Application capacity management with HP OpenView Storage Area Manager

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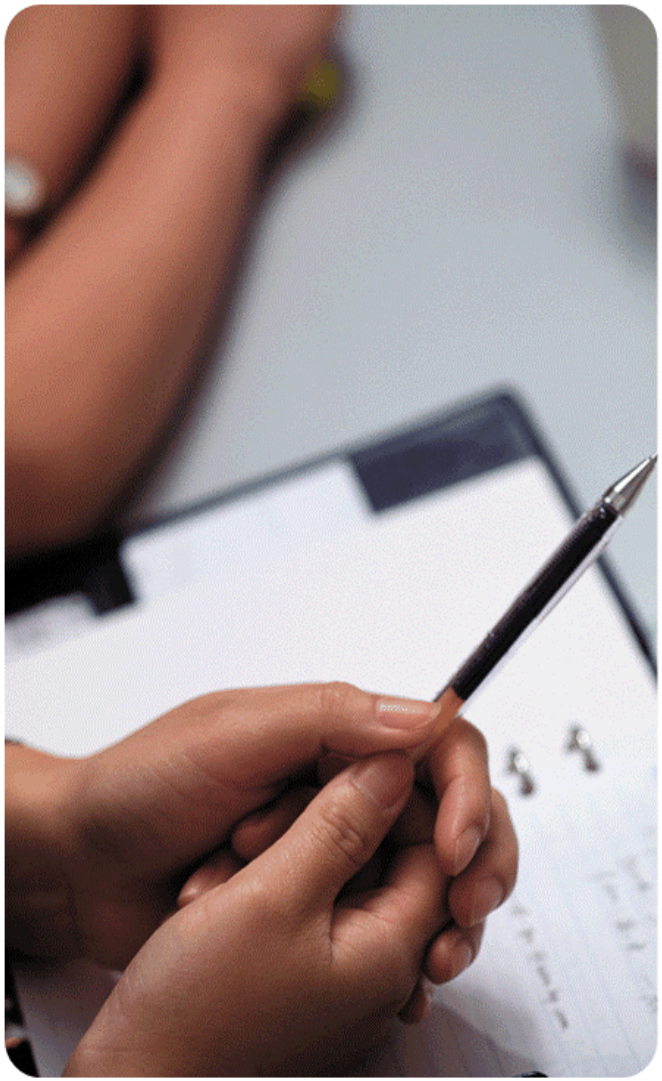
Agenda



- OpenView Storage Area Manager overview
- OpenView Storage Area Manager architecture
  - Management Server
  - Host Agent
  - Client
  - Discovery
  - Device support
- Application Integration
  - Oracle 8/9/9i RAC
  - Exchange 2000/2003
- HP OpenView Integration

Objectives

- Outline the needs for storage management
- Overview of HP OpenView Storage Area Manager
- Aid understanding of overall product suite and how to deploy it through an architectural discussion
- Explain the benefits of application integrated storage management, and how it works with SAM
- Briefly describe integration into other enterprise management products

OpenView Storage Area Manager overview

Why use a storage management product?

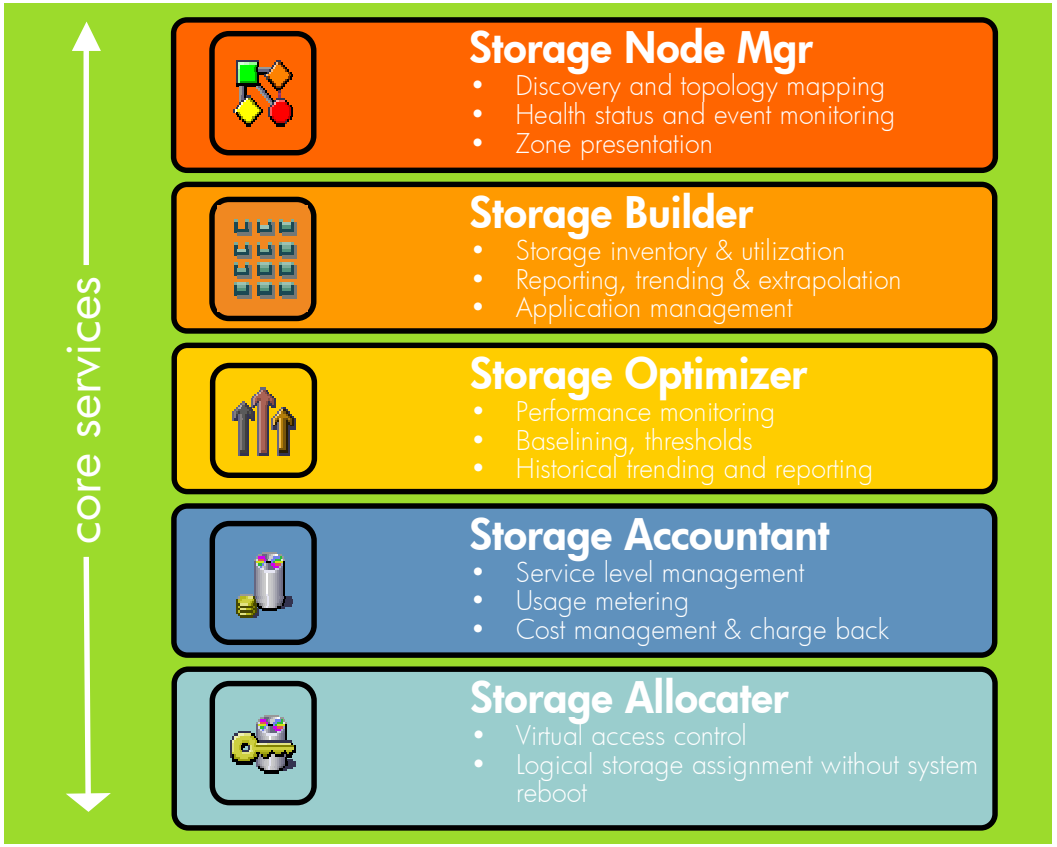
- Helps you answer questions and resolve issues such as:
  - Why can my e-commerce server suddenly not access the Oracle database
  - How can I proactively avoid my Oracle e-commerce server going down in future?
  - Is my corporate email system about to run out of disk space?
  - Why is the performance of my file server so slow?
  - How much does it really cost to have all these MP3s stored away?
  - Why can't my HP-UX server access the LUNs on my StorageWorks DiskArray XP1024?
  - How can I easily control access to different storage devices?

HP OpenView Storage Area Manager (SAM)

- Broad, fully-featured storage management integrated suite of products
  - Connectivity and topology management
  - Health monitoring and event management
  - Capacity management
  - Performance monitoring
  - Cost accounting
  - Storage allocation

HP OpenView Storage Area Manager product suite

An integrated software suite, comprised of five modules, for managing and monitoring multi-vendor, networked and direct-attached storage environments



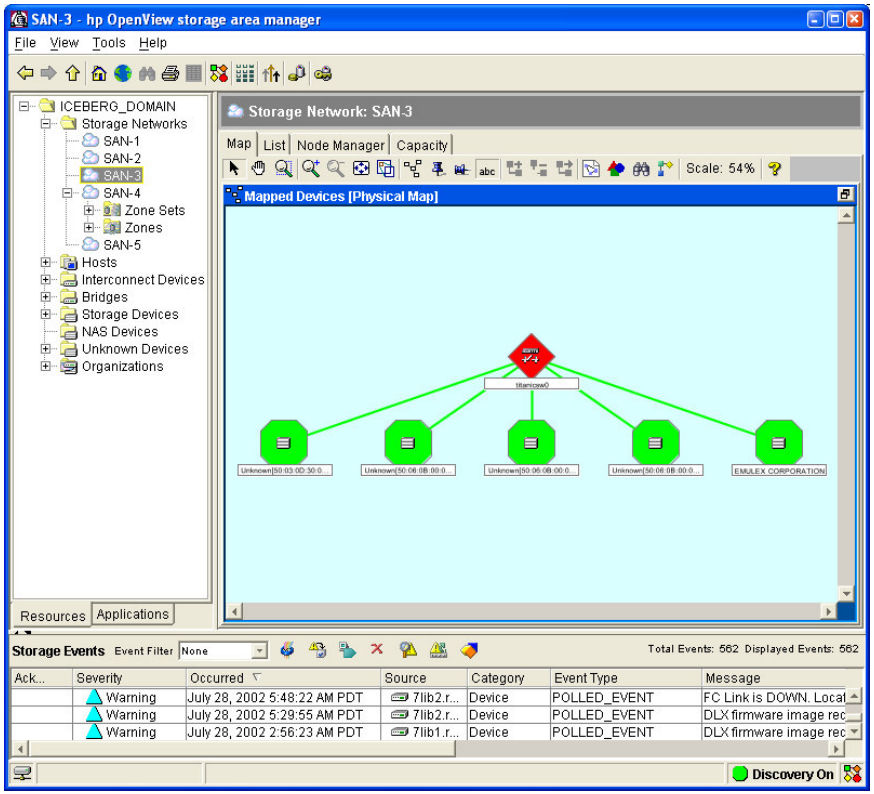
Use cases

- Managing a growing storage environment with existing storage resources
- Managing complex multi-vendor and multi-operating system environments
- Looking to use existing storage resources more effectively
- Managing to a service level objective
- Understanding the cost of providing storage

HP OpenView Storage Node Manager

Features

- Automated discovery, topology mapping, monitoring, and management across multivendor SAN, NAS and DAS environments
- Zoning presentation
- Launch platform for central device management
- Manager of Managers



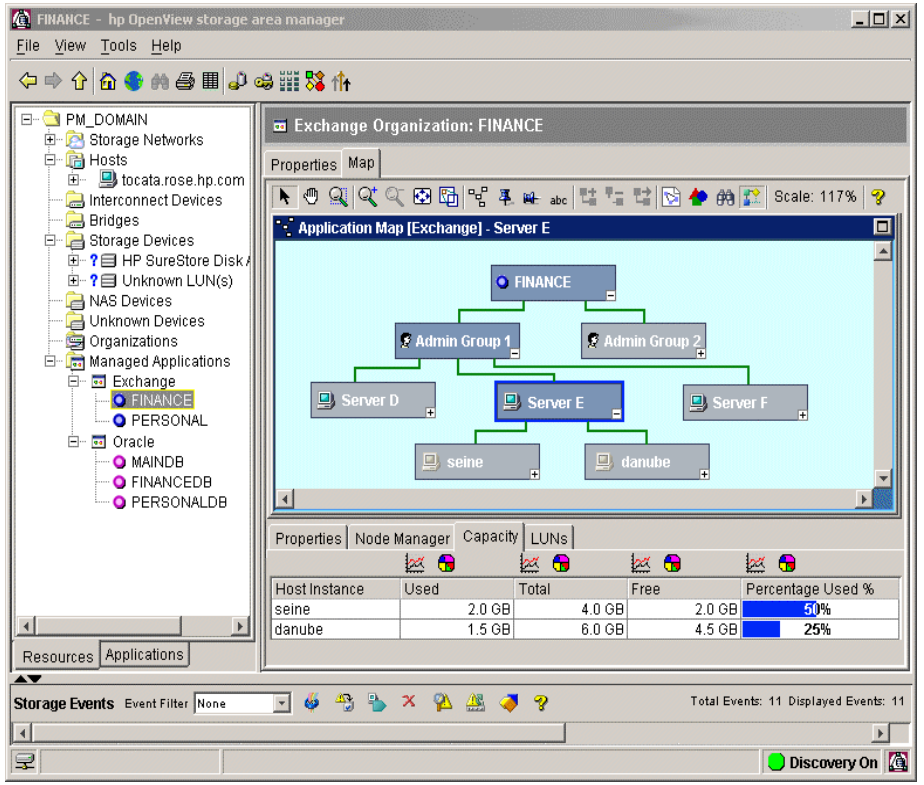
Benefits

- Visualize your enterprise storage environment
- Quickly isolate and solve bottlenecks
- Perform all storage management operations from a central console

HP OpenView Storage Builder

Features

- Resource and utilization view by array, LUN, volume, host, user, application
- Reports, graphs, and charts
- Historical trending and future extrapolations
- Capacity thresholds
- Application – file – volume – array – LUN mapping



Benefits

ORACLE Microsoft Exchange Server

- Generate detailed storage inventory for resource assessment
- Increase utilization rates
- Reclaim wasted or unused storage
- Just-in-time capacity acquisition
- Avoid SLA penalties and downtime due to capacity shortfalls

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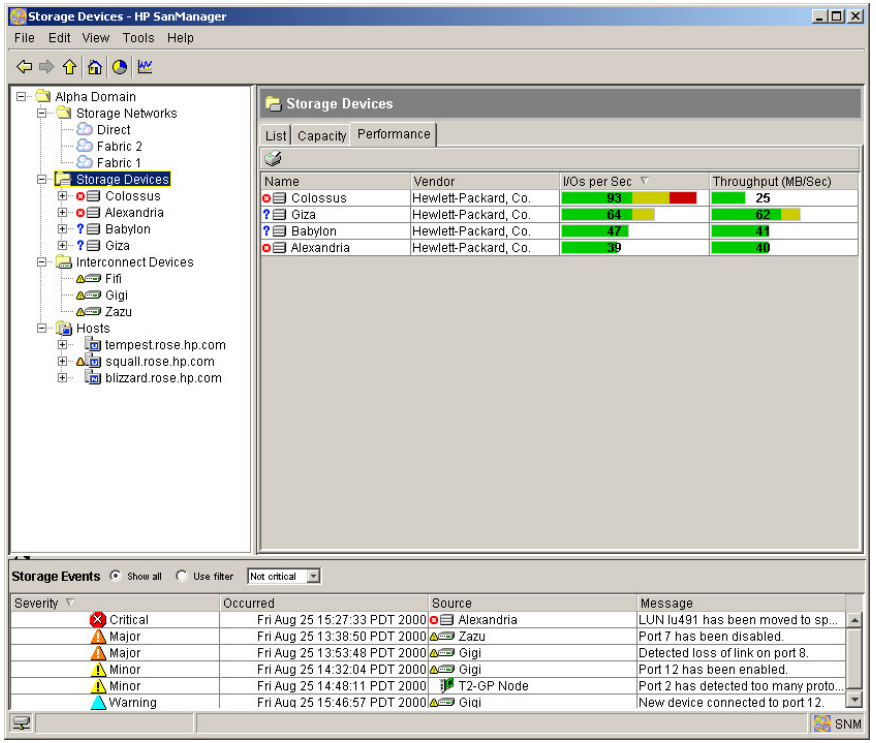
HP OpenView Storage Optimizer

Features

- Host, storage, and infrastructure performance monitoring with drill-down capabilities
- Automated base lining, 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



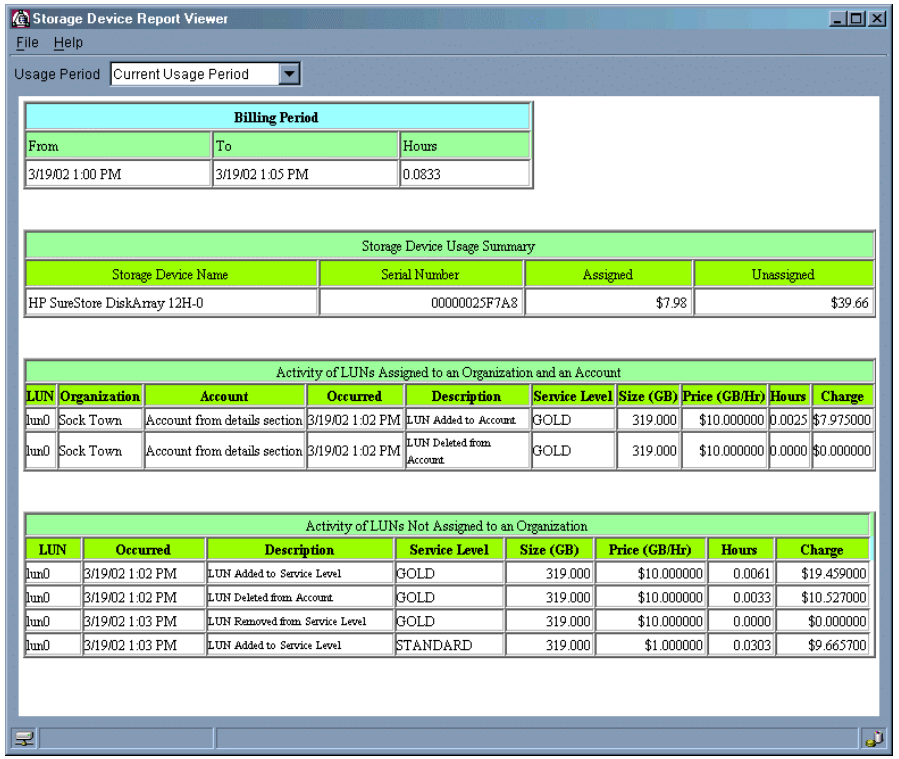
HP OpenView Storage Accountant

Features

- Measure, calculate, and bill based on assigned storage
- Manage service levels and price tiers based on associated storage and services
- Report on customer, service level and devices

Benefits

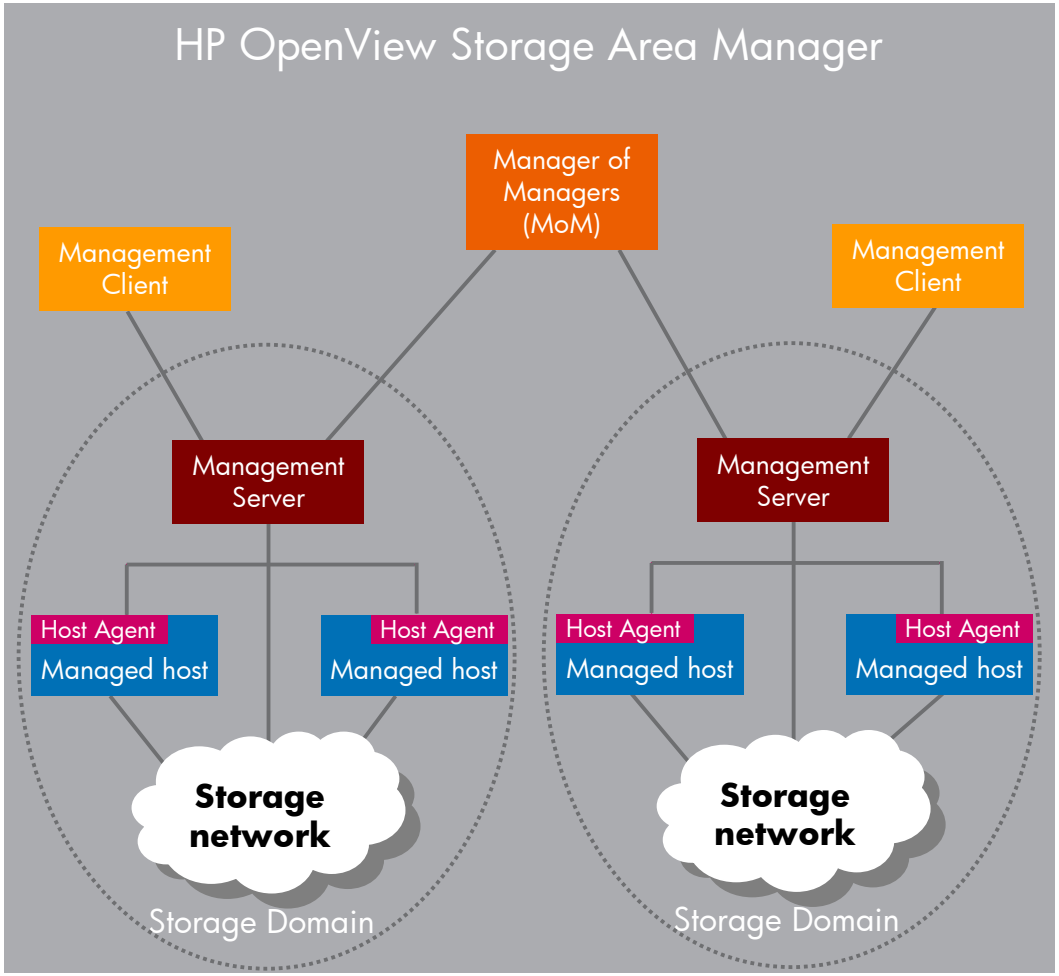
- Enable cost allocation, financial analysis, and charge-back
- Recover the cost for providing services, supporting a move from cost center to profit center
- Make qualified decisions based on storage usage and cost analysis



OpenView Storage Area Manager Architecture

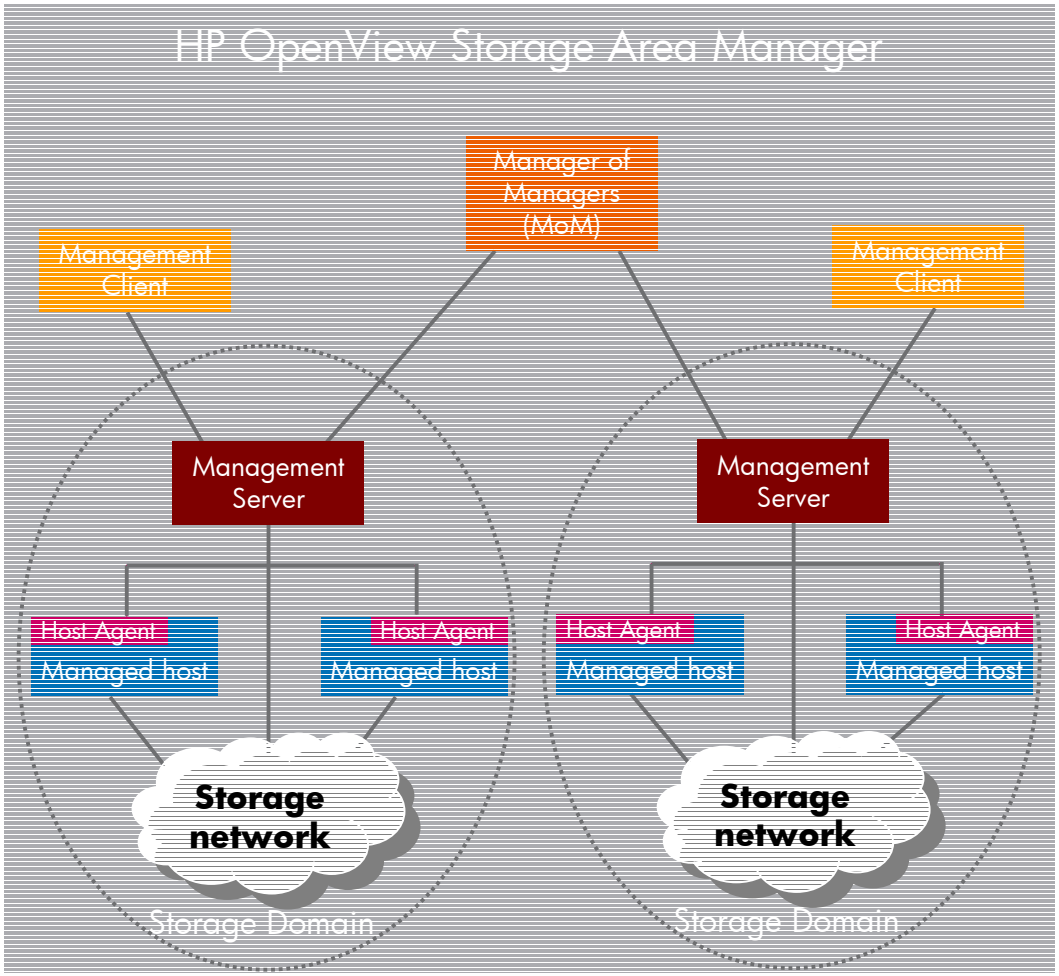
Storage Area Manager installation architecture

- SAM runs on a central Management Server
- Host agents used to access host-specific information
- Remote client user interface (GUI and CLI)
- Consolidation of information from multiple storage domains via MoM



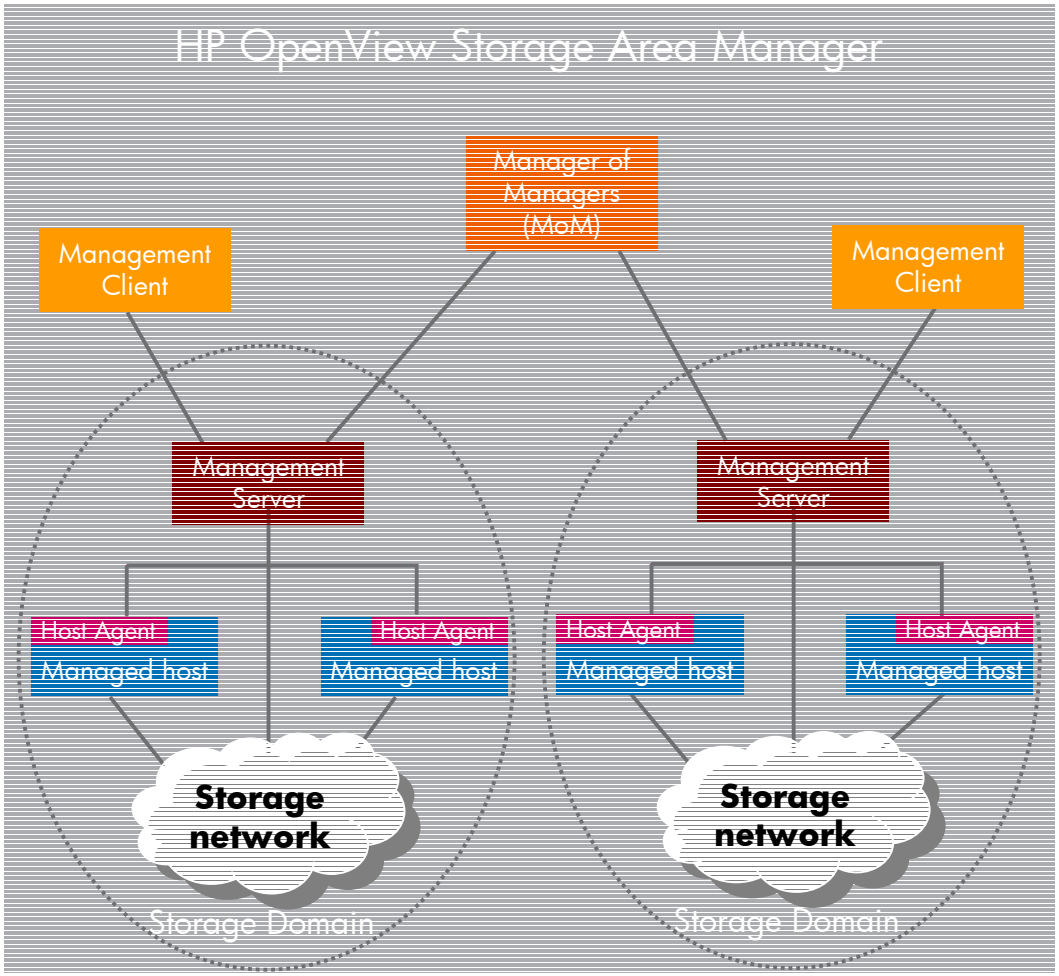
Storage Area Manager architecture – management server

- Most functionality runs on the management server
- Includes the database repository
- Runs on a Windows 2000 or 2003 host
- Management server communicates with hosts and storage devices for discovery, status, etc



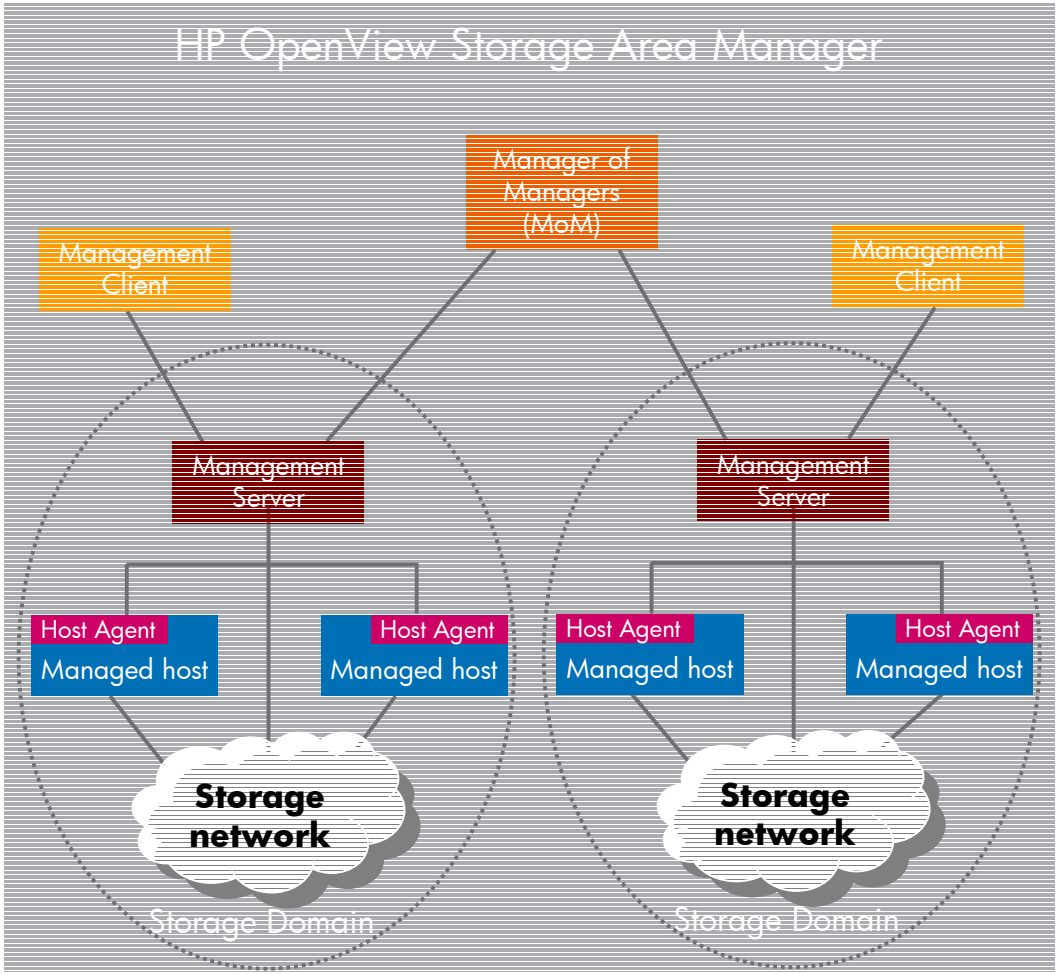
Storage Area Manager architecture – management client

- The management client provides a GUI interface to OpenView SAM
- Can run on the management server or remotely
- Supported on Windows, HP-UX and Solaris
- Java application, downloadable from the management server



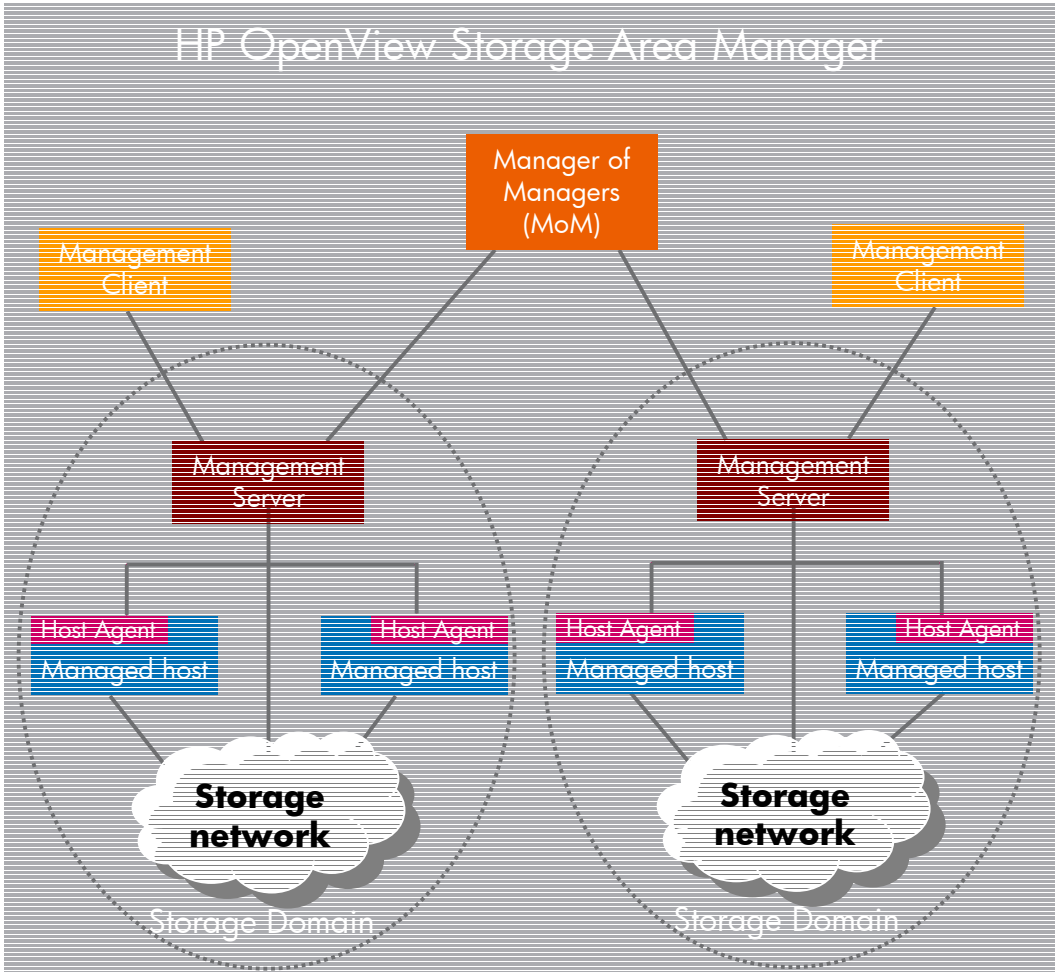
Storage Area Manager architecture – managed host

- Full management capability of hosts via a host agent
- Collection of host-specific information such as mount points, logical volumes, file details, etc
- Allows management of in-band only devices
- Also provides for application management
- Can be remotely deployed from management server

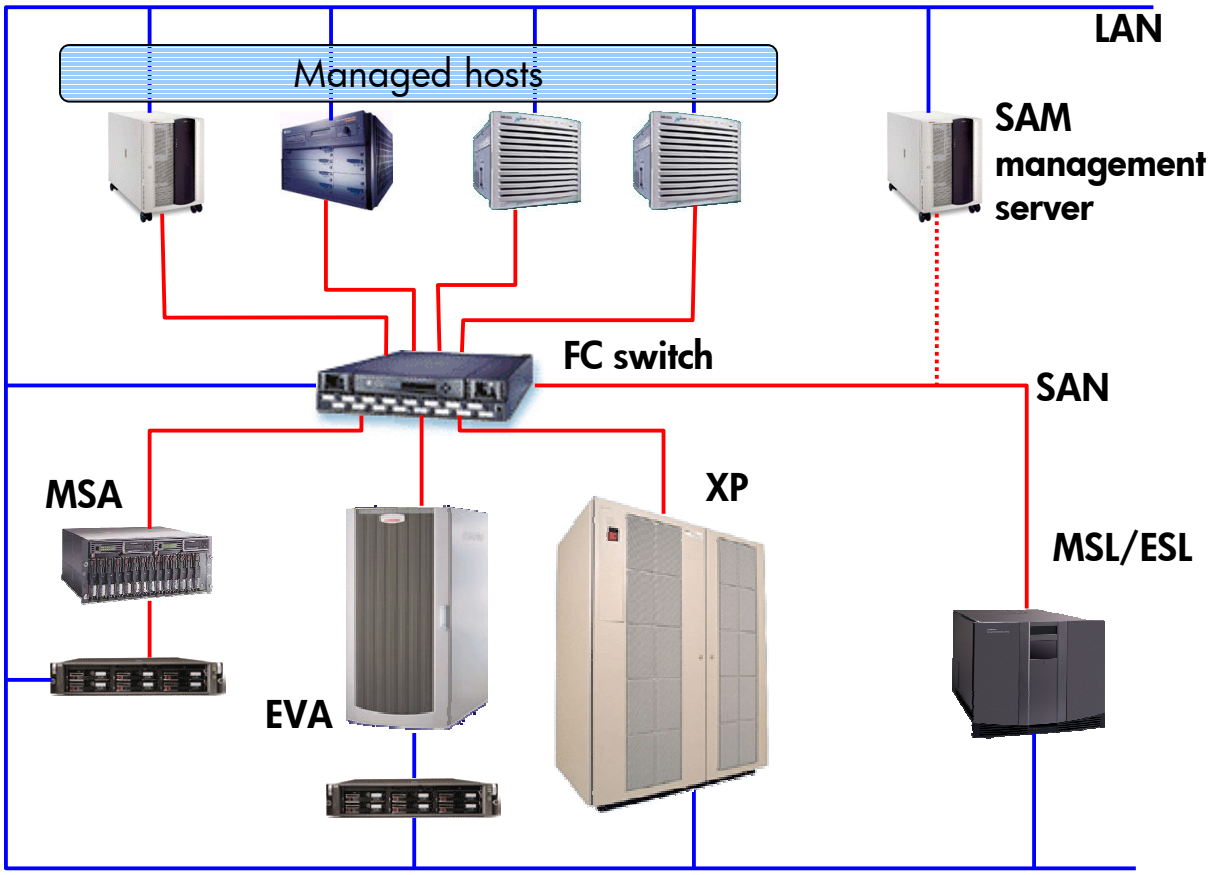


Storage Area Manager architecture – manager of managers

- Allows multiple management domains to be centrally managed
- Rolls up status and event information
- Allows launch of domain specific client

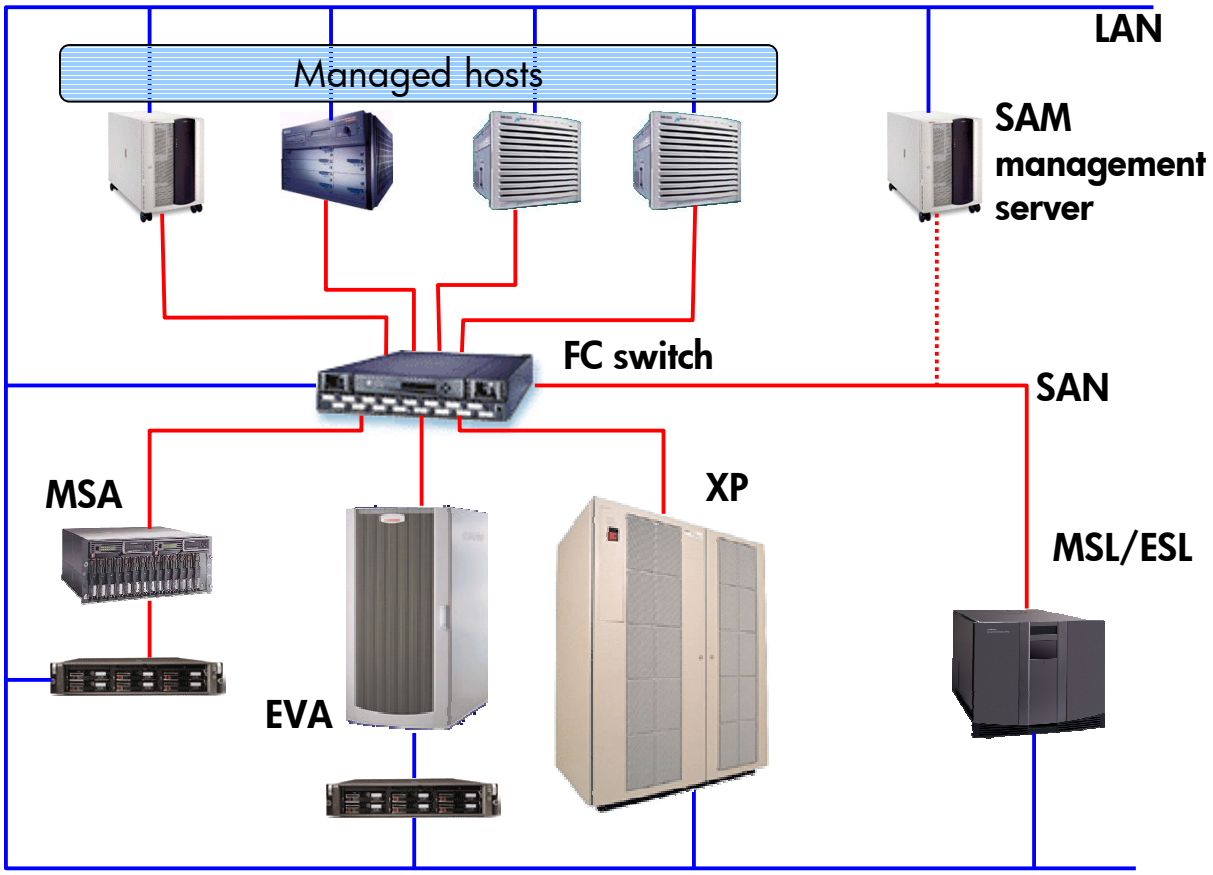


Discovering the environment



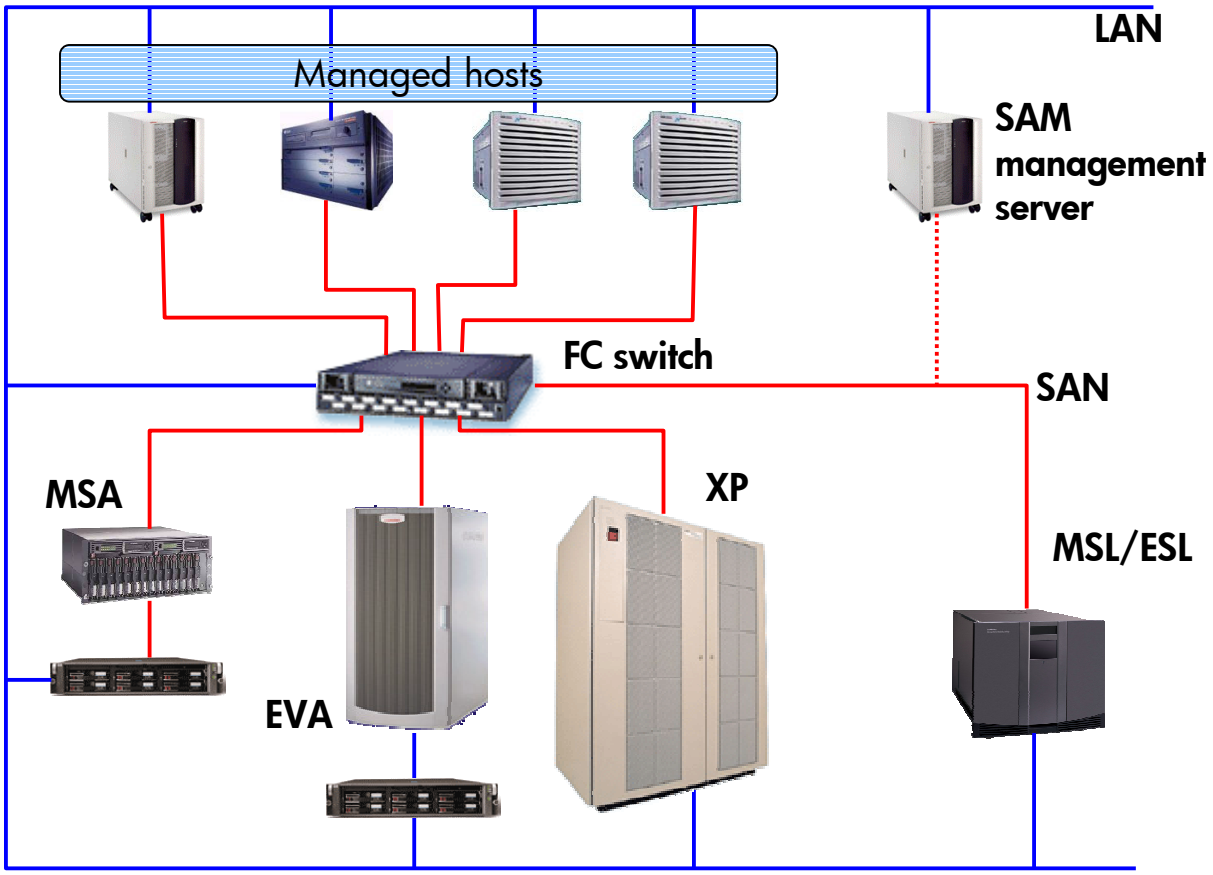
- Multiple discovery methods for hosts, storage devices and infrastructure

Discovering the environment - hosts



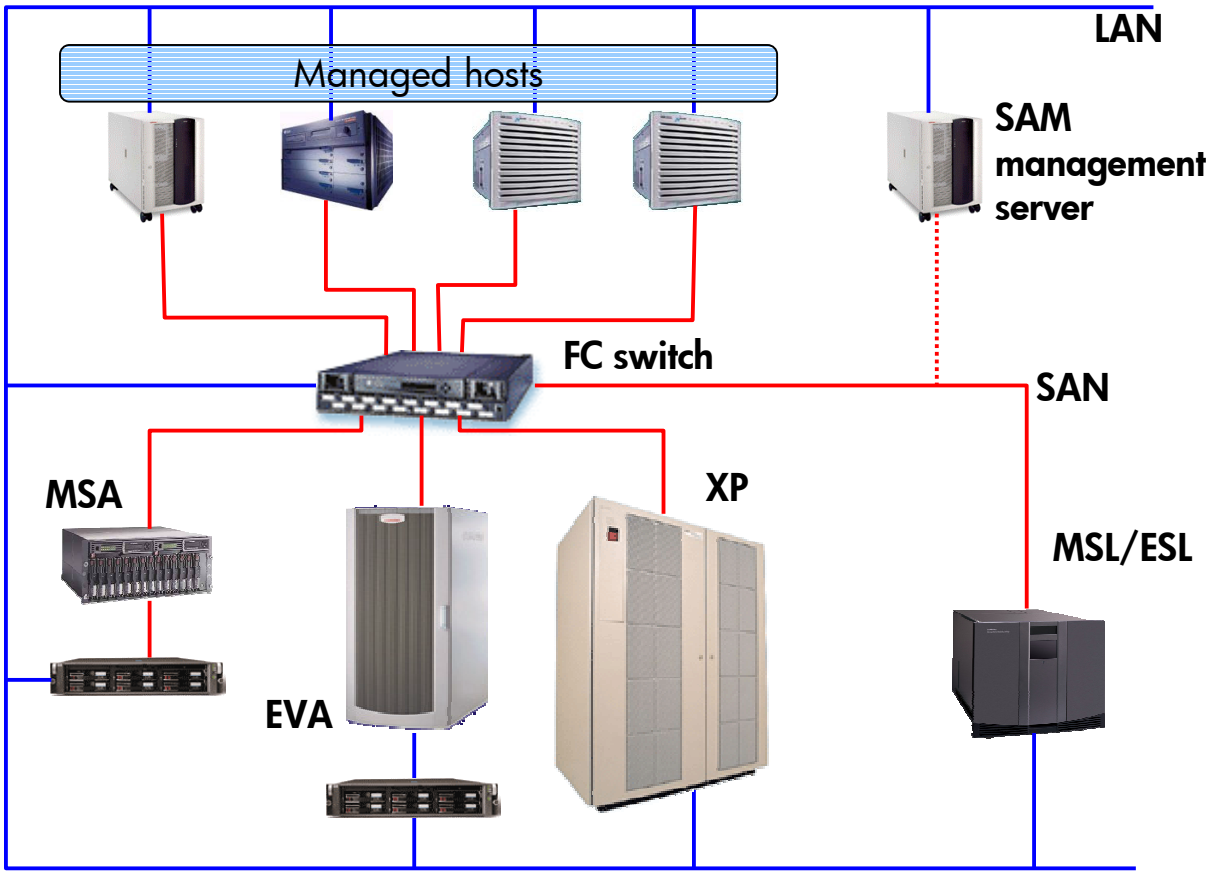
- Hosts discovered via the LAN
- HBAs discovered through the SAN and via hosts

Discovering the environment - switches



- Fibre Channel switches discovered via the LAN through SNMP

Discovering the environment - devices



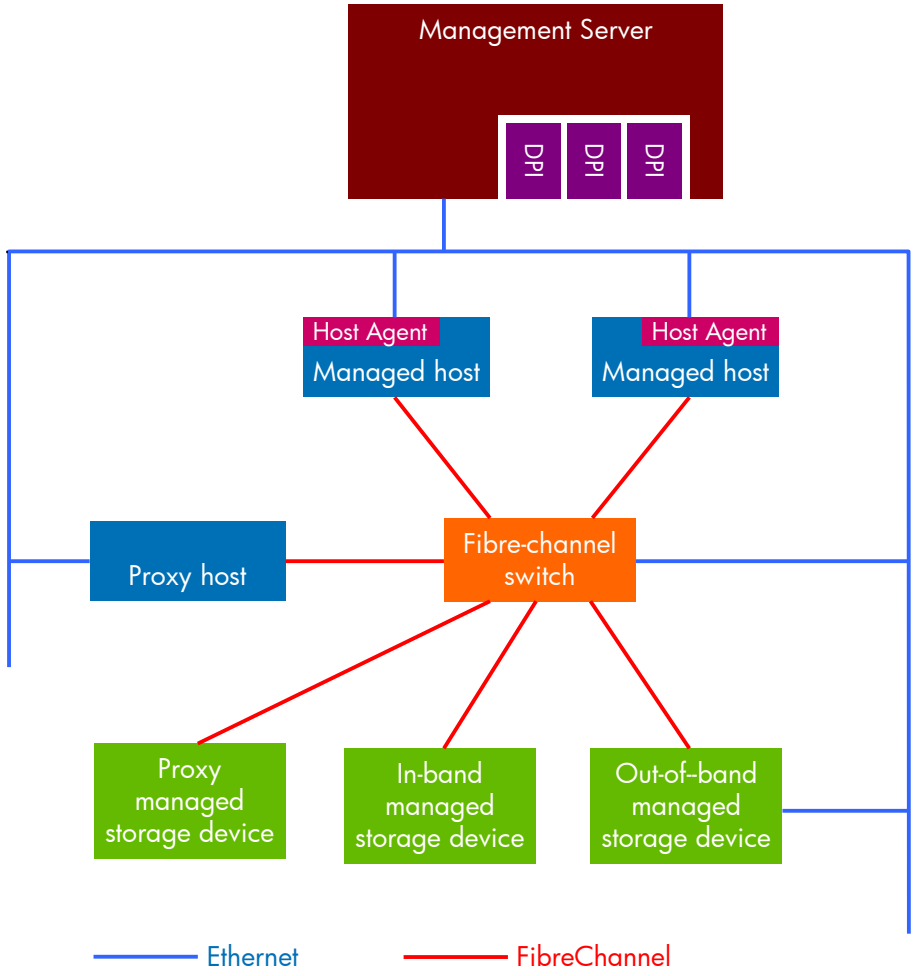
- Storage devices are discovered in multiple ways:
  - Via SNMP for out-of-band managed devices
  - Via FC for in-band devices
  - Via a proxy for devices with management appliances
  - Via SLP for SMI-S devices

Device support

- Prior to SMI-S, storage had no standard management interface
- Existing interfaces include…
  - SNMP (out-of band)
  - SCSI (in-band, often special LUNs on the device with special SCSI commands)
  - Proprietary APIs
- SMI-S resolves this problem
  - An industry wide standard management interface
  - Based on CIM/WBEM
- But… many legacy devices exist, so a management application needs to be able to support legacy interfaces

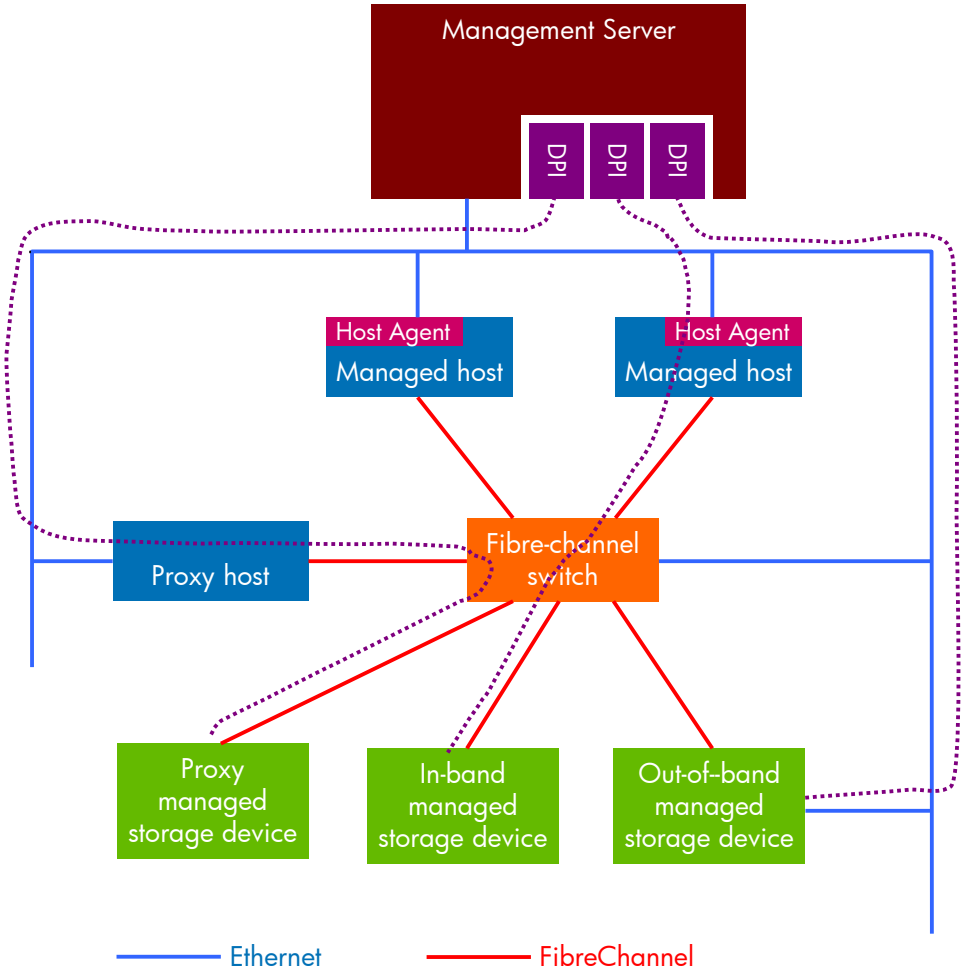
Storage Area Manager DPI architecture

- SAM uses Device Plug-ins (DPIs) to provide support for many different devices
- DPIs act as an abstraction of device-specific interfaces
- DPIs can be added and updated separately from the main installation
- DPIs allows communication to devices out-of-band, in-band or through proxy servers
- Flexible architecture has allowed SAM to support one of the widest range of heterogeneous devices



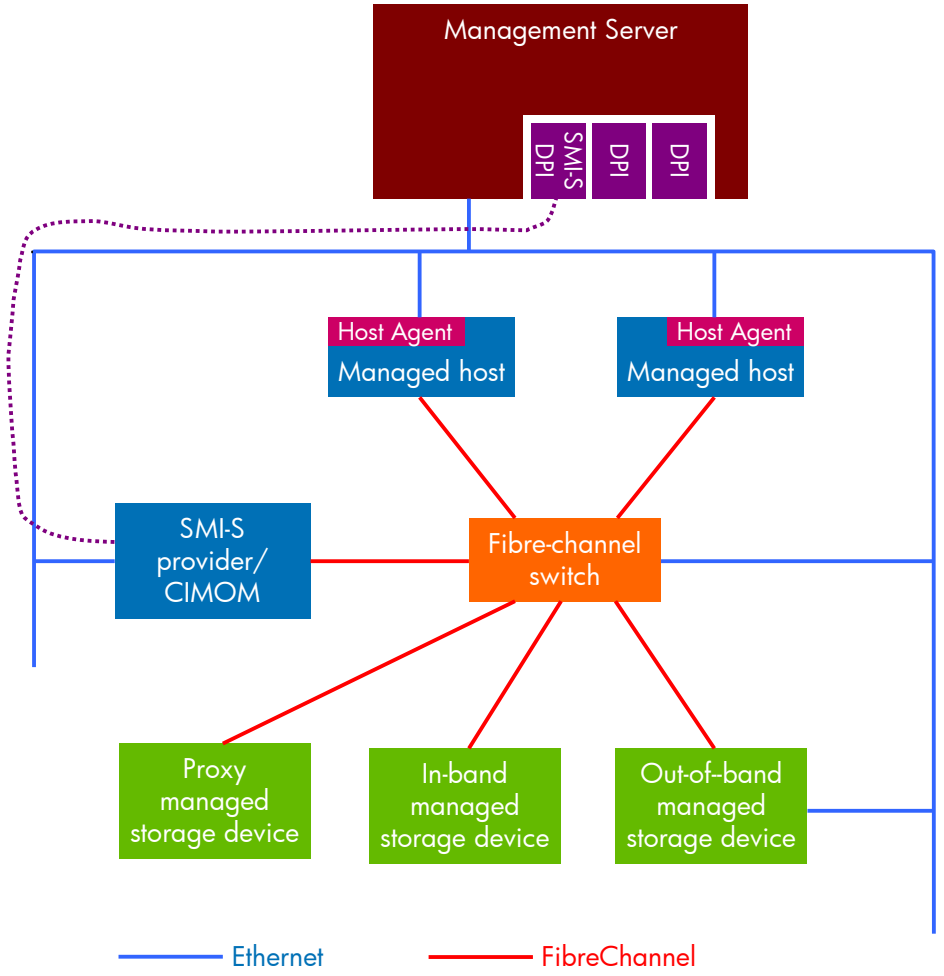
DPI device communication

- In-band devices
  - DPI talks to the device via the host agent on a host connected to the device (device communication is SCSI)
- Out-of-band devices
  - DPI directly talks to the device over Ethernet (eg using SNMP)
  - Also can get in-band information through hosts
- Proxy devices
  - DPI talks to the proxy, which is connected to the device



SMI-S communication

- SMI-S is implemented through an SMI-S DPI
  - Co-exists with legacy DPIs for other devices
- DPI communicates directly with SMI-S provider
- SMI-S provider and CIMOM are implemented as a proxy or potentially embedded in the device
- Other SAM enhancements for SIM-S
  - SLP discovery
  - SMI-S indications for events



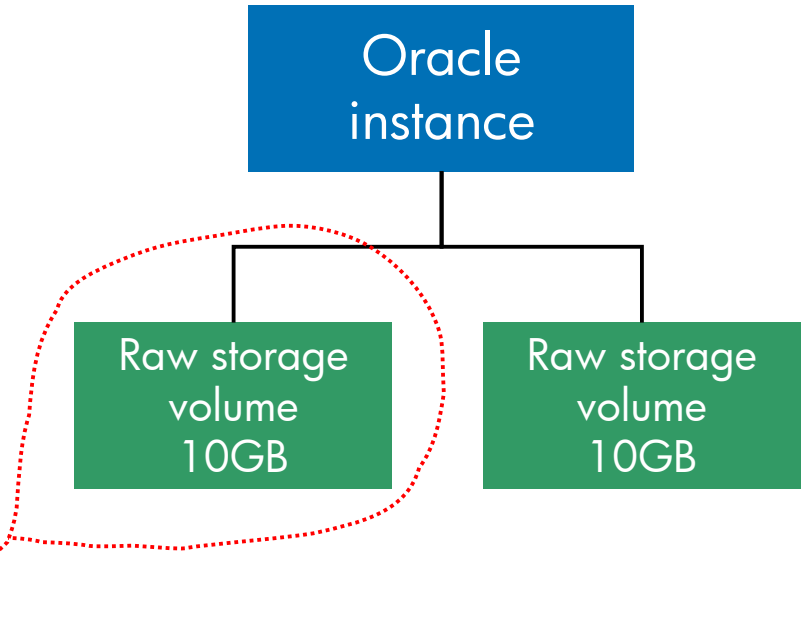
OpenView Storage Area Manager application views

The need for application storage management

- IT/storage managers have a tough job with conflicting objectives
  - Meet application SLAs – applications must keep running
  - Minimize expenses – make efficient use of resources
- A common cause of application down-time is running out of storage
- But… increasing utilization of existing storage help reduce cost
- Storage management products can help, through reporting and automatic alerts based on application capacity usage

Storage usage by applications – without application support

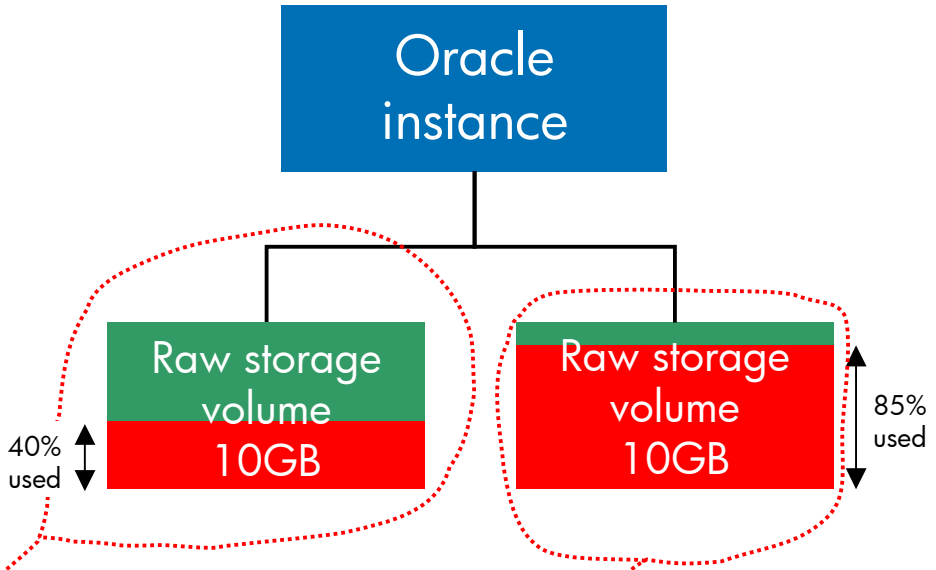
- Without application support, only the storage allocated to an application can be monitored
- Storage manager has no visibility to actual usage



Management application can only see raw volume size allocated to applications

Storage usage by applications – adding application views

- Adding application support allows SAM to have visibility to actual consumption of storage by the application
- Planning and alerts possible based on critical thresholds being hit
- Also shows logical topology and health of storage usage by applications

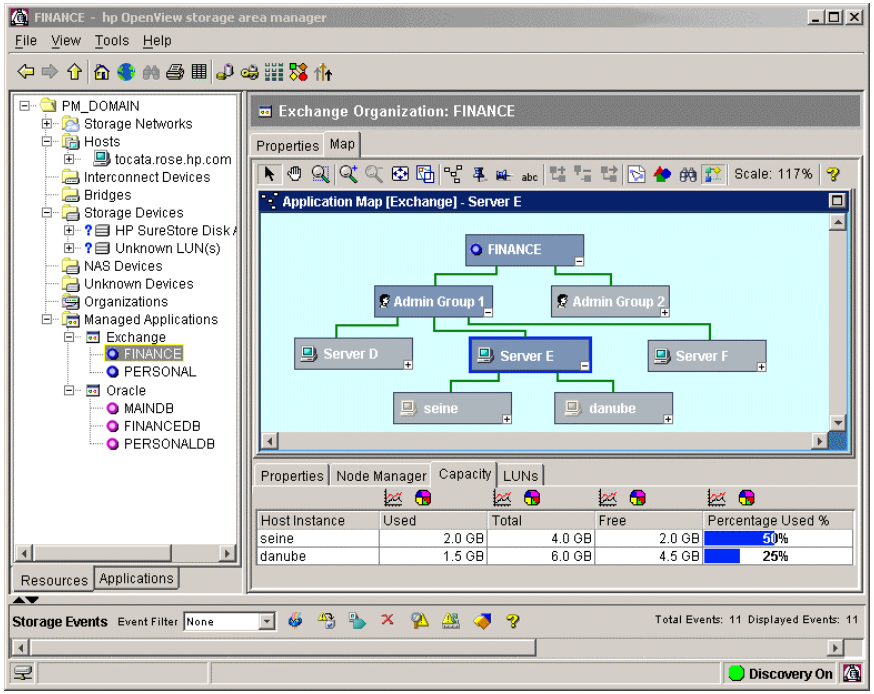


Management application can see used vs free capacity within the volume ('logical usage')

Approaching 100% capacity, need to proactively address storage allocation

Summary of SAM application views

- Purpose
  - Provide early warnings of application problems that are caused by the storage subsystem
  - Provide a view of storage usage by application
    - Storage capacity used, free and total
    - Mapping from application to storage hardware
- Key Features
  - Application status
  - Application - host - file - storage device - LUN mapping
  - Resource and utilization views
    - Storage allocated to this application
    - Logical usage of storage by the application
  - Capacity thresholds and alerts
  - Historical trending and future extrapolations of utilization



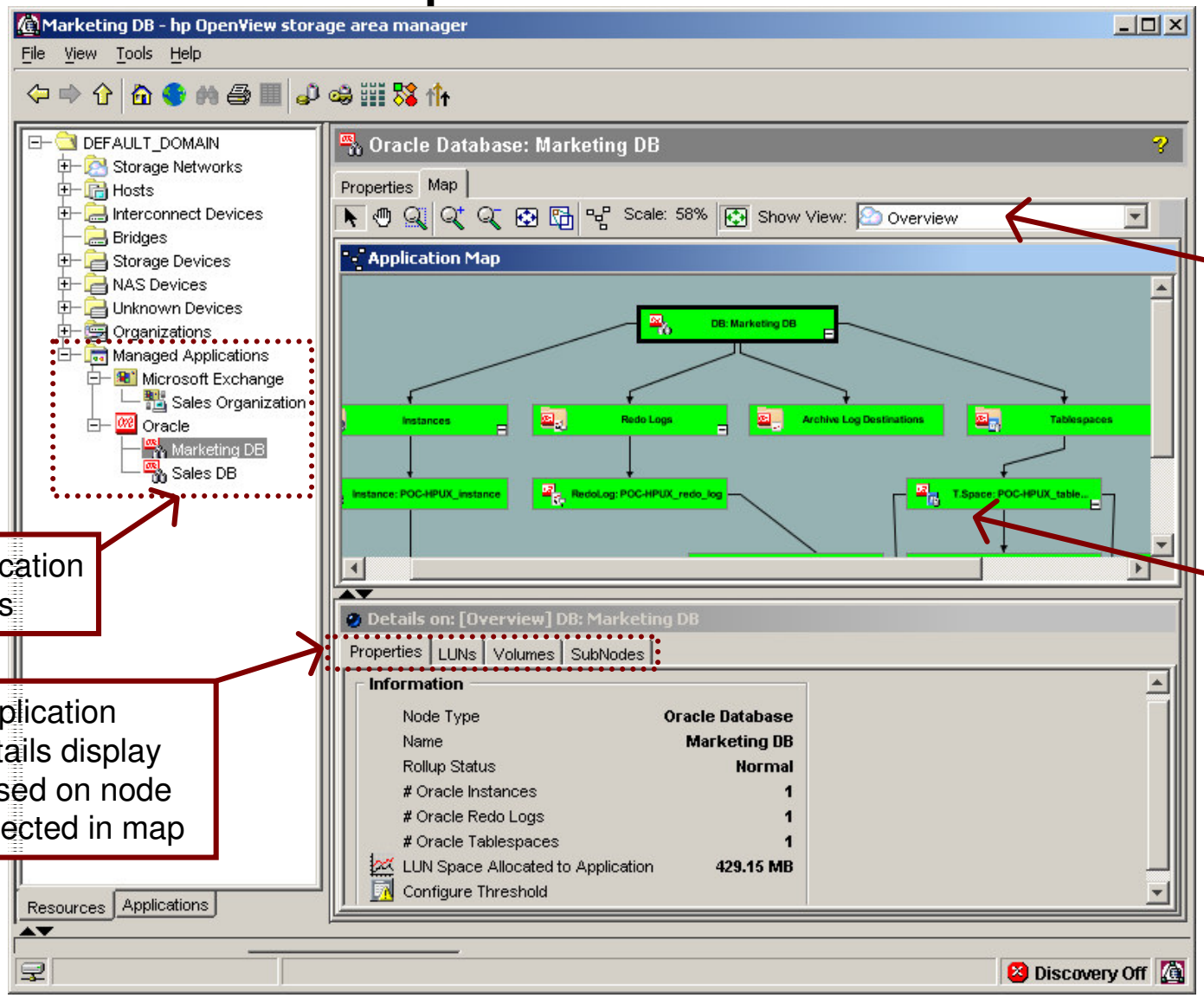
ORACLE

Microsoft Exchange Server

Overview of Oracle management features

- Overview of entire application (with multiple instances for Oracle RAC), through servers down to the individual storage device
- Display structure of Oracle storage usage, including table spaces, data files, internal usage of data files, redo logs and archive log destinations
  - Display graphical capacity utilization trend at all nodes in the application map
  - Capacity thresholds for events on all nodes in the application map
- View capacity and utilization of hosts, volumes, LUNs and arrays that Oracle is running on
- Supports Oracle RAC (Real Application Clusters)
  - Shows structure of overall database over multiple instances/servers
  - Accounts correctly for clustered use of storage, avoiding multiple counting of the same storage

Viewing managed applications – Oracle example



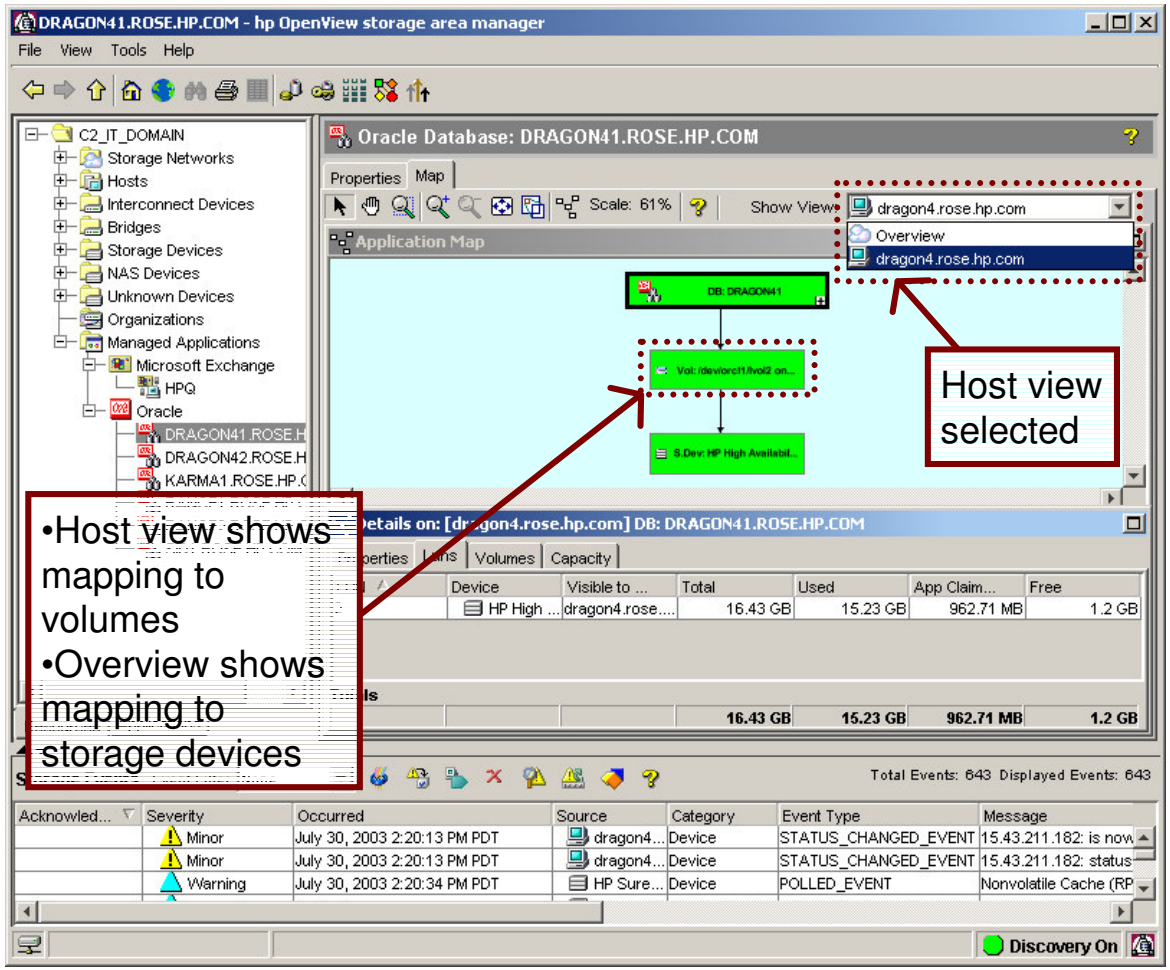
Application nodes

Application details display based on node selected in map

Choose view: overview or host

Map shows logical structure of applications to servers to storage

Viewing the Oracle application map using the host view



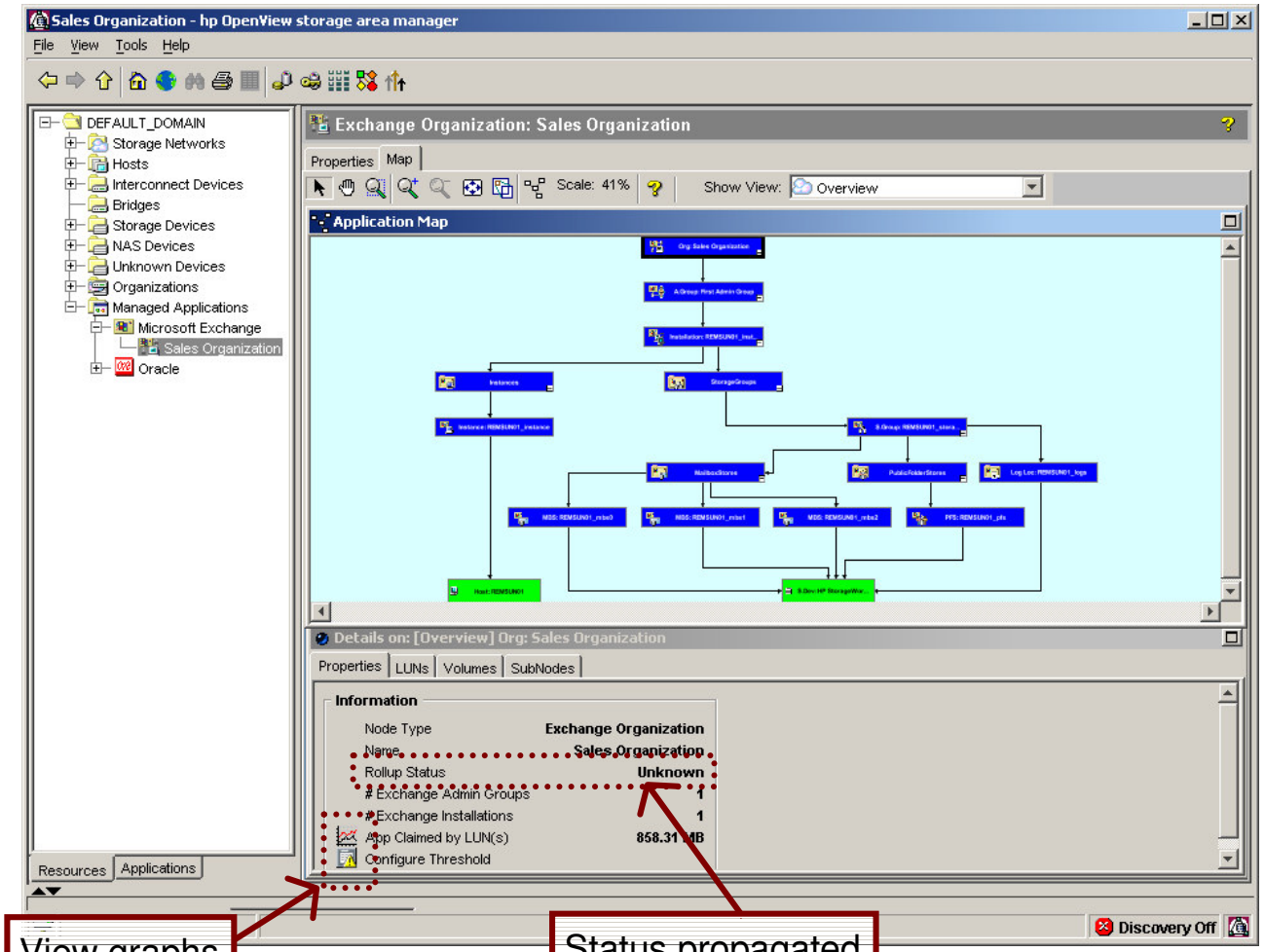
- Host view shows storage consumption on a specific host, for this application
- Overview shows total storage consumed by the application across multiple hosts

Overview of Microsoft Exchange management features

- Overview of entire application with multiple instances, through servers down to the individual storage device
- Displays Exchange application map showing relationship between and health of organization, administrative groups, installation instances, storage groups, mailbox store, public folders, log files
  - Display graphical capacity utilization trend at all nodes in the application map
  - Capacity thresholds for events on all nodes in the application map
- View capacity and utilization of volumes, LUN and arrays that Exchange is running on
- Report on stale mailboxes, top-n mailbox folders and top-n public folders across entire Exchange organization
  - Stale mailboxes have been unused for a configurable period
  - Helps to reclaim unused storage by directing archives or deletion of stale mailboxes

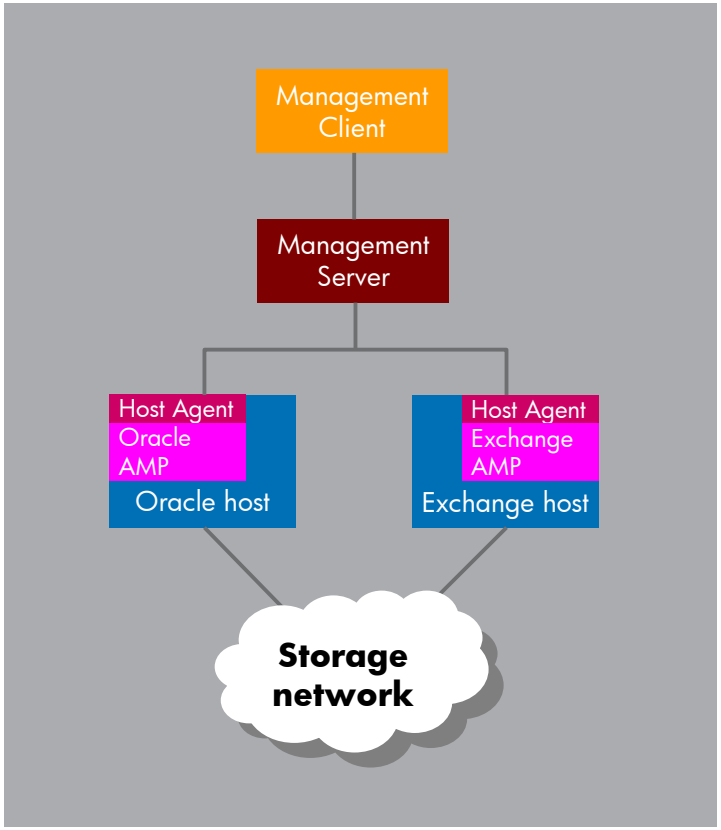
Viewing the application map and properties – Exchange example

- Map is initially collapsed
- Shows linkages to all storage devices that this node and children consume space on
- Requires volume manager software to be installed to see storage device utilization



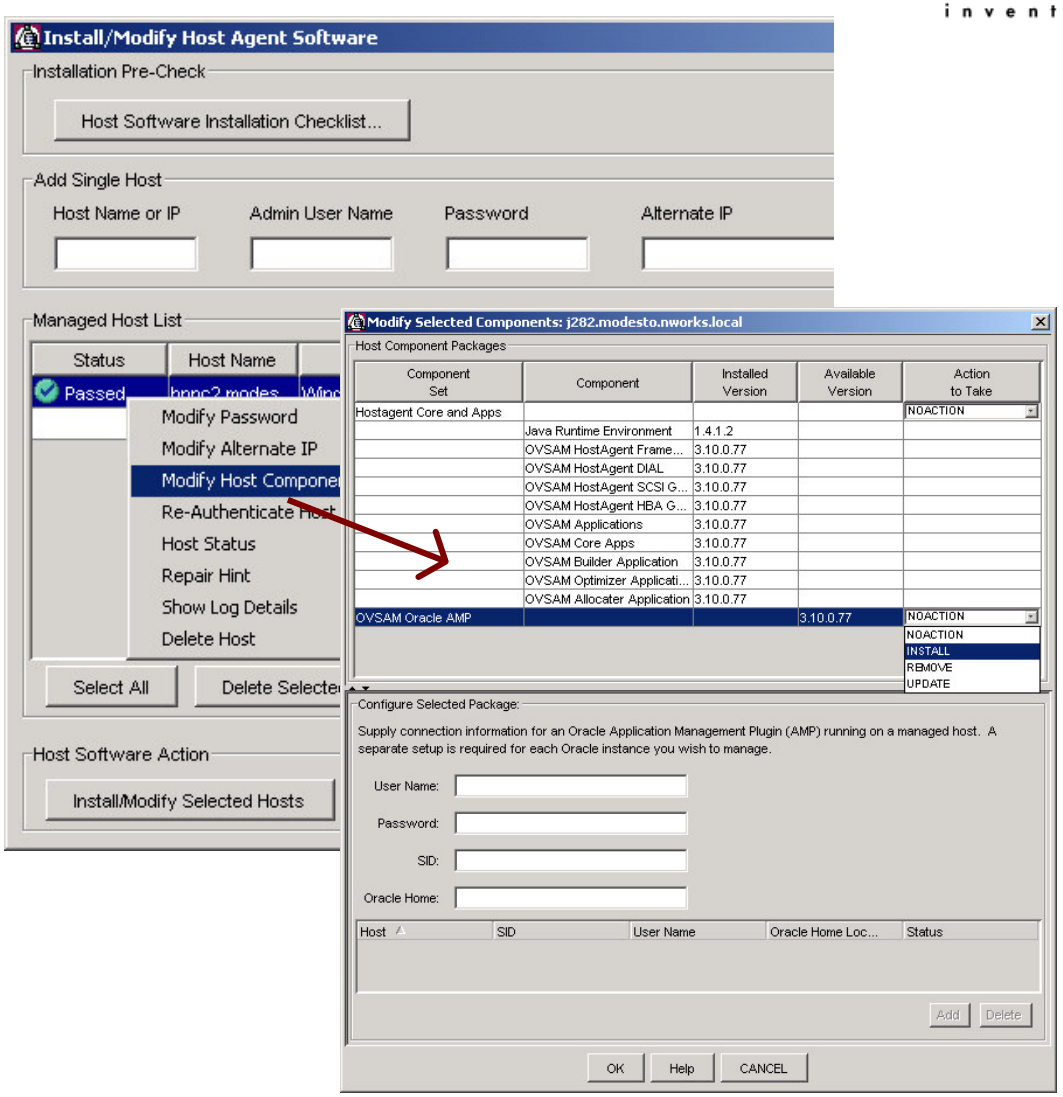
Application host support architecture

- Application support uses a host agent component called an AMP (Application Management Plug-in)
- The AMP uses application-specific interfaces to gather application data and status
- Application data is collected in a similar way to other host data (such as volume information or file details)



Installing AMPs

- An AMP must be installed on each host where the application to be managed resides
- AMPs may be installed remotely as Host Agent component packages
  - They are not installed as part of the default Host Agent installation but must be selected
- AMPs may be installed/removed locally using the standard install/uninstall scripts
- During installation, the user is prompted whether to install the optional AMP package
- During uninstallation, the AMP is automatically removed

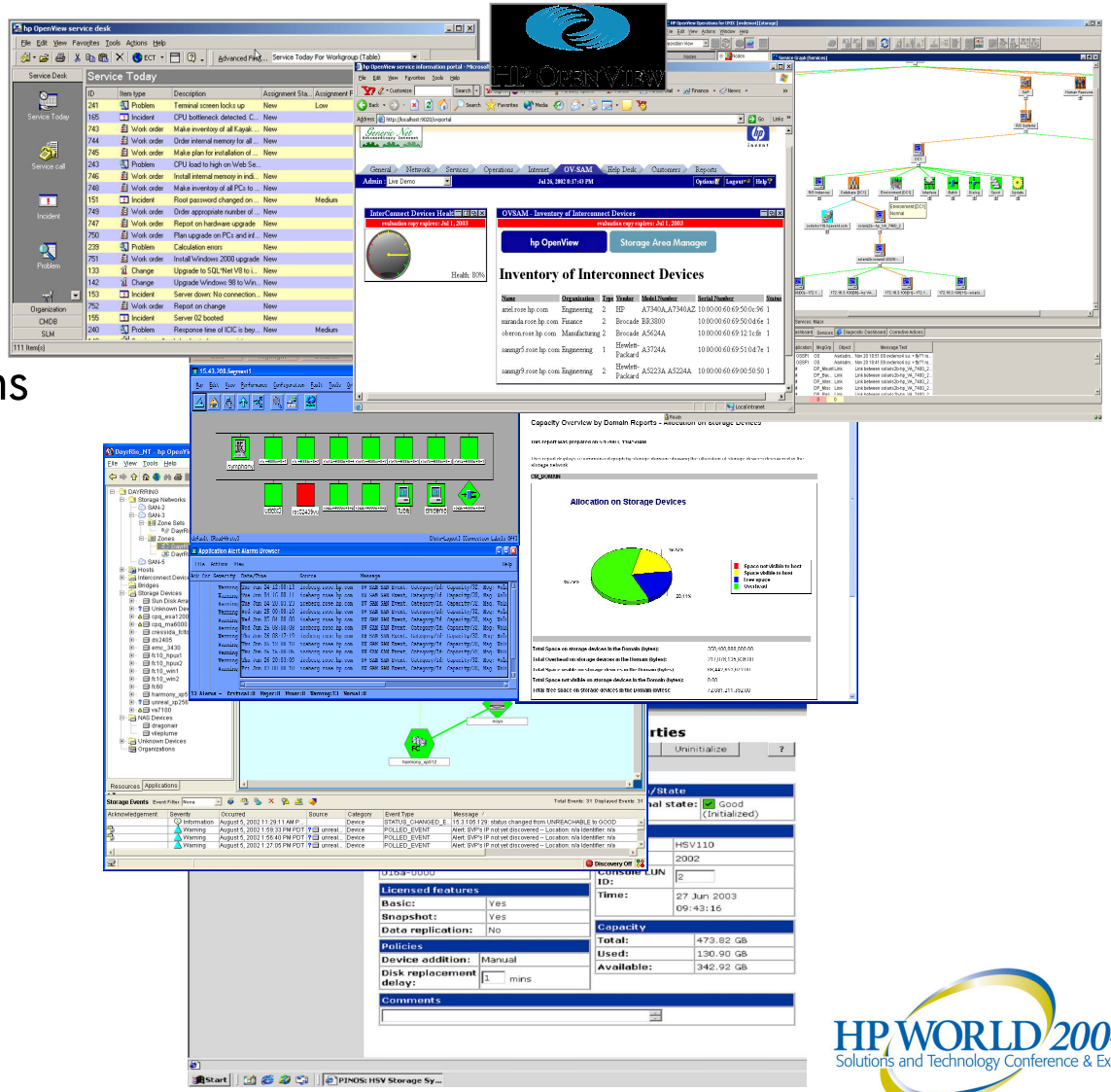


HP OpenView integration

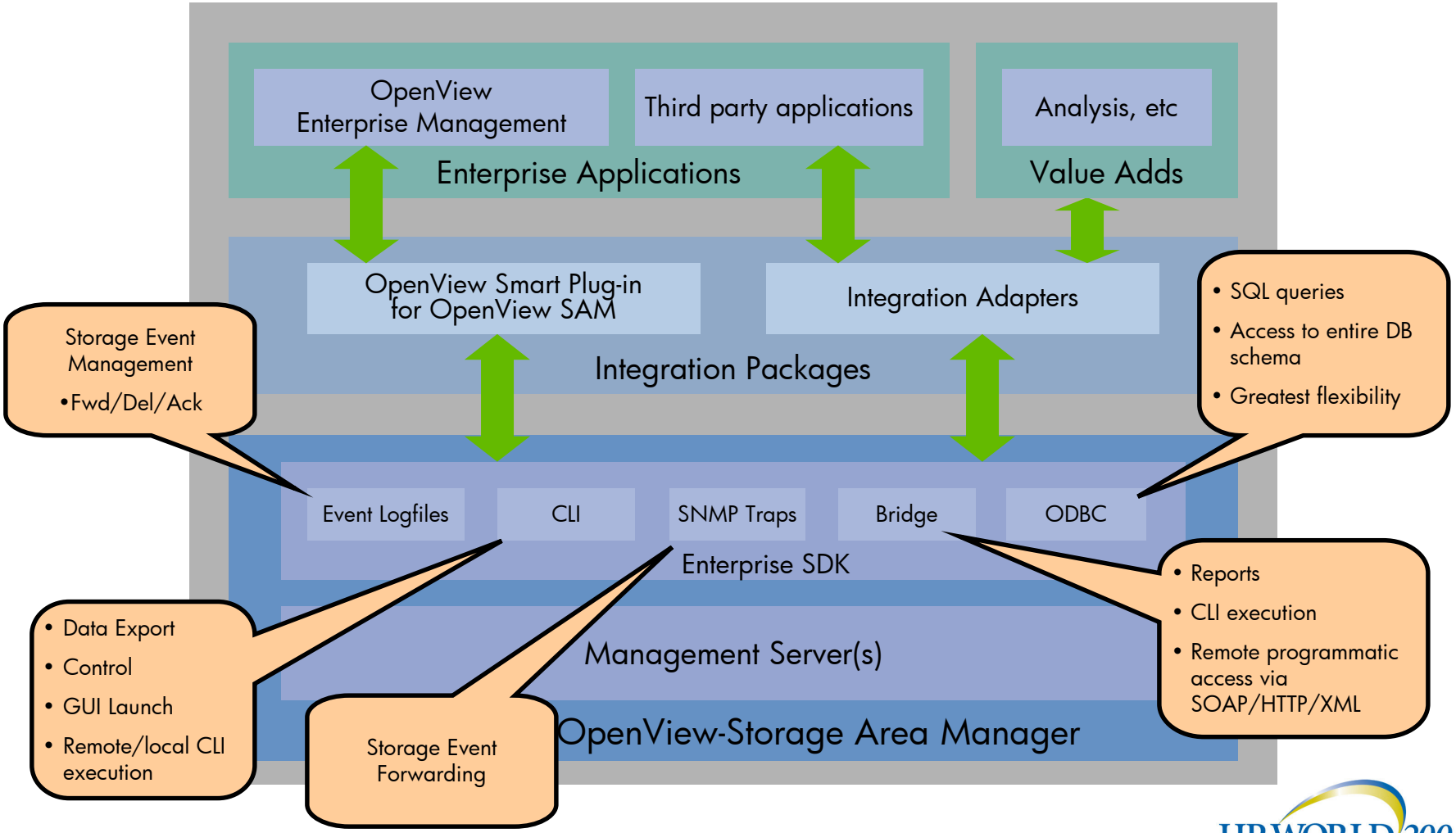
Philosophy: Integrated management from device to service Level

Integrated together

- Service Centric Management
  - ServiceDesk
  - Service Navigator
  - SIP
- Enterprise Operations Management
  - OVO
  - Reporter
  - NNM
- Storage Area Management
  - OpenView SAM
- Storage element managers
  - CommandView



Enterprise SDK architecture – multiple integration points



Conclusions

Conclusions

- HP OpenView Storage Area Manager
  - Integrated product suite to manage storage, one of the fastest growing IT costs
  - Includes integration to enterprise applications to increase management insight into storage usage
  - Integrates into enterprise-wide management solutions
- Described overall product usage and features
- Explained the architecture
- Explained application integration, and briefly described the architecture
- Questions?
- Demo…

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