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# HP OpenView Storage Management Appliance and EVA Value-added Applications



# HP Open View Storage Management Appliance and Applications

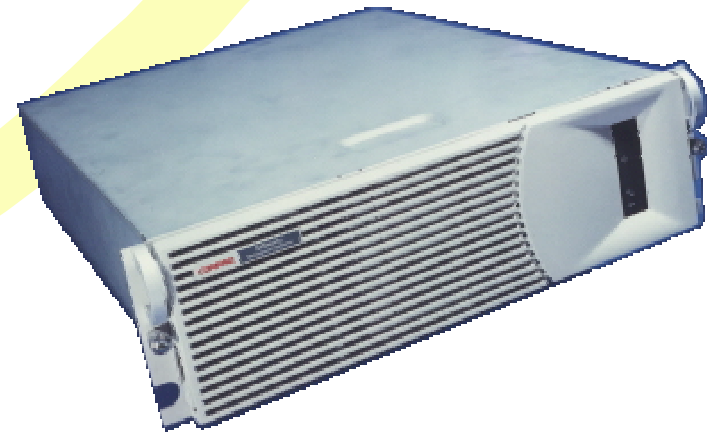
- Appliance Overview
- Appliance Management
- SSSU
- Business Copy EVA
- Continuous Access EVA
- OpenView Storage Area Manager



# Storage Management Appliance

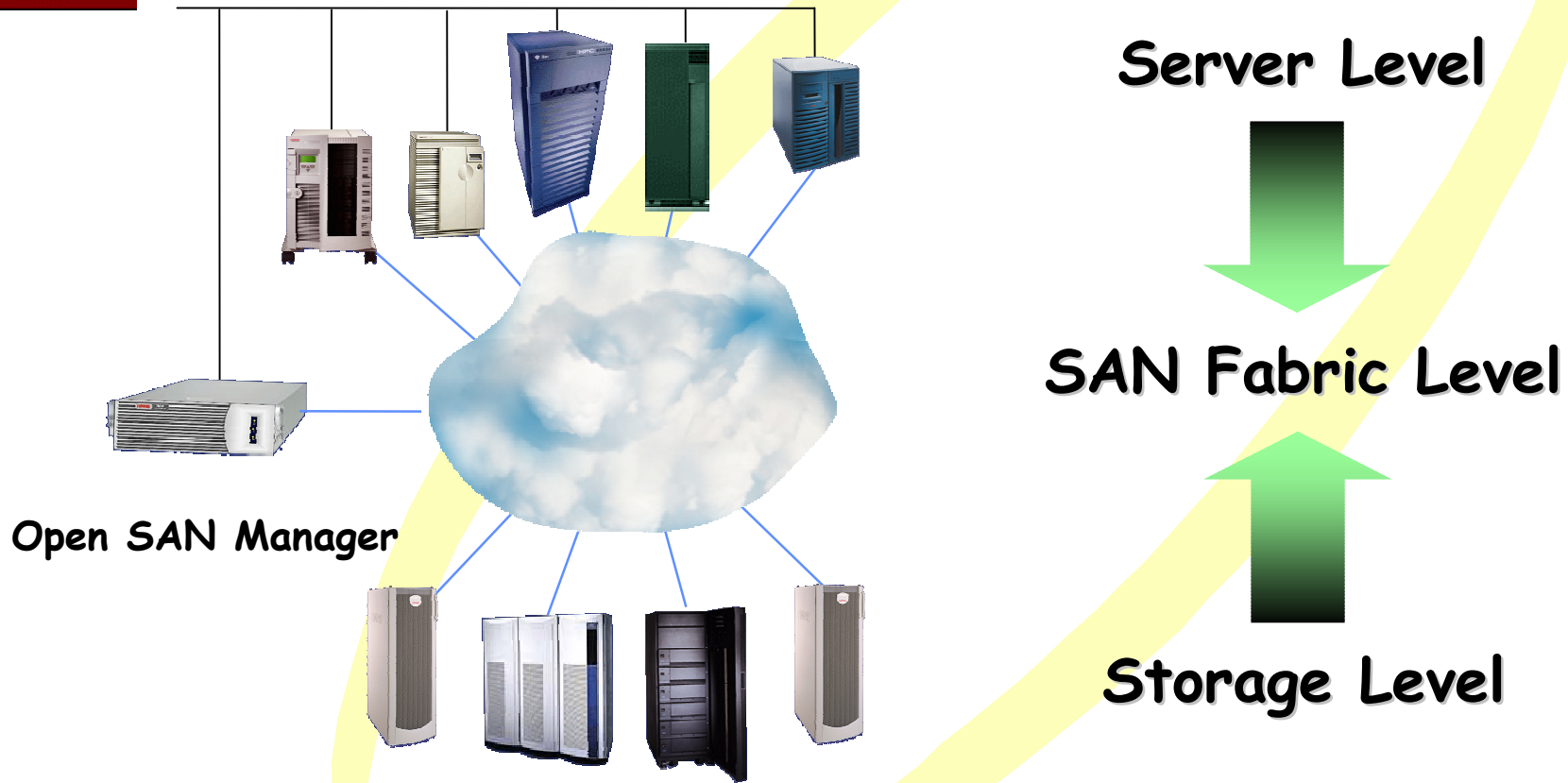
## ➤ Features/Benefits

- Simple, unobtrusive management of storage elements
- High SAN performance and availability since appliance is out of the data path
- Support for mixed heterogeneous platforms
- Web-based, centralized user interface
- Proactive automated responses to monitored events
- Customer deployable and customizable scripts for policy-based automation
- Support for popular virus & data protection software
- Customer restore CD





# Storage Optimization Strategy



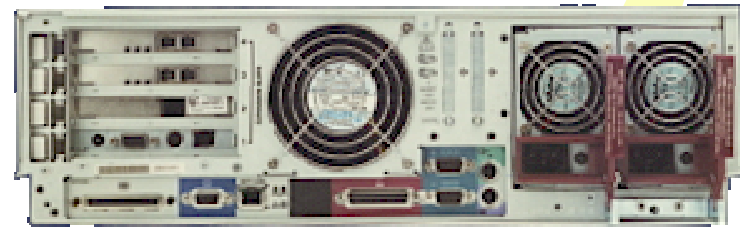
*Push as much functionality as possible to SAN fabric level to optimize customer benefits*



# Management Appliance - Generation 1

## ➤ Components

- Based on a ProLiant rack-mount server
- 733MHz processor
- 512MB memory
- 10/100 Base-T NIC
- Two 18GB disk drives - hardware mirrored
- CDROM
- Two FibreChannel adapters
- Remote Insight Board
- Modem

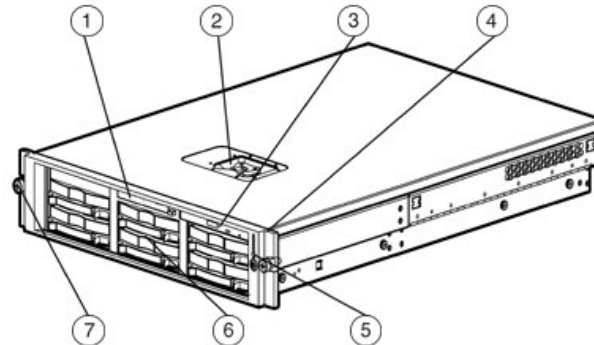




# Management Appliance - Generation 2

## Components

- 2U Form Factor
- 1.13+ MHz microprocessor
- 1GB memory
- 2 – 10/100 NICs
- Two 18GB disk drives mirrored with hardware
- CDROM
- Two Fibre Channel adapters
- Remote Insight Lights Out Edition (RILOE) board



1. 1.44 MB (3.5") Floppy Disk Drive
2. Latching Mechanism (facilitates easy hood removal)
3. 24x Max CD-ROM (with easy front ejection removal)
4. Front LED's (show server status)

5. Unit identification button and LED (for easy in rack server identification)
6. Two 1" Wide Ultra3 SCSI 18.2GB Hot Plug Hard Drives
7. 2U Form Factor



# Management Appliance - Generation 3

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## Components

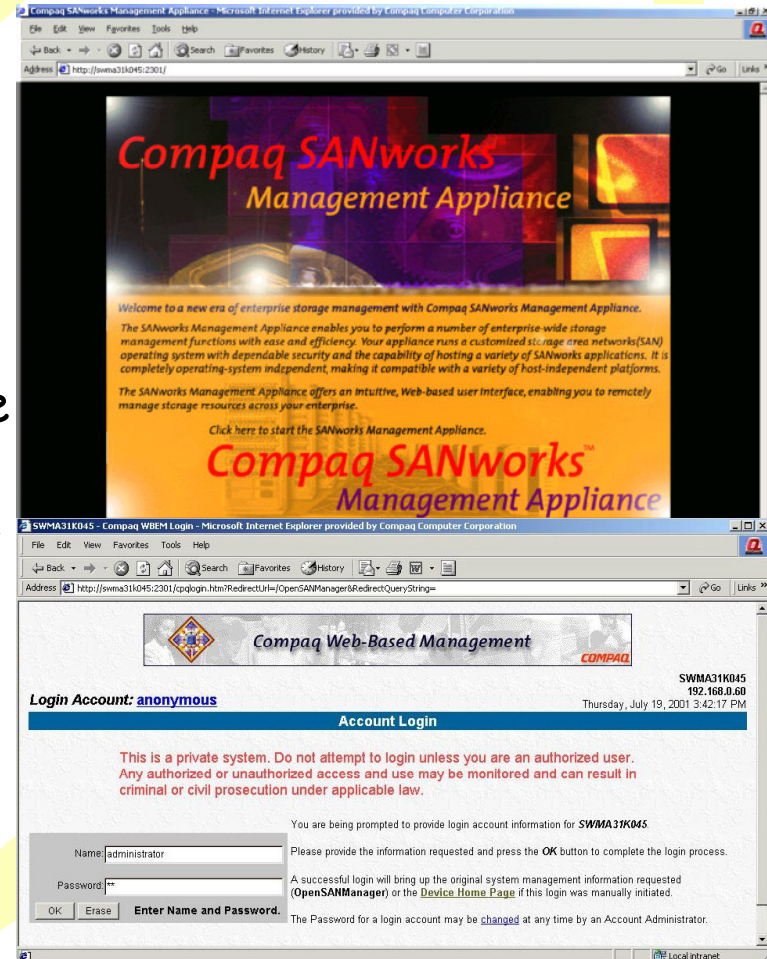
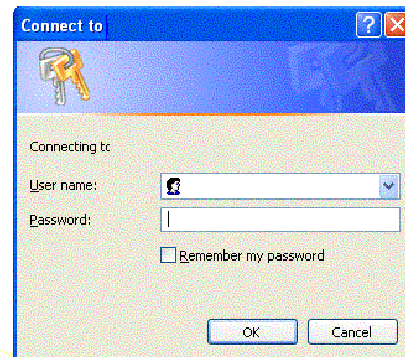
- 1U Form Factor
- 2.4 GHz Xeon microprocessor
- 2GB memory
- 2 Gbit NICs
- Two 72GB disk drives
- CDROM
- Two Fibre Channel adapters





# Logging in to the Appliance

- Browse to
  - `http://SMAxxxxxxx`
- Older versions used port 2301
- Click on splash screen, if visible to continue to login screen
- Later versions display Windows username/password dialog box







# Configuring the Management Appliance

hp OpenView  
storage management appliance

Status: Minor

Appliance Name: crush

Microsoft Windows Powered

Home Tools Devices Status Settings Help ?

Maintenance Users Discovery Groups Manage Tools Network Licensing Notification Automation Remote Access Diagnostics

### Settings

View and configure all the features, options, and services available on the HP OpenView Storage Management Appliance.

**Maintenance**  
Configure and maintain the Storage Management Appliance.

**Discovery**  
Configure discovery service, operations, and settings.

**Manage Tools**  
Control applications and services on the Storage Management Appliance.

**Licensing**  
Manage software licenses.

**Automation**  
Automate storage management tasks.

**Diagnostics**  
Test email and SNMP trap settings.

**Users**  
Create, modify, and delete Storage Management Appliance users.

**Groups**  
Import, modify, and remove Storage Management Appliance groups.

**Network**  
Manage essential network properties and settings.

**Notification**  
Configure and manage event notification settings.

**Remote Access**  
Assign and maintain inter-application passwords.

Done Local intranet



# Passwords

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- Passwords enable access to
  - Web agent — administrator/administrator
  - MA operating system — administrator/adminxxxxxx
    - "xxxxxx" = Last six digits of serial number, reversed
  - RILOE/ILO board — Administrator/"on tag"

## Note

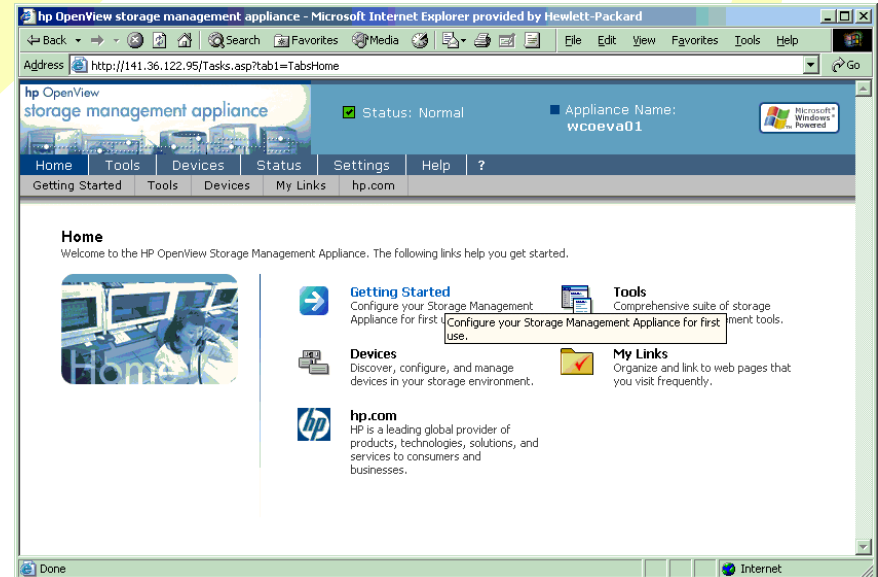
Passwords are case-sensitive — Alphabetic character in MA password must be upper case.



# Management Appliance Software

## ➤ Basic functionality:

- OpenSAN Manager
- Appliance Manager
- Automation Manager
- Notification Utility
- HSG Element Manager
- Command View EVA



## ➤ Optional

- HP StorageWorks Secure Path Manager
- HP StorageWorks Business Copy
- HP StorageWorks Continuous Access EVA
- HP OpenView Storage Area Manager



# Management Appliance Software

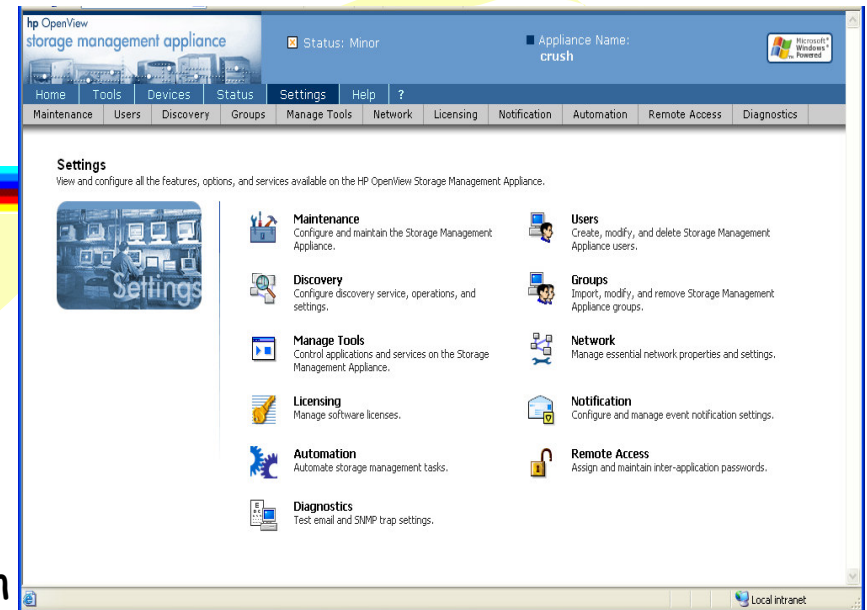
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- MA Operating System
  - Customized version of Windows 200x Server
  - Allows communication between FC storage and Ethernet network
  - Supports
    - Peripherals — NIC, HBA
    - MSDE — SQL version
    - FC combo drivers
    - RILOE software
    - ELM server — Web server



# MA Management

- Accessed via web browser
- Interface to
  - Customize system installation
  - Install and set up SAN applications
  - Upgrade system components - operating system and drivers
  - Launch other installed SANworks applications
- Install and Uninstall applications
  - Installation Services
  - Previous Installs — displays list of installed packages or updates





# MA Management

- View Appliance properties
- Set the date, time, time zone
- Set or reset Administrator password
- View/configure network properties
- Restart or shut down Appliance
- Rename the Management Appliance
- Start/Restart Appliance applications
- Backup and restore MA configuration files

hp OpenView  
storage management appliance

Status: Minor Appliance Name: crush

Home Tools Devices Status Settings Help ?

Maintenance Users Discovery Groups Manage Tools Network Licensing Notification Automation Remote Access Diagnostics

### Maintenance

Configure and maintain the Storage Management Appliance.

- Install Software**  
Install or update Storage Management Appliance software.
- Remove Software**  
Remove Storage Management Appliance software.
- Date/Time**  
Set the date and time on the Storage Management Appliance.
- Shutdown**  
Shut down or restart the Storage Management Appliance now or at a scheduled time.
- Backup**  
Backup the Storage Management Appliance and application data.
- Restore**  
Restore the Storage Management Appliance and application data.
- Language**  
Change the language used by the Storage Management Appliance.
- Mail Server**  
Set the Mail Server used by the Storage Management Appliance.
- Locate Appliance**  
Turn on light to locate the Storage Management Appliance.
- Login Message**  
Customize the login window for the Storage Management Appliance.
- RILO**  
Remotely manage the Storage Management Appliance using its Remote Insight Lights-Out board.

Back



# Notification Utility

- Centralized notification for all MA applications to:
- Receive requests from applications and sends notification alerts
  - Support Event logging, SMTP, SNMP, and command line launching operations

hp OpenView  
storage management appliance

Status: Minor

Appliance Name: crush

Microsoft Windows Powered

Home Tools Devices Status Settings Help ?

Maintenance Users Discovery Groups Manage Tools Network Licensing Notification Automation Remote Access Diagnostics

### Notification

The devices and tools listed below can generate events. To configure event notification, select a device or tool and click Events.

Search: Type [v] [Go]

Subsystem	management...		
<input type="checkbox"/> Subsystem	StorageWorks HSG RAID Control...	Z603007726_Z69341384...	
<input type="checkbox"/> Subsystem	StorageWorks HSG RAID Control...	Z613801475_Z61380149...	
<input type="checkbox"/> Subsystem	StorageWorks Enterprise Virtua...	DemoHSV	
<input type="checkbox"/> Subsystem	StorageWorks Enterprise Virtua...	TargetHSV	

Tasks

Events...

Back

Local Intranet



# Notification Utility

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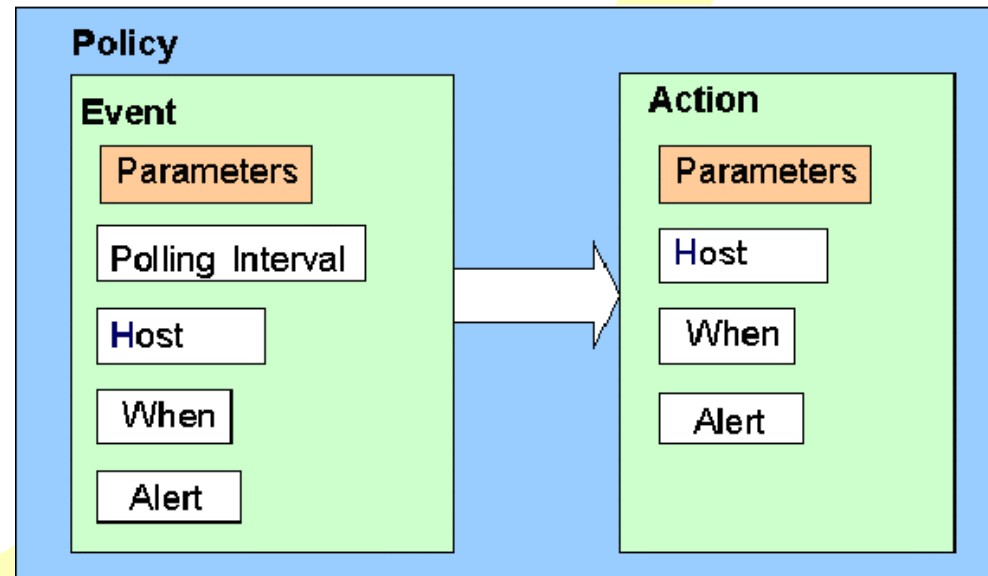
- Uses notification policies to parse application requests, audit policy filter, deliver notifications. You can
  - Notify users or groups via email or SNMP
  - Log application events to the Windows Event Log
  - Launch scripts or applications to perform maintenance
  - Generate SNMP traps and target the results to various machines
  - Create groups of users to be notified
  - Track the following events
    - Notifications received from SANworks applications
    - Policies triggered
    - Notifications sent to customized list of users
  - Use policy-based distribution lists based on severity, program, time (daily, weekly, monthly)





# Automation Manager

- Automation tool with fundamental monitoring and reaction capabilities which can be tailored to a custom environment
- Create and integrate cause and reaction scripts to automate storage area network procedures that usually require human intervention.
  - Run and manage predefined policies
  - Predefined scripts and user-created scripts - use Perl and Command Scripter

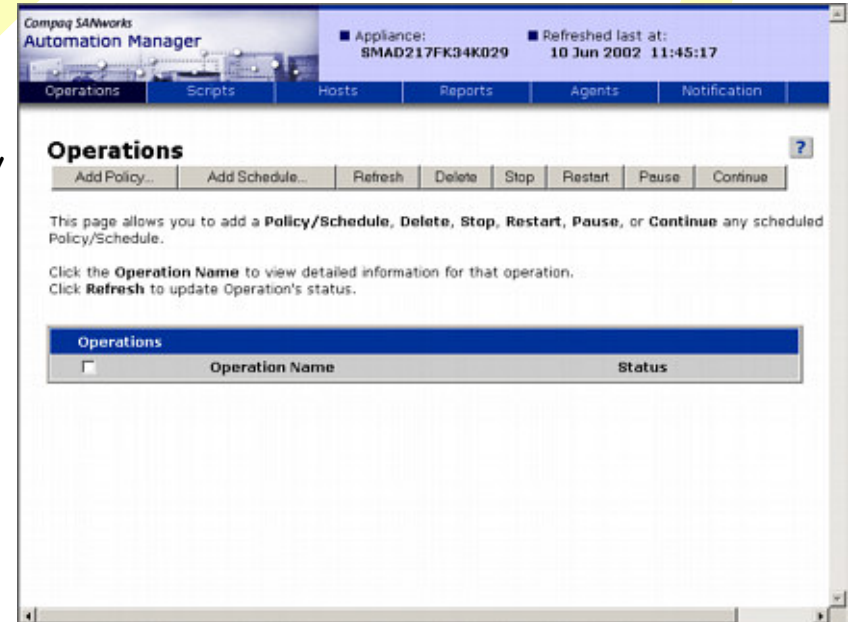




# Automation Manager

## Manage storage operations

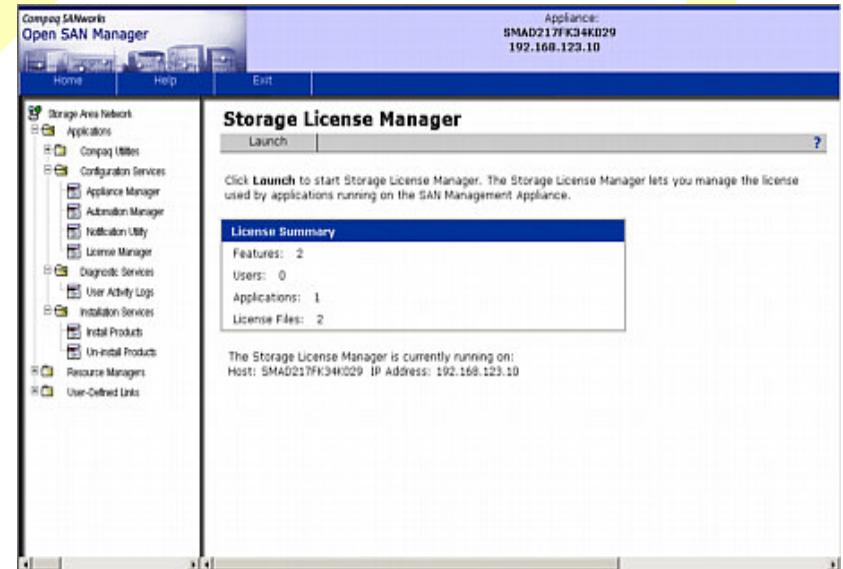
- **Operations** — View, add, manage storage policies or schedules
- **Scripts** — View, import, export, modify user-defined Perl scripts
- **Hosts** — View, add, or remove hosts on which storage policies run
- **Reports** — View and print status reports about storage operations
- **Agents** — View/download an agent to hosts on which scripts reside
- **Notification** — Set up different notification types for Automation Manager events
- **Online Help** — Use HTML Help for detailed information on Automation Manager





# License Manager

- Allows software licenses management through a license manager server
- Allows software licenses to be available on the network instead of being tied to a particular machine
- Functionality:
  - Add licenses
  - Modify or remove licenses
  - Upgrade licenses
  - View license use
  - Combine or separate licenses
  - Redirect an the license of an application to another license user
  - Control the Storage License Server by starting, stopping, or restarting the service





# Management Agents

- Remote diagnosis of Management Appliance using HP SIM 7
- SIM Agents collect data
  - Foundation Agents — For the host
  - NIC Agents — From NIC
  - Server Agents — From server and Service Access Board
  - Storage Agents — From FC switch, drive array, SCSI, and IDE
- Web Agents — Converts information to HTML

**Management Agents**  
Version 6.30.0.0

Condition Legend  
Unknown OK  
Degraded Failed

**CONFIGURATION**

- System Info
- System Board
- Bus Boards
- System Hardware
- Storage
- SMD Configuration
- Software Version Info

**MASS STORAGE**

- Fibre Channel
- Standard IDE

**Summary**

CRUSH: hp OpenView storage management appliance

Contact Information:  
Location: N/A  
IP Address: 16.101.232.149  
172.27.10.81  
Current Webagent User: administrator [login](#) [logout](#)

**Failed or Degraded Items**

Item Name:	Category:
Remote Insight	Recovery

Manually Refreshed @ Monday, July 12, 2004 12:11:58 PM



# User Activity Logs

## ➤ Provides

- Date/time of event
- User name related to event
- Application in which event occurred
- Activity or event

## ➤ User Activity Log are

- User activities
  - Log in OSM
  - Log in Appliance Manager
  - Changing system password
  - Modifying DNS or host file
  - Starting/restarting a service
  - Changing MA name
  - Changing system date and/or time
  - Changing time zone
  - Shut down/restart appliance
  - Back up/restore Management Appliance
- System activities — Auto-purging files older than six months

Compaq SANworks  
Open SAN Manager  
Appliance: 5MAD217FK34K029  
192.168.123.10

Storage Area Network  
Applications  
Compaq Utilities  
Compaq Management Agents  
Configuration Services  
Appliance Manager  
Automation Manager  
Migration Utility  
License Manager  
Diagnostic Services  
User Activity Logs  
Installation Services  
Install Products  
Un-install Products  
Resource Managers  
User-Defined Links

Get Log File | Del Log Files | Select Log File

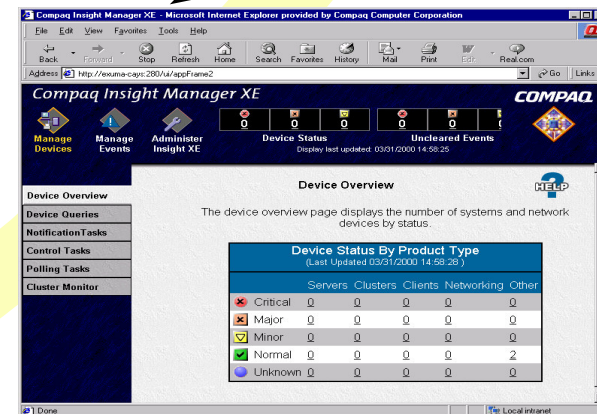
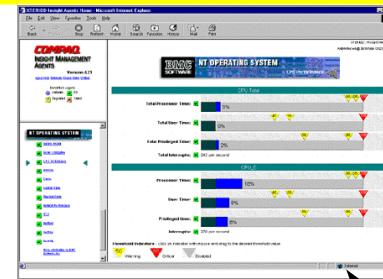
User Activity Log — 05 Jun, 2002

Date/Time	User	Application	Activity
05 Jun 2002 15:20:36	administrator	OSM	Logged in
05 Jun 2002 12:48:44	administrator	ApplianceManager	Logged in
05 Jun 2002 12:23:17	administrator	ApplianceManager	Logged in
05 Jun 2002 12:22:35	administrator	ApplianceManager	Logged in
05 Jun 2002 12:21:16	administrator	OSM	Logged in
05 Jun 2002 11:47:32	administrator	ApplianceManager	Successful network card change
05 Jun 2002 11:46:49	administrator	ApplianceManager	Logged in
05 Jun 2002 11:23:26	administrator	OSM	Logged in



# SNMP Traps for Enterprise Managers

- Management Appliance sends "SNMP" traps with a MIB to Enterprise Managers (i.e.. CIM-XE, Tivoli, etc.).
- User of an Enterprise Manager creates a Management Interface Module to interpret the MIB sent by the Management Appliance.





# Integrate FC Switch with Appliance

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- Telnet to switch, login as admin
- Use `cfgshow` to show current snmp config
  - 6 community entries; 3 RO, 3RW
- Use `cfgset` to set correct community and ip address for appliance
- Generate a trap to have the switch show up in appliance interface
  - Removing an unused GBIC will do this



# HSG Element Manager

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- Shipped with Management Appliance, adds Web enabled G80/G60 element manager
- Adds SWCC equivalent functionality to the Management Appliance:
  - Support ACS 8.5F/S/P/L (and higher)
  - Support for RA/MA enclosures
  - Launchable from Open SAN Manager
  - StorageWorks Command Console 3.0 compliant
  - Presents logical storage views
  - Manage up to 25 HSG pairs





# HSG Element Manager

hp StorageWorks  
hsg element manager

Status:  Failure    Appliance: CRUSH  
16.101.232.149

Home    Options    Legend    Help

HSG Network  
+ MA8000  
+ NAS8000

## HSG Element Manager

Submit ?

### Introduction

The hp StorageWorks hsg element manager is the application used to configure, manage, and monitor your hsg subsystem and subsystem resources using supported browsers. Use the tree in the pane to the left to navigate within your hsg network and begin managing its subsystems.

**Product Version:** UI V1.0F Build\_20030821  
**Configuration Info:** COMLib V1.0F-Build\_20030821  
HSLib V1.0F-Build\_20030821  
SCSILib V1.0F-Build\_20030821

**Default Monitor Interval:**  seconds  
**Default Rescan Interval:**  minutes  
**Automanage:**  Enable  Disable

Done    Local intranet



## Command View EVA

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- Part of OpenView Storage Operations Manager (OVSOM)
- An EVA is managed through Command View EVA (previously HSV Element Manager), a device management application with a graphical user interface that runs on the Storage Management Appliance/Management Server and that is accessed via a Web browser.
- Up to 16 Enterprise Virtual Array storage systems (16 HSV1xx controller pairs) can be managed by a single Storage Management Appliance in a given SAN.



# Command View EVA

WCOEVA01: HSV Storage System - Microsoft Internet Explorer provided by Hewlett-Packard

Address <http://141.36.122.95:2301/ResEltCpqFusion>

Links Hardware Software Parts Org Docs Kunden Tools Personal Compaq BBN GRC

hp StorageWorks  
command view eva

Appliance:  
WCOEVA01 141.36.122.95

Root View Agent Options Help

EVA01-Weissach

- Virtual Disks
- Hosts
- Disk Groups
- Hardware
  - Rack 1
    - Controller Enclosure
    - Disk Enclosure 13
    - Disk Enclosure 12
    - Disk Enclosure 11
    - Disk Enclosure 10
    - Disk Enclosure 9
    - Disk Enclosure 8
    - Disk Enclosure 6
    - Disk Enclosure 5
    - Disk Enclosure 4
    - Disk Enclosure 3
    - Disk Enclosure 2
    - Disk Enclosure 1
  - Rack 2
  - Unmappable Hardware

### HSV Storage Network Properties

Discover ?

HSV Storage System Network Properties	
Name:	HSV Storage System Network
Total HSV systems:	1
Total storage space:	4644.27 GB
Storage space used:	3902.20 GB
Available storage space:	742.06 GB

Internet



# Creating a Disk Group

The screenshot shows a Microsoft Internet Explorer browser window displaying the HP StorageWorks Command View EVA web interface. The browser title is "WCOEVA01: HSV Storage System - Microsoft Internet Explorer provided by Hewlett-Packard". The address bar shows "http://141.36.122.95:2301/ResEltCpqFusion". The interface includes a navigation menu with "Root View", "Agent Options", and "Help". A left-hand tree view shows the storage hierarchy: HSV Storage Network, EVA01-Weissach, Virtual Disks, Hosts, Disk Groups, Hardware, Rack 1, Controller Enclosure, and a list of Disk Enclosures (13 down to 3). The main content area is titled "Create a Disk Group" and includes a progress bar with "Finish", "Advanced options", and "Cancel" buttons. Below the progress bar, there is a text box for entering a name, with "Test" entered and a question mark icon to its right. The text below the text box reads: "Complete this step and click **Finish** to create a disk group in the simplest way possible. If you'd like more control over the creation of your disk group, complete the step and click **Adv Options** instead." Below this is the heading "STEP 1: Enter a Name" and the instruction "Enter a name for your disk group."



# Adding Disks to a Group

The screenshot shows a Microsoft Internet Explorer browser window displaying the HP StorageWorks command view eva interface. The browser title is "WCOEVA01: HSV Storage System - Microsoft Internet Explorer provided by Hewlett-Packard". The address bar shows "http://141.36.122.95:2301/ResEltCpqFusion". The interface includes a navigation menu with "Root View", "Agent Options", and "Help". A tree view on the left shows the "HSV Storage Network" structure, including "EVA01-Weissach", "Virtual Disks", "CAE", "CAX", "Hosts", "Disk Groups", "test", "Diskgroup-CAE", "Ungrouped Disks", and "Hardware". The main content area displays a dialog box titled "Add Disks to Disk Group" with "Add disks" and "Cancel" buttons. Below the buttons, it says "Enter the number of disks you wish to add (up to a maximum of 84):" and has a text input field containing the number "8".



# Predicting the Future

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## Command View roadmap

- CV 3.2 July (supports 3.020 new features)
- CV 3.3 Sept (supports Appliance and Windows 2003 customer server)
- CV 4.0 Dec (possibly tied with VCS 3.030)
- March 2005 SMA EOL



# Predicting the Future

## Command View 4.0

The screenshot displays the HP CommandView 4.0 interface. The main window is titled "HSV110 Sim Boise - HP CommandView SDM EVA". The interface includes a menu bar (File, View, Tools, Help), navigation buttons (Back, Forward, Up), and a tree view on the left showing the hierarchy of storage components. The right pane shows the "HSV110 Sim Boise Properties" window with tabs for General, System, Storage, and Licensing. The "Actions" menu is open, listing options like Initialize, Uninitialize, Load Firmware, Shut Down, Edit Properties, Print, and Help. The properties window displays the following information:

- Name: HSV110 Sim Boise
- node wwn: 5005-08B4-0000-CCFC-0000-0000-0000
- System UUID: 6005-08B4-0000-F6FC-0000-0000-0000
- Serial number: P4889B59INT06R
- Operational state: Good

At the bottom of the interface, there is a table with columns for Severity, Time, Source, and Message. The table is currently empty. The bottom status bar shows "Storage", "Replication", and "Jobs" tabs.



# Predicting the future

## Command View Planned Key Features:

- ↓ Flexible deployment options
  - Application Host (HP-UX, Linux, Windows)
  - Windows Management Server
  - Storage Management Appliance
- ↓ Enhanced Security
  - Administrator: Read/Write access
  - User: Read Only access
- ↓ Management of EVA's across multiple SANs
- ↓ Highly available configurations
  - Multiple instances can manage the same device
- ↓ GUI/CLUI
- ↓ Support for VCS v3.010 and VCS v3.020 release





# Predicting the Future

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## Command View Planned Key Features:

- ↓ Common services that align with replication management & OpenView Storage Area Manager
  - Security
  - User Interface
  - Licensing
- ↓ EVA performance enhancements
  - Configure for "real-time" data collection (variable)
  - Export to OpenView SAM/Performance Optimizer
- ↓ Support for HP Systems Insight Manager

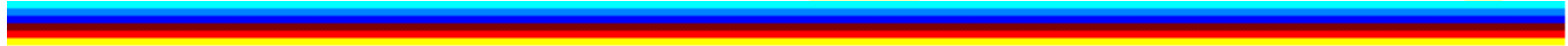


# Predicting the Future

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## VCS roadmap

- VCS 3.014 today
  - Orphaned PSEG Metadata Inconsistency fix
  - Snapclone Performance repair
  - Intermittent Unresponsive Drive Handling
  - Insulating CA source from CA destination problems
- VCS 3.020 July/August
  - FATA 250 GB drive support
  - 300 GB/ 10 K FC drive support
  - CA performance enhancements
- VCS 4.0 ?



# Storage System Scripting Utility (SSSU)



## SSSU - What is it?

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- The Enterprise Storage Scripting Utility for Enterprise Virtual Array is a command line application that allows you to configure and control HSV controllers.
- The Scripting Utility is the client side of a client/server application. The Scripting Utility's server component resides on the hp StorageWorks Management Appliance.
- The Scripting Utility announces itself as SSSU, which stands for Storage System Scripting Utility.
- Complex configuration requests and operations can be handled by either the Command View EVA GUI or the Scripting Utility.
- While initial configuration requests can be handled easily and expediently through the GUI, repetitious and complex configuration steps can be scripted and executed through the character cell interface of the Scripting Utility.



# Storage System Scripting Utility (SSSU)

- Commonly referred to as SANscript
  - ↓ Tool to issue commands through a shell UI and execute scripts
  - ↓ Scripts to create/modify a configuration
  - ↓ Interactive mode as a command prompt
  - ↓ Configuration commands to add, set, and delete
  - ↓ Capture of a configuration into a script file
  - ↓ Show command to display configuration

```
C:\Sanscript\SANscript.exe

SANscript_DEBUG version 2.0 Build 80 on Jun 19 2001 at 18:26:20
EMClientAPI Version 1.5 BETA, Build date: Jun 19 2001

NoCellSelected> select manager fraggle user=administrator passw=administrator
NoCellSelected> show cell

Cells available on this Manager:
  HSU Storage System
NoCellSelected> select cell "HSU Storage System"

HSU Storage System> add storage Accounting size=12

HSU Storage System> show storage

Storage available on this Cell:
  \Virtual Disks\Accounting\ACTIVE
HSU Storage System>
```



# SSSU - Installing the Scripting Utility

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- The Scripting Utility is installed from your host operating system solution kit. See the installation instructions in the SSSU directory on that kit for details on how to install SSSU..
- For your convenience, you may wish to add the directory containing the Scripting Utility executable to your path, or copy the executable to a directory already in your path..
- The executable file is named *sssu* or *SSSU.EXE*, depending on the operating system environment.



# SSSU - Starting the Scripting Utility

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- The Scripting Utility is started at a command prompt window or equivalent.

**IMPORTANT:** In order to execute the Scripting Utility, ensure that the password access to the controller (if enabled) is already set up from the HSV Element Manager software. You cannot set this password from within the Scripting Utility.

- Syntax

**SSSU** *<additional arguments>*



# SSSU - Implementation

- If the Scripting Utility is started without arguments on the command line, a generic application "NoCellSelected>" prompt is displayed on the terminal and input can be accepted.
- If the Scripting Utility is started with arguments on the command line, those commands are echoed to the input terminal and executed, then the utility exits.

**NOTE:** Commands or object names with embedded blanks (spaces) must be enclosed in double quotes.

## ➤ Examples

### SSSU

This example starts the Scripting Utility without additional arguments and will prompt you for commands.

### SSSU FILE "snap d1.txt"

This example starts the Scripting Utility and executes the file named *sanp d1.txt* and then exits. The file extension is not required with Scripting Utility files, *txt* here is used just an example.





# SSSU - Examples

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## ➤ Hosts Example

- For example, to add a host named *engineering* to the root Hosts folder:

```
ADD HOST \Hosts\engineering WORLD_WIDE_NAME=1111-2222-3333-4444
```

- Whenever you refer to this host, you must give the full path. For example, when adding a LUN to this host:

```
ADD LUN 4 HOST=\Hosts\engineering STORAGE=<virtual_disk_name>
```

- If you create a folder structure within the root Hosts folder, you must include all levels of the folder structure in your commands.



# SSSU - Examples

## ➤ Virtual Disk Example

- For example, to add a virtual disk family named *new\_code* to the root folder Virtual Disks:

```
ADD STORAGE “\Virtual Disks\new_code” SIZE=10
```

- This example creates a 10 GB virtual disk family named *new\_code*.

**NOTE:** This is a virtual disk family. The actual virtual disk name is “\Virtual Disks\new\_code\ACTIVE.” The family only consists of this one virtual disk, unless a copy or snapshot is made.

- Whenever you refer to this virtual disk, you must always give the full path and enclose it in double quotes.
- For example, referencing this same virtual disk '*new\_code*' within another command, give the full path, add the *ACTIVE*, and be sure to include everything within double quotes:

```
SET STORAGE “\Virtual Disks\new_code\ACTIVE” WRITE_PROTECT
```



# SSSU - Examples

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## ➤ Disk Groups Example

- When a path includes the root folder “\Disk Groups” you must enclose the entire path in double quotes:

```
SHOW GROUP “\Disk Groups\admin”
```

```
ADD STORAGE “\Virtual Disk\new_code” SIZE=10 GROUP=“\Disk  
Groups\admin”
```



# SSSU - Getting Help

---

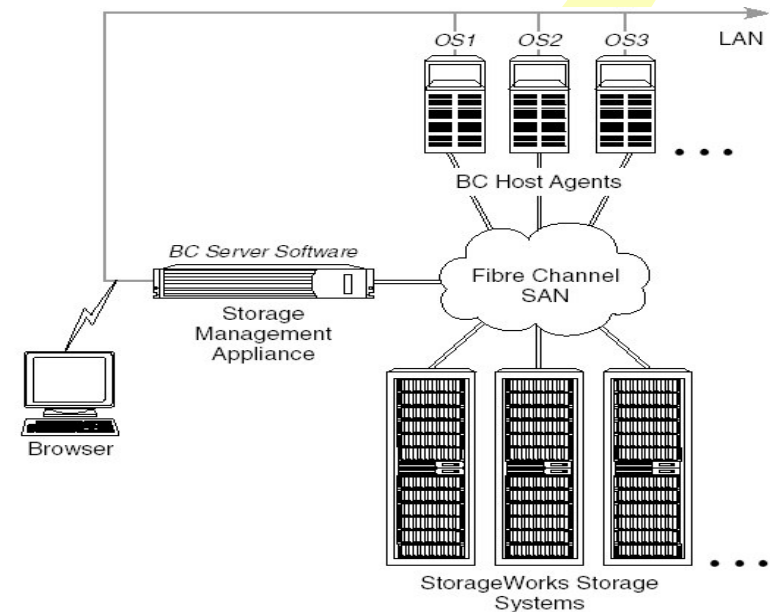
- You can display a list of options for each command by entering a space and question mark ("?") after the command or option name. This displays a list of parameters or options that you can enter with the present command.
- For example, to get information on what options are available with the ADD command:
- Type ADD ? at the command prompt:  
NoCellSelected> ADD ?
- The following list of options is presented:  
CELL  
COPY  
FOLDER  
GROUP  
HOST  
LUN  
SNAPSHOT  
STORAGE



# HP StorageWorks Business Copy EVA

## ➤ Purpose

- Make Point-in-time copies of storage volumes
- UI on Management Appliance
- Coordinates with host OS and applications
- Requires BC "network"





# Business Copy EVA

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## ➤ What is it?

- ↓ Business Copy EVA is a local replication software product for the EVA, which provides Basic snapshot and clone capability as well as Enhanced SAN wide replication management to help insure enterprise business continuity

## ➤ What's New:

- ↓ New, smaller license and upgrade tier
- ↓ New, simpler licensing rules
- ↓ New Enhanced Mode host agents
- ↓ New Basic Mode support for Novell
- ↓ Bundled 1 year of 24x7 phone support & rights to new versions



# BC Network

---

- Server (on Appliance)
- Multiple hosts
- Storage subsystems (MA/EVA)
- Managed with web browser
- Build Jobs to creates point-in-time BCVs for
  - Offline backups
  - Data warehousing
  - Testing
  - Work distribution

BCV - Business Continuance Volume



# Creating an BC Job

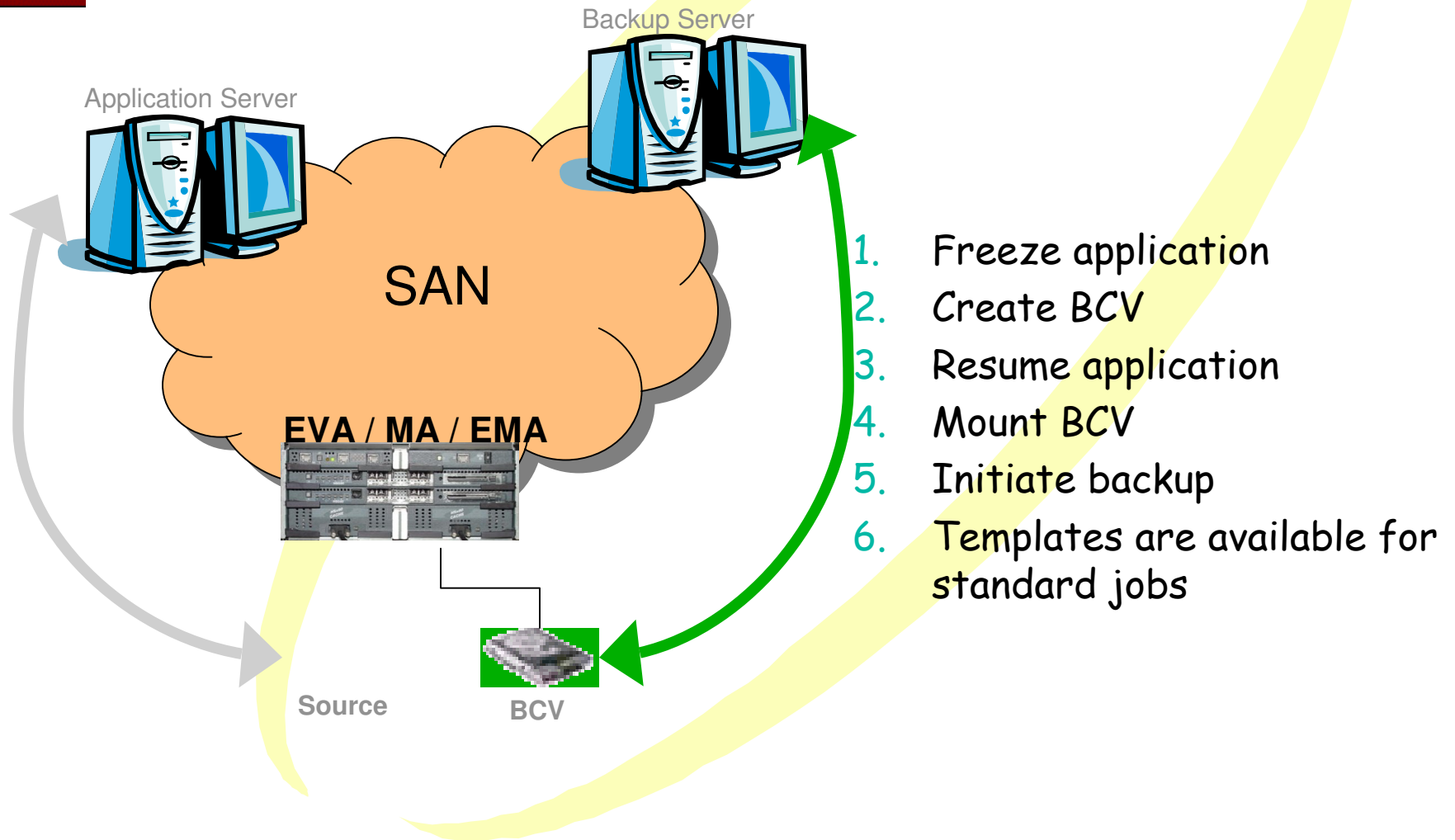
- Access Appliance
- Select *Tools*
  - Business Copy
- Make sure resources visible

Name	Value
Subsystem name	RSG4HSV1
Type	HSV
Product ID	HSV110
Node ID	5000-1FE1-0015-35F0
Firmware version	V3_W020829-0030
Last refresh	2003/01/13 11:01:14





# Business Copy at Work



# Data Replication Approaches Vary

## host-based

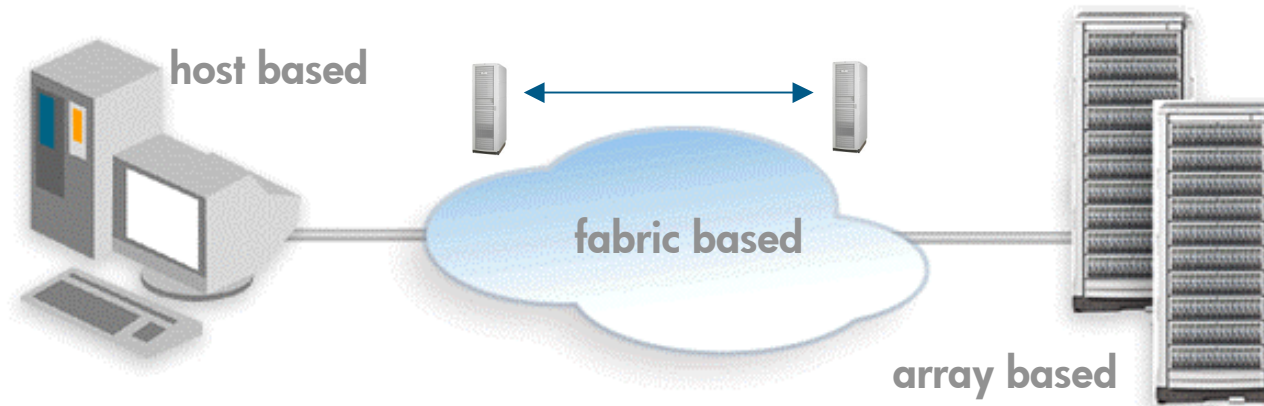
- pool and manage heterogeneous arrays
- replication across unlike arrays and hosts
- O/S dependent
- host overhead
- TCP based
- IP based clustering

## SAN fabric-based

- pool and manage heterogeneous arrays
- replication across unlike arrays
- O/S independence
- no host overhead
- more functions
- less management

## SAN storage-based

- logically pool array
- dynamic LUN optimization
- like for like arrays
- vendor specific, no interoperability





# Continuous Access EVA

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## ➤ What is it?

- ↓ Continuous Access EVA is a powerful, array-based remote replication software product providing synchronous and asynchronous mirroring and easy to use advanced management to ensure enterprise business continuity.

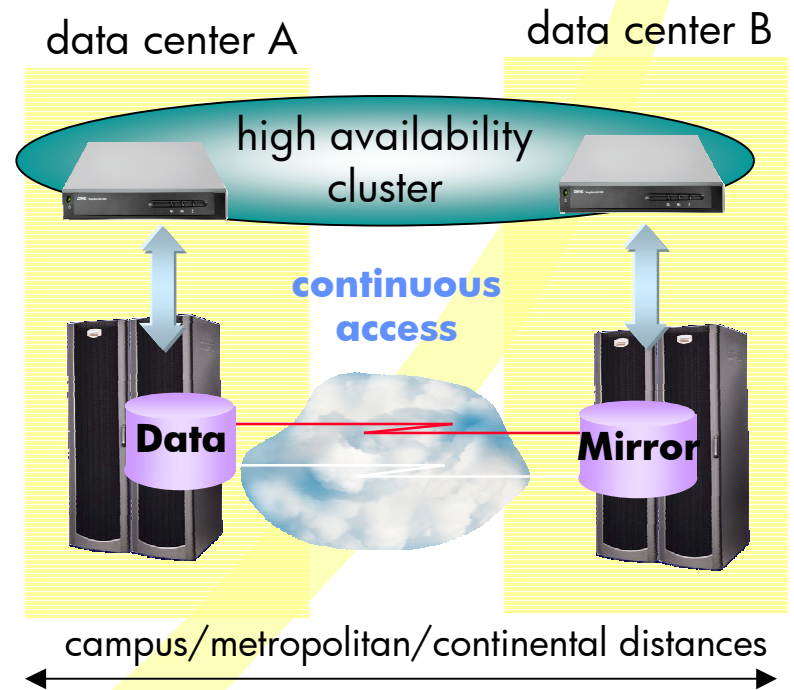
## ➤ Key recent enhancements

- ↓ Supports replication between EVA3000 and EVA5000
- ↓ Asynchronous replication
- ↓ Multiple relationships, Limited Fan Out and Fan In replication
- ↓ Enhanced scalability -128 copy sets and 128 DR Groups
- ↓ Updated user interface v1.1 to support new features (OpenView SOM required)
- ↓ 1 TB initial & upgrade capacity
- ↓ Bundled support



# Continuous Access EVA

- Performs remote mirroring and disaster recovery
- Enterprise-class availability solution
- Up to the last I/O data integrity
- Fast consistent application recovery





# Continuous Access EVA

## features

- storage-based replication
- heterogeneous host O/S support
- Synchronous replication
- high availability host clustering
- MAN dark fibre and WDM
- WAN SAN extensions FC-IP
- sequential I/O replication

## benefits

- remote site disk-disk disaster recovery
- business continuance and reduced high cost of downtime
- local, regional, global recovery sites
- increased high availability and data protection against disasters
- maintain write order



# Continuous Access Highlights

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- Management solution automates mirroring functions
- Web based GUI
- Remote access through SAN storage management appliance
- Log reports
- Failover/fail back operations



# Operating Systems

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## ➤ HP

- OpenVMS V7.2-2, V7.3-1 (including clusters)
- HP Tru64 V5.1, V5.1a, V5.1b (including TruCluster)
- HP-UX V11.0 and V11.i (including MC/Serviceguard)

## ➤ IBM

- AIX V4.3.3, 5.1
- HACMP support

## ➤ Linux

- Red Hat V7.2, AS V2.1
- SuSE SLES7

## ➤ Microsoft

- Microsoft NT4 with SP6a
- Windows 2000
  - Adv. Svr., Svr. SP2,3
  - DC V1.1a
- Windows 2003 (32bit)

## ➤ Novell

- NetWare V5.1, V6.0

## ➤ Solaris

- V2.6, 7, 8, 9
- SUN Cluster V2.2
- VERITAS Cluster V1.3, V3.5



# Solutions Configurations

---

- peer-to-peer relationship
- up to 64 remote copy sets per EVA pair
- up to 8 remote copy sets per association Set
- copy set size: 1GB to 2.047 TB
- centralized management
  - ↓ Up to 16 arrays within 100 km
  - ↓ 2 arrays per management zone if more than 100 km between arrays





## CA/EVA - DRM Enhancements Comparison

---

- numerous and significant enhancements
  - ↓ more LUNs, smaller LUNs
  - ↓ true bi-directional
  - ↓ connection failover
  - ↓ synchronous performance
  - ↓ normalization / initialization Performance
  - ↓ write history log performance
  - ↓ shorter failover / recovery times
  - ↓ dynamically expandable LUNs
  - ↓ simplified command structure



# CA EVA Management User Interface

---

- set-up and configuration
- configuration and status visualization
- automated procedures
- spans multiple arrays
- activity logging and log viewer
- monitoring and event notification
- fabric infrastructure management
- performance monitoring and thresholding
- API into same interface



# Multiple Relationships

## ➤ Fan-in of multiple relationships

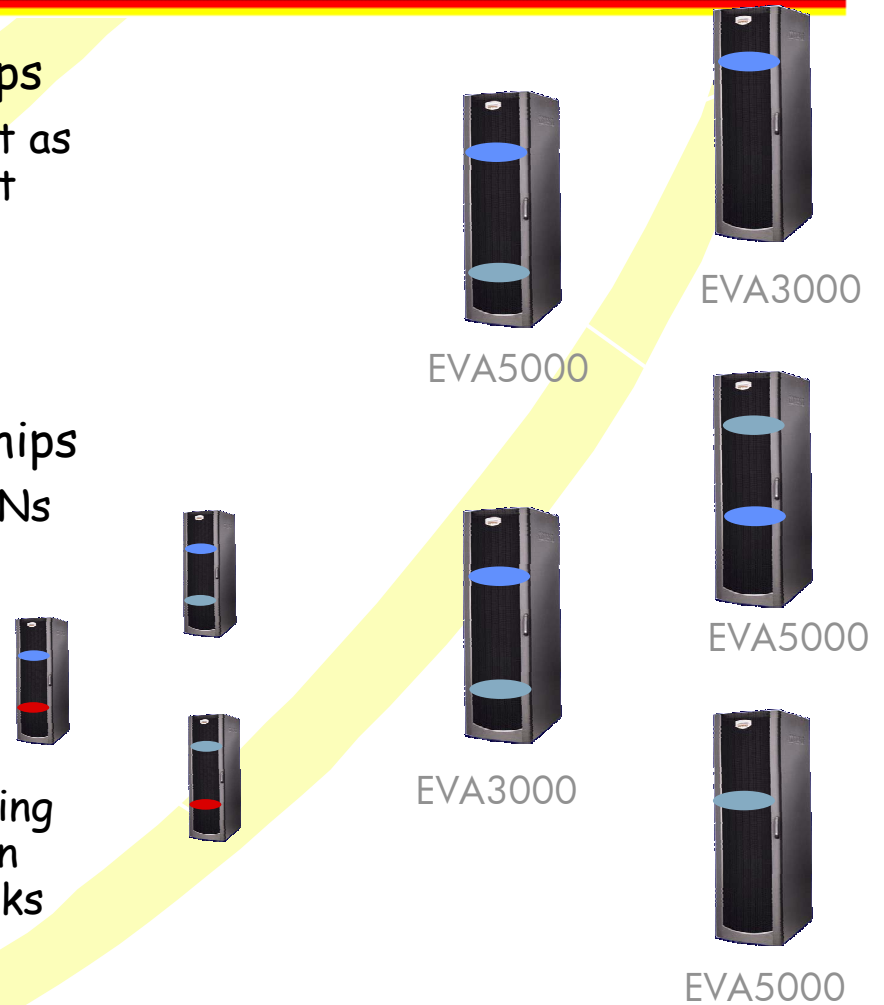
- ↓ The ability of one EVA to act as the destination for different LUNs from more than one source EVA

## ➤ Fan-out of multiple relationships

- ↓ The ability for different LUNs on one EVA to replicate to different destination EVA

## ➤ bidirectional

- ↓ one array with copy sets acting as the source and destination across the same intersite links or fabric





# HP OpenView Storage Area Manager

- enterprise-wide management of all storage resources and infrastructure

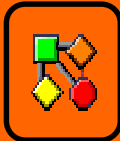
core services

- Device Discovery
- Topology Maps
- Event Framework
- Fabric Zones
- Organizational Views



## storage builder

- Monitor storage utilization and inventory
- capacity thresholds
- historical trending and reporting



## storage node manager

- health status and event monitoring
- discovery and topology mapping
- zoning presentation



## storage optimizer

- performance monitoring
- baselining, thresholds
- historical trending and reporting



## storage allocator

- Drag and drop heterogeneous storage provisioning
- virtual access control

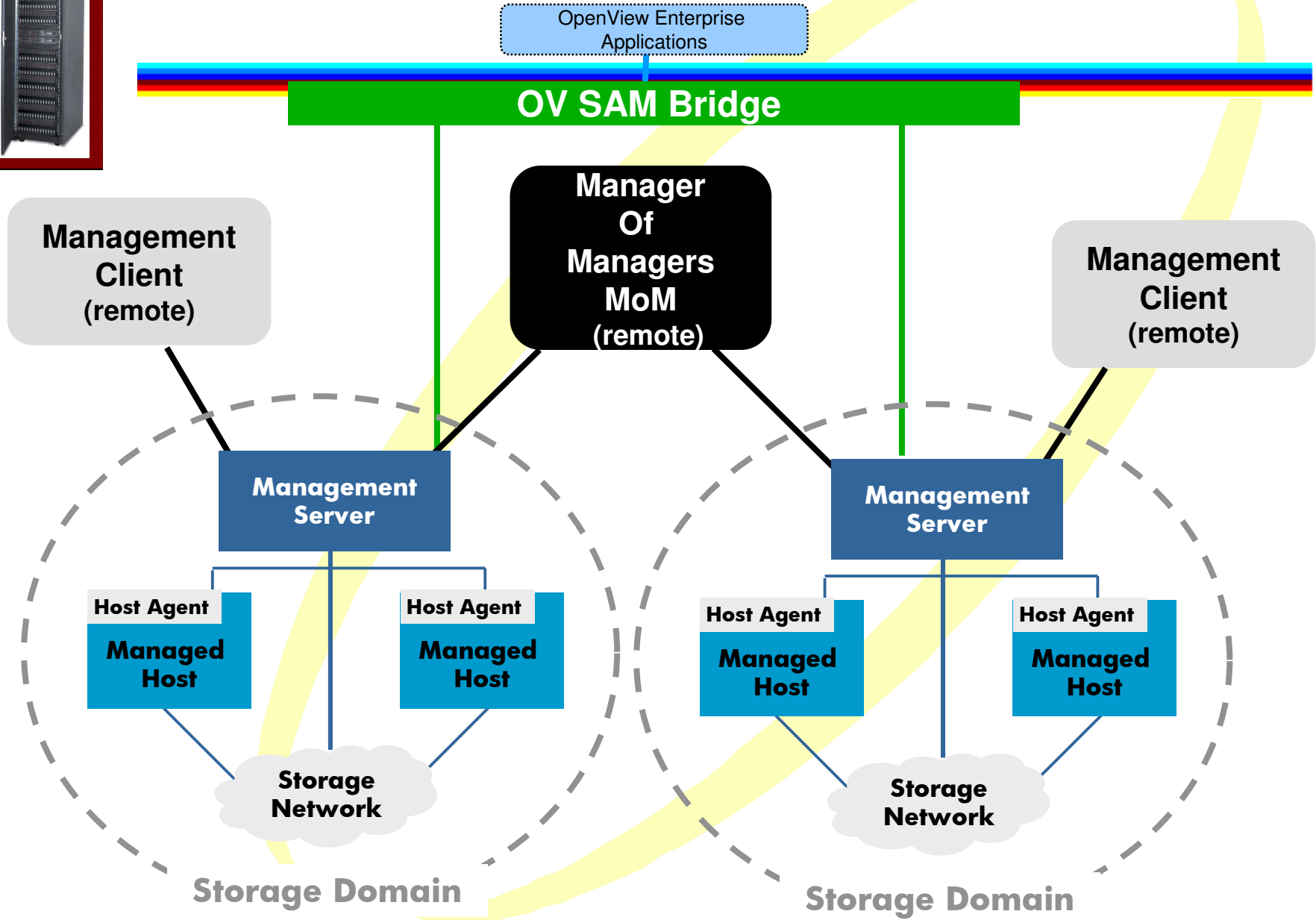


## storage accountant

- service level management
- usage metering
- billing



# Storage Area Manager Key Terminology





# OVSAM Supported Operating Systems

## Management Server

- Windows 2000 (Professional, Server, Advanced Server) with Service Pack 1, 2 & 3
- HP OpenView Storage Management Appliance II with Storage Management Appliance software v2.0 and Storage Area Manager SANMGR\_00008 patch installed

## Management Clients

- Windows 2000 (Professional, Server, Advanced Server) with Service Pack 1 & 2
- Solaris 7.0, 8.0
- HP-UX 11.00, 11.11

## SAN Hosts

- HP-UX 10.20, 11.0, 11.11, 11.20
- Solaris 2.6, 7.0, 8.0, 9.0
- Linux Red Hat 7.1 (2.4.2 kernel)
- AIX 4.3.3, 5.1.0
- Tru64 5.1a, 5.1b
- NT 4.0 (Workstation, Server, and Enterprise) with Service Pack 6a
- Windows 2000 (Professional, Server, Advance Server, Data Center) with Service Pack 1 & 2
- Windows 2003



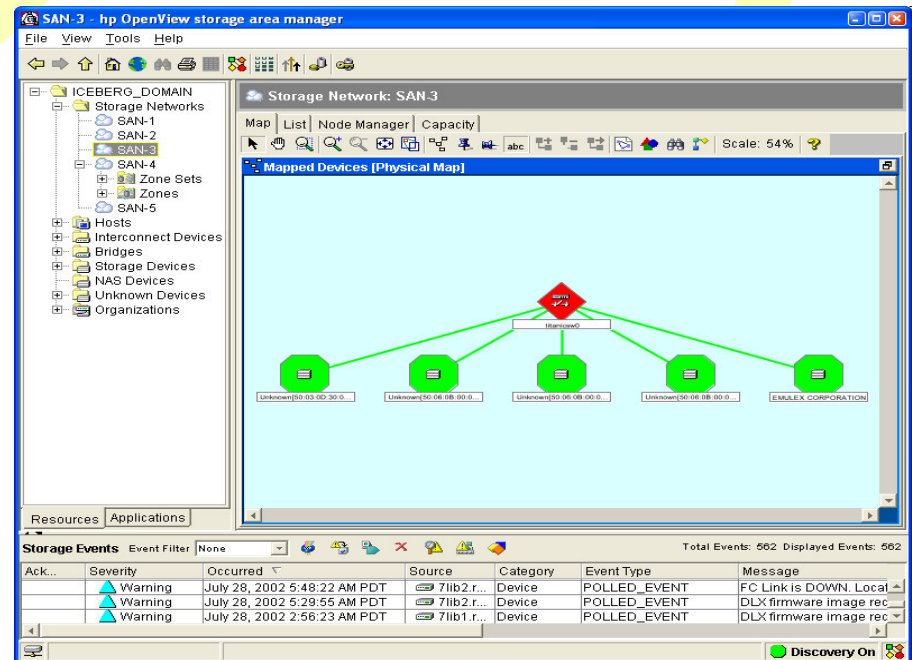
# storage node manager\* (device management)

## features

- automated discovery, topology mapping, monitoring, and management through firewalls and across multivendor SAN, NAS, and DAS environments
- zoning presentation
- continuous health monitoring - MoM
- launch platform for central device management

## benefits

- visualize your enterprise storage environment
- quickly isolate and solve device issues
- perform all storage management operations from a central console



\*snm + optimizer are equivalent to network view



# storage builder\*

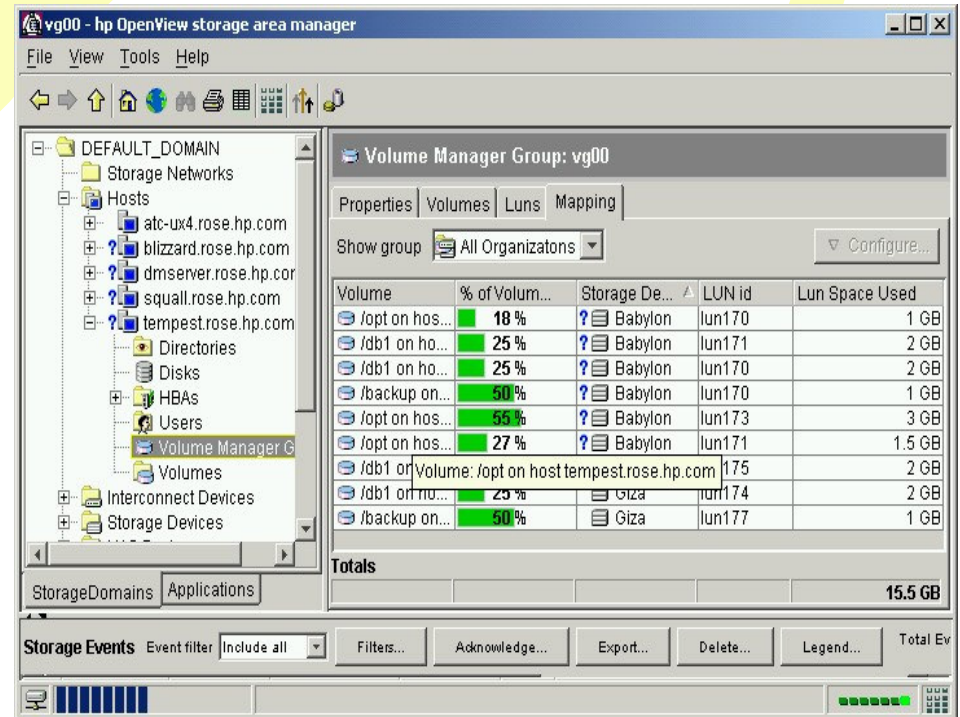
(capacity utilization management)

## features

- monitor storage utilization and inventory
- storage allocation and usage views by host, device, user . . .
- historical trending and future extrapolations
- capacity thresholds

## benefits

- generate detailed storage inventory for resource assessment
- predict storage demands, enabling just-in-time capacity acquisition
- avoid SLA penalties and downtime due to capacity shortfalls



\*equivalent to SRM





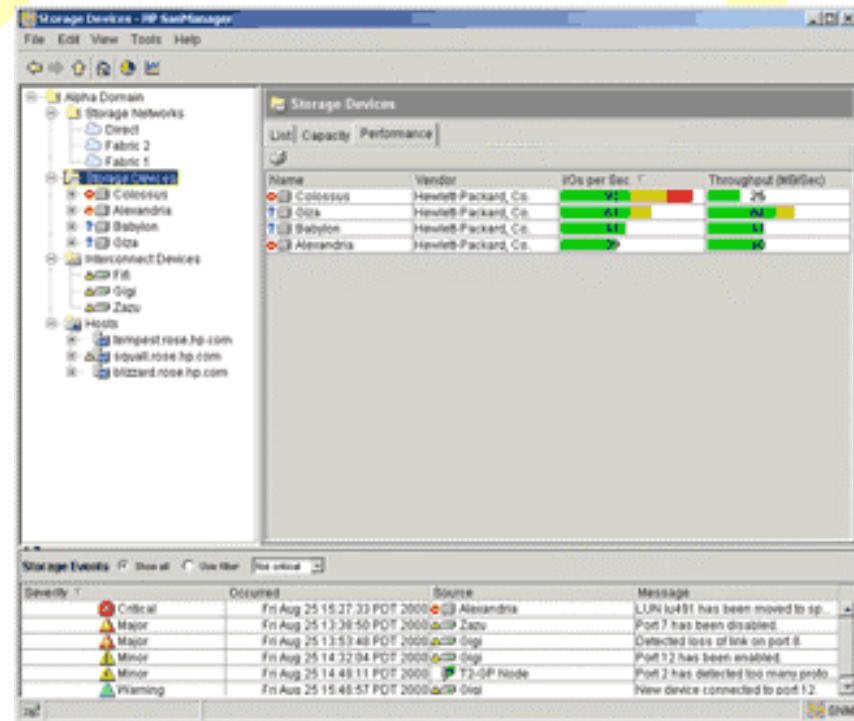
# storage optimizer\* (performance management)

## features

- host, storage, and infrastructure performance monitoring with drill-down capabilities
- automated baselining, threshold determination, and over-baseline notification
- reporting, historical trending, and analysis

## benefits

- quickly identify and isolate performance bottlenecks
- proactively plan for performance growth and maintenance
- avoid SLA penalties and downtime due to performance bottlenecks



\*snm + optimizer are equivalent to network view



# storage accountant\* (charge management)

## features

- measure, calculate, and bill based on assigned storage
- manage service levels and price tiers based on associated storage and services
- enable customer- or device-based reporting

## benefits

- enable cost allocation, financial analysis, and charge-back
- recover the cost for providing services, supporting a move from cost center to profit center
- make qualified decisions based on storage usage and cost analysis

The screenshot shows the 'Storage Device Report Viewer' application window. It includes a menu bar (File, Help), a 'Usage Period' dropdown set to 'Current Usage Period', and several data tables:

Billing Period		
From	To	Hours
3/19/02 1:00 PM	3/19/02 1:05 PM	0.0833

Storage Device Usage Summary			
Storage Device Name	Serial Number	Assigned	Unassigned
HP SureStore DiskArray 12H-0	00000025F7A8	\$7.98	\$39.66

Activity of LUNs Assigned to an Organization and an Account									
LUN	Organization	Account	Occurred	Description	Service Level	Size (GB)	Price (GB/Hr)	Hours	Charge
lun0	Sock Town	Account from details section	3/19/02 1:02 PM	LUN Added to Account	GOLD	319.000	\$10.000000	0.0025	\$7.975000
lun0	Sock Town	Account from details section	3/19/02 1:02 PM	LUN Deleted from Account	GOLD	319.000	\$10.000000	0.0000	\$0.000000

Activity of LUNs Not Assigned to an Organization								
LUN	Occurred	Description	Service Level	Size (GB)	Price (GB/Hr)	Hours	Charge	
lun0	3/19/02 1:02 PM	LUN Added to Service Level	GOLD	319.000	\$10.000000	0.0061	\$19.459000	
lun0	3/19/02 1:02 PM	LUN Deleted from Account	GOLD	319.000	\$10.000000	0.0033	\$10.527000	
lun0	3/19/02 1:03 PM	LUN Removed from Service Level	GOLD	319.000	\$10.000000	0.0000	\$0.000000	
lun0	3/19/02 1:03 PM	LUN Added to Service Level	STANDARD	319.000	\$1.000000	0.0303	\$9.665700	

\*accountant is equivalent to SAR



# storage allocator

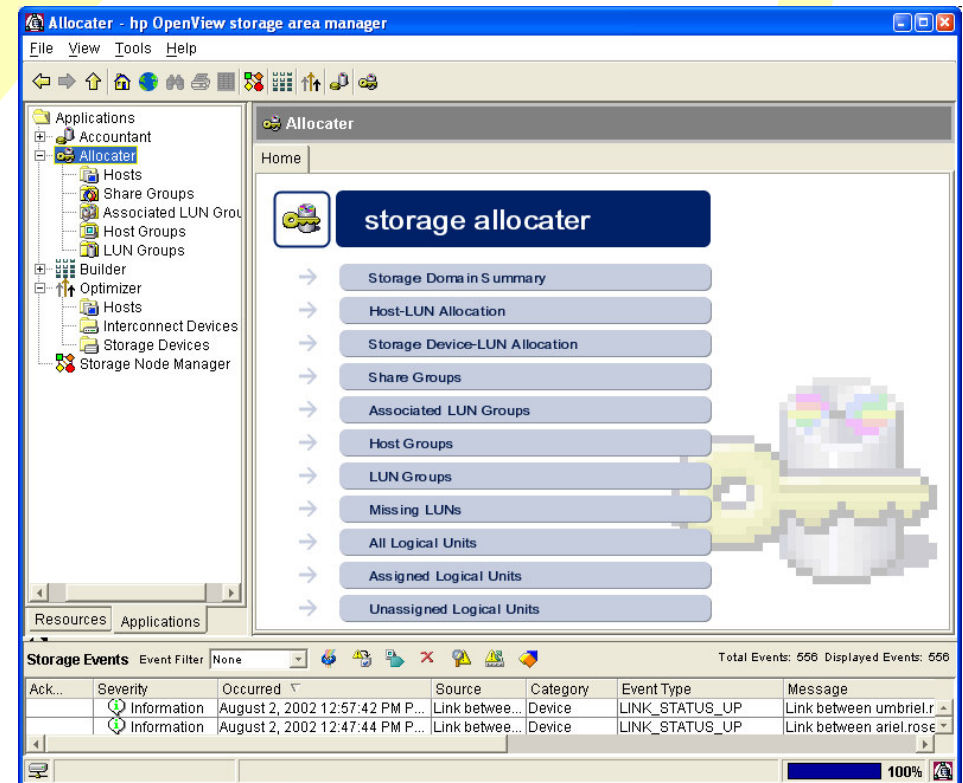
(access control and storage assignment)

## features

- heterogeneous drag-and-drop LUN provisioning without system reboot
- virtualized access control between host and multivendor storage (RAID, JBOD, tape)
- configuration wizard
- notification of unauthorized host access

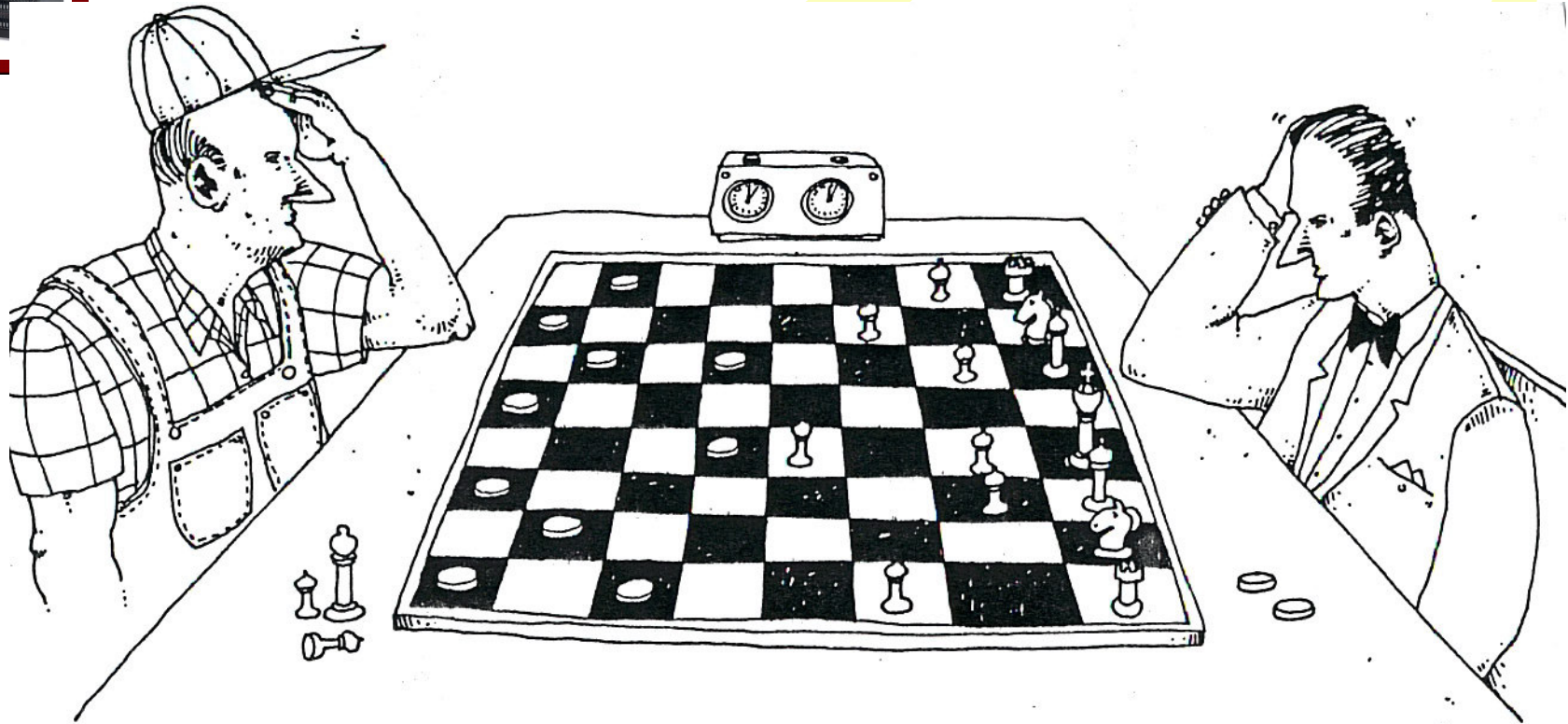
## benefits

- ensure uptime with easy and quick storage provisioning
- significantly reduce storage deployment time
- increase SAN security





# Any Questions?



ATTOE.