vSphere with Operations Management™ (vSOM) and vCenter Operations™ (vCOPS)
What’s on the agenda?

- vSphere with Operations Management Overview
  - What it is and how it benefits
  - Solution details
    - New capabilities in vSphere with Operations Management 5.5
    - Scenario 1 – Performance Monitoring: Performance Issue Caused by Change
    - Scenario 2 – Capacity Management: Monitor and Plan Capacity Utilization
  - How to buy: editions and upgrades
  - NEW: Adding on vCenter Operations Management Advanced

- vCenter Operations Management Advanced & Enterprise
  - Go beyond Capacity and Performance
vSphere with Operations Management Overview
Virtualization with Critical Enhancements

vSphere with Operations Management
- Reliable, battle-tested virtualization platform
- Performance monitoring and capacity management

- **Capacity planning** – forecast capacity shortfalls
- **Optimize efficiency** – reclaim resources from over-provisioned VMs
- **Improve performance** – identify emerging system issues faster
- **Proven virtualization platform** – provide availability for your business applications
vSphere with Operations Management vs. vCenter Server

**vSphere with Operations Management**
- Collects the metrics from vCenter Server and provides a holistic view and deep insights into the health, risk and efficiency of IT infrastructure

**vCenter Server**
- vCenter Server collects real time performance data from virtualized hosts
- vCenter Server stores the data in vCenter database and also keeps a historical roll up of data
Differentiating vSphere with Operations Management with vCenter Server

- Immediate Problems
- Future Problems
- Opportunities to Optimize

vCenter Server

vSphere with Operations Management
Operations Management needs to evolve for Cloud

Health/Risk/Efficiency

Self-learning Analytics

Fit for purpose
Capacity Planning

vCenter Server and 3rd party monitoring tools
### Asking All the Right Questions

<table>
<thead>
<tr>
<th>Is It Healthy?</th>
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<tbody>
<tr>
<td>- Every VM &amp; ESX performing well? CPU, RAM, Network, Disk?</td>
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<tr>
<td>- Are they behaving expectedly?</td>
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<tr>
<td>- Any fault on any component?</td>
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<table>
<thead>
<tr>
<th>Is It Enough?</th>
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</thead>
<tbody>
<tr>
<td>- Enough CPU, RAM, Network, Disk?</td>
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<tr>
<td>- Time remaining?</td>
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<tr>
<td>- Capacity remaining?</td>
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<tr>
<td>- Where are the “Stressed points” in time?</td>
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<table>
<thead>
<tr>
<th>Is It Optimized?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Which VMs need adjustment?</td>
</tr>
<tr>
<td>- What are my key ratios?</td>
</tr>
<tr>
<td>- How much can I claim back from “fat” VMs?</td>
</tr>
<tr>
<td>- Am I burning money &amp; tree unnecessarily?</td>
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</table>

<table>
<thead>
<tr>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>93</td>
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</table>

<table>
<thead>
<tr>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
</tr>
</tbody>
</table>
“Health is affected and there is no Network redundancy on the host but network demand is low. I can fix it but there is no immediate issue.”
Solution Details

• New capabilities in vSphere with Operations Management 5.5

• Scenario 1 – Performance Monitoring: Performance Issue Caused by Change

• Scenario 2 – Capacity Management: Monitor and Plan Capacity Utilization
vSphere with Operations Management 5.5

**Powerful Computing**
Virtualize your x86 server resources and aggregate them into logical pools for allocation of multiple workloads.

**Network Services**
Get network services optimized for the virtual environment, along with simplified administration and management.

**Efficient Storage**
Reduce the complexity of back-end storage systems and enable the most efficient storage utilization in virtual environments.

**Robust Security**
Protect your data and applications with the industry’s most secure “bare-metal” virtualization platform.
vSphere with Operations Management 5.5

**High Availability**
Maximize uptime across your virtualized infrastructure, reducing unplanned downtime and eliminating planned downtime for server and storage maintenance.

**Consistent Automation**
Lower operating expenditures and minimize errors by streamlining routine tasks with vSphere's accurate and repeatable solutions.

**Performance and Capacity Management**
Create a virtualized environment suited for running mission-critical applications with confidence through proactive capacity and operations management.
vSphere Features Overview

Management Services
- Single Sign On
- vSphere Web Client
- Enhanced vCenter Orchestrator
- Capacity Optimization
- Health and Performance Monitoring

Core Services
- Availability
  - Data Protection
  - Replication*
  - vMotion w/o shared storage
  - 0 Downtime upgrades of VMware Tools
- Security
  - vShield Endpoint*
- Automation
  - Storage DRS and Profile-Driven Storage integration with VCD
  - Enhanced Auto Deploy
- Compute
  - HW version 9
  - 64 way SMP
  - 1 TB VMs
- Storage
  - Storage Appliance
  - Storage Space Reclamation for VDI
- Network
  - Enhanced Distributed Switch
  - SR-IOV support

*Now included at no charge with vSphere platform
Solution Details

• New capabilities in vSphere with Operations Management 5.5
• Scenario 1 – Performance Monitoring: Performance Issue Caused by Change
• Scenario 2 – Capacity Management: Monitor and Plan Capacity Utilization
Performance Issue Caused by Change

World view

Search for VM

Things are healthy

A little bit of risk

Pretty efficient
Performance Issue Caused by Change (cont.)

Health is yellow with recent drop.
Risk is also high.
Click for more details.

Tree expanded.
Performance Issue Caused by Change (cont.)

Recent drop in performance

Corresponding rise in anomalies

Workload view

CPU bound
Performance Issue Caused by Change (cont.)

Anomalies

CPU bound

CPU Demand > CPU Usage
Performance Issue Caused by Change (cont.)

Recent spike in anomalies

- Ready Time up
- Throttling up
- Active CPU down.
Performance Issue Caused by Change (cont.)

History of anomalies

Event Overlay

Root cause: CPU limit set on the VM
Solution Details

• New capabilities in vSphere with Operations Management 5.5
• Scenario 1 – Performance Monitoring: Performance Issue Caused by Change
• Scenario 2 – Capacity Management: Monitor and Plan Capacity Utilization
Let's look at capacity shortfalls.

Very low on capacity.
Capacity Modeling for growth/changes/consolidation etc.

- vSphere UI – Planning Tab – What-if scenario

Model VM growth

How many Small, Medium, Large VMs can fit into this cluster?
“What-If” Analysis

- Capacity state today
- VM count capacity
- Actual VMs deployed
- New capacity shortfall if I add 10 new VMs
- Current capacity cross-over point
### Cluster Capacity Risk

<table>
<thead>
<tr>
<th>Object</th>
<th>vCenter Server</th>
<th>Capacity Remaining</th>
<th>Time Remaining</th>
<th>Stress</th>
<th>VM : Host Ratio</th>
<th>% CPU Allocation</th>
<th>% Memory Allocation</th>
<th>% CPU Usage (Demand)</th>
<th>% Memory Usage (Demand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS</td>
<td>vCenter - Southes Lab</td>
<td>70% / 22 VMs</td>
<td>&gt; 1 year</td>
<td>0%</td>
<td>4.8</td>
<td>118%</td>
<td>33%</td>
<td>5.8% / (21%)</td>
<td>28% / (27%)</td>
</tr>
<tr>
<td>cos-salesesx1.eng.v</td>
<td>vCenter - Southes Lab</td>
<td>64% / 3.6 VMs</td>
<td>&gt; 1 year</td>
<td>-</td>
<td>1</td>
<td>100%</td>
<td>-</td>
<td>- / ( - )</td>
<td>- / ( - )</td>
</tr>
<tr>
<td>Mgmt_Infra</td>
<td>vCenter - Southes Lab</td>
<td>27% / 14 VMs</td>
<td>16 days</td>
<td>0%</td>
<td>9.4</td>
<td>264%</td>
<td>73%</td>
<td>12% / (31%)</td>
<td>58% / (42%)</td>
</tr>
<tr>
<td>cos-salesesx2.eng.v</td>
<td>vCenter - Southes Lab</td>
<td>19% / 0.98 VMs</td>
<td>&gt; 1 year</td>
<td>0%</td>
<td>4</td>
<td>108%</td>
<td>25%</td>
<td>33% / (81%)</td>
<td>25% / (43%)</td>
</tr>
<tr>
<td>10.25.52.95</td>
<td>vCenter - Southes Lab</td>
<td>0% / Over by 2 VMs</td>
<td>0 days</td>
<td>88%</td>
<td>4</td>
<td>95%</td>
<td>87%</td>
<td>47% / (118%)</td>
<td>88% / (214%)</td>
</tr>
<tr>
<td>10.25.52.96</td>
<td>vCenter - Southes Lab</td>
<td>0% / Over by 4 VMs</td>
<td>0 days</td>
<td>25%</td>
<td>3</td>
<td>150%</td>
<td>221%</td>
<td>6.6% / (17%)</td>
<td>82% / (137%)</td>
</tr>
<tr>
<td>Mgmt_BCA</td>
<td>vCenter - Southes Lab</td>
<td>0% / Over by 0.34 VMs</td>
<td>0 days</td>
<td>12%</td>
<td>22</td>
<td>449%</td>
<td>97%</td>
<td>45% / (104%)</td>
<td>77% / (48%)</td>
</tr>
<tr>
<td>Mgmt_Competo</td>
<td>vCenter - Southes Lab</td>
<td>0% / Over by 8 VMs</td>
<td>0 days</td>
<td>0%</td>
<td>7</td>
<td>270%</td>
<td>0%</td>
<td>87% / (70%)</td>
<td>7% / (4%)</td>
</tr>
</tbody>
</table>

### Capacity Risk Details

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Capacity</th>
<th>Buffers</th>
<th>Usable Capacity</th>
<th>Capacity Remaining</th>
<th>Time Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>52.8 GHz / 24 Cores</td>
<td>HA / +10%</td>
<td>23.75 GHz / 10 Cores</td>
<td>30% / 6.6 VMs</td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Memory</td>
<td>96 GB</td>
<td>HA / +%</td>
<td>32 GB</td>
<td>0% / Over by 11 VMs</td>
<td>0 days</td>
</tr>
<tr>
<td>Disk Space</td>
<td>17 TB</td>
<td>-- / +10%</td>
<td>15.45 TB</td>
<td>0.14% / Over by 5 VMs</td>
<td>0 days</td>
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<tr>
<td>Disk I/O Read</td>
<td>202 MBps</td>
<td>-- / +10%</td>
<td>182.25 MBps</td>
<td>96% / 399 VMs</td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Disk I/O Write</td>
<td>98 MBps</td>
<td>-- / +10%</td>
<td>88 MBps</td>
<td>97% / 852 VMs</td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Disk I/O Read per Second</td>
<td>6,749 Tps</td>
<td>-- / +10%</td>
<td>5.9 MBps</td>
<td>95% / 373 VMs</td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Disk I/O Write per Second</td>
<td>3,461 Tps</td>
<td>-- / +10%</td>
<td>3 MBps</td>
<td>94% / 274 VMs</td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Network</td>
<td>47.63 MBps</td>
<td>-- / +10%</td>
<td>42.87 MBps</td>
<td>98% / 1,005 VMs</td>
<td>1 days</td>
</tr>
<tr>
<td>Summary</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0% / Over by 11 VMs</td>
<td>0 days</td>
</tr>
</tbody>
</table>

**Root cause:**
1. Exceeded Allocation threshold
2. High Demand
3. Undersized

Quickly Identify clusters at risk by color

- Exceeded Allocation threshold
- High Demand
- Undersized
View Opportunities to Optimize

Let's look at powered off, idle and oversized VMs

Reclaimable capacity
vSphere with Operations Management Increases your ROI

Benefits of running vSphere with Operations Management
Impact beyond running vSphere alone

- Increase capacity utilization: 34%
- Increase consolidation ratios: 36%
- Increase hardware savings: 30%
- Reduce diagnostics & problem resolution time: -26%

Source: 2014 Management Insights Studies
# vSphere with Operations Management: Select the Right Edition

**Licensing (per CPU)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard</th>
<th>Enterprise</th>
<th>Enterprise+</th>
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<tbody>
<tr>
<td>Health Monitoring and Performance Analytics</td>
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<td><img src="#" alt="Green" /></td>
<td><img src="#" alt="Green" /></td>
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<tr>
<td>Capacity Management and Optimization</td>
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<td>Operations Dashboard and Root Cause Analysis</td>
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<td>High Availability and Fault Tolerance</td>
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<td>vMotion and Storage vMotion</td>
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<tr>
<td>Data Protection (backup) // and VM Data Replication</td>
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<tr>
<td>vShield Endpoint</td>
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<td>Distributed Resource Scheduler and Distributed Power Management</td>
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<td>Storage APIs for Array Integration, Multipathing</td>
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<td>Big Data Extensions</td>
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<td>Reliable Memory</td>
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<td>Distributed Switch</td>
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<td>Storage DRS, Profile-Driven Storage</td>
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<td>I/O Controls (Network and Storage) and SR-IOV</td>
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<td>Host Profiles and Auto Deploy</td>
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<td>Flash Read Cache</td>
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*All editions include: Thin Provisioning, Update Manager, Storage APIs for Data Protection, Image Profile, and SLES*
NEW: Add vCenter Operations Management Advanced for vSOM

vCenter Operations Management Advanced adds:

- OS resource monitoring
- Third-party Management Packs for infrastructure and OS.
- Application auto-discovery and dependency mapping.
- Automated detection, enforcement and remediation of vSphere security hardening guidelines, configuration standards and regulatory compliance requirements.
Upgrade Between All Major Offerings

- **vSphere with Ops Mgt.**
  - Enterprise+
  - Enterprise
  - Standard
  
  Upgrade from any vSOM to any vSOM.

- **vCloud Suite**
  - Enterprise
  - Advanced
  - Standard
  
  Upgrade from any vCloud Suite to any vCloud Suite.

- **vSphere**
  - Enterprise+
  - Enterprise
  - Standard
  
  Upgrade from any vSphere to any vCloud Suite.

- **Upgrade from any vSphere to any vCloud Suite.**

**Additionally**
- **New:** Add vCenter Operations Management Advanced to any vSOM environment
- vSphere Essentials/Essentials Plus can upgrade to any vSOM Acceleration Kit
Customer success with vSphere with Operations Management

• Cornerstone replaces Hyper-V with vSphere with Operations Management
  – http://www.youtube.com/watch?v=iqw1AtHibnY

• How Cornerstone Uses the Product on a Daily Basis
  – http://www.youtube.com/watch?v=mW0WVj5QSig

• Millennium upgrades from vSphere to vSphere with Operations Management
  – http://www.youtube.com/watch?v=cojmJGA7-E
See it for yourself

- Level-set difference between vCenter Server and vSphere with Operations Management
- See a product walk-through
- Take an online hands on lab
- Ask for a demo
- Install 60-day evaluation or contact your reseller for a vSphere Optimization Assessment (VOA)
vCenter Operations Advanced and Enterprise
Visualization...that Fits Every Need

- vSphere-specific UI

- Custom UI for creating role based dashboards
vCOps Not Just For vSphere

Management

vCops

vSphere

Setup
Update
Inventory
HA
vMotion
DRS
Distr. S/W
I/O Control

INFRASTRUCTURE
OPERATIONS

physical Datacenters

tional Datacenters
A Day In A Life- Where Do I start?

- Reactive
  - vSphere Web Client
  - Alerts
A Day In A Life- Where Do I start? Continue…

- Pro-Active
  - vSphere UI Dashboards
  - Heatmaps
  - Use-case defined Dashboards
Scenario 1

- Application Aware Service Continuity Monitoring
  - Persona: VI Architect/Admin/Config Manager
  - Use-case: Understand the impact of misconfiguration of the Virtual Infrastructure on Business applications and how it ties to Company IT policies
A Day in a life of a VI Admin

“Good morning, what’s new in vSphere Client, is my env OK?”
“Health is bad and there is no Network redundancy on the host but network demand is low. Do I need to fix it?”
What’s the Service Impact?

"Looks like there are some critical Services running on VMs residing on this host with some application dependencies"
Let’s Drilldown even more?

“I am going to check in more details inside vC ops”
“Looks like Host is not 100% compliant with our policies”
Which Internal IT Standards are not met?

"Looks like 6 rules are met and 1 rule has failed, but which rule is it? Let's drilldown to vCenter Configuration Manager"
Network Redundancy is a Required Configuration

“Network Redundancy rule is there and it fails our compliance assessment on the host. I better fix it then”
Now I can take an Informed Decision!

“Now I have enough information for me to take an informed decision. There are some critical apps running on that host and I need to make sure I configure network redundancy especially when it is documented as a mandatory configuration in my company Internal IT Standard”
Scenario 2

- Storage issue
  -Persona: VI Admin & Storage expert
  -Use-case: Understand the impact of Disk IO and disk latency on performance. Which vm's reside on which datastores and also show datastores, then drill down to show what VM's were the heavy IOPs hitters on that particular datastore.
Heatmaps - VM I/O spikes Grouped by Datastores

Most affected Datastore

Most problematic VM

vCenter 1

vCenter 2
Which VM Contribute Most?

Worst performing Datastores in terms of IOPS & Latency

Worst performing VM in terms of IOPS & Latency on the above datastores
**The “Villain” VM**

<table>
<thead>
<tr>
<th></th>
<th>READ</th>
<th>WRITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total I/O Commands</td>
<td>62</td>
<td>19</td>
</tr>
<tr>
<td>Total Throughput(KBps)</td>
<td>1,930</td>
<td>243</td>
</tr>
<tr>
<td>Total Latency(ms)</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>VM I/O Commands</td>
<td>63</td>
<td>8</td>
</tr>
<tr>
<td>VM Throughput(KBps)</td>
<td>1,930</td>
<td>140</td>
</tr>
<tr>
<td>VM Latency(ms)</td>
<td>27</td>
<td>18</td>
</tr>
</tbody>
</table>

VM contribute almost 100% to total datastore IOPS
Scenario 3

- Storage issue (NetApp)
  - Persona: VI Admin & NetAPP Admin
  - Use-case: Which VM contribute most to a latency issue on the NetAPP Filer
Observations – Intelligent Automation

Heat map showing NetApp systems and volumes

Select system/volume and connected datastores are displayed

Graphs display showing relationship between resource and performance
Observations – Intelligent Automation

... and which VM is the villain

ACTION:
SvMotion VM
Check application running inside the VM
Understanding Capacity Planning

Meeting IT Supply with Business Service Demand “Just-in-Time”
First things FIRST—Translating ‘Dials & Levers’ into Policy settings

Production Policy

- Flag risk when 60% capacity allocated
- Over-commit CPU 2:1
- Don’t over-commit Memory
- Ensure capacity for peak usage
  - Higher buffers
  - Enable Alerts
- Business period preference set

Test-Dev Policy

- Flag risk when 85% capacity is in demand
- Over-commit CPU 4:1
- Over-commit Memory 20%
- Acceptable stress =10%
- Lower buffers
- Disable Alerts
- No Business period preferences
Which model should be used for Managing Cluster Capacity Risk?

### Allocation based model
- **Static Allocation**
  - (may cause waste/stress)
- **What is needed**
  - (Demand)

**Pros:**
- Reduces risk of capacity shortfalls by over provisioning
- Maps to clients’ production policies

**Cons:**
- Does not minimize costs - results in Over/Early Provisioning
- May not handle all bursts/peaks
- Cannot account for over-commit

### Demand based model
- **Observed Memory Usage**
- **Right Sizing Recommendation**
- **Memory actually needed**
  - (Demand)

**Pros:**
- Increases density, minimizes waste/cost
- Accounts for CPU/Memory over-commit
- Accounts for peaks, waste in forecasting

**Cons:**
- Does not account for Vendor or Company policies / best practices
- Less adopted in production since its more aggressive

### Use Both
- **Pros:**
  - Use allocation model to create a safe top line allocation to manage capacity to.
  - E.g. fill VMs till cluster is 200% of Usable capacity (over-commit) and then add new host
  - Use Demand model in conjunction to catch unexpected bursts/peaks and prevent waste
  - Helps you compare actual demand on cluster vs. allocation
  - To assess performance risk
  - Prove true ROI to upper management
Heatmaps - VM CPU Ready by Cluster

Most problematic cluster in terms of CPU contention
Cluster Focused Dashboard Example (Real Time & Overtime)

Cluster 1
- CPU & RAM Usage & Contention (%) for the last 7 days

Cluster 2
- CPU & RAM Usage & Contention (%) for the last 7 days

Cluster 3
- CPU & RAM Usage & Contention (%) for the last 7 days
Thank You