



Hardware Monitoring in vSphere

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- > This session may contain product features that are currently under development.
- > New technology discussed in this session/overview represents no commitment from VMware to deliver these features in any generally available product.
- > Features are subject to change, and must not be included in contracts, purchase orders, or sales agreements of any kind.
- > Technical feasibility and market demand will affect final delivery.
- > Pricing and packaging for any new technologies or features discussed or presented have not been determined.

These features are representative of feature areas under development. Feature commitments are subject to change, and must not be included in contracts, purchase orders, or sales agreements of any kind. Technical feasibility and market demand will affect final delivery.

Agenda

- > Introduction
- > Everything you want is at your fingertips
- > Working with our partners' products
- > Automating your daily tasks
- > Integrating with/Extending our implementation

Introduction

- > A virtual data center still has several physical hosts that must be monitored and serviced just like a traditional data center
- > In Classic ESX, customers installed Linux-based hardware monitoring tools in the Console Operating System
Embedded ESX does not offer that option
- > Starting with ESX 3i, VMware has integrated a set of tools and APIs into the VMware Infrastructure to make this task much easier
- > These interfaces are available and supported on both Embedded and Classic ESX starting with ESX 3.5/3i U2

Everything you want is at your fingertips

- > vSphere Client provides a Health status screen that allows a system administrator to monitor the health of any host in the datacenter
- > In our next release, vSphere Client will provide additional asset information about the hardware components on the host
- > vCenter also monitors the health of each component on the hosts that it manages and rolls up an aggregated health status of the host and the datacenter

- > Each host can also be configured to send traps when a key hardware event occurs
- > The host hardware events are also monitored by vCenter, which can be configured to trigger alarms
- > Like any other vCenter alarm, these can be configured to send SNMP traps that can be monitored by standard tools

Everything you want is at your fingertips

- > CPU details
 - > Fan
 - > Battery
 - > Host Hardware RAID
 - > Power Supply
 - > Power State Management
 - > System logs
 - > System Memory
- > Each entry into the System Event log will result in an SNMP trap

vSphere Client – Host View

pa-sdk-d83.pasl.vmware.com VMware ESX, 4.0.0, 164009

Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Users & Groups Events Permissions

Hardware Reset Sensors Refresh

- Health Status
 - Processors
 - Memory
 - Storage
 - Networking
 - Storage Adapters
 - Network Adapters
 - Advanced Settings
- Software**
 - Licensed Features
 - Time Configuration
 - DNS and Routing
 - Virtual Machine Startup/Shutdown
 - Virtual Machine Swapfile Location
 - Security Profile
 - System Resource Allocation
 - Advanced Settings

Sensor	Status	Reading
[-] Dell Inc. PowerEdge 2950	✓ Normal	
[-] Processors	✓ Normal	
[-] Memory	✓ Normal	
[-] Storage	✓ Normal	
[-] Fan	✓ Normal	
[-] Temperature	✓ Normal	
[-] Software Components	✓ Normal	
[-] Power	✓ Normal	
[-] Power Supply 1: Running/Full Power-Enabled	✓ Normal	750 Watts
[-] Power Supply 2	⊗ Unknown	
[-] Power Supply 1 Status 0: Failure detected - Deassert	✓ Normal	
[-] Power Supply 1 Status 0: Predictive failure - Deassert	✓ Normal	
[-] Power Supply 1 Status 0: Power Supply AC lost - Deassert	✓ Normal	
[-] Cable/Interconnect	✓ Normal	
[-] Chassis	✓ Normal	
[-] Watchdog	✓ Normal	
[-] Voltage	✓ Normal	
[-] Battery	✓ Normal	

vSphere Client – vCenter Aggregated View

10.21.1.83 VMware ESX, 4.0.0, 164009

Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Tasks & Events Alarms Permissions Maps

Updated: 08/27

System summary: BIOS Manufacturer: Dell Inc., BIOS Version: 2.2.6
Model: PowerEdge 2950, Serial Number: 1T9M6G1, Tag: 23.0, Asset Tag: unknown
No alerts or warnings out of 184 sensors

View: Sensors Show all sensors Show all details Hide all

Sensor	Status	Details
Processor	Normal	
Memory		
Fan	Normal	
Voltage	Normal	
Temperature	Normal	
Power	Unknown	
Power Supply 1	Normal	Total Output Power: 750000 mW
Power Supply 1 Status 0: Failure detected	Normal	Current State: Deassert
Power Supply 1 Status 0: Power Supply AC lost	Normal	Current State: Deassert
Power Supply 1 Status 0: Predictive failure	Normal	Current State: Deassert
Power Supply 1 Status 0: Presence detected		Current State: Assert
Power Supply 2	Unknown	Total Output Power: Unknown
Network		
Storage	Normal	
Cable/Interconnect	Normal	
Software Components		
Watchdog	Normal	
Other	Normal	

vSphere Client – vCenter Aggregated View

pa-sdk-d83.pasl.vmware.com VMware ESX, 4.0.0, 164009

Updated: 08/28/2009 5:38:38 PM - Update Reset sensors Print Export Refresh page

Updating hardware data... Hide

System summary: BIOS Manufacturer: Dell Inc., BIOS Version: 2.2.6
Model: PowerEdge 2950, Serial Number: 1T9M6G1, Tag: 23.0, Asset Tag: unknown
No alerts or warnings out of 184 sensors

View: Sensors Show all sensors Show all details Hide all

Sensor	Status	Details
Processor	✓ No	
Memory	✓ No	
Fan	✓ No	
Voltage	✓ No	
Temperature	✓ No	
Power	? Un	
Power Supply 1	✓ No	Total Output Power: 750000 mW
Power Supply 1 Status 0: Failure detected	✓ No	Current State: Deassert
Power Supply 1 Status 0: Power Supply AC lost	✓ No	Current State: Deassert
Power Supply 1 Status 0: Predictive failure	✓ No	Current State: Deassert
Power Supply 1 Status 0: Presence detected	✓ No	Current State: Assert
Power Supply 2	? Un	Total Output Power: Unknown
Network	✓ No	
Storage	✓ No	
Cable/Interconnect	✓ No	
Software Components	✓ No	
Watchdog	✓ No	
Other	✓ No	

vSphere Client – System Event Log

The screenshot displays the vSphere Client interface. The top menu bar includes File, Edit, View, Inventory, Administration, Plug-ins, and Help. The breadcrumb navigation shows Home > Inventory > Hosts and Clusters. A search bar for the inventory is also present.

The left sidebar shows a tree view with a folder named 'VMWARE-' containing a sub-folder 'DC'. Under 'DC', there are several icons representing hosts, with the selected host 'pa' expanded to show its details.

The main content area is titled 'pa-sdk-d83.pasl.vmware.com VMware ESX, 4.0.0, 164009'. Below the title, there are tabs for various views: Overview, Resource Allocation, Performance, Configuration, Tasks & Events, Alarms, Permissions, Maps, Storage Views, and Hardware Status. The 'Hardware Status' tab is active, showing a summary of the system's health.

The system summary includes:

- Updated: 08/28/2009 5:38:38 PM - Update Reset sensors Print Export Refresh page
- System summary: BIOS Manufacturer: Dell Inc., BIOS Version: 2.2.6
- Model: PowerEdge 2950, Serial Number: 1T9M6G1, Tag: 23.0, Asset Tag: unknown
- No alerts or warnings out of 184 sensors

Below the summary, there is a 'View:' dropdown menu set to 'System event log'. A 'Reset event log' button is visible, with a note: '(Note: Resetting the event log may take several minutes.)'

The event log table has two columns: 'Time' and 'Events'. The events listed are:

Time	Events
04/28/2008 4:02:54 PM	Assert + Event Logging Disabled Log area reset/cleared
15 seconds since log star	Assert + Physical Security General Chassis intrusion
20 seconds since log star	Deassert + Physical Security General Chassis intrusion
15 seconds since log star	Assert + Physical Security General Chassis intrusion
20 seconds since log star	Deassert + Physical Security General Chassis intrusion
15 seconds since log star	Assert + Physical Security General Chassis intrusion
20 seconds since log star	Deassert + Physical Security General Chassis intrusion
15 seconds since log star	Assert + Physical Security General Chassis intrusion
20 seconds since log star	Deassert + Physical Security General Chassis intrusion

vSphere Client – Configuring Alarms

The screenshot shows the vSphere Client interface with the 'Alarms' tab selected for a VMware ESXi host. A table lists various alarms, and an 'Alarm Settings' dialog box is open, showing the configuration for an alarm.

Alarms List:

Name	Defined In	Description
Host connection and power state	VMWARE-...	Default alarm to monitor host connection and power state
Host storage status	VMWARE-...	Default alarm to monitor storage
Host hardware fan status	VMWARE-...	Default alarm to monitor fans
Host error		
Host memory status		
Host hardware power status		
Host battery status		
Host cpu usage		
Host processor status		
Host hardware temperature status		
Status of other host hardware objects		
Host connection failure		
Exit standby error		
Host memory usage		
Host hardware voltage		
Cannot connect to network		
License error		
Host service console swap rates		
Host hardware system board status		
Cannot connect to storage		

Alarm Settings Dialog:

General | Triggers | Reporting | Actions

Specify the actions to take when a type of alarm changes.
Select whether the action should be repeated.
Specify how often actions should be repeated.

Action	Configuration
Send a notification trap	Once
Send a notification email	
Send a notification trap	
Run a command	
Enter maintenance mode	
Exit maintenance mode	
Enter standby	
Exit standby	
Reboot host	

Frequency
Repeat actions every: 5 minutes
Actions will repeat until the alarm type changes.

Buttons: Add, Remove, OK, Cancel, Help

Working with partner products

- > All the key management tools in the industry can monitor and manage the VMware Infrastructure
- > VMware has close partnerships with several key server and hardware vendors to offer enhanced management capabilities
 - Broadcom (NICs)
 - Dell (Servers)
 - Emulex (HBAs)
 - HP (Servers, Storage, Networking)
 - IBM (Servers)
 - LSI (RAID controllers)
 - QLogic (HBAs)
- > The VMware Hardware Compatibility List provides a list of supported servers and devices from the partners above and others
- > Our customers can either use tools from VMware or from our partners to manage their virtual datacenter
- > Some partners have created GUI plug-ins to vSphere Client to enable you to manage your devices from a single pane of glass

Working with partner products

- > With multiple partners, there come variances in what is displayed

```
Add TimeStamp: 20080910212809.000000+000
Current Number Of Records: 1
Max Number Of Records: 64

SEL Records
-----
Caption : Assert + Power Supply Failure detected
Message TimeStamp : 20080910212809.000000+000

#2 Status of Fan Speed, Sensors.

Device          Health  Numeric Sensor          Current Reading
-----
Fan 6           OK     Processor 4 Fan 6      36.06 Percentage
Fan 5           OK     Processor 3 Fan 5      36.06 Percentage
Fan 4           OK     Processor 2 Fan 4      36.06 Percentage
Fan 3           OK     Processor 1 Fan 3      41.94 Percentage
Fan 2           OK     System Internal Expansion Board 2 Fan 245.07 Percentage
Fan 1           OK     System Internal Expansion Board 1 Fan 145.07 Percentage
```

```
#2 Status of Fan Speed, Sensors.
```

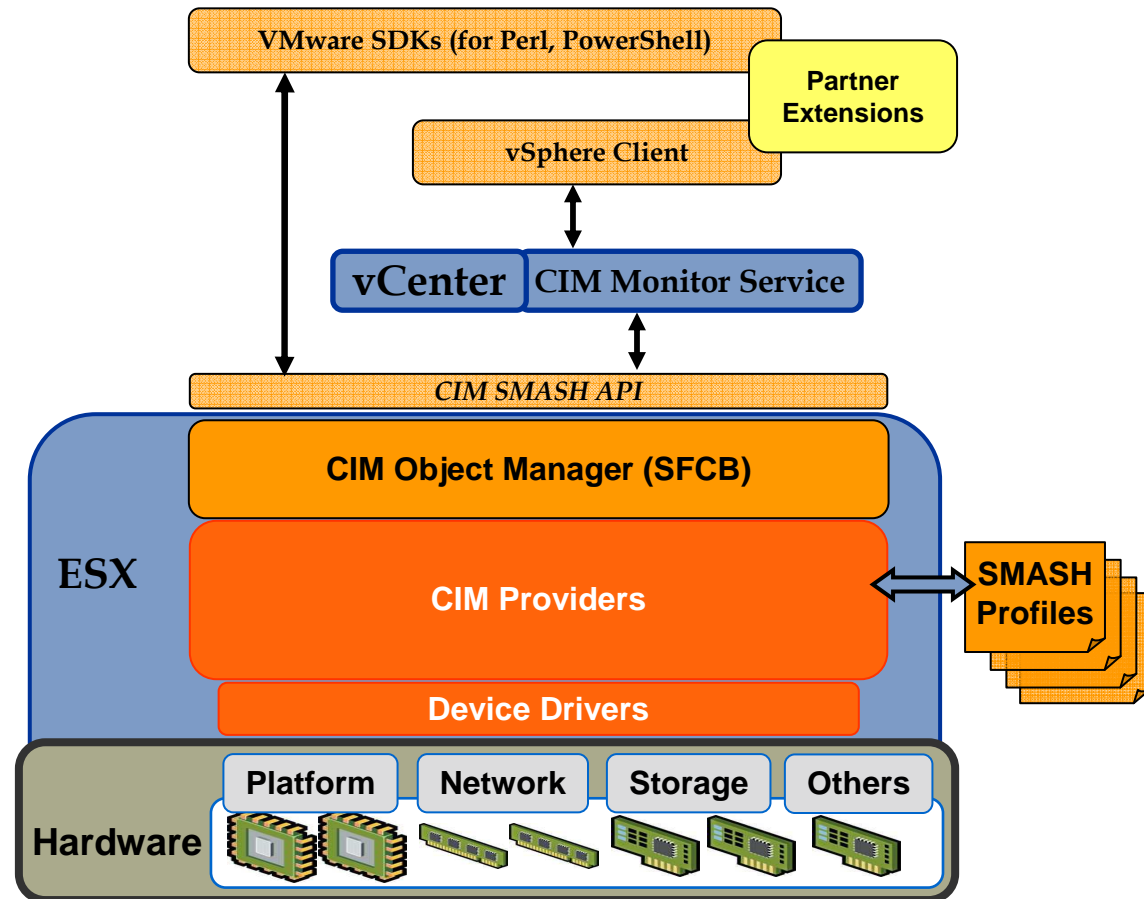
```
Device          Health  Numeric Sensor          Current Reading
-----
FAN 4 RPM       OK     System Board 1 FAN 4 RPM 6300 RPM
FAN 3 RPM       OK     System Board 1 FAN 3 RPM 6300 RPM
FAN 2 RPM       OK     System Board 1 FAN 2 RPM 6375 RPM
FAN 1 RPM       OK     System Board 1 FAN 1 RPM 6450 RPM
```

Make your life simpler with automation

- > The VMware Infrastructure exposes all its hardware information through an industry standard CIM (Common Interface Model) interface
- > CIM is an object-oriented information model that provides a UML-based framework for describing and access management data
- > The CIM data can be access either through CIM XML over http or WSMAN (Web Services Management) interfaces
- > The DMTF (Distributed Management Task Force) is a leading industry standards body that defines a schema that includes over 1000 classes and associations, organized into logical groups called “Profiles”
The profiles related to Server Management are grouped under a standard called **SMASH** (Server monitoring and control through the Systems Management Architecture for Server Hardware)

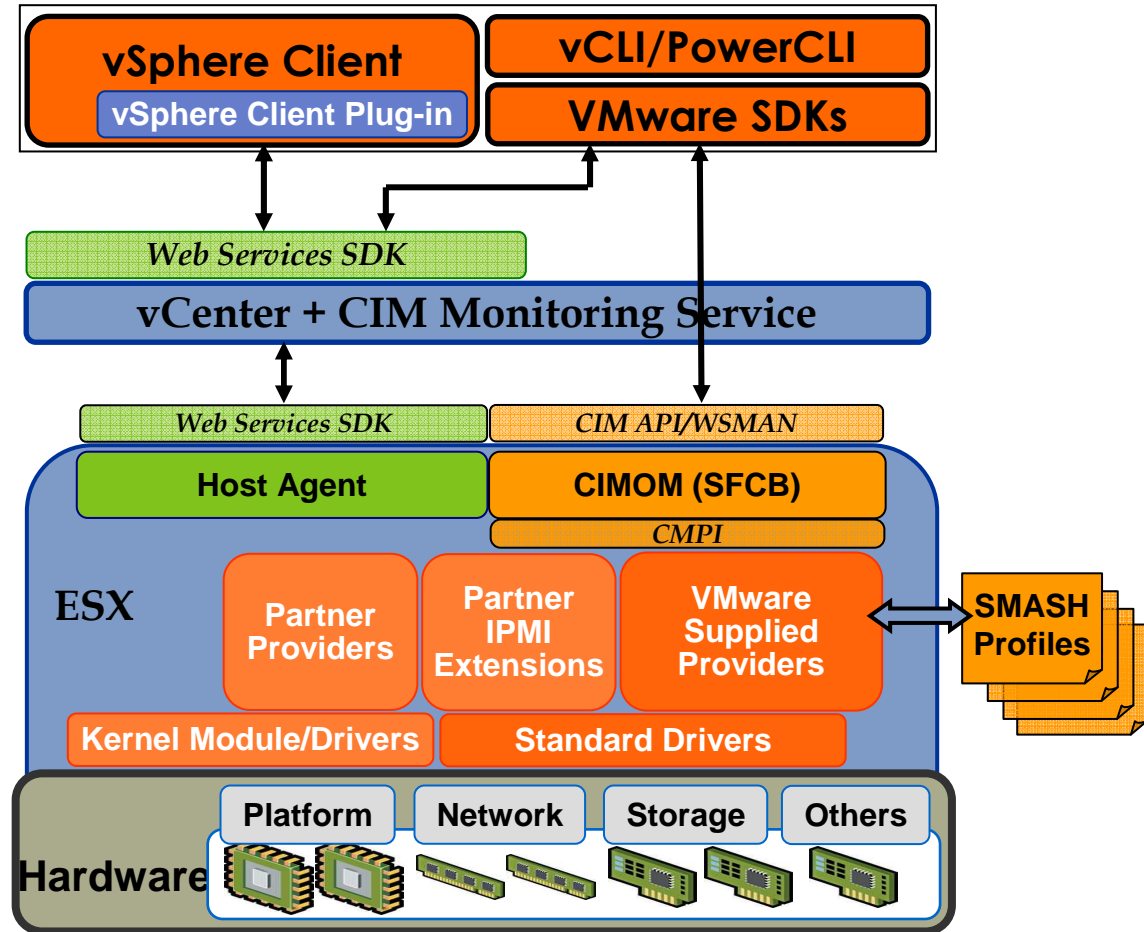
How do the pieces fit together

- > Hardware data exposed through the CIM SMASH interface
- > vCenter ships with the CIM Monitoring Service that monitors the hosts and rolls up health status, viewable in the GUI
- > The VMware SDKs make it easy to access this information in automation scripts
- > Windows bundles a tool called WinRM that provides a command-line front-end to the CIM API. Windows PowerShell now provides an integration to CIM as well
- > Partners create extensions to vSphere both in the GUI and to the CLIs to manage their devices



Partner Extensibility Options

- Device Support – Custom Drivers through the DDK
- OEM-specific differentiators through OEM IPMI extensions
- IHV enhancements – Partners develop custom providers through the CIM PDK
- GUI extensible through vCenter plug-ins
- ISV partner management software using the VMware SDKs or WSMAN



Demo

**Demo on
Hardware Health Monitoring
at 4:45 p.m.**

<http://developer.vmware.com>