME/bin*

In some cases, EVM uses relative paths that may not work correctly if executing the EVM program from anywhere other than *$EVM_HOME/bin*.

Environment Variables

As described in the EVM Installation Guide, two environment variables must be added to the login environment. On EVM Server and Client installations, add the following variables:

- *EVM_HOME=/opt/CPQevm*
- *LD_LIBRARY_PATH=/opt/CPQevm/lib*

> **IMPORTANT:** These variables are given in Bourne shell syntax and assume that the default paths were accepted at installation. Modify each variable appropriately, depending on if EVM was installed in an alternate location or if using another shell.

A good practice, though not required, is to add *$EVM_HOME/* to the PATH variable.

File System Support

EVM was tested and is only compatible with the UNIX file system (UFS) file system. Even though EVM can create clones or snapshots of units that contain other file systems, EVM cannot be used to mount the replicated units.

EVM Requires Root Privileges

The EVM program and associated support scripts are only installed with root execute permission, which is required to run EVM.

Recommended Web Browser Settings

The default font settings for the Netscape browser, running on Solaris, cause some graphical elements to be displayed incorrectly. For improved viewing:

■ Change the fixed width and variable width font selections to "Application DT" or "document specified."

■ Choose a 12-point or larger font size.

Starting EVM Automatically at System Startup Time Using Run Control Files

The easiest way to configure EVM to start automatically at system startup, and stop automatically at system shutdown, is by using run control files.

A sample script named *Sample_rc_script* is located in the *$EVM_HOME/bin/samples* directory. Rename this script to *evm.rc*, place the script in */etc/init.d*, and create the following links in */etc/rc3.d*:

■ *S40evm -> /etc/init.d/evm.rc*

■ *K40evm -> /etc/init.d/evm.rc*

The startup sequence of "40" in these sample file names is arbitrary. Choose any number desired for the startup sequence, with one exception: the host that is running the EVM Server. On this server, make sure EVM starts after the SWCC *steamd* agent process—which contains a start sequence of "30" by default.

See the *init.d* "man page" for more information on using run control files.

Mount Points Must Not Be Busy During Mount and Unmount Operations

As with any mount operation, if the mount point is busy, EVM cannot successfully complete a mount or unmount. Simply using a mount point as the present working directory in a terminal window is enough to keep mounts and unmounts from completing.

To prevent mount and unmount operations from failing due to busy conditions, use a dedicated set of unique mount points for EVM jobs. Also, make sure that these mount points are not in use during EVM job execution.

FC Adapters Must Have Device Files Associated with Them for SAN Detection to Work Properly

EVM determines which FC adapters are connected to the storage subsystem by detecting the presence of at least one set of device files in the */dev/dsk* directory for each adapter. If the adapter was recently installed and has never seen a device, these files will not exist and EVM will be unable to detect the adapter. To avoid this problem, make sure that each adapter has visibility of at least one device at all times.

Since EVM configurations often involve hosts that do not use dedicated storage subsystems, this solution may be undesirable. In this case, a work-around involves the following steps:

1. Creating a temporary device

2. Assigning this device to the adapter in question

3. Creating the required device files—by either restarting the host or using the *drvconfig* command followed by the *devlinks* command

4. Deleting the temporary device

Device files are generally persistent and remain even after removing a device. In most cases, if an adapter can be associated to a valid device at some time in the past then the adapter is acceptable. However, there is a problem with this method. If the orphaned device files are ever removed, with a *disks -C* command (Solaris 7 and 8 only) for example, then the adapter is not detected when restarting EVM.

Use EVM Verbose Mode to Aid Troubleshooting

If an EVM job fails and the cause cannot be determined by examining the EVM log file, run EVM in verbose mode to help track down the cause of the problem. To do this, stop the currently running EVM process, change to *$EVM_HOME/bin*, and enter the following command at the prompt:

```
evm verbose
```

In this mode, EVM displays extended information in the terminal window to help with troubleshooting the problem. Due to the complex nature of EVM code, this information is best understood by a qualified support person.

Specifying Slices to Prevent Mount Failures

EVM is storage centric, meaning that EVM sees the SAN from the point of view of the StorageWorks controller. As a result, EVM does not know:

■ How a given source volume is used by a host.

■ How, or even if, the volume is mounted.

■ If the volume contains a file system.

■ The slice on which the file system resides.

This lack of knowledge can be a problem when creating an EVM job that involves a mount operation, because the slice to be mounted:

■ must be specified, and

■ must correspond to the valid slice on the source volume

For example: To create an EVM job that clones unit D1 and mount the clone on a server, assuming that unit D1 is attached to a Solaris host as device *c1t0d1* and that a file system exists on slice 2 (*c1t0d1s2*).

When EVM clones D1, EVM copies *all* of the data to include the partition structure and file system information. Because D1 contains a valid file system on slice 2, the clone of D1 also contains the same file system on slice 2. Therefore, when creating the EVM job, slice 2 must be specified in the mount point entry. If a slice other than slice 2 is specified, the mount operation fails when running the EVM job.

> **IMPORTANT:** To prevent mounting failures, be familiar with how all source units are used by the various hosts and on which slices the file systems reside.

Side Effects of a Dynamic Mount

Sun Solaris does not fully support the dynamic addition and removal of storage units (devices). EVM overcomes this obstacle, but with side effects (such as *phantom devices*). Phantom devices occur when EVM creates and then removes a clone or snapshot device (unit). The operating system (OS) kernel maintains a persistent record of the device that is not deleted until a restart occurs.

Records of phantom storage units can affect the operation of the Solaris *format* utility, and possibly third party utilities.

For example: Assume an EVM job is run to create and mount two snapshots. When the undo-job is run, EVM removes these devices, but the OS kernel maintains a master record of them. Running the format utility at this point would result in the output appearing to hang at "Searching for disks…," while the utility attempts to communicate with the phantom devices. After a timeout period of roughly 30 seconds per device, the format utility would then continue normally and display a table similar to the following:

```
AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
          /pci@1f,4000/scsi@3/sd@0,0
       1. c1t0d1 <DEC-HSG80-V85S cyl 9024 alt 2 hd 19 sec 208>
          /pci@1f,4000/pci1242,4642@2/sd@0,1
       2. c1t0d2 <DEC-HSG80-V85S cyl 11479 alt 2 hd 18 sec 172>
          /pci@1f,4000/pci1242,4642@2/sd@0,2
       3. c1t0d3 <drive type unknown>
          /pci@1f,4000/pci1242,4642@2/sd@0,3
       4. c1t0d4 <drive type unknown>
          /pci@1f,4000/pci1242,4642@2/sd@0,4
```

NOTE: Disks 3 and 4 in the display are added and then removed by EVM. Although these devices no longer exist, the format utility references the records kept by the OS kernel and displays the devices as "drive type unknown."

Phantom units can be confusing, but do not cause problems with normal system operation. Because EVM is able to reuse phantom device files for other jobs, the list of phantom units does not grow over time. Restarting the host removes the phantom units and restores the format utility to normal operation.

Response Time from EVM Startup

After a restart, EVM takes a few minutes to compile the necessary information about the storage configuration and the SAN topology. In most cases, EVM completes initialization within 2 minutes or less; however, configurations that contain multiple Client nodes or large number of phantom devices may take a few minutes longer. If one or more EVM nodes were recently restarted, and browsing to the EVM Server shows a blank page or displays an "HTTP 404 Not Found" error, wait 1 or 2 minutes and then refresh the Web browser to obtain a normal display.

Aborting EVM Jobs

EVM provides an **Abort** button on the Job Monitor page that halts the EVM job currently executing. While Abort is effective at stopping a job, related EVM processes (such as mount or clone normalization) may be left in an indeterminate state that cannot be easily recovered. In nearly all cases, running the corresponding undo-job after the abort will recover the resources.

In rare cases, the host must be restarted or the storage must be manually reconfigured to recover from the abort. When this occurs, use the following recommended procedure:

1. Run the undo-jobs for all outstanding EVM jobs

2. Manually restore any remaining resources used by EVM

3. Delete the *evm.mnt* file

4. Restart the host

In most cases, storage resources used by EVM can be identified by the container names. Any container created or modified by EVM uses a name of the type *x!S!yyyy*, where "*x*" can be the letter J, S, or M, and "*yyyy*" can be any number from 0 to 9999. EVM uses this special naming convention for all resources that EVM creates or modifies.

Restore the storage configuration to the original state using one of two ways:

■ Manually—by creating a configuration worksheet that describes the details of each unit on the subsystem.

■ Automatically—using features built into the HSG controller.

ACS Version 8.5 documentation includes a configuration worksheet that can be used for manual restoration and also gives detailed information on how to use the automatic restoration feature.

> **IMPORTANT:** With either restoration method, *always* update the saved configuration after modifying the storage configuration.

Unused Disks Must Be Initialized Before EVM Can Use Them

EVM must know the capacity of a disk before determining if the disk can be used for a clone or snapshot. Unused disks that were not initialized do not report a capacity, and consequently cannot be used by EVM.

To prevent this problem, make sure that all unused disks are initialized with the StorageWorks Command Line Interpreter (CLI) INITIALIZE command.

Uncontrolled Mount Operations

A stable storage environment is required to allow EVM to dynamically mount and dismount volumes without requiring a restart. Adding or removing volumes outside of EVM, or inadvertently making a unit visible to an EVM-enabled host, can interfere with the EVM ability to accomplish mount operations successfully.

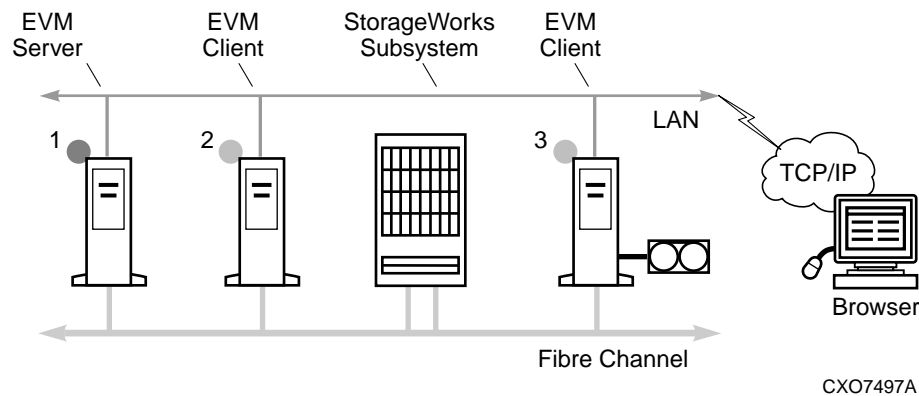Refer to Figure 1 for the following description.

Figure 1. Sample EVM network

Assume that a new production volume is being added to host 2 in the SAN. A new unit (called D5) is created and assigned to host 2. If EVM is running during this process, EVM has no knowledge of D5 or of the mount resources that D5 uses on host 2. This means that EVM mount operations that occur on host 2 conflict with D5 and might result in failed mounts.

Now assume that when D5 was being created, the Access ID was inadvertently set to "ALL." This makes unit D5 potentially visible to every host in the SAN and can cause widespread EVM mount failures.

The best way to prevent these mount problems is to ensure that the storage configuration remains stable while EVM is running. When changes to the storage configuration become necessary, Compaq recommends using the following procedure:

1. Stop EVM

2. Make the necessary changes

3. Restart the applicable hosts

4. Restart EVM

This procedure ensures that EVM maintains an accurate record of the mount resources on each host.

Known Issues

This section contains previously identified issues relating to this EVM release.

Resizing the Web Browser Window May Cause a Browser Hang or Java Script Error

Changing the size of the Web browser window may cause the page to go blank or generate a Java script error when using the Solaris version of the Netscape browser. If this happens, click the browser **Refresh** button to correct the problem.

Table Borders, Check Boxes, and Radio Buttons Are Not Displayed Correctly

The Solaris version of the Netscape browser does not display some HTML elements correctly. This problem is most noticeable in the EVM Create Job page, where the various radio buttons and check boxes are only partially displayed. This problem does not occur when browsing from a Windows NT or Windows 2000 system.

Long Job Names Disrupt the Job Monitor Page

The layout of the EVM Job Monitor page is based on an HTML table. If the EVM job name is longer than approximately 30 characters (depending on font size), the graphical elements in the Job Monitor page may be forced out of alignment. This problem is purely cosmetic and does not affect job execution.

Delay Between Job Completion and Update of Jobs View Browser Page

A minor bug in EVM causes the EVM Job Monitor page to display the "Complete" status message 15 seconds before the Jobs View browser page is updated. Browsing back to the Jobs View page before this 15-second period has elapsed results in an incorrect status display. Clicking on the **Jobs** link in the navigation bar after the 15-second period has elapsed updates the display.

Job Monitor Page Does Not Update Correctly

A Java script problem in the Solaris port of the EVM HTTP server (Elm) causes intermittent refresh problems in the EVM Job Monitor page, resulting in an incorrect job status. Under normal conditions, the Job Monitor page automatically refreshes every 15 seconds while an EVM job is running. If these refreshes do not appear to be occurring or the job status remains in one state for an unusually long period of time, refresh the Web browser. Refresh the browser by returning to the EVM Network SAN View page, then follow the link back the Job Monitor page.

Folder Tree Refresh Problems

The refresh mechanism that updates the EVM Jobs, SAN View, and Storage View pages do not cause similar updates to occur in the EVM folder tree (the left pane in the EVM browser window). The only way to update the folder tree is to perform a Web browser refresh. This problem will be corrected in a future release of EVM.

Creating a Job Against a Reduced RAID3/5 Unit

There is an EVM problem that causes snapshot jobs to fail in some cases. Creating a job that involves the snapshot of a *reduced* RAID3/5 unit causes the job to fail at execution time with a "Snapshot unit must be the same size or larger than the original" error. To avoid this problem, do not create EVM jobs that use reduced RAID3/5 units.

EVM/Web Browser Race Condition

The EVM Job Monitor page was designed to automatically refresh every 15 seconds for providing up-to-date status information on the currently executing job. If this periodic refresh occurs at the same moment that the underlying EVM code is performing an internal variable refresh, the Web browser may receive invalid information and report a Java script error.

This problem is very rare, since both refresh events must occur at the same time. Typically, the problem only occurs when a job is currently executing and the Web browser is pointed to the Job Monitor page. To clear this problem, refresh the Web browser.

Using EVM Over a Dial-Up Connection

The EVM Job Monitor page automatically refreshes every 15 seconds during job execution to provide up-to-date status information. If browsing to the EVM Server over a slow connection (such as with a dial-up connection), not all of the Monitor Page data may be received before the next automatic refresh occurs.

Even though this problem prevents the monitoring of job status progression, the automatic refreshes halt when the job completes. Halting the automatic refreshes allow the Job Monitor page to display the final status of the job ("complete" or "failed").

Firmware Problem in ACS Versions 8.5S and 8.5P Affects Snapshots

The firmware for ACS Versions 8.5S and 8.5P contains a bug that prevents host visibility to snapshot units in rare cases. The problem results in EVM jobs that appear to hang during the mount process. This problem is not expected to be encountered. The problem will be corrected in a future release of the ACS firmware.

DRM and EVM interaction

EVM Version 1.1A only allows clones or snapshots of target-side RCSs.

EVM cannot create BCVs of initiator-side RCSs. The EVM Storage View page may display a "Yes" message to allow a clone or snapshot of an initiator-side RCS, but the EVM job will fail when run. This type of failure is normal and expected.