



VMware Monitoring in OpsMgr 2007 R2

Key Metrics, Common Issues and Effective Solutions

System Center Central

Agenda

- Basics of VMware Monitoring in OpsMgr
 - Agent or No Agent?
 - Sources of Monitoring Data
 - Key Performance Indicators
 - Hardware Monitoring
- Roadmap for VMware monitoring on the cheap
- Common Issues
- Management challenge – and solution
- A little nworks + Veeam history
- nworks MP and PRO Pack architecture
- Advanced features
- Q&A

Should I load an OpsMgr Agent (X-Plat) on ESX / vSphere?

Question: Should I install an OpsMgr X-Plat agent on an ESX / vSphere server???

Answer: No

Why not?

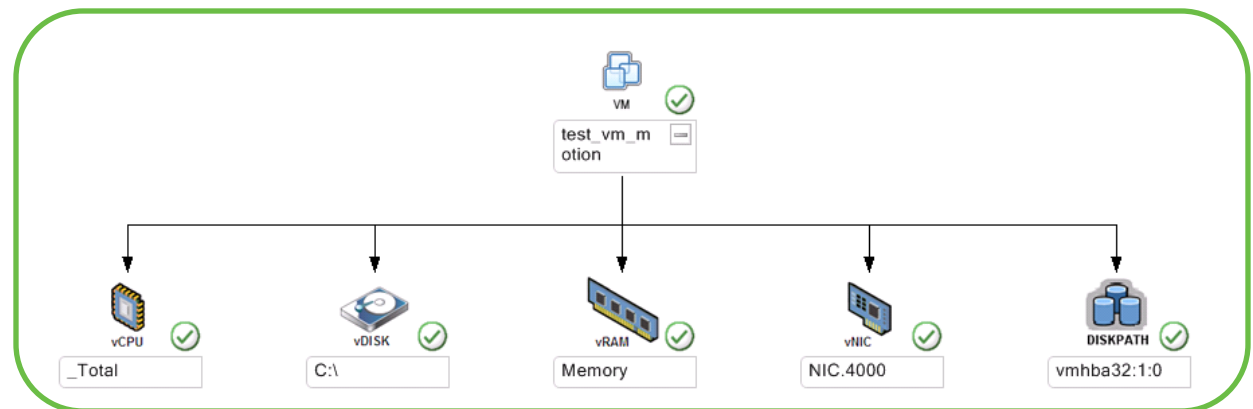
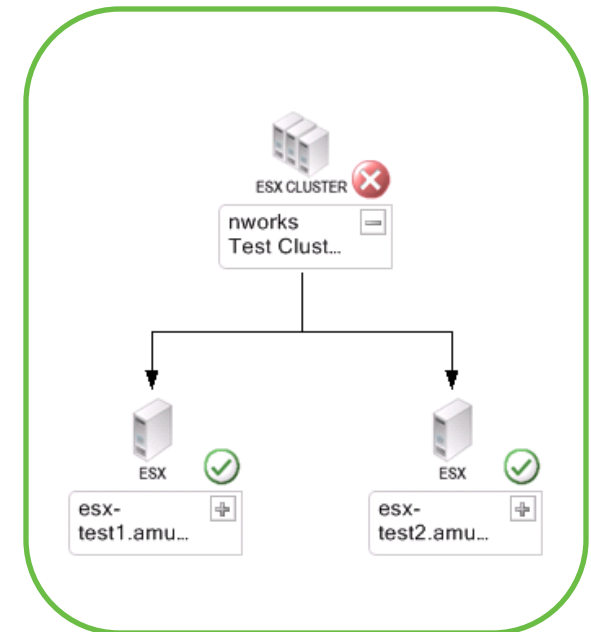
Sources of Monitoring Data in VMware

VMware servers have a number of sources of monitoring data

- **VMware SOAP API** (*VMware's Best Practice*)
- **SYSLOG** - *These tend to be pretty cryptic.*
- **SNMP**
- **SSH (esxtop)**
- **vmcontrol-based APIs (including vmPerl / vmCOM)**
 - *These were deprecated some time ago, so definitely not a preferred solution.*

VMware Key Performance Indicators

- **Host**
- Storage, CPU, memory status, voltage, temperature, or power change
- **Guest**
- CPU usage, memory usage, disk IOPS, or even fault tolerance status changes
- **Cluster**
- HA Errors, Resource issues

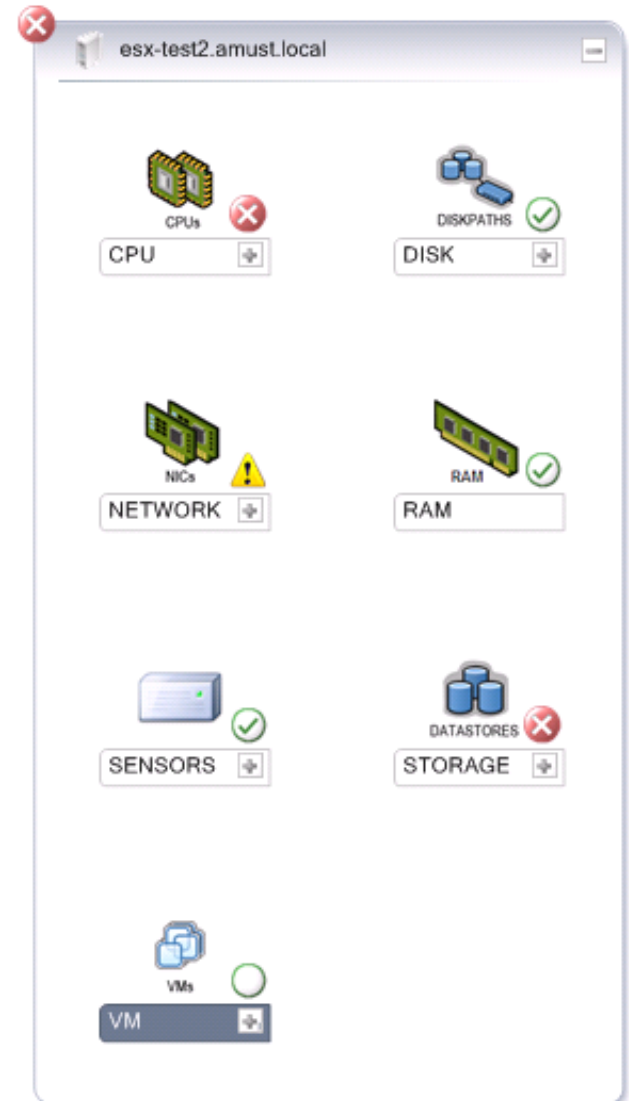


Hardware Monitoring with VMware

Hardware metrics are available from VMware APIs

- Which VMware data sources provide hardware data?
- Which metrics are available?
- Do I need to load an OEM hardware agent?

[How to monitor VMware with SNMP and Syslog](#)
by Jonathan Hambrook



Roadmap for VMware Monitoring on the Cheap

Creating your own VMware monitoring solution

- Access to a VMware SME
- Script-based or SNMP discoveries
- Dynamic Groups
- Monitors for all the key performance indicators
- Collection rules for performance data
- Custom Reports (linked reports will do in a pinch)
- Presentation (Alert, Perf, State, Diagram views)
- Knowledge (to guide your Opsmgr Operators)

Bottom Line: Many weeks (months) of effort

Useful OpsMgr Monitoring Elements

Several useful monitoring elements that can be used with little-to-no programming skills

- SNMP Network Device Discovery
- SNMP trap and probe-based unit monitors
- SNMP performance collection rules
- SYSLOG
- Script-based rules and monitors
- Linked Reports

Common Issues with Home-grown Monitoring

Common issues presented by this strategy

- Scalability (over-reliance on SNMP)
- Accuracy (lack of a SME, errors in monitoring logic)
- Monitoring Gaps (time, authoring skills, SME knowledge)

Bottom Line:

- Easier said than done
- Plan development cycle in months if you want a good result

The Management Challenge *(the big picture)*

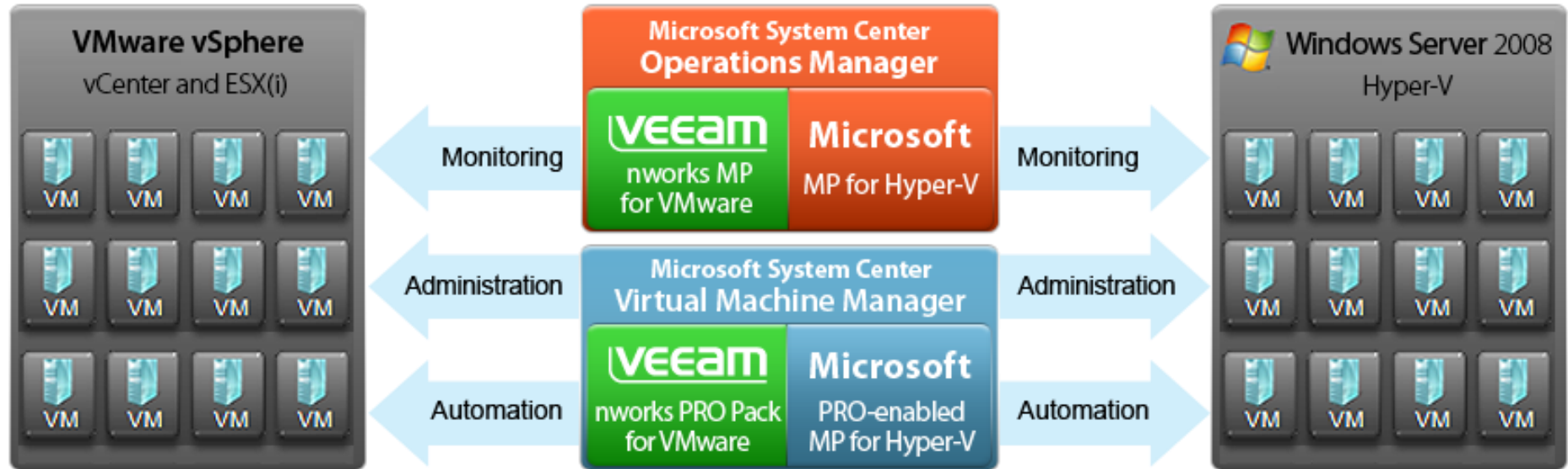
- Multiple diverse datacenter technologies to monitor
 - Applications & Services
 - Operating Systems
 - Physical hardware
 - Virtualized servers
 - Hypervisors
- Clear benefits to a common management framework
 - Operational efficiency
 - Streamlined IT processes
 - Lower costs and meet SLAs

The Management Solution

- Microsoft System Center
 - Operations Manager
 - Best of Breed for Microsoft OS & Applications
 - Extensible framework
 - Rich partner ecosystem
 - Virtual Machine Manager
 - Manage both Hyper-V and VMware
 - Self-healing systems with PRO Tip automation

The Management Solution

- Microsoft natively integrates Hyper-V
- Veeam nworks MP & PRO Pack integrate VMware



Some history

- **nworks MP for VMware** released 2006 for MOM 2005
- Ops Mgr 2007 version released at MMS, Spring 2007
 - Same show where Ops Mgr itself was released
- nworks invited into new System Center Alliance late 2007
- nworks acquired by Veeam Software in 2008
- Veeam wins FOUR awards at VMworld 2010
- Veeam is Finalist in Microsoft WPC Awards 2010



Key features of the **Veeam nworks MP**

Enterprise strength

Complete integration

Proven architecture

Enterprise strength

- Horizontal “no-limits” scalability
 - Distributed architecture
 - Configurable data collection and delivery
- Centralized management
 - Administration of multiple collectors
 - Pre-deployment planning and ongoing analysis
- Fault tolerant
 - Automatic failover and load balancing
 - Continuous delivery of monitoring data

Complete integration

- Enable all Ops Mgr functionality
 - Targeted Alerting
 - Diagrams & Dashboards
 - Reporting & Auditing
 - Notifications & Responses



Detailed health model

- Standard VMware metrics:
 - Cluster memory %
 - Host CPU %
 - VM CPU ready %
- Unique Advanced metrics:
 - Memory pressure
 - Memory swap file I/O
 - Disk IOPS
 - Total network traffic
- 150+ vCenter events:
 - Cluster status
 - vMotion issues
 - Storage connectivity
- Agentless Hardware alerts:
 - Power supply failure
 - Temperature sensors
 - Fan status
 - RAID disks

Knowledge base

- VMware
“expert in a box”
- Elevates front-line monitoring staff, without additional training
- Ensures correct escalation path and reduces time to resolution

Knowledge | State Change Events (5)

Summary

This Datastore has breached threshold for free disk space in percentage. View the [Datastore Usage Dashboard](#) for historical information.

Causes

ESX hosts store all files necessary for virtual machine operation in a VMware Virtual Machine File System (VMFS). Proper capacity management is critical because this file system is required for any operations related to a virtual machine.

All VMFS (vmfs2, vmfs3) must retain a level of free space to ensure that the virtual machine functions properly. Two important capacity thresholds must be observed:

- **200 Megabyte remaining:** VMware suggests 200 MB as the threshold where ESX system administrators take action to resolve capacity issues. VMFS volumes vary widely in size and it is impossible to define a precise percentage, but the risk of unexpected problems become greater at this point.
- **100 Megabyte Remaining:** If left unchecked, a VMFS volume grows until only 100 MB of space remains, at which time issues may occur. 100 MB is defined as a critical threshold at which ESX system administrators must take immediate action to correct the issue because VMware VMFS stops growing at this point.

The default thresholds in nworks for this monitor are 95% = Warning, and 98%=Critical. Depending on the size of the Datastore, these percentages may be more or less than the above precise values in MB. Note that Datastore usage is also monitored as free KB with the diskFree metric, so you can set thresholds as both percentage and fixed KB value.

Note that Datastore usage is also monitored as a percentage, with the diskPercUsed metric.

Potential Issues

The following is a list of some potential issues that may affect virtual machines residing on a VMFS that is full:

- **Virtual machine startup failure:** ESX hosts are able to provide more RAM space than is available in the total physical RAM installed in the server. This is called Over Commitment. ESX hosts create .vswp files for any virtual machine that has allocated memory greater than the physical RAM that is available to the virtual machine. The <VMName>.vswp file is created when the virtual machine is started. Without sufficient space, this file cannot be created, and the virtual machine is unable to start. For more information, see [ESX Virtual Machine Won't Start \(Insufficient Memory\) \(1330\)](#).
- **VMotion failures:** ESX hosts that are in a cluster of ESX hosts that have VMware HA/DRS enabled may encounter failures when VMotion attempts to move a virtual machine from one host to another. It is possible for this failure to occur during off hours when it may not be immediately identified as a failure because VMware DRS can be configured to VMotion virtual machines without interaction from an administrator.
- **Snapshot creation/commit:** When a snapshot is taken or committed to the virtual machine, data is written to the VMFS. If the VMFS is unable to accommodate the additional data, the snapshot does not grow, does not get written, or is not committed. As a result, the virtual machine may fail.
- **Poor performance:** File copy, ls commands, and a variety of Linux level functions perform poorly when the space is full because the VMware VMFS is a filesystem. Though less likely to affect virtual machine availability, these issues impact ESX system administrators and must be resolved. **Note:** Journaling filesystems (like VMFS) are generally capable of maintaining proper performance when at nearly full capacity. However, the probability of performance problems is greatly increased when the filesystem becomes 100% full.
- **Unpredictability:** It is difficult to predict precisely how a full filesystem may create issues because VMFS is a core element of the ESX host. To ensure more efficient troubleshooting and system operation, keep VMFS below the thresholds defined above.

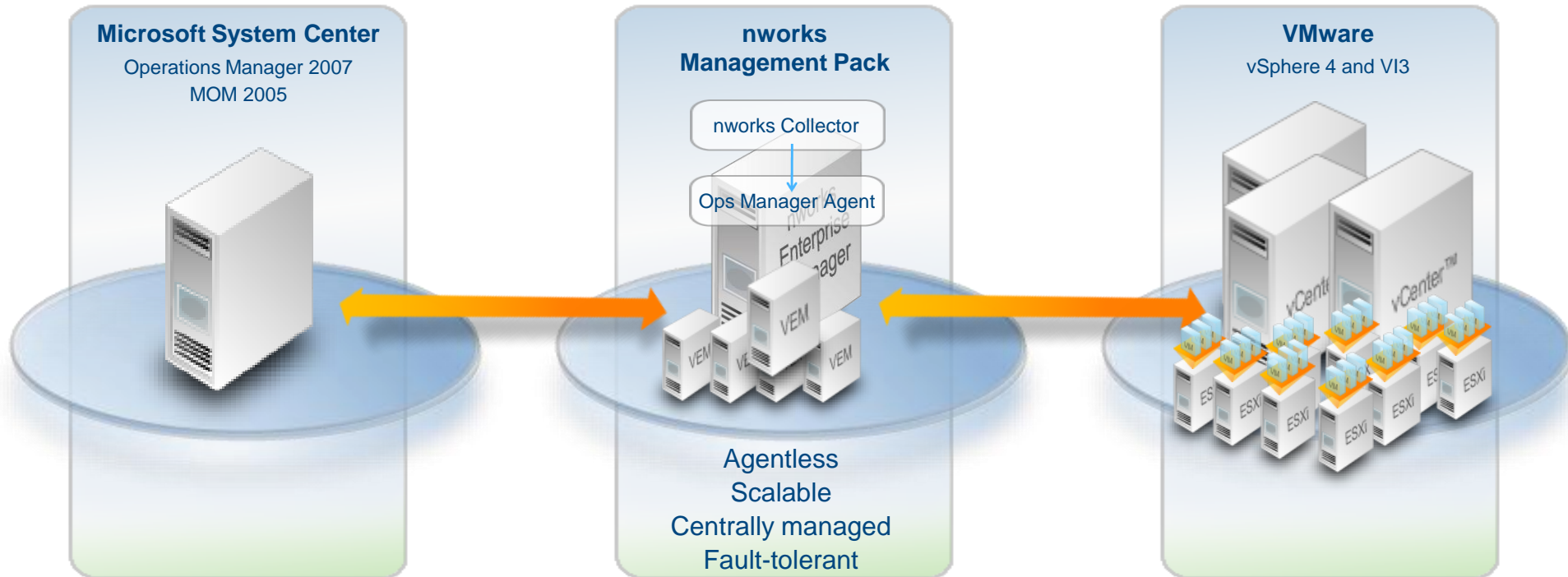
Proven architecture

- Agentless
 - Leverages the vSphere API
 - Eliminates agent “tunnel vision” of VMware aspects
- Mature
 - Version 5.x
 - Extensive production use—1000+ customers, large-scale deployments
- Certified
 - VMware Ready for vSphere 4 and VI3
 - Microsoft Management Pack Catalog, Pinpoint site



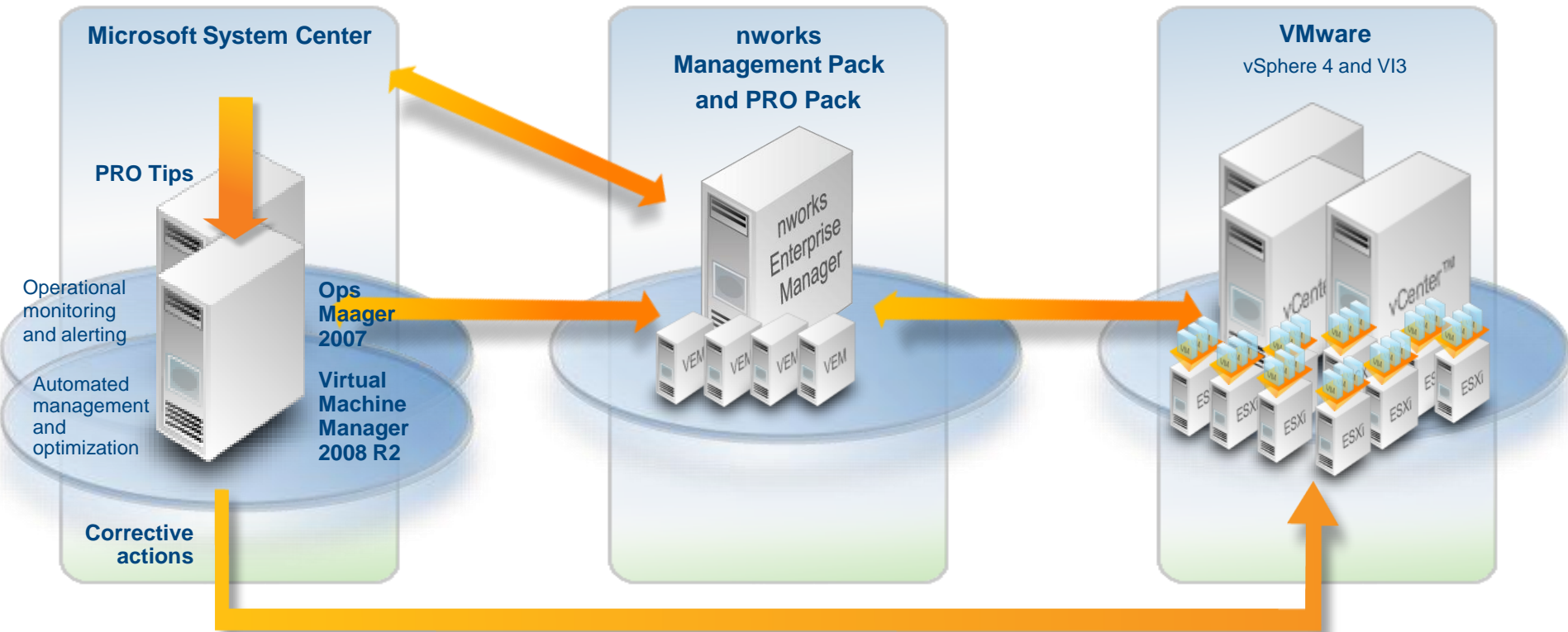
Microsoft Pinpoint™

nworks MP architecture



nworks PRO-enabled MP architecture

Microsoft System Center



Gathering VMware data

- Agentless solution
 - No agents required in ESX servers or VMs
 - nworks 'Collector' uses VMware SOAP API
 - Certified VMware Ready
 - Scalable, secure & granular data source
 - Out-performs legacy methods - Syslog, SNMP, COS agent
 - Republishes data in standard formats – WMI, XML, Event log
 - Unique derived metrics
- Centralized management of multiple Collectors
 - High availability and load balancing features



Advanced Ops Mgr features

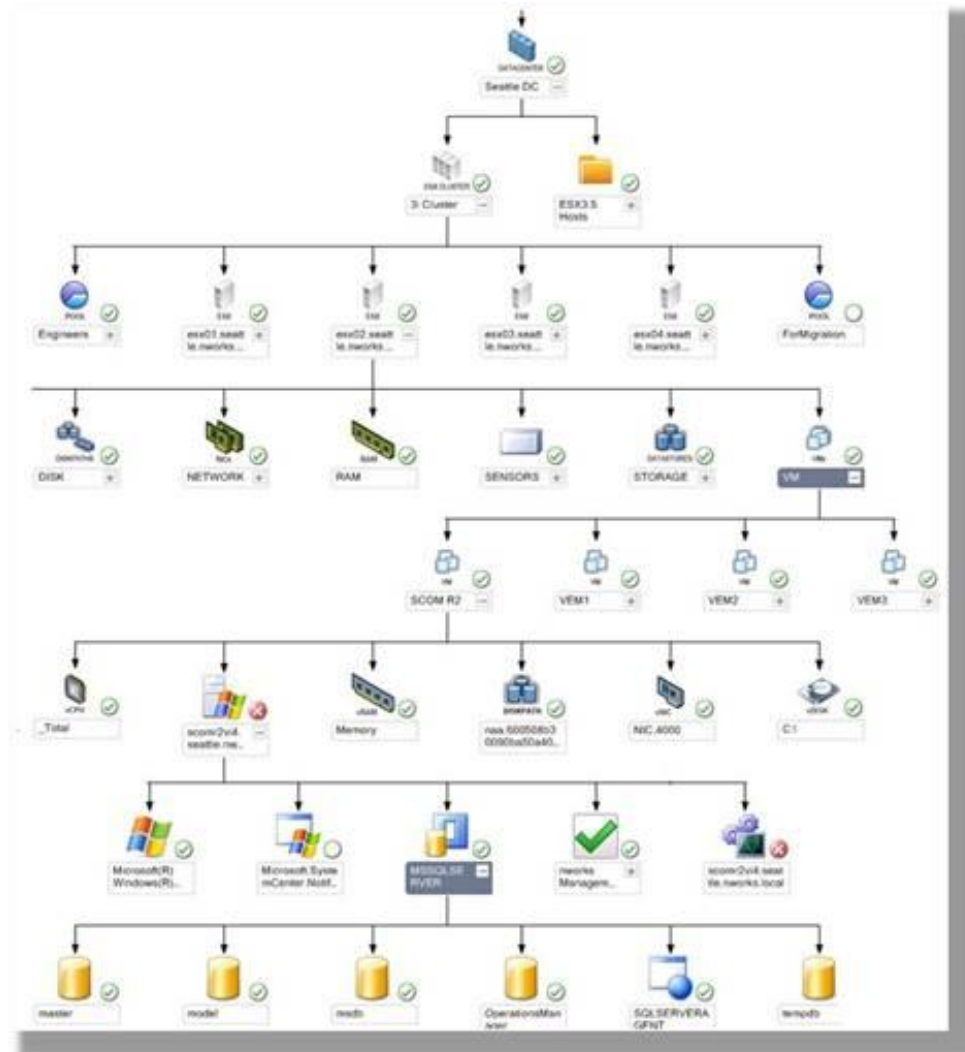
- Full topology diagram of the VMware environment
 - See all dependencies and relationships
- Efficient 'cooked-down' datasources
 - Each Collector can deliver data for 500+ VMs
- Optimized performance data publication
 - Minimize Ops Mgr DB footprint



End-to-end topology in Operations Manager

Connect the dots!

- End-to-end visibility from:
 - Hardware to hypervisor
 - Hypervisor to VM
 - VM to application
- Enable root-cause analysis
- Ensure correct escalation path





Demo

Q&A



Thank you!

Feedback: alec.king@veeam.com

Visit: www.veeam.com

www.SystemCenterCentral.com