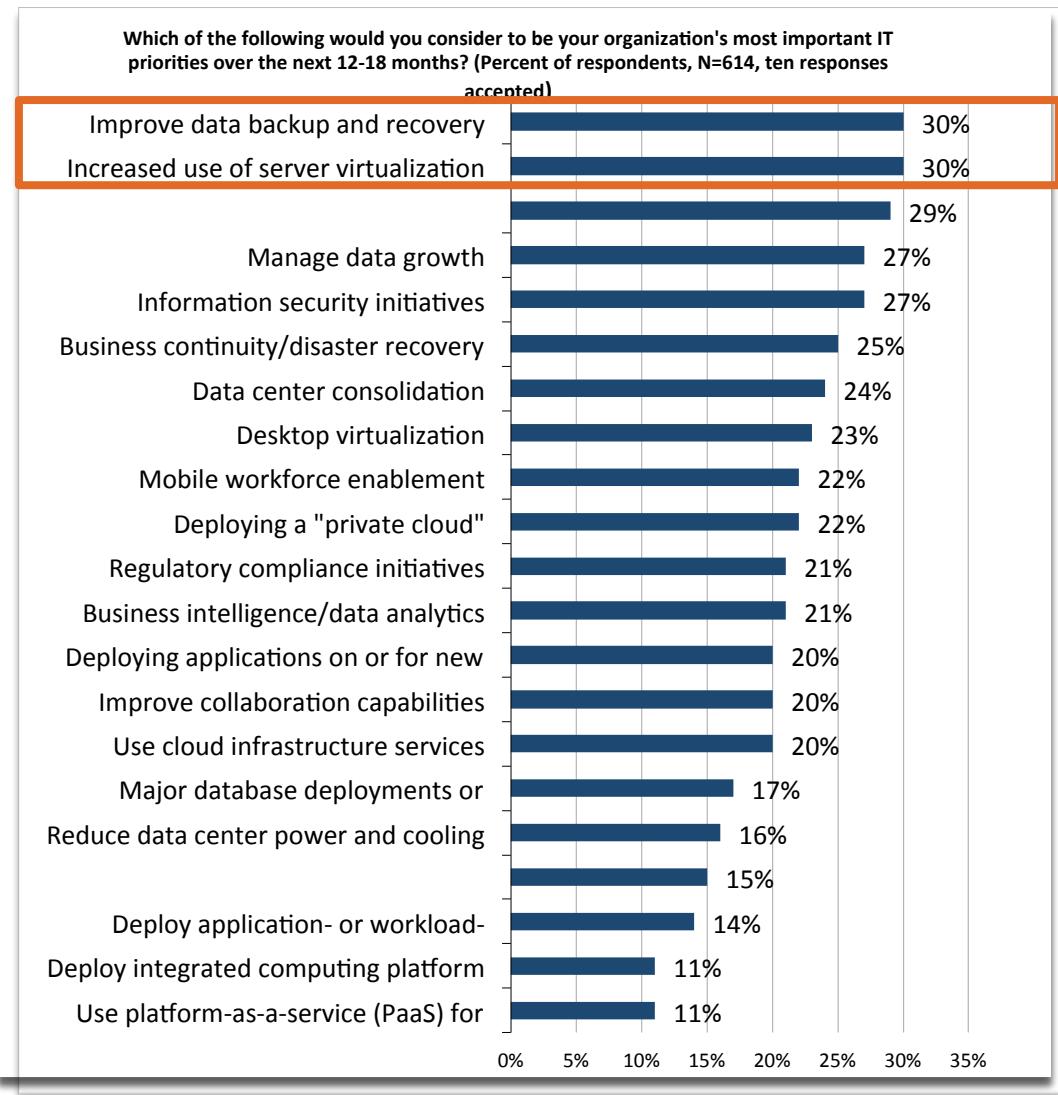


vCenter Operations Manager 訓練簡報



vmware®

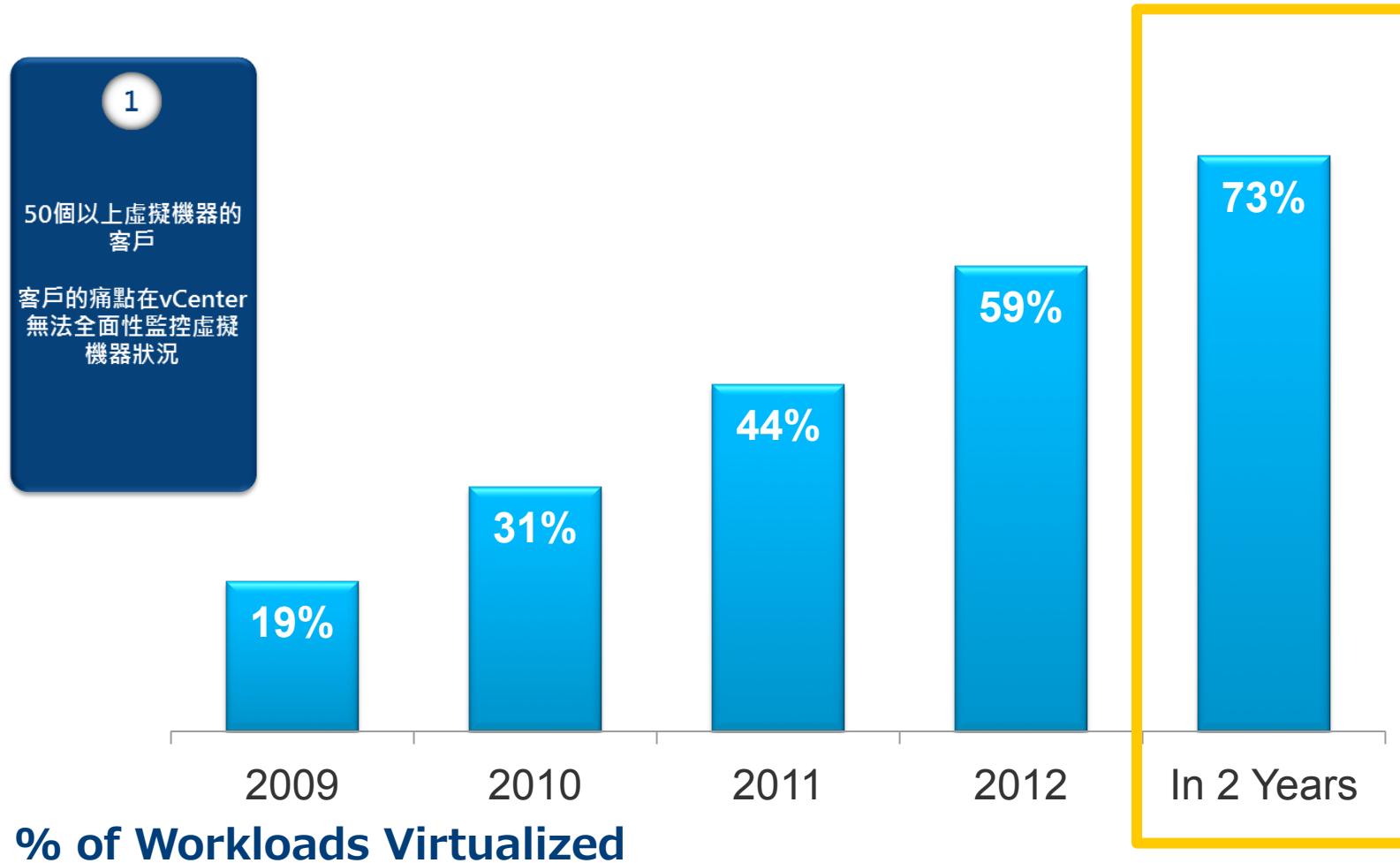
加深虛擬化腳步與資料保護刻不容緩



Source: ESG "2012 IT Spending Intentions Survey", January 2012

多數企業認為加速虛擬化與資料防護是IT的首要任務

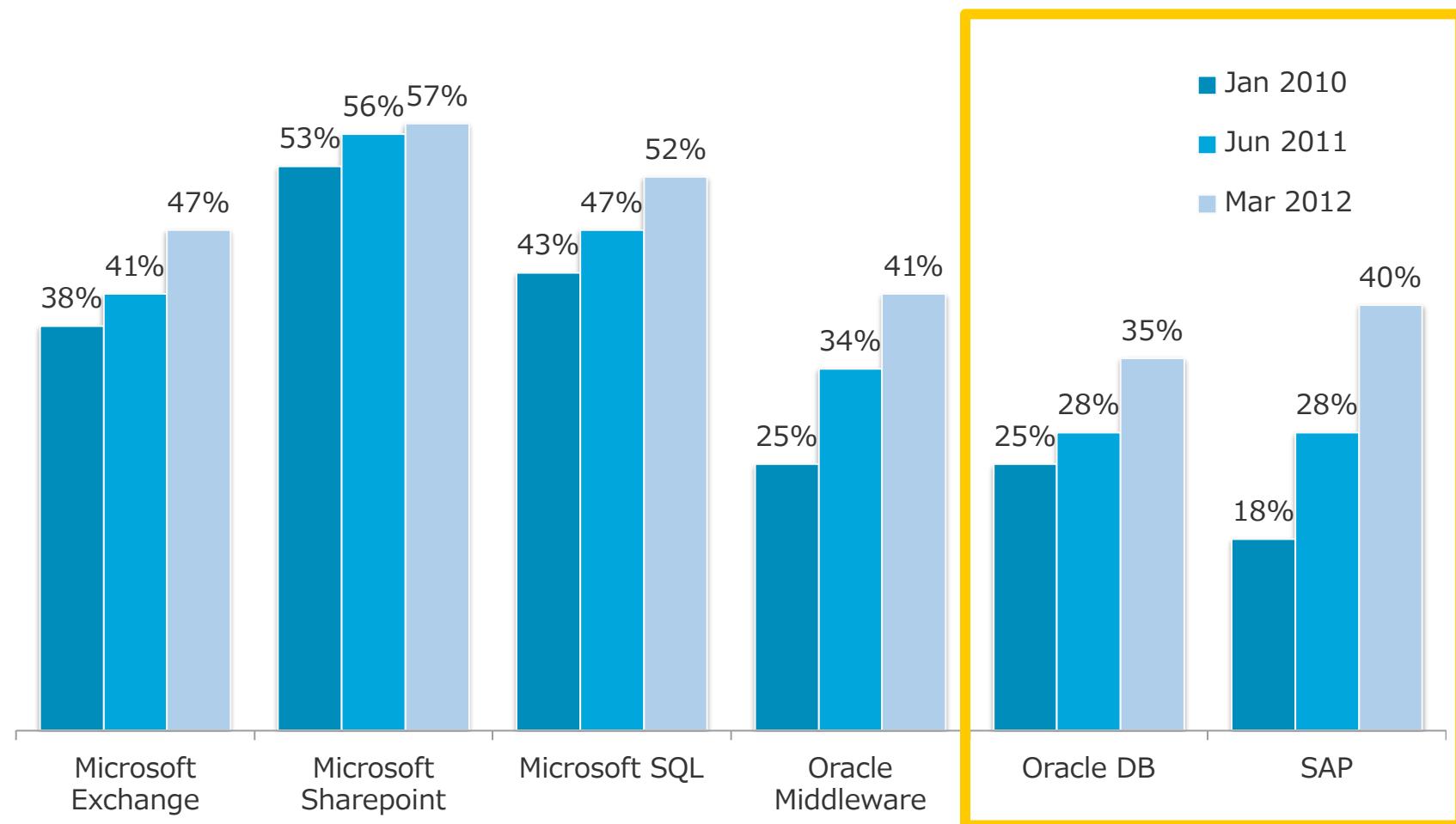
全球資料中心已經有60%的主機都虛擬化了



Source: VMware customer survey, Jan 2010, Jun 2011, Mar 2012

Question: Please indicate percentage of x86 server operating system instances (e.g., Windows, Linux) that run in virtual machines

關鍵應用虛擬化程度趨勢



Source: VMware customer survey, Jan 2010, Jun 2011, Mar 2012

Question: Total number of instances of that workload deployed in your organization and the percentage of those instances that are virtualized .

當虛擬機變多單用vCenter需要從多個角度去監控

The screenshot displays four separate instances of the vSphere Web Client interface, each showing a different host or cluster under management. The hosts shown are:

- vCenter (top left)
- EMDemoVC.demo.em.local (top right)
- cos-salesesx2.eng.vmware.com (middle left)
- cos-salesesx1.eng.vmware.com (middle right)

The middle-left window (cos-salesesx2.eng.vmware.com) is the active instance, with its title bar highlighted. It shows the "Monitor" tab selected. The left sidebar lists various objects under "EMDemoVC.demo.em.local", including "Management" and several hosts like "10.25.52.95" and "cos-salesesx1.eng.vmware". The main content area displays a table of events:

Description	Type	Date Time	Task	Target	User
A ticket for EMDemoDC of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 10:40 PM		EMDemoDC	DEMO\Administrator
A ticket for MKTG-Q2-BI of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 10:21 PM		MKTG-Q2-BI	DEMO\Administrator
A ticket for EMDemoVC of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 10:17 PM		EMDemoVC	DEMO\Administrator
A ticket for EMDemoDC of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 9:39 PM		EMDemoDC	DEMO\Administrator
A ticket for MKTG-Q2-BI of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 9:20 PM		MKTG-Q2-BI	DEMO\Administrator
A ticket for EMDemoVC of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired	info	4/28/2013 9:16 PM		EMDemoVC	DEMO\Administrator

Below the table, detailed event information is provided:

Date Time: Sunday, April 28, 2013 10:40:29 PM Target: EMDemoDC
User: DEMO\Administrator Type: info
Description:
Sunday, April 28, 2013 10:40:29 PM A ticket for EMDemoDC of type guestControl on cos-salesesx2.eng.vmware.com in Management has been acquired

Related events:
There are no related events.

許多監視項目

Description	Rollup	Units	Internal Name
<input type="checkbox"/> Storage DRS datastore write workload metric	Latest	Number	datastoreWr
<input type="checkbox"/> Average write requests per second	Average	Number	numberWrite
<input type="checkbox"/> Storage DRS datastore outstanding write requests	Latest	Number	datastoreWr
<input type="checkbox"/> Storage DRS datastore write I/O rate	Latest	Number	datastoreWr
<input type="checkbox"/> Storage DRS datastore bytes read	Latest	Number	datastoreRe
<input type="checkbox"/> Storage DRS datastore read workload metric	Latest	Number	datastoreRe
<input type="checkbox"/> Read rate	Average	KBps	read
<input type="checkbox"/> Storage I/O Control aggregated IOPS	Average	Number	datastoreIop
<input type="checkbox"/> Storage I/O Control datastore maximum queue depth	Latest	Number	datastoreMa
<input type="checkbox"/> Storage I/O Control normalized latency	Average	Microsecond	sizeNormaliz
<input type="checkbox"/> Storage DRS datastore bytes written	Latest	Number	datastoreWr
<input type="checkbox"/> Write rate	Average	KBps	write
<input checked="" type="checkbox"/> Write latency	Average	Millisecond	totalWriteLat
<input type="checkbox"/> Highest latency	Latest	Millisecond	maxTotalLat
<input checked="" type="checkbox"/> Read latency	Average	Millisecond	totalReadLat
<input type="checkbox"/> Storage DRS datastore outstanding read requests	Latest	Number	datastoreRe
<input type="checkbox"/> Average read requests per second	Average	Number	numberRead
<input type="checkbox"/> Storage DRS datastore normalized write latency	Latest	Number	datastoreNo
<input type="checkbox"/> Storage DRS datastore normalized read latency	Latest	Number	datastoreNo
<input type="checkbox"/> Storage DRS datastore read I/O rate	Latest	Number	datastoreRe

Description	Rollup	Units	Internal Name
<input checked="" type="checkbox"/> Read latency	Average	Millisecond	totalReadLat
<input type="checkbox"/> Highest latency	Latest	Millisecond	maxTotalLat
<input type="checkbox"/> Average read requests per second	Average	Number	numberRead
<input type="checkbox"/> Read rate	Average	KBps	read
<input checked="" type="checkbox"/> Write latency	Average	Millisecond	totalWriteLat
<input type="checkbox"/> Average commands issued per second	Average	Number	commandsAve
<input type="checkbox"/> Write rate	Average	KBps	write
<input type="checkbox"/> Average write requests per second	Average	Number	numberWrite

Description	Rollup	Units	Internal Name
<input checked="" type="checkbox"/> Read rate	Average	KBps	read
<input type="checkbox"/> Commands terminated	Summation	Number	commandsAborted
<input type="checkbox"/> Maximum queue depth	Average	Number	maxQueueDepth
<input checked="" type="checkbox"/> Write rate	Average	KBps	write
<input type="checkbox"/> Average write requests per second	Average	Number	numberWriteAverage
<input type="checkbox"/> Commands issued	Summation	Number	commands
<input type="checkbox"/> Queue read latency	Average	Millisecond	queueReadLatency
<input type="checkbox"/> Kernel command latency	Average	Millisecond	kernelLatency
<input type="checkbox"/> Physical device write latency	Average	Millisecond	deviceWriteLatency
<input type="checkbox"/> Kernel read latency	Average	Millisecond	kernelReadLatency
<input type="checkbox"/> Kernel write latency	Average	Millisecond	kernelWriteLatency
<input type="checkbox"/> Bus resets	Summation	Number	busResets
<input type="checkbox"/> Command latency	Average	Millisecond	totalLatency
<input type="checkbox"/> Queue write latency	Average	Millisecond	queueWriteLatency
<input type="checkbox"/> Queue command latency	Average	Millisecond	queueLatency
<input type="checkbox"/> Read requests	Summation	Number	numberRead
<input type="checkbox"/> Physical device command latency	Average	Millisecond	deviceLatency
<input type="checkbox"/> Write requests	Summation	Number	numberWrite
<input type="checkbox"/> Write latency	Average	Millisecond	totalWriteLatency
<input type="checkbox"/> Average read requests per second	Average	Number	numberReadAverage
<input checked="" type="checkbox"/> Usage	Average	KBps	usage
<input type="checkbox"/> Physical device read latency	Average	Millisecond	deviceReadLatency
<input type="checkbox"/> Highest latency	Latest	Millisecond	maxTotalLatency
<input type="checkbox"/> Average commands issued per second	Average	Number	commandsAveraged
<input type="checkbox"/> Read latency	Average	Millisecond	totalReadLatency

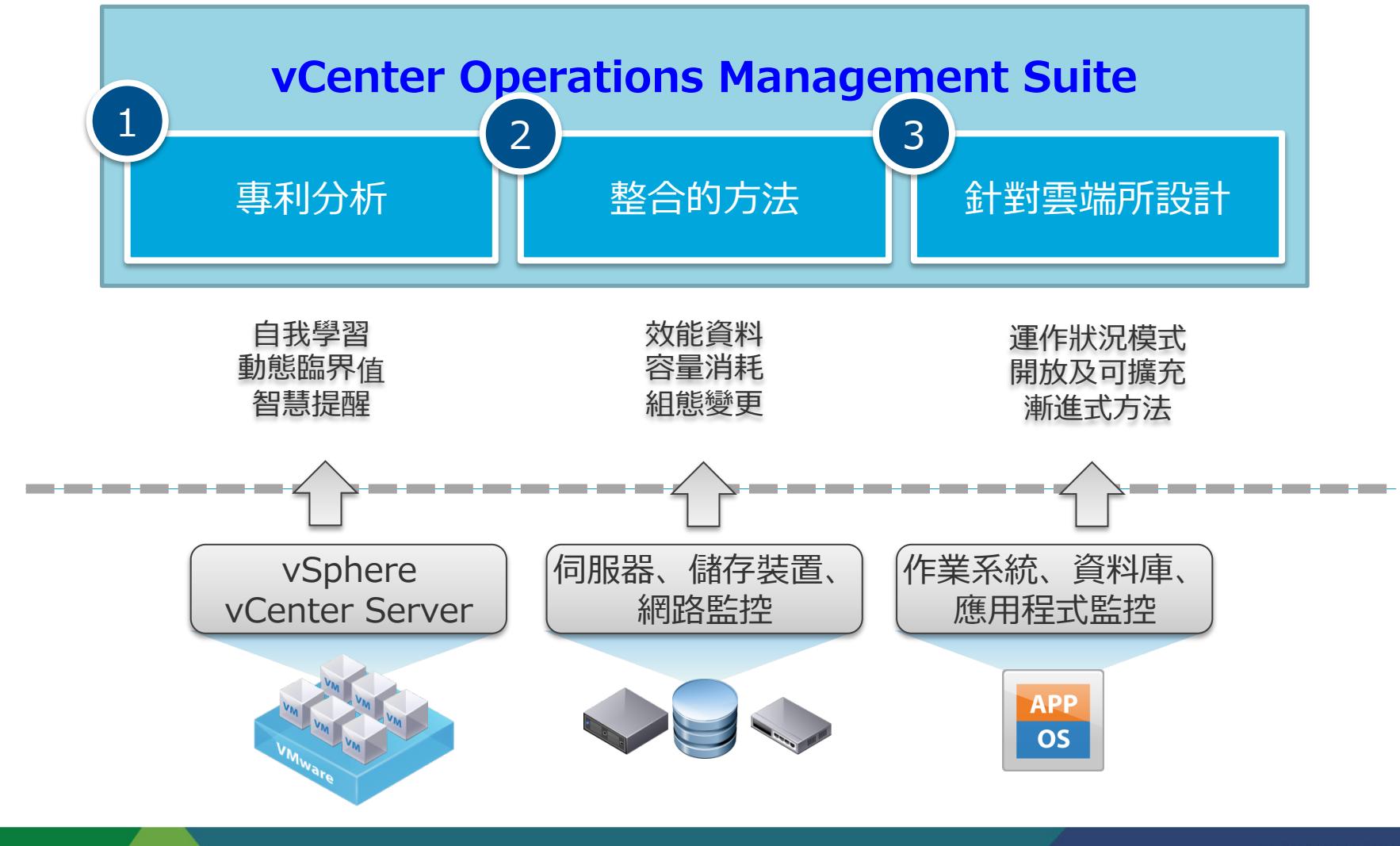
Description	Rollup	Units	Internal Name
<input type="checkbox"/> Average commands issued per second	Average	Number	commandsAveraged
<input type="checkbox"/> Average read requests per second	Average	Number	numberReadAverage
<input checked="" type="checkbox"/> Write latency	Average	Millisecond	totalWriteLatency

Description	Rollup	Units	Internal Name
<input type="checkbox"/> vSphere Replication VM Count	Average	Number	HostVMCount
<input type="checkbox"/> Replication Latency	Average	Microsecond	latency
<input type="checkbox"/> Replication Throughput	Average	KBps	Throughput

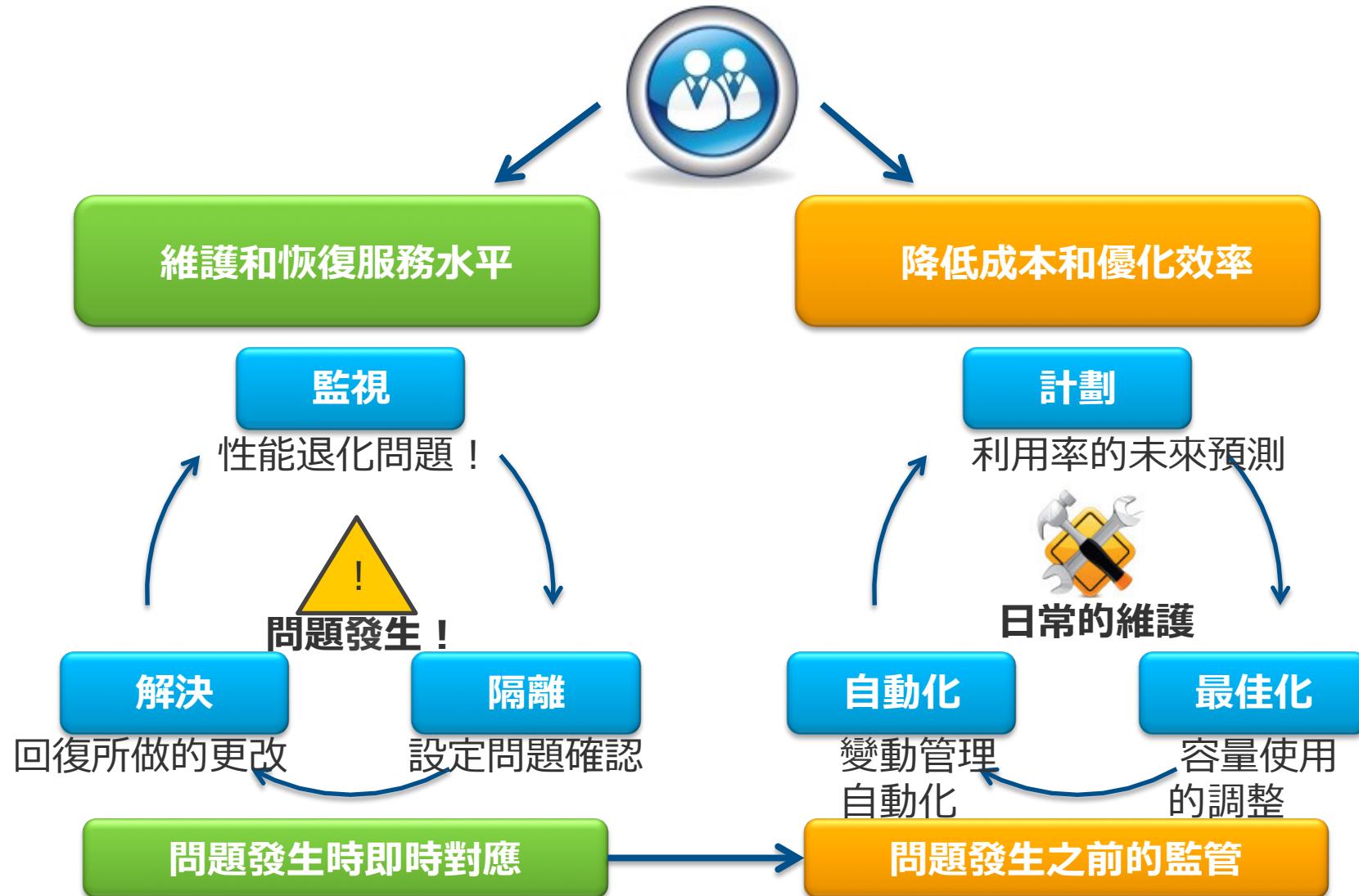
Description	Rollup	Units	Internal Name
<input type="checkbox"/> Read rate	Average	KBps	read
<input checked="" type="checkbox"/> Read latency	Average	Millisecond	totalReadLatency
<input type="checkbox"/> Write rate	Average	KBps	write
<input type="checkbox"/> Write latency	Average	Millisecond	totalWriteLatency

例: 130 VM 的環境大約有 76,000 個測定項目！

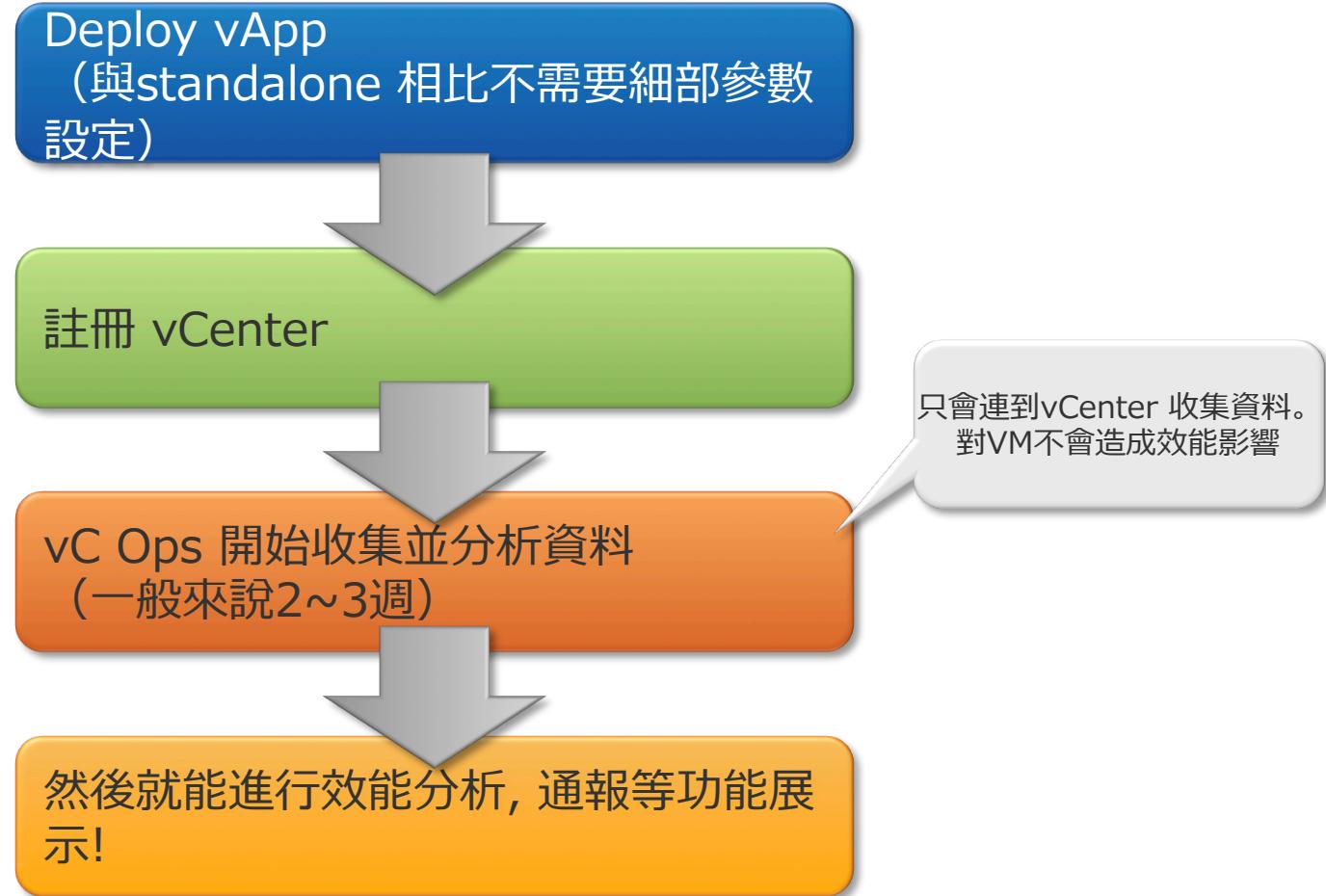
VMware 的維運管理方案



vCops 協助運營轉換“被動”的角色



vCOPS 架設簡單

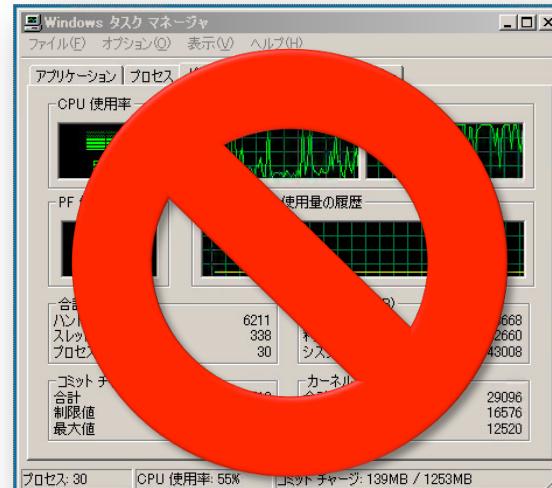


虛擬世界資源用量管理

■ 傳統效能監控

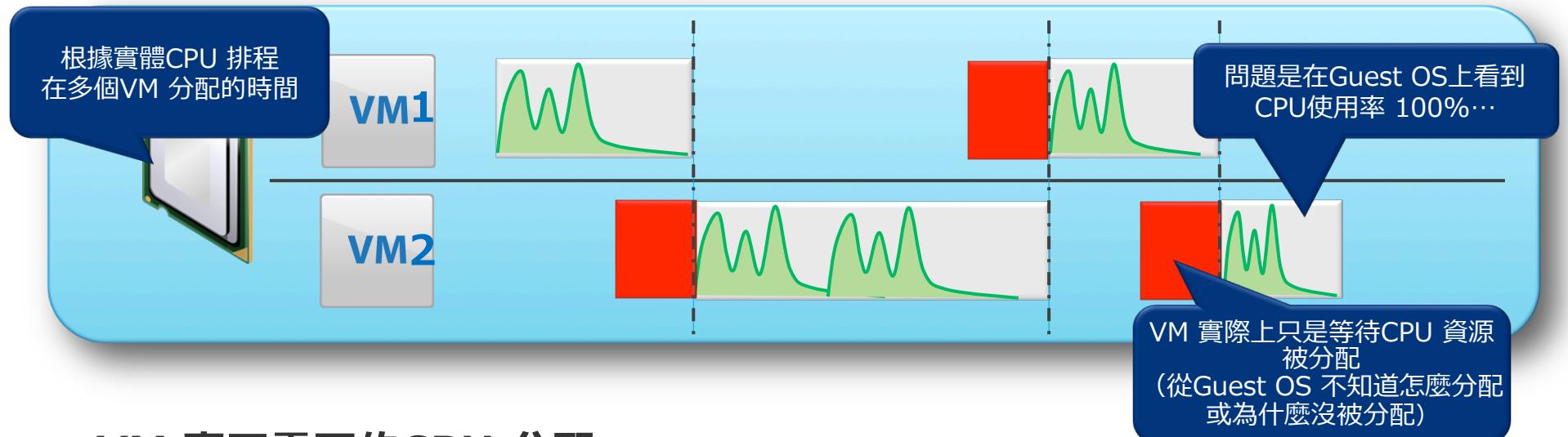
- 傳統方式以Guest OS, Hypervisor 等對象設定臨界值來監控資源利用率，如果超過就通報
- 這樣是以管實體機的方法在管虛擬環境

Guest OS上perfmon不適合用來管理虛擬平台的效能管理

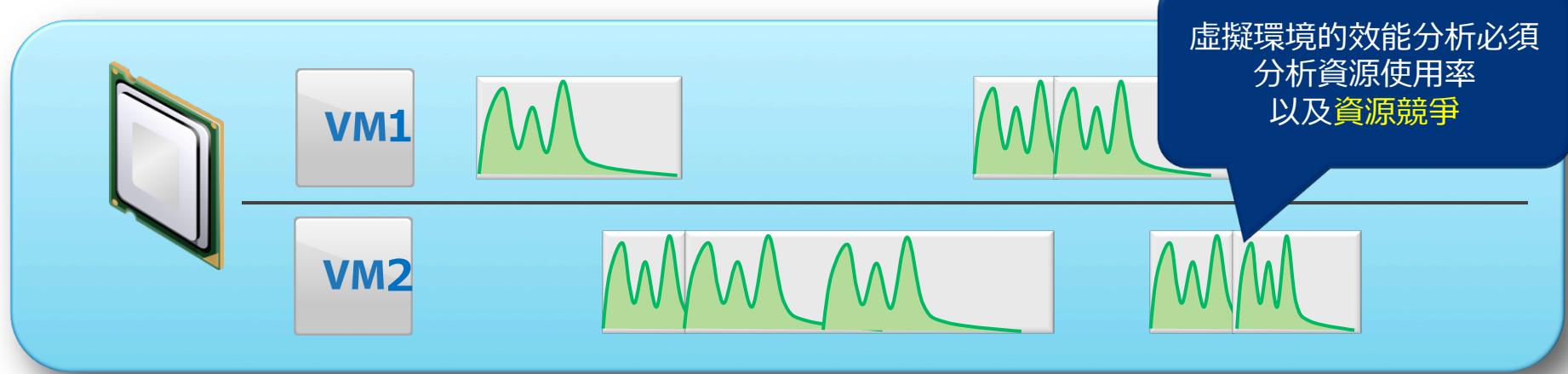


原因是VMM 在幫忙分配調度資源

- 在Guest OS 上用perfmon 是看到在「被分配了」時間的CPU slot 的活動率



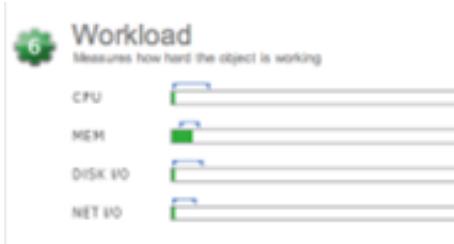
- VM 真正需要的CPU 分配





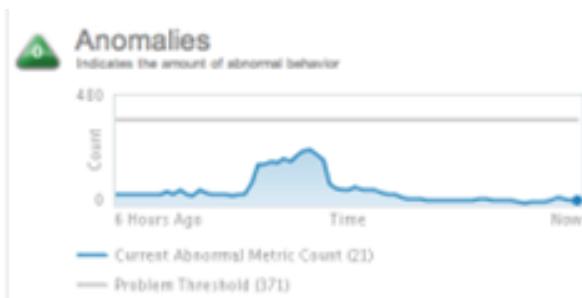
系統的“健全性”(Health) ~ 效能表面凸顯的問題

管理人員第一時間關心的狀況
根據“工作負載”, “異常”及“障礙”計算出來



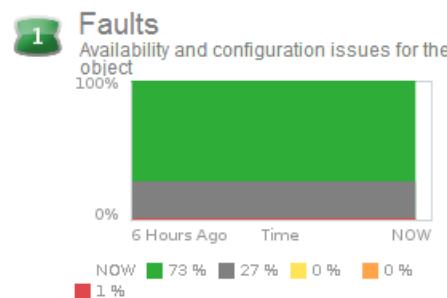
■ “工作負載”(Workload)

- 各個資源的負載狀況(Consumed vs Demand)
- 數值越低越好
(代表關心的對象有足夠的資源)



■ “異常”(Anomalies)

- 累積對歷史資料的學習、
代表偏離正常狀況的程度
- 數值越低越好(表示問題較少)

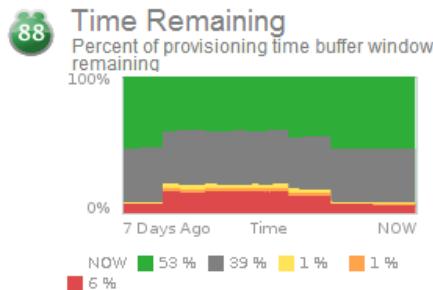


■ “障礙”(Faults)

- 例如硬體故障, vSphere HA 的狀況, vCenter 的問題
- 數值越低越好(表示問題較少)

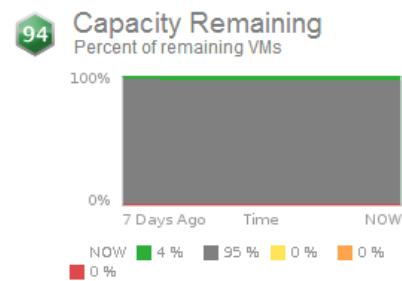
風險(Risk) ~ 將來可能發生的問題

具體對應潛在的問題
由“剩餘時間”, “剩餘容量”及“壓力”算出



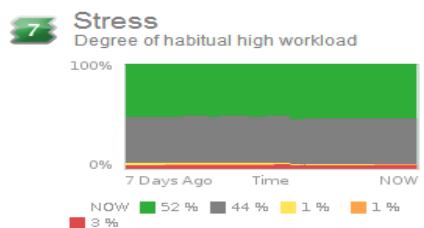
■ “剩餘時間”(Time Remaining)

- 到資源耗盡為止的預估時間
- 數值越高越好(代表容量越寬裕)



■ “剩餘容量”(Capacity Remaining)

- 還有多少虛擬機可以部署在現有環境上
- 數值越高越好(代表不需要增加額外資源)



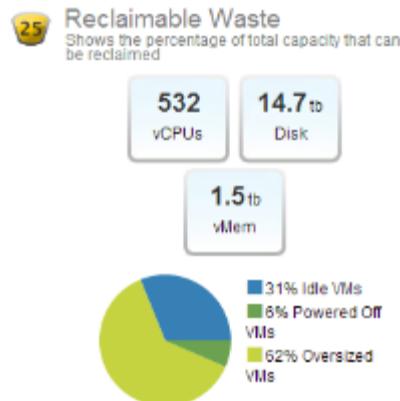
■ “壓力”(Stress)

- 過去6周容量的變化
- 數值越低越好(代表資源配置沒有偏差)

Descendant Clusters, Hosts, and VMs with High Stress
1 Clusters and Hosts **39** VMs

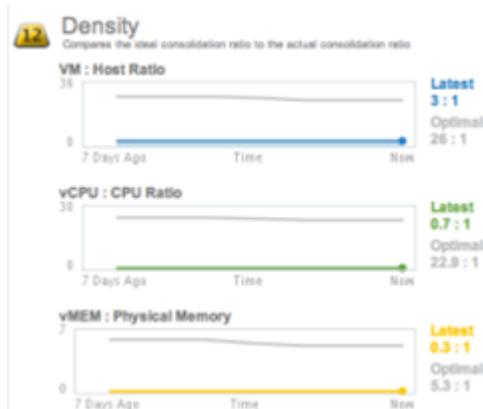
“效益”(Efficiency) ~ 最佳化的機會

資源利用的最佳化, 由“可回收資源”與“密度”計算出來



■ “可回收資源”(Reclaimable Waste)

- 根據VM Idle 狀態或Oversized 來預估可回收資源
- 數值越低越好



■ “密度”(Density)

- 虛擬機整合比, CPU, Memory 的整合比
- 一般來說數值越高越好

直覺的階層式數位儀表板快速分析各種問題

The screenshot shows the BOOYAH dashboard interface. On the left, a navigation pane titled 'Hosts and Clusters' lists categories like 'World', 'Buildsys', 'DATACENTERS', 'CLUSTERS', 'HOSTS', 'VMs', and 'DATASTORES'. The main area displays a 'Scoreboard' with various metrics for different entities. A large red warning icon is visible in the top right corner of the main content area.

可了解如何使用這些燈號顏色來確切偵測環境中何處出了差錯 – VC、資料中心、叢集、ESX 或虛擬機及存儲6層級。

VMware logo is present in the bottom right corner.

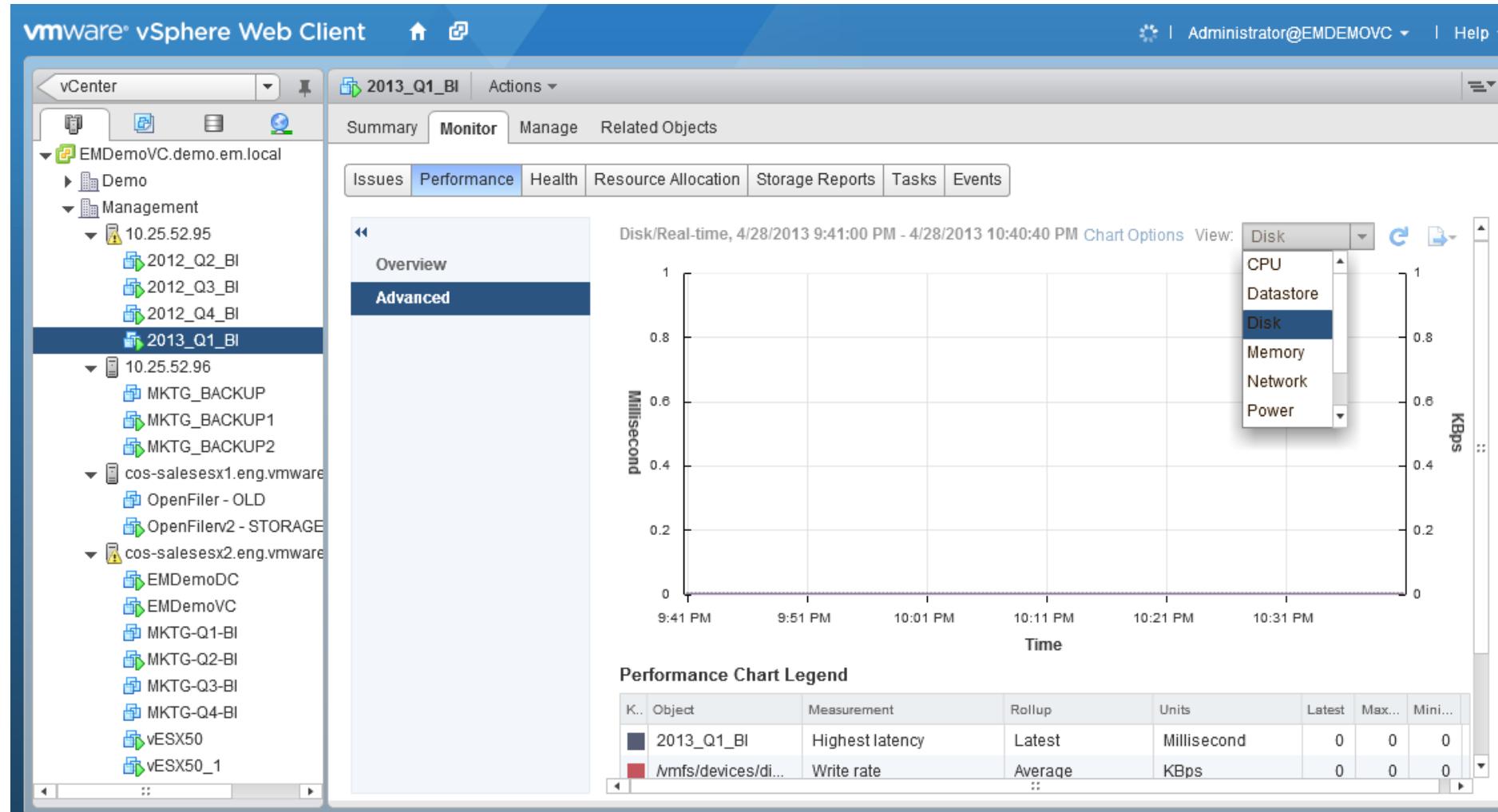
儀表板可依據客戶管理需求客製化群組方便管理

優勢

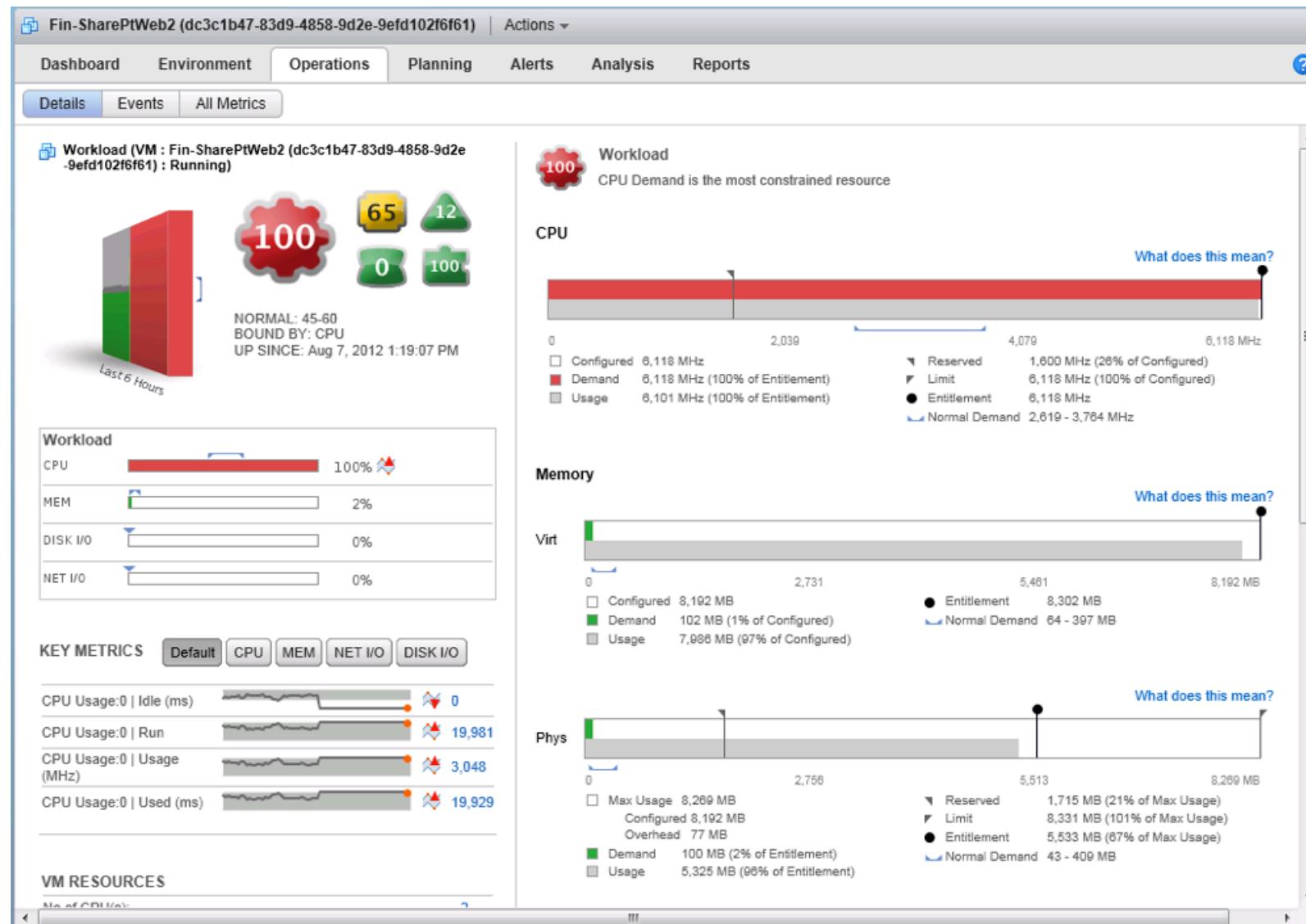
- 依AP 或業務特性調整Infra 維運的角度
- 依群組管理策略產生智能式報警與臨界值

The screenshot shows the vCenter Operations Manager interface. On the left, there's a navigation tree with categories like Application, Folder, VM, and vCM Machine Groups. Under vCM Machine Groups, there are several options: All Machines, All VM Guest Machines, All VM Guest Windows, and All Windows Machines. The main pane displays a 'Define membership' form. It includes a summary section with '95 Health' (Immediate issues) and '67 Efficiency' (Optimization opportunities). Below this, there's a table for defining membership rules. The table has columns for rule type, operator, value, and a dropdown menu. One row shows 'VM Power State' set to 'equals' 'Powered On'. Another row shows 'VM CPU Count' set to 'less than' '4'. A third row shows 'VM Memory (in GB)' set to 'less than' '16'. A fourth row shows 'VM Disk Space (in GB)' set to 'less than' '150'. An 'Application' row is partially visible. To the right of the table is a dropdown menu containing 'tc Server', 'IIS', and 'RabbitMQ'. A large orange speech bubble points to this dropdown with the text 'VIN 提供內建應用感知能力' (VIN provides built-in application awareness). Other orange callout boxes point to the '95 Health' metric and the '依規則自動更新群組成員 (e.g. Host, VM settings)' text.

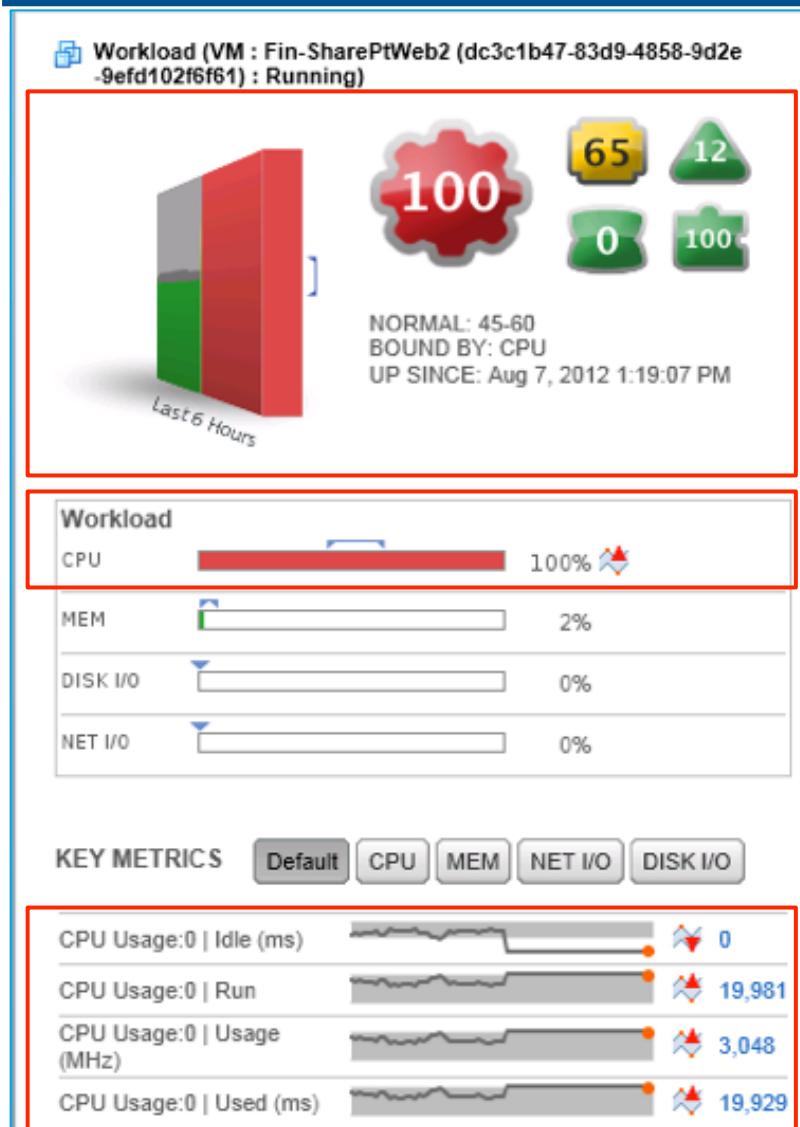
傳統管理方式你需要慢慢比對效能問題



某個虛擬機的工作量狀態



過去六小時的工作量



工作量過去在三小時前是綠色並約佔50百分比，現在是到百分之百並呈現紅色示警

這個虛擬機絕對是在消耗處理器資源

有多個指標超標，CPU idle 是比一般狀況低非常多且CPU 使用率超出正常情況

CPU 工作量細節

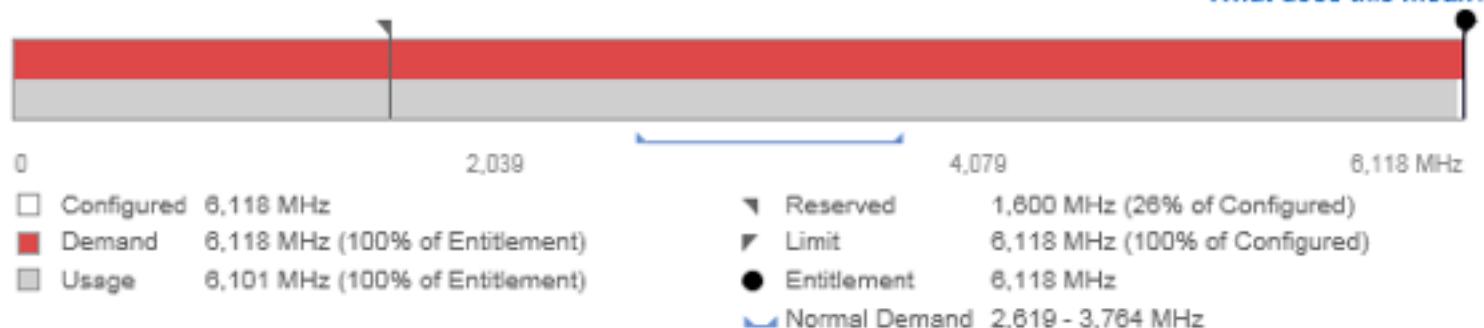


Workload

CPU Demand is the most constrained resource

線上協助功能提供問題解釋與可能的解法

CPU



Interpretations and Recommendations

VMware vCenter Operations Manager: Interpretations and Recommendations

Virtual Machine Workload CPU

What Is It? / What Does It Mean?

The CPU section shows the load on VM CPUs by comparing Demand and Usage to Configured. The CPU section also shows the Reservation, Limit, Entitlement, and Normal Demand.

Usage measures the amount of CPU that the VM currently uses. Typically, a problem exists if Demand is higher than Usage. The VM can use at least its Entitlement, but it does not have to use all of its entitlement. A VM can use CPU resources above its entitlement only if other VMs do not use their full entitlements. Normal Demand is the normal range of Demand based on vCenter Operations Manager.

Demand is the key metric. You can compare Demand to Usage, Entitlement, Configured, and Normal Demand.

提出建議如何解決問題

Entitlement measures the amount of CPU that the VM is entitled to use. If there are no constraints on its consumption, such as limits or contention with other VMs, the VM can use more CPU resources than its entitlement. Normal Demand is the range of Demand values between Usage and Entitlement. A Demand value outside of the Normal Demand range indicates a potential problem.

Common Problems / Solutions

VM CPU Spike

What Do I Look For?

- Demand > Normal Demand
- Examine the Normal Demand line. If the current Demand is above the normal range, it might indicate a CPU spike.

How Do I Fix This?

- To determine the effect of the spike, **check the Anomalies badge**. If the Anomalies score is low or its color is green, the workload spike does not have a noticeable effect on the VM. If the Anomalies score is high or its color is not green, the workload spike might be part of a larger problem.
- If a larger problem is indicated, select the Anomalies badge to obtain a list of abnormal metrics. The order of the metric list is from most likely cause to least likely cause. For example, if CPU is near the top of the list, the cause is probably a CPU problem. If disk is at the top of the list, the cause is probably a disk I/O spike that has a side-effect of increasing CPU.
- To further investigate the cause of the problem, select the Events tab, make sure that Workload is selected, and select Show self events and Show parent object events. The chart shows the Workload badge for the past few days, annotated with events that have occurred on the VM and on the host on which the VM is running. These events might highlight a change that occurred that could be the cause of the problem.
- If you cannot identify a problem with the virtual infrastructure (the VM container or host on which the VM is running), contact the VM or application owner to determine if there is a problem with the application in the VM.

VM is under-provisioned

VM has a limit set

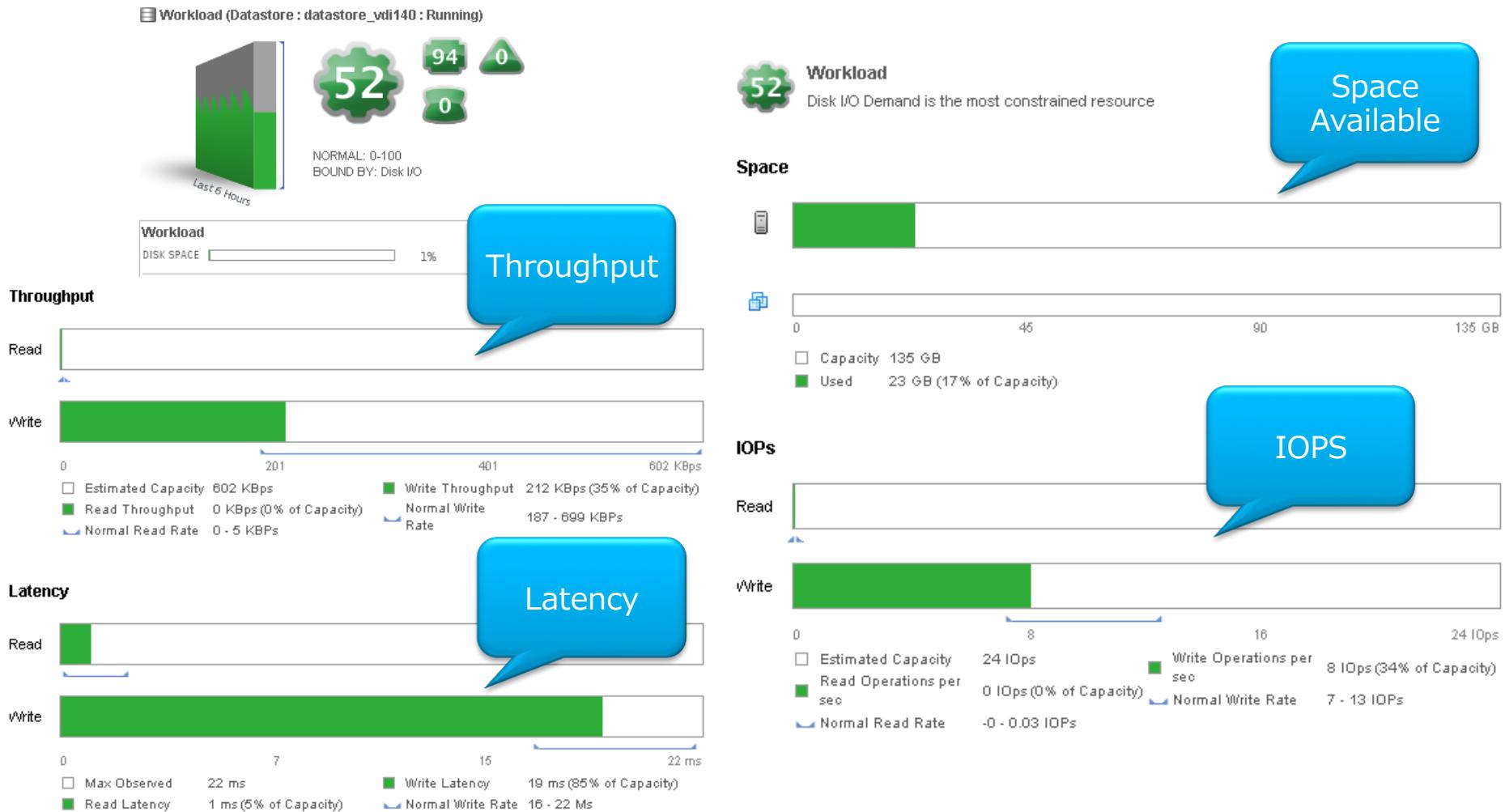
ESX host is CPU overcommitted

Best Practices

- Verify that VMware Tools is installed on each virtual machine.
- Set the CPU reservations for all high-priority virtual machines to guarantee that they receive enough CPU cycles.
- Reduce the number of virtual CPUs on a virtual machine to the number required to execute the workload. For example, a single-threaded application on a four-way virtual machine can only benefit from a single vCPU, but the hypervisor's maintenance of the three idle vCPUs takes CPU cycles that could be used for other work.

Operations: Details

■ Workload Badge Focus : Datastore 範例



透過vSOM可自動根據歷史資料分析異常的狀況提早預警

Anomalies (Cluster : Infrastructure-cluster-TB2)

NORMAL: 0-4

Last 6 Hours

Workload

CPU	18%
MEM	8%
DISK I/O	1%
NET I/O	3%

KEY METRICS Default CPU MEM NET I/O DISK I/O

▲ VIRTUAL MACHINE (14 OUT OF 17 SYMPTOMS)

▷ SYSTEM (20 OF 27)

▷ MEMORY (10 OF 27)

38 %	Memory Estimated entitlement
8 %	Memory Overhead Max (KB)
4 %	Memory Shared (KB)
4 %	Memory Consumed (KB)
4 %	Memory Zero (KB)

▷ NETWORK (2 OF 27)

8 %	Network I/O Usage Capacity
-----	------------------------------

▷ VIRTUAL DISK (2 OF 27)

▷ STORAGE (1 OF 27)

▷ CPU USAGE (1 OF 27)

▷ GUEST FILE SYSTEM (1 OF 27)

▷ SUMMARY (1 OF 27)

▷ HOST SYSTEM (13 OUT OF 15 SYMPTOMS)

▷ DATASTORE (9 OUT OF 11 SYMPTOMS)

▷ CLUSTER COMPUTE RESOURCE (2 SYMPTOMS)

▷ RESOURCE POOL (1 SYMPTOM)

Operations: Details

■ Fault Badge Focus

Faults (vCenter Server : Monaco2KTBMN)

Last 6 Hours

NORMAL: Not calculated yet

Workload

CPU	1%
MEM	
DISK I/O	
NET I/O	

KEY METRICS

CPU Usage Provisioned Capacity (MHz)	777,985
Instance Generated Number of down resources	0
Summary Total Number of Clusters	3
Summary Total Number of Datacenters	2

vCenter Service overall health changed from 'green' to 'not available'. Generated by vCenter Server.

Alert Information

Fault criticality:	Critical
Resource type:	vCenter Server
Resource name:	Monaco2KTBMN
Parent name:	World
Event time:	Oct 27, 2011 9:59:37 AM

Event Source Details

Event source:	Monaco2KTBMN
Source event object name:	Monaco2KTBMN
Source event name:	vCenter Service Overall Health Changed
Source event status:	vCenter Service overall health changed from 'green' to 'not available'. vCenter Operations message: Make sure that the vCenter management web service is running, and use the vSphere Client to access the vCenter Service Status icon for more information.

vCenter Service overall health changed from 'not available' to 'red'. Generated by vCenter Server.

Alert Information

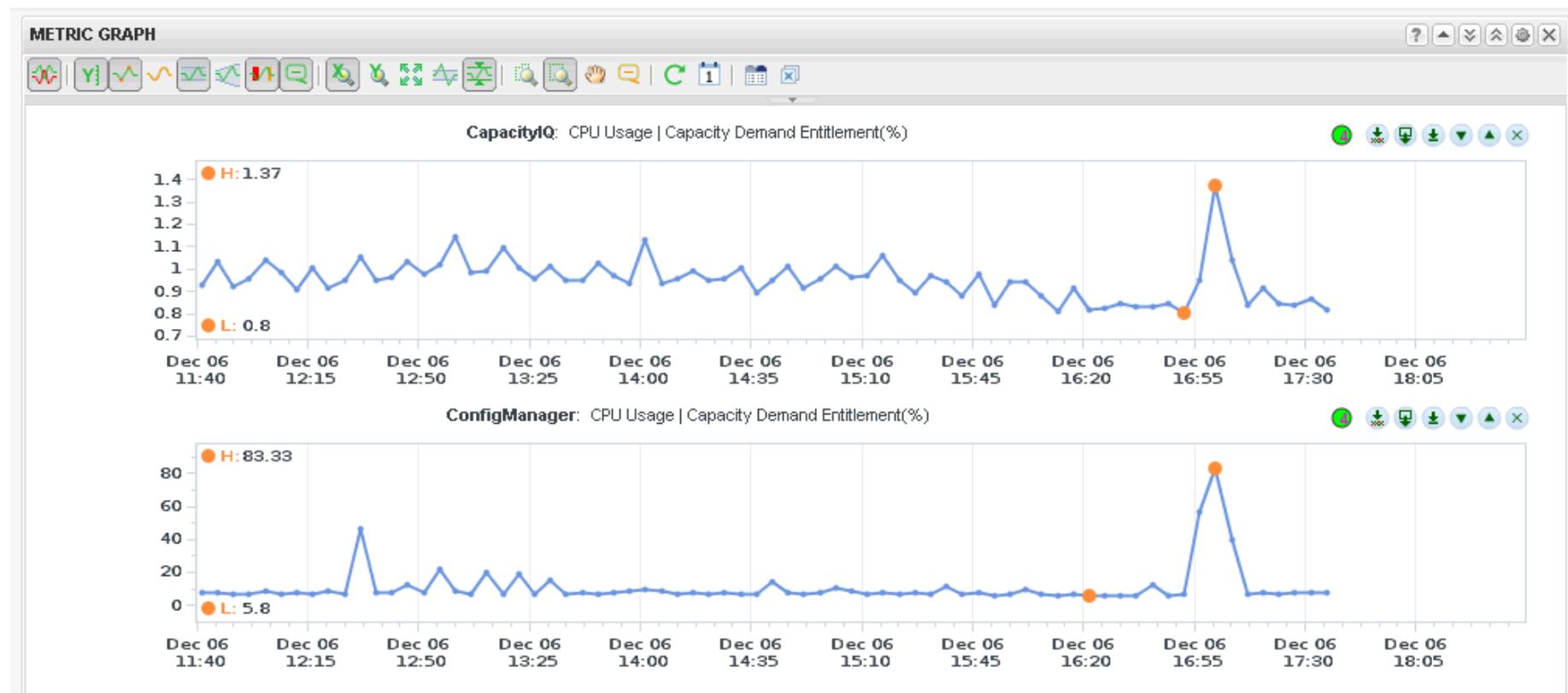
Fault criticality:	Critical
Resource type:	vCenter Server
Resource name:	Monaco2KTBMN
Parent name:	World
Event time:	Oct 27, 2011 10:05:35 AM

Event Source Details

Event source:	Monaco2KTBMN
Source event object name:	Monaco2KTBMN
Source event name:	vCenter Service Overall Health Changed
Source event status:	vCenter Service overall health changed from 'not available' to 'red'. vCenter Operations message: Make sure that the vCenter management web service is running, and use the vSphere Client to access the vCenter Service Status icon for more information.

vCOPS提供多維度的分析角度讓問題更容易被發掘

可同時顯示多個圖表並且合併或分拆.
可同時從不同為維度和度量衡分析.
超過警戒值會以橘點顯示



Operations: All Metrics

■ New Metrics Available

HEALTH TREE

METRIC SELECTOR (10.20.87.203)

Badge Metrics

Capacity Planning Metrics

METRIC CHART

Last 7 days

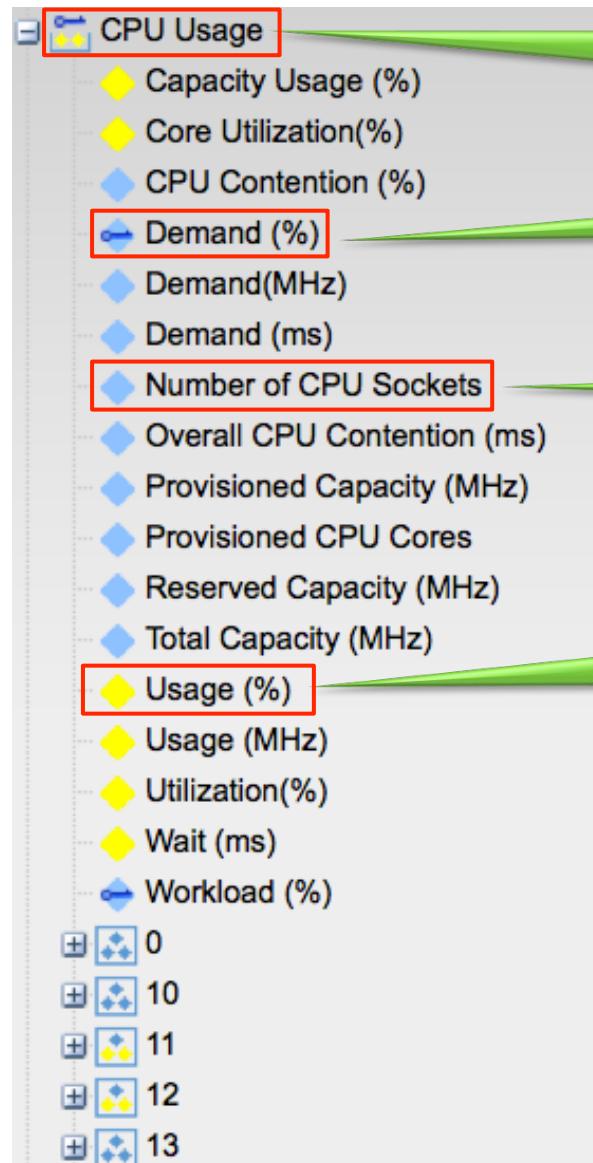
10.20.87.203: System | Uptime (seconds)

H: 21,152,844

L: 20,548,104

Sep 26 Sep 27 Sep 27 Sep 28 Sep 28 Sep 29 Sep 29 Sep 30 Oct 01 Oct 01 Oct 02 Oct 02 Oct 03 Oct 03
10:41 00:23 14:06 03:49 17:32 07:15 20:58 10:41 00:23 14:06 03:49 17:32 07:15 20:58

vCOPS提供最重要的關鍵KPI



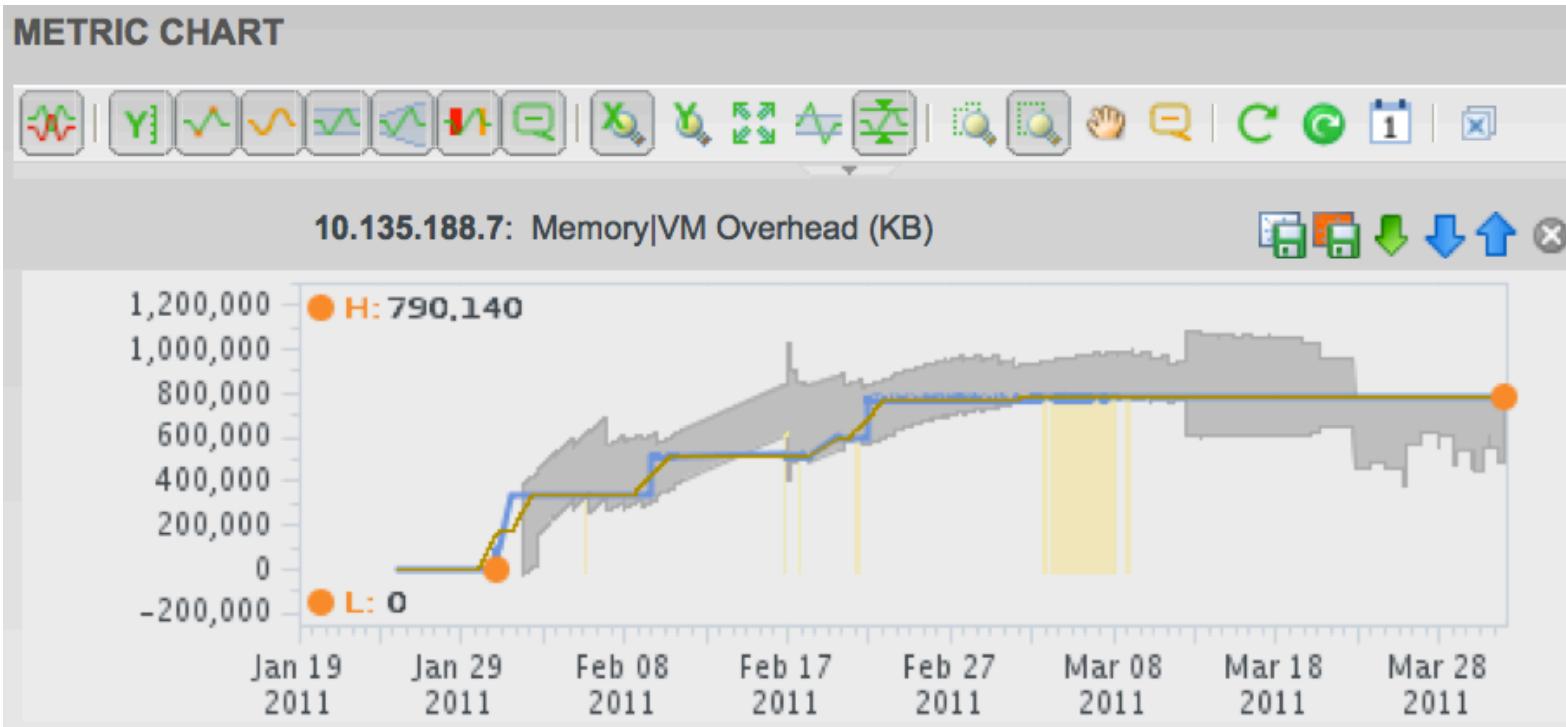
Metric Collection – includes KPI and metric violating a threshold

Blue icon with key – a KPI metric

Blue icon – Regular metric

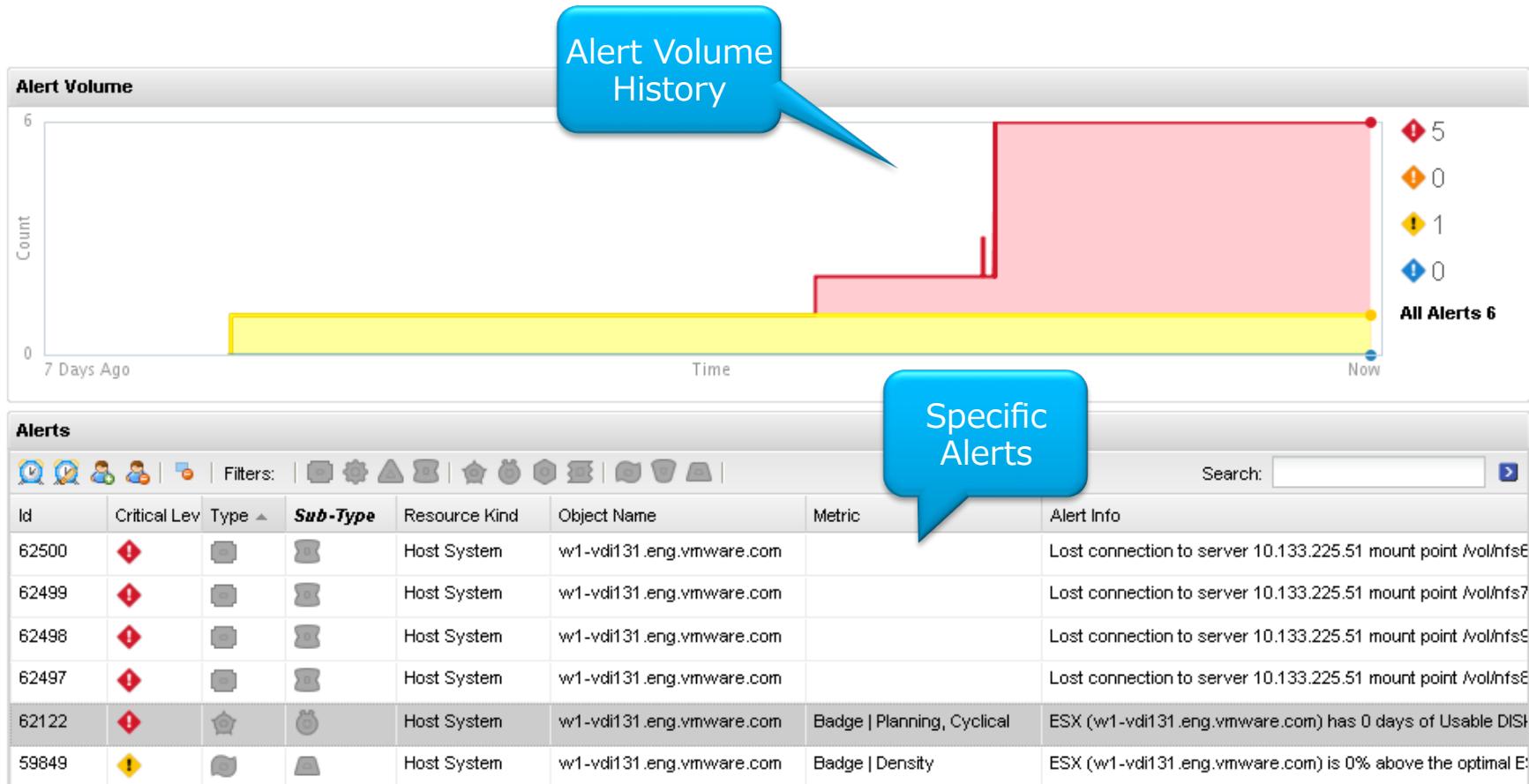
Yellow icon – metric violating a threshold

How to Read Charts



- Blue line – Metric line
- Green line – Trend line
- Orange dots – Minimum and maximum data point
- Gray band – Dynamic Thresholds
- Yellow – Number of anomalies

Smart Alerts View



Smart Alerts Details

Active Alert: w1-vdi131.eng.vmware.com (Host System)

Actions:

AlertId: 62122 Risk Alert Time Remaining Start: Oct 27, 2011 5:53:53 PM Duration: 2d:21h:47m:29s | w1-vdi131.eng.vmware.com

Reason

TRIGGER: METRIC HT equals
RESOURCE: w1-vdi131.eng.vmware.com (Host System)
METRIC NAME: Badge | Planning, Cyclical
VALUES: 0.0 = 0.0

Root Cause

ESX (w1-vdi131.eng.vmware.com) has 0 days of Usable DISK I/O Capacity remaining

Forecast Information

Forecast Method: Automatic fit of last 30 days
Forecast Interval: Daily
Capacity Rules: Last Known, Usable (HA + 30% Buffer)
Usage Rules: Demand, Reservation

Impact

Resource Kind: Host System

Time Remaining (Host : w1-vdi131.eng.vmware.com : Running)

100 **8** **79**

NORMAL: Not calculated yet

CAPACITY METRICS Score Time Remaining

Planning Usage Percent Trend CPU	0.15	29d
Planning Usage Percent Trend Memory	2	140d
Planning Usage Percent Trend diskSpace	17	> 1 year
Planning Usage Percent Trend DiskIO	17	< 1d
Planning Usage Percent Trend Network	0	> 1 year

Close

我該如何調整資源配置?



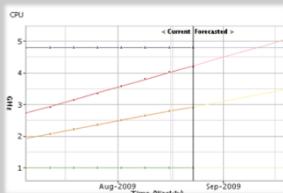
分析

- 我要知道VM 使用資源歷史資料?
- 什麼資源分配出去? 什麼資源真的有在用?
- 我還可以跑多少個VM?

1.2.3 Oversized Virtual Machines - List				
Virtual Machine	Configured vCPU	Recommended vCPU	Configured Memory	Recommended Memory
ESX-leap-002	1 vCPU	0.020 vCPUs	2 GB	364 MB
HOST-AFP-001	1 vCPU	0.020 vCPUs	1 GB	322 MB
host-001	1 vCPU	0.020 vCPUs	1 GB	294 MB
SCN-RCD-009	2 vCPUs	0.08 vCPUs	4 GB	344 MB
SCN-RCD-010	2 vCPUs	0.08 vCPUs	4 GB	321 MB
airplane-001	2 vCPUs	0.08 vCPUs	3.5 GB	364 MB
airplane-002	2 vCPUs	0.11 vCPUs	3.5 GB	371 MB
airplane-003	2 vCPUs	0.11 vCPUs	4 GB	472 MB
airplane-004	2 vCPUs	0.11 vCPUs	2 GB	422 MB
airplane-005	2 vCPUs	0.11 vCPUs	8 GB	3,638 MB
airplane-006	2 vCPUs	0.11 vCPUs	8 GB	1,096 MB
airplane-007	1 vCPU	0.08 vCPUs	2 GB	460 MB
airplane-008-g	1 vCPU	0.11 vCPUs	8 GB	594 MB
air-tools	1 vCPU	0.02 vCPUs	1.5 GB	399 MB
express-project	1 vCPU	0.02 vCPUs	8 GB	3,295 MB
express-project-01	0.02 vCPUs	0.02 vCPUs	32 GB	12,013 MB
express-project-02	0.02 vCPUs	0.02 vCPUs	32 GB	951 MB

優化

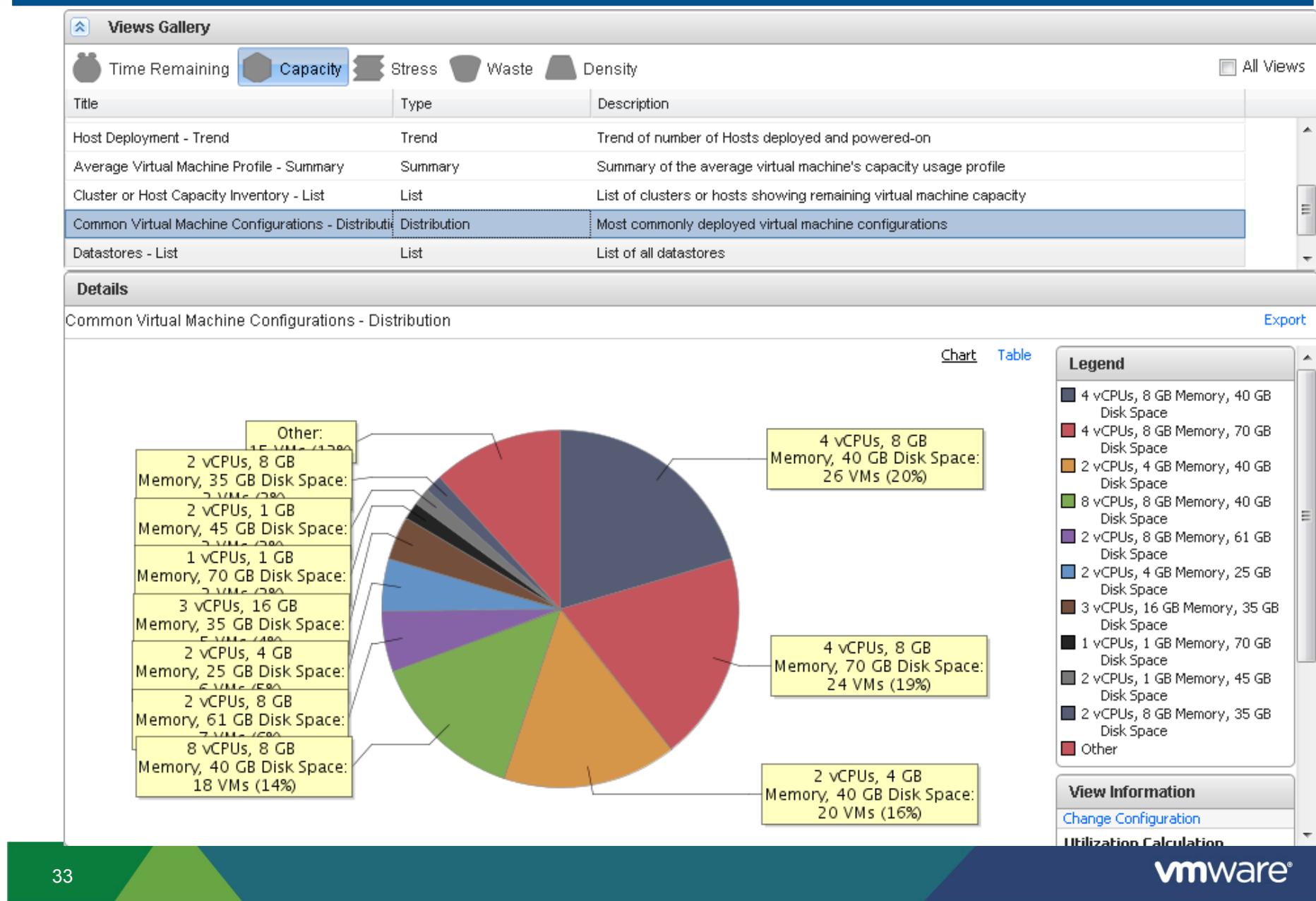
- 我可以怎樣更有效率使用資源?
- 哪些VM 資源沒有正確配置?
- 我可以收回哪些過度配置或沒在用的資源?



預估

- 我的環境何時會容量滿載?
- 如果我增加, 移除或調整容量對現況有何幫助?
- 我需要更科學地佐證硬體採購?

檢視現在環境虛擬機設定規格



內建儀表板可快速從各種維度快速分析所有問題

The screenshot shows the vCenter Operations Manager interface for the 'Palo Alto' cluster. The navigation pane on the left lists various hosts and clusters under 'World'. The main content area is titled 'HEAT MAP GALLERY' and displays a heatmap for memory contention across hosts. A tooltip at the bottom of the heatmap asks, 'Which hosts currently have the highest memory demand and contention?'. A dropdown menu in the top right is open, with 'MEMORY' selected from a list of categories: All, CAPACITY, COUNT, CPU, HEALTH, IO, MEMORY, NET, STORAGE, and WORKLOAD. The heatmap shows several green squares, indicating low contention levels. Below the heatmap is a 'DETAILS' table:

Host	Datacenter	Cluster	Memory Machine Demand (KB)	Memory Contention (%)
w2-mgmtpm-11.eng.vmware.com	Palo Alto	Mgmt_Compete	2,968,059	0

Page navigation controls are visible at the bottom of the details table.

使用 Heatmaps 進行分析

World

Dashboard Operations Planning Alerts **Analysis** Reports ?

HEAT MAP GALLERY Focus Area All Smallest Box Shows VM Search Showing 9 of 25 Customize

Description	Color By	Size By	Group By	Smallest Box
VM CPU Contention Sized By CPU Usage Grouped By Cluster/Host	CPU Contention (%)	CPU Usage Usage (MHz)	Cluster / Host	VM
VM Capacity Remaining Sized By Workload Grouped By Cluster/Host	Badge Time Remaining - Planning, Cycl...	Badge Workload (%)	Cluster / Host	VM
VM Health Sized By Workload Grouped By Cluster/Host	Badge Health	Badge Workload (%)	Cluster / Host	VM
VM I/O Contention Sized By I/O Usage Grouped By Datastore	Datastore:<datastore> Total Latency (ms)	Datastore:<datastore> Usage Rate(KB...)	Datastore	VM
VM Memory Contention Sized By Memory Usage Grouped By Clust...	Memory Contention (%)	Memory Usage (KB)	Cluster / Host	VM

VM Health Sized By Workload Grouped By Cluster/Host



Cluster4_BMP devesx14.wp.fsi devesx13.wp.fsi devesx12.wp.fsi Cluster2 devesx6.wp.fsi devesx7.wp.fsi devesx5.wp.fsi Cluster3 devesx10.wp.fsi Cluster1_Automation

0 50 100

DETAILS

VM	Cluster	Host	Badge Workload (%) ▾	Badge Health
SMHesx01	Cluster2	devesx7.wp.fsi	236	78
sgbd-cent50	Cluster2	devesx3.wp.fsi	107	43
iisWebServer	Cluster2	devesx5.wp.fsi	107	56
OSP-RTP-W-67	Cluster4_BMP	devesx15.wp.fsi	107	83
OSP-RTP-L-38	Cluster4_BMP	devesx14.wp.fsi	103	59
OSP-RTP-W-50	Cluster4_BMP	devesx13.wp.fsi	103	65

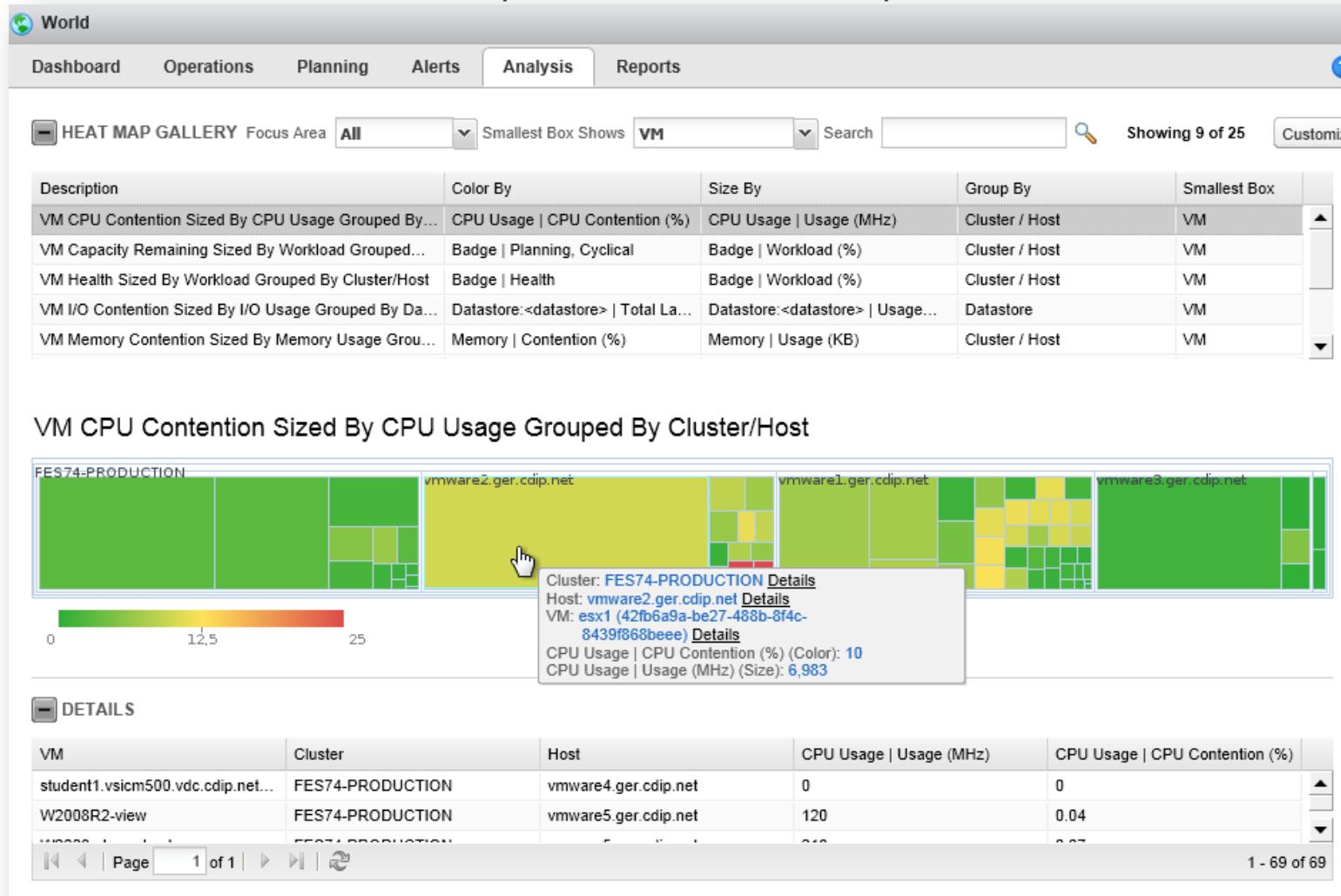
Page 1 of 5

1 - 100 of 420

使用 Heatmaps 進行分析 – CPU Contention

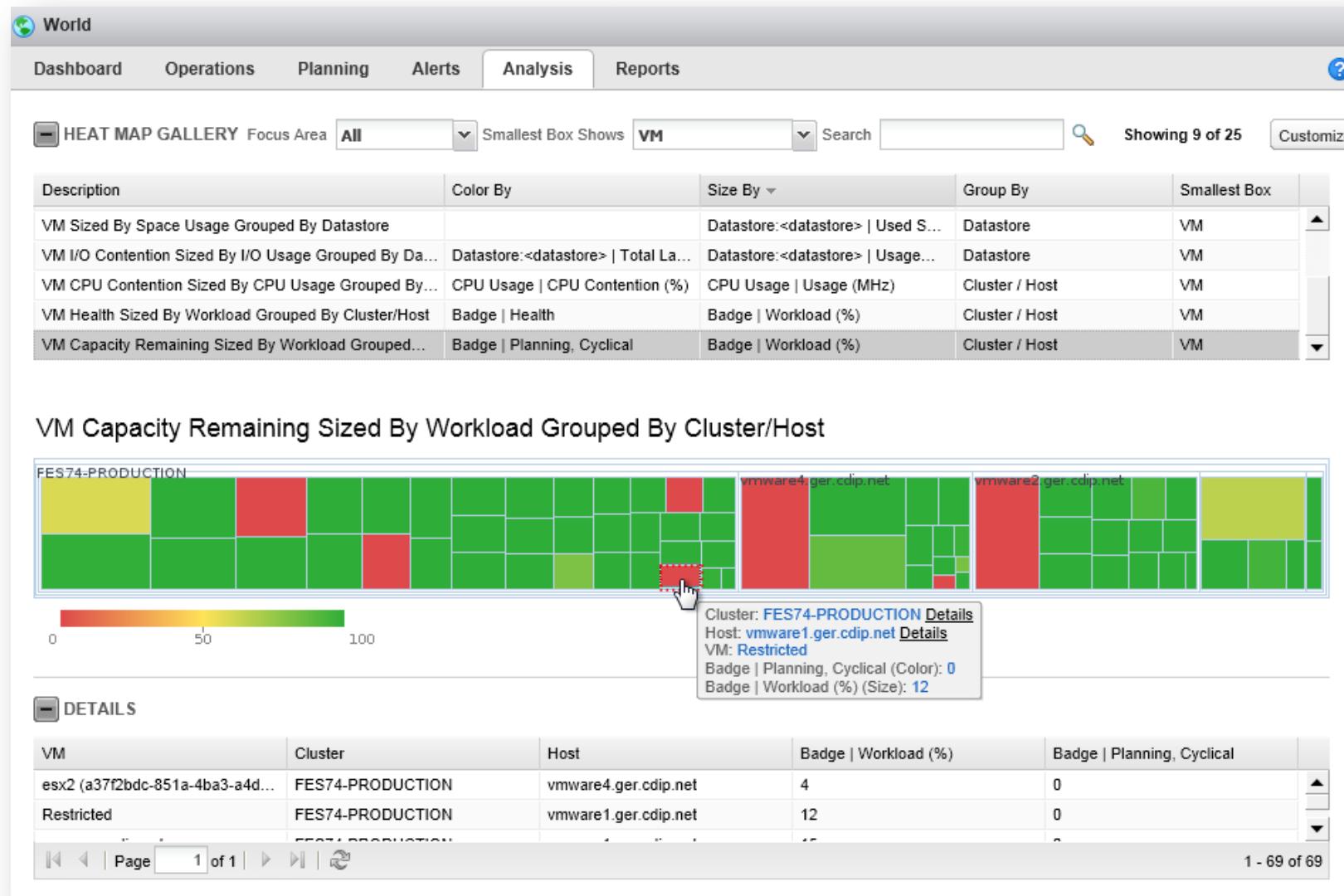
■ 範例：在叢集中找到哪個主機及虛擬機組合是資源最競爭的狀況

- 以叢集及主機為群組分類 / 小方格代表虛擬機 / 顏色代表負載



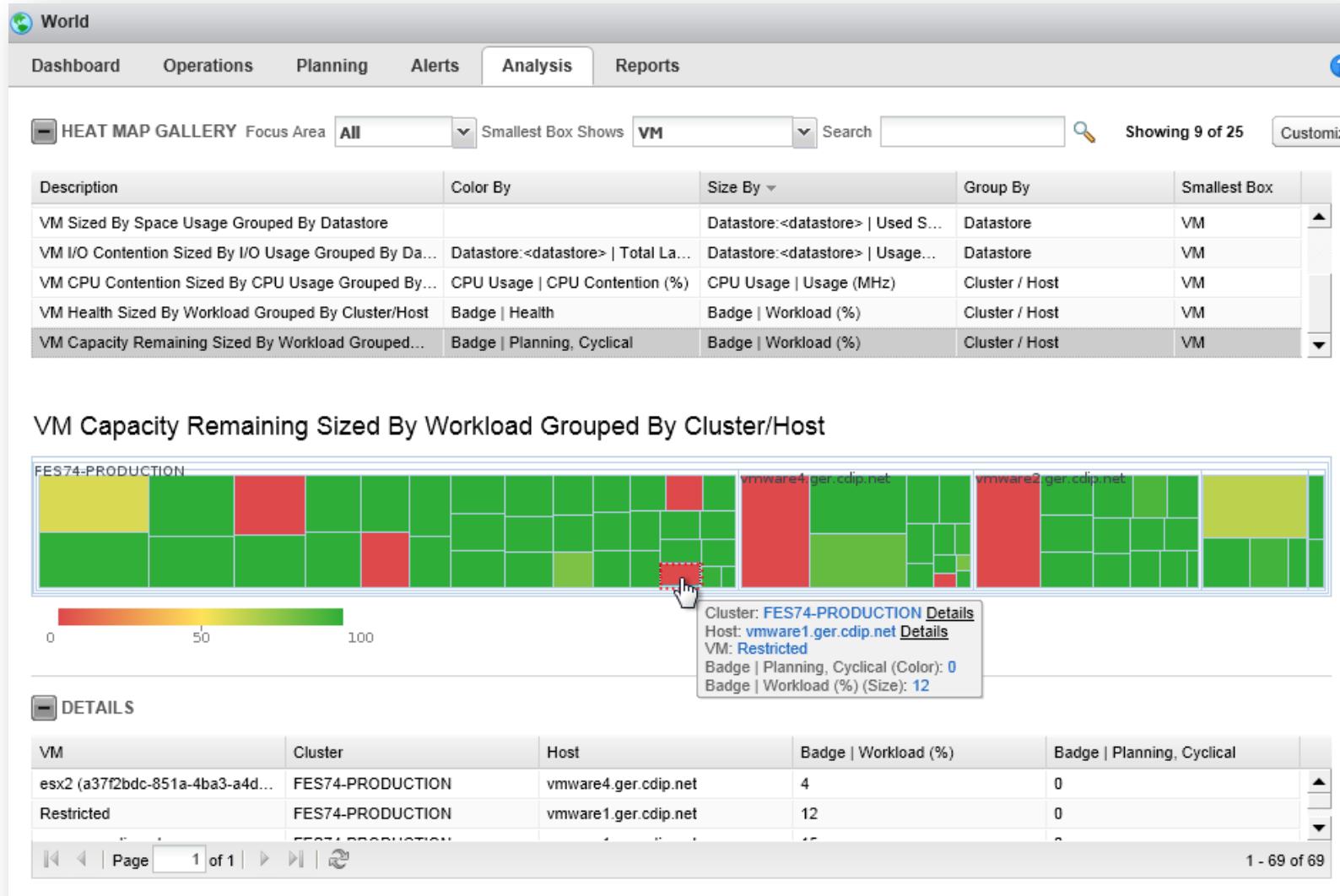
使用 Heatmaps 進行分析 – 虛擬機容量評估

- 範例：根據計劃工作負載哪個虛擬機會缺乏資源？



範例-分析 Virtual Machines 存儲空間狀況

- 每個方塊都代表一個虛擬機器亮紅色就代表資料空間不足了



範例-快速分析 Virtual Machines 存儲空間效能狀況

Manager

Palo Alto | Actions ▾

Dashboard Environment Operations Planning Alerts Analysis Reports ?

HEAT MAP GALLERY Focus Area All Smallest Box Shows All Configurations Search Showing 43 of 43 Customize

Description	Color By	Size By	Group By	Smallest Box
Which VMs currently have the highest storage I/O usage and...	Virtual Disk:Aggregate of all instanc...	Disk Usage Rate(KBps)	Cluster / Host	VM
Which VMs currently have the most abnormal Workload?	Badge Anomaly	Badge Workload (%)	Cluster / Host	VM
Which VMs have high Workload that is possibly due to long-t...	Badge Stress	Badge Workload (%)	Cluster / Host	VM
Which VMs have the highest disk space overcommitment an...	Virtual Disk:Aggregate of all instanc...	Time Remaining Disk Space	Datastore	VM
Which XenApp Servers have highest CPU ready time and m...	CPU Usage Ready (ms)	CPU Usage Demand (%)	Cluster / Host	VM

Which VMs currently have the highest storage I/O usage and latency?

Mgmt_BCA

0 29.573 59.145

Cluster: Mgmt_BCA Details
Host: w2-mgmtpm-6.eng.vmware.com Details
VM: bca-sql-analytics Details
Virtual Disk:Aggregate of all instances | Total Latency (Color): 59
Disk | Usage Rate(KBps) (Size): 115,647

DETAILS

VM	Cluster	Host	Disk Usage Rate(KBps)	Virtual Disk:Aggregate of all instanc...
ControlCenter2	Mgmt_Infra	w2-mgmtpm-1.eng.vmware.com	0	0

Page 1 of 2

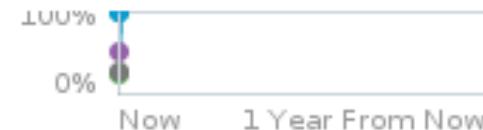
• 每個方塊都代表一個磁碟空間 越趨近黃色代表IO過忙

可有效評估現有雲端中心容量做為未來採購需求依據

87

Time Remaining

Indicates the number of days before resources are exhausted



162

Days

DISK SPACE 162

MEM 205

DISK I/O >1y

NET >1y

CPU >1y

磁碟空間剩162天可使用

44

Capacity Remaining

Measures the remaining available VMs as a percent of the total VM capacity

56%

44%

DEPLOYED 106 VMs

POWERED ON 101 VMs

78

More VMs

雲端資料中心容量
剩78虛擬機可部署



Cluster3

Dashboard Operations Planning Alerts Analysis Reports

Environment Scoreboard Summary Views Events



143



11



97



13



97



94



53

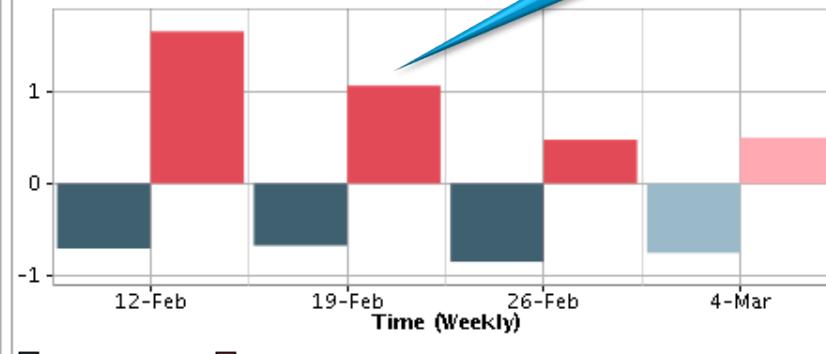
規劃儀表板提供趨勢與預測細項資訊

New what-if scenario Export

Objects

Perspective: Remaining

Trend and Forecast



Extended Forecast

	Current Week	Next Week	Next Month	Next Quarter	Next
Remaining Ho...	-0.8543 Hosts	-0.7572 Hosts	-0.856 Hosts	-1.12 Hosts	-1.51
Remaining VMs	0.4753 VMs	0.4978 VMs	-1.66 VMs	-7.09 VMs	-14.4

Time Remaining

Remaining Virtual Machine Capacity	Time Remaining
	8 days

Resources

Source: Physical Aggregation: Sum Perspective: Used Unit: Actual Value

Time Remaining and Trend Information

	Time Remaining	Last 2 Weeks	Last Week	Current Week	Next Week	Next Month	Next Quarter	Next Half Year
Host CPU Limited Demand	> 1 year	25.71 GHz	26.97 GHz	28.29 GHz	27.83 GHz	30.04 GHz	35.93 GHz	44.76 GHz
Host CPU Reserved Capacity	> 1 year	1.15 GHz	1.17 GHz	1.17 GHz	1.11 GHz	1.09 GHz	1.04 GHz	0.95 GHz
Host Memory Limited Demand	> 1 year	45.21 GB	44.71 GB	46.39 GB	46.38 GB	48.02 GB	52.4 GB	58.96 GB
Host Memory Reserved Capacity	> 1 year	11.27 GB	11.22 GB	11.32 GB	11.87 GB	12.5 GB	14.17 GB	16.68 GB
Datastore Disk Space Total Used	8 days	9.31 TB	9.35 TB	9.38 TB	9.38 TB	9.51 TB	9.84 TB	10.34 TB

評估容量擴充風險及優化虛擬基礎架構

The screenshot shows the vCenter Operations Manager interface for a cluster named "DemoCluster". The "Planning" tab is selected. A summary chart indicates remaining hosts and VMs until February 17th. A callout bubble highlights the "Time Remaining" column in the "Time Remaining and Trend Information" table, which shows 179 days for CPU effective demand.

VM CPU Effective Demand 179 days

	Time Remaining	Last Weeks	Last Week	Current Week	Next Week	Next Month	Next Quarter	Next Half Year
VM CPU Effective Demand	179 days	-	3.89 GHz	4.28 GHz	4.64 GHz	5.75 GHz	8.71 GHz	13.15 GHz
VM CPU Reservation Used	> 1 year	4.13 GHz	4.13 GHz	4.13 GHz	4.13 GHz	4.13 GHz	4.13 GHz	4.13 GHz
VM Memory Effective Demand	> 1 year	-	2.16 GB	3.09 GB	2.82 GB	3.12 GB	3.92 GB	5.12 GB
VM Memory Reservation Used	309 days	-	4.52 GB	6.34 GB	6.15 GB	7.44 GB	10.88 GB	16.03 GB
VM Disk Space Total Used	> 1 year	-	40.26 GB	46.81 GB	46.78 GB	52.77 GB	68.75 GB	92.71 GB
VM Disk I/O Read	> 1 year	-	0.04 MBps	1.44 MBps	1.06 MBps	1.57 MBps	2.91 MBps	4.93 MBps
VM Disk I/O Write	> 1 year	-	291.4 KBps	834.9 KBps	637 KBps	727.8 KBps	969.8 KBps	1,332 KBps
VM Disk I/O Reads per Second	> 1 year	-	1.165 Tps	74.26 Tps	55.84 Tps	85.07 Tps	163 Tps	279.9 Tps
VM Disk I/O Writes per Second	> 1 year	-	21.93 Tps	30.18 Tps	24.78 Tps	21.19 Tps	11.6 Tps	0 Tps
VM Network I/O Received Rate	> 1 year	-	27.58 KBps	20.43 KBps	24.08 KBps	25.05 KBps	27.63 KBps	31.51 KBps
VM Network I/O Transmitted Rate	> 1 year	-	5.69 KBps	11.7 KBps	5.91 KBps	0 KBps	0 KBps	0 KBps

可有效評估現有雲端容量成長狀況

Resources									
Source:	Physical	Aggregation:	Sum	Perspective:	Used	Unit:	Percentage		
Time Remaining and Trend Information									
	Time Remaining	Last 2 Weeks	Last Week	Current Week	Next Week	Next Month	Next Quarter	Next Half Y...	
Usable Host CPU Effective Demand	> 1 year	28%	28%	27%	30%	33%	39%	48%	
Usable Host CPU Reserved Capacity	> 1 year	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
Usable Host CPU Count Overcommitted Allocation	148 days	83%	84%	84%	85%	87%	93%	101%	
Usable Host Memory Effective Demand	134 days	44%	45%	43%	50%	58%	79%	110%	
Usable Host Memory Reserved Capacity	> 1 year	18%	18%	19%	18%	18%	17%	16%	
Usable Host Memory Overcommitted Allocation	0 days	174%	180%	178%	180%	185%	198%	218%	
Usable Datastore Disk Space Total Used	134 days	74%	76%	77%	78%	82%	91%	104%	
Usable Datastore Disk Space Overcommitted Allocation	95 days	93%	93%	93%	94%	95%	99%	104%	
Usable Host Disk I/O Read	> 1 year	48%	53%	56%	53%	54%	57%	61%	
Usable Host Disk I/O Write	> 1 year	2.7%	2.6%	2.1%	2.9%	3.3%	4.1%	5.5%	
Usable Host Disk I/O Reads per Second	> 1 year	14%	16%	17%	17%	18%	20%	24%	
Usable Host Disk I/O Writes per Second	> 1 year	3.5%	3.4%	2.8%	3.7%	3.9%	4.5%	5.5%	

Details						
Capacity Risk Details						
	Total Capacity	Buffers	Usable Capacity	Capacity Remaining	Time Remaining	
CPU	288 GHz / 108 Cores	HA / +25%	162 GHz / 60 Cores	74% / 298 VMs	> 1 year	
Memory	863 GB	HA / +65%	226 GB	72% / 265 VMs	204 days	
Disk Space	15 TB	-- / +10%	13 TB	48% / 100 VMs	159 days	
Disk I/O Read	689 MBps	-- / +65%	241 MBps	47% / 89 VMs	> 1 year	
Disk I/O Write	1.3 Gbps	-- / +65%	480 MBps	97% / 4,370 VMs	> 1 year	
Disk I/O Read per Second	14,015 Tps	-- / +65%	4,905 Tps	85% / 584 VMs	> 1 year	
Disk I/O Write per Second	33,428 Tps	-- / +65%	11,699 Tps	96% / 2,642 VMs	> 1 year	
Network	124 MBps	-- / +65%	43 MBps	40% / 69 VMs	> 1 year	

可分析現有虛擬主機組態是否有資源浪費的狀況

79 Reclaimable Waste
Shows the percentage of total capacity that can be reclaimed

50
vCPUs

702.3 gb
Disk

88.4 gb
vMem

⌚ Time Remaining 📦 Capacity ⚡ Stress 🔒 Compliance 垃圾桶 Waste 密度 Density All Views (19)

Title	Type	Description
Idle Virtual Machines	List	Useful for checking idle capacity. Shows CPU, disk I/O, network I/O, memory co
Oversized Virtual Machines	List	Used to check excess capacity and for optimization. Compares configured and i
Undersized Virtual Machines	List	Used to check stressed capacity and for troubleshooting. Shows percentage of
Powered-Off Virtual Machines	List	Useful for reclaiming unused capacity. Sort the columns to rank Virtual Disk Space Usage, Provisioned DISK Space, and Time Powered Off.

Details

Oversized Virtual Machines

Virtual Machine	P... TM	Configured vCPU	Recommended vCPU	C... Cpu Utilization	Configured Memory	Recommended Memory
wl-win7-vm1	I 2 vCPUs	2 vCPUs	99% 1 GB		544 MB	
wl_cpu_stress	I 1 vCPUs	1 vCPUs	99% 0.5 GB		160 MB	
wl-win7-vm2	I 2 vCPUs	2 vCPUs	99% 1 GB		576 MB	
wl_cpu_stress2	I 1 vCPUs	1 vCPUs	99% 0.5 GB		160 MB	
bca-sap-oradb-linux	I 4 vCPUs	2 vCPUs	80% 15 GB		3,872 MB	
bca-sap-app-linux	I 4 vCPUs	4 vCPUs	78% 23 GB		928 MB	
wl-vmware-io-analyzer-15	I 2 vCPUs	1 vCPUs	50% 2 GB		256 MB	

◀◀ | Page 1 of 2 | ▶▶ | 🔍Displaying 1 - 50 of 68

View Information

[Change Display Settings](#)

Interval Information

Interval size: Monthly
Number of intervals: 3

44

vmware®

可分析現有虛擬主機存儲設備是否有資源浪費的狀況

Host System: w2-mgmtpm-5.eng.vmware.com

Datastore	Policy	Datastore Disk Space Capacity	Datastore Disk Space Used	Powered-Off Disk Space Used	Idle Disk Space Used	Template Disk Space Used	Templates	Snapshot Disk Space Used	Snapshots	Total Waste
datastore1 (4)	TM BCA Staging and Build	0.13 TB	1.4 GB	0 MB	0.51 GB	0 MB	0 Templates	0 MB	0 Snapshots	0.51 GB
mgmt_bca_1	TM - Production Systems	1 TB	764 GB	50,595 MB	30 GB	0 MB	0 Templates	0 MB	0 Snapshots	80 GB
mgmt_bca_2	TM - Production Systems	1 TB	717 GB	8,010 MB	17 GB	0 MB	0 Templates	0 MB	0 Snapshots	25 GB
mgmt_infra_1	TM - Production Systems	1 TB	840 GB	0 MB	167 GB	0 MB	0 Templates	0 MB	0 Snapshots	167 GB
mgmt_infra_2	TM - Production Systems	1 TB	831 GB	4,965 MB	65 GB	0 MB	0 Templates	0 MB	0 Snapshots	70 GB
mgmt_infra_3	TM - Production Systems	1 TB	717 GB	170,715 MB	63 GB	0 MB	0 Templates	0 MB	0 Snapshots	230 GB
mgmt_wor_kload_1	TM - Production Systems	1 TB	655 GB	52,704 MB	183 GB	0 MB	0 Templates	0 MB	0 Snapshots	234 GB

分析：監控及計劃容量使用

The screenshot shows the vCenter Operations Manager interface. On the left, the navigation tree displays the hierarchy: World > Site A - Private Cloud > Datacenter Site A > esx-04a.corp.local > MainStorage-Ops3. A blue callout box points to the 'MainStorage-Ops3' item with the text '檢視容量問題點' (Review capacity issues). The main dashboard features a large green hexagon with the number '89'. Below it are several horizontal bars composed of colored hexagons (green, red, yellow) representing different metrics across categories: WORLD, DATACENTERS, CLUSTERS, HOSTS, VMs, and DATASTORES. A second blue callout box points to the 'DATASTORES' bar with the text '容量偏低' (Capacity is low). In the bottom right corner, a detailed status card is open for 'Main Storage-Ops3', showing the following data:

Name:	Main Storage-Ops3
Capacity:	1
Capacity Remaining Count	0.09
VM Disk Space:	Day
Risk:	90
Time Remaining:	100
Stress:	?
Important Standards:	100

透過what-if 預測模型預估未来的容量

What-if scenario

Select type of change
What type of change would you like to model?

View
Change Type
Scenario
Configuration
VM Count
Ready to Complete

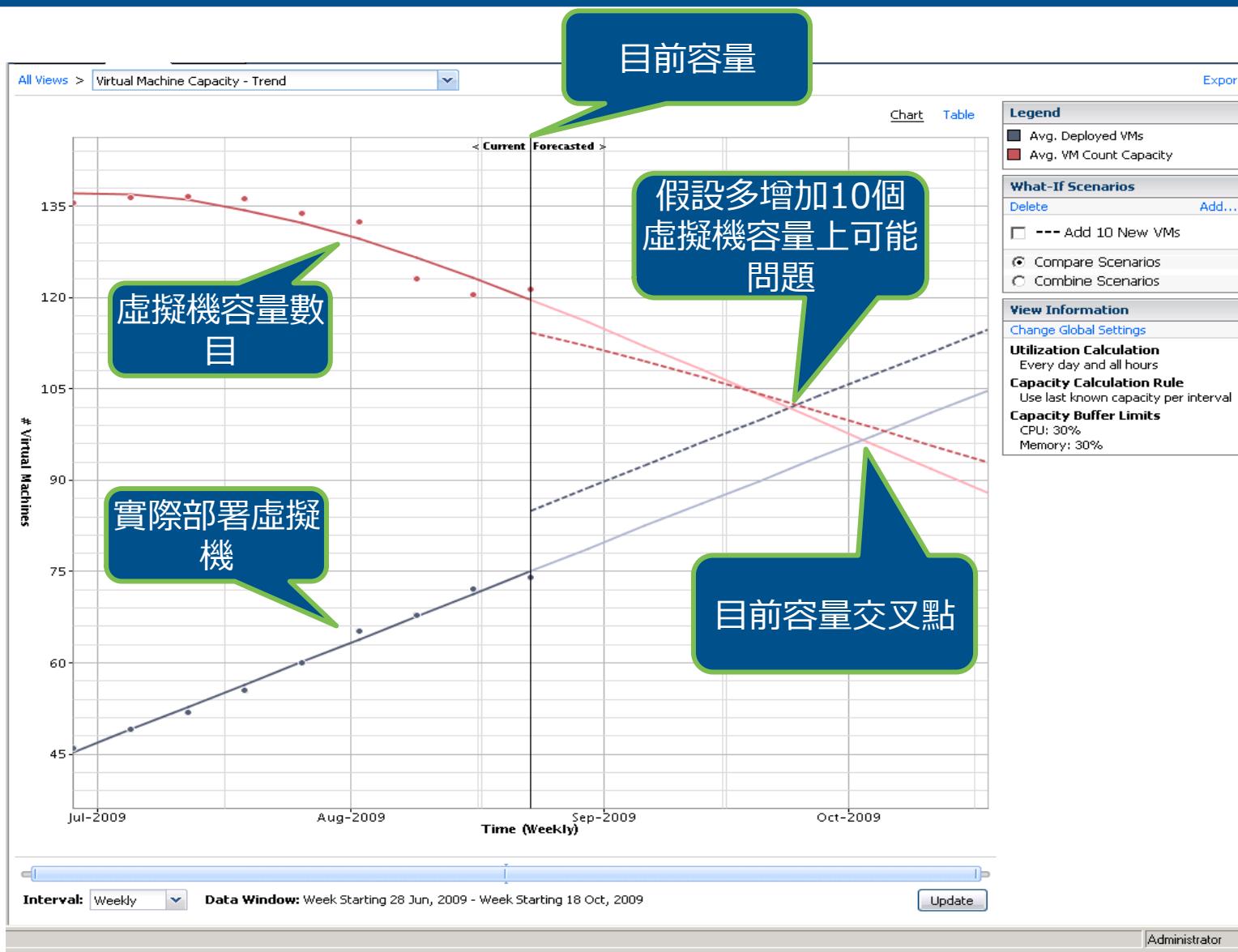
Hosts & Datastores
Model adding, changing or removing host & datastore capacity

Virtual machines
Model adding or removing virtual machines

```
graph LR; A[改變供給] --> B[改變主機/Datastore]; C[改變需求] --> D[改變虛擬機]; D --> E[基於現有虛擬機]; D --> F[新的虛擬機規格]
```

Help < Back Next > Cancel

預測：“What-If” 分析



優化：檢視優化的機會

The screenshot shows the vCenter Operations Manager interface. On the left, a navigation tree displays a hierarchy of sites and datacenters. In the center, a table titled "Powered-Off Virtual Machines" lists several VMs. A callout bubble points to the table with the text "檢視關機、休眠、清閒，及過度配置的虛擬機". Another callout bubble points to the bottom of the table with the text "可回收的資源". The top right corner of the browser window shows a certificate error message.

Virtual Machine	Policy	Total Virtual Disk Space Usage	% Time Powered-Off	Provisioned Disk Space
Baseline-Win2k8-020210	Default Policy	20 GB	100%	28.24 GB
OLD Backup of DB - Q1-2...	Default Policy	20 GB	100%	41.21 GB
Old-SLES-01a	Default Policy	0.73 GB	100%	1.42 GB
Q42010-SaveFile	Default Policy	20 GB	100%	28.24 GB
Save-BobG-MegaServer	Default Policy	20 GB	100%	28.24 GB
Temp-DB01-CQS	Default Policy	20 GB	100%	41.21 GB

硬體採購該如何規劃可利用該工具作預測

Dashboard Environment Operations **Planning** Alerts Analysis Reports ?

Summary Views Events

New what-if scenario Export

Objects

Perspective: Remaining

Trend and Forecast

The chart displays four bars representing the number of remaining hosts and VMs for the weeks of April 7, April 14, April 21, and April 28. The Y-axis ranges from 0 to 15. The legend indicates that dark blue bars represent 'Remaining Hosts' and red bars represent 'Remaining VMs'. The bars for April 7, 14, and 21 are dark blue, while the bar for April 28 is red.

	Current Week	Next Week	Next Month	Next Quarter	Next Half Year
Remaining Hosts	0.51 Hosts	0.38 Hosts	0.26 Hosts	Over by 0.034	Over by 0.48 H
Remaining VMs	14 VMs	10 VMs	7.1 VMs	Over by 0.86 V	Over by 11 VM

Extended Forecast

Time Remaining

	Time Remaining
Remaining Virtual Machine Capacity	72 days

What-if scenario

Select type of change
What type of change would you like to model?

View

Change Type

Hosts & Datastores
Model adding, changing or removing host & datastore capacity

Virtual machines
Model adding or removing virtual machines

硬體採購該如何規劃可利用該工具作預測

The screenshot shows the 'Hosts' configuration screen in the VMware Host Configuration tool. On the left, a sidebar lists 'View', 'Change Type', 'Hosts' (selected), 'Datastores', and 'Ready to Complete'. The main area displays a table of hosts:

Count	Name	CPU Total	Mem Total
1	Added Host	12 x 2.67GHz	96GB
1	w2-mgmtpm-4.eng.vmwar...	12 x 2.67GHz	95.99GB
1	w2-mgmtpm-5.eng.vmwar...	12 x 2.67GHz	95.99GB
1	w2-mgmtpm-6.eng.vmwar...	12 x 2.67GHz	95.99GB
1	w2-mgmtpm-7.eng.vmwar...	12 x 2.67GHz	95.99GB

Below the table are buttons for 'Add Host', 'Remove Host', and 'Restore Host'. A red arrow points from the 'Mem Total' column of the 'Added Host' row to the text '原本是4台主機如果要再添購一台主機容量會如何變化'.

On the right, a 'Capacity Remaining' table shows current usage and available resources:

	Actual	Hardware Change #0
Host CPU	18 VMs	46 VMs
Host Memory	138 VMs	181 VMs
Disk Space	181 VMs	181 VMs
Disk I/O Read	308 VMs	308 VMs
Disk I/O Write	1,465 VMs	1,465 VMs
Disk I/O Reads per Second	1,397 VMs	1,397 VMs
Disk I/O Writes per Second	1,465 VMs	1,465 VMs

A red arrow points from the 'Actual' column of the 'Host CPU' row to the text '原本只能在部屬18VM現在可以增加到46VM'.

原本只能在部屬18VM現在可以增加到46VM

提供各種資源利用報表,也可以進一步客製化您需要的報表

vmware vCenter Operations Manager

vCO

Dashboard Operations Planning Alerts Analysis Reports

Virtual Machine Capacity Overview Report
Overview of used, remaining capacity, time remaining and overall capacity efficiency
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Capacity Inventory and Optimization Report
List of clusters or hosts showing used and remaining virtual machine capacity
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Virtual Machine Optimization Report
Summary of idle, powered-off, oversized and undersized virtual machines
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Idle Virtual Machines Report
List of all idle virtual machines
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Oversized Virtual Machines Report
List of all oversized virtual machines
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Undersized Virtual Machines Report
List of all undersized virtual machines
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Powered Off Virtual Machines Report
List of all powered off virtual machines
Schedule: New Schedule | Remove | Not Scheduled
No Available Reports

Host Utilization Report
Distribution of average capacity utilization across deployed hosts

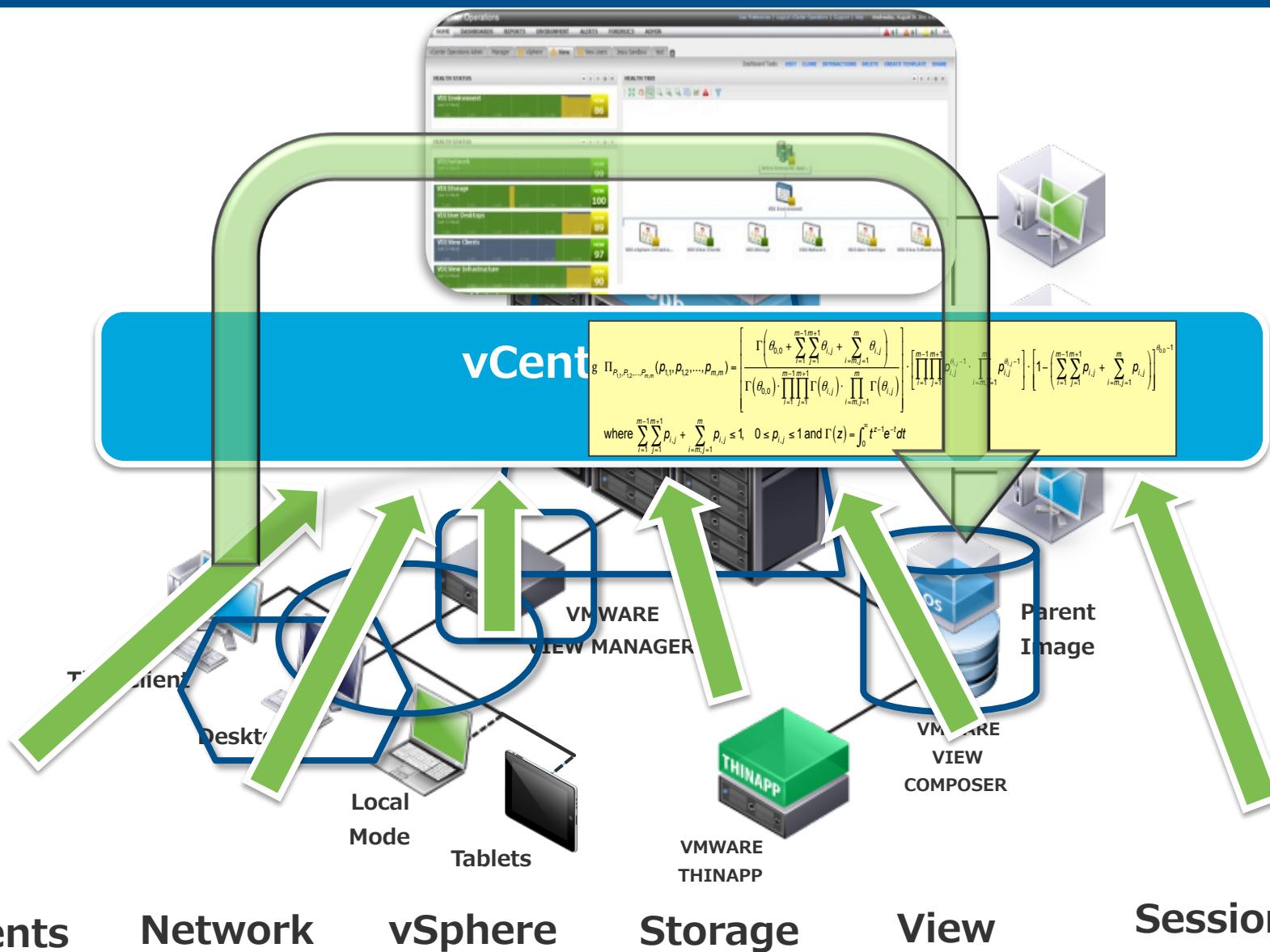
Run Now Run Now

?

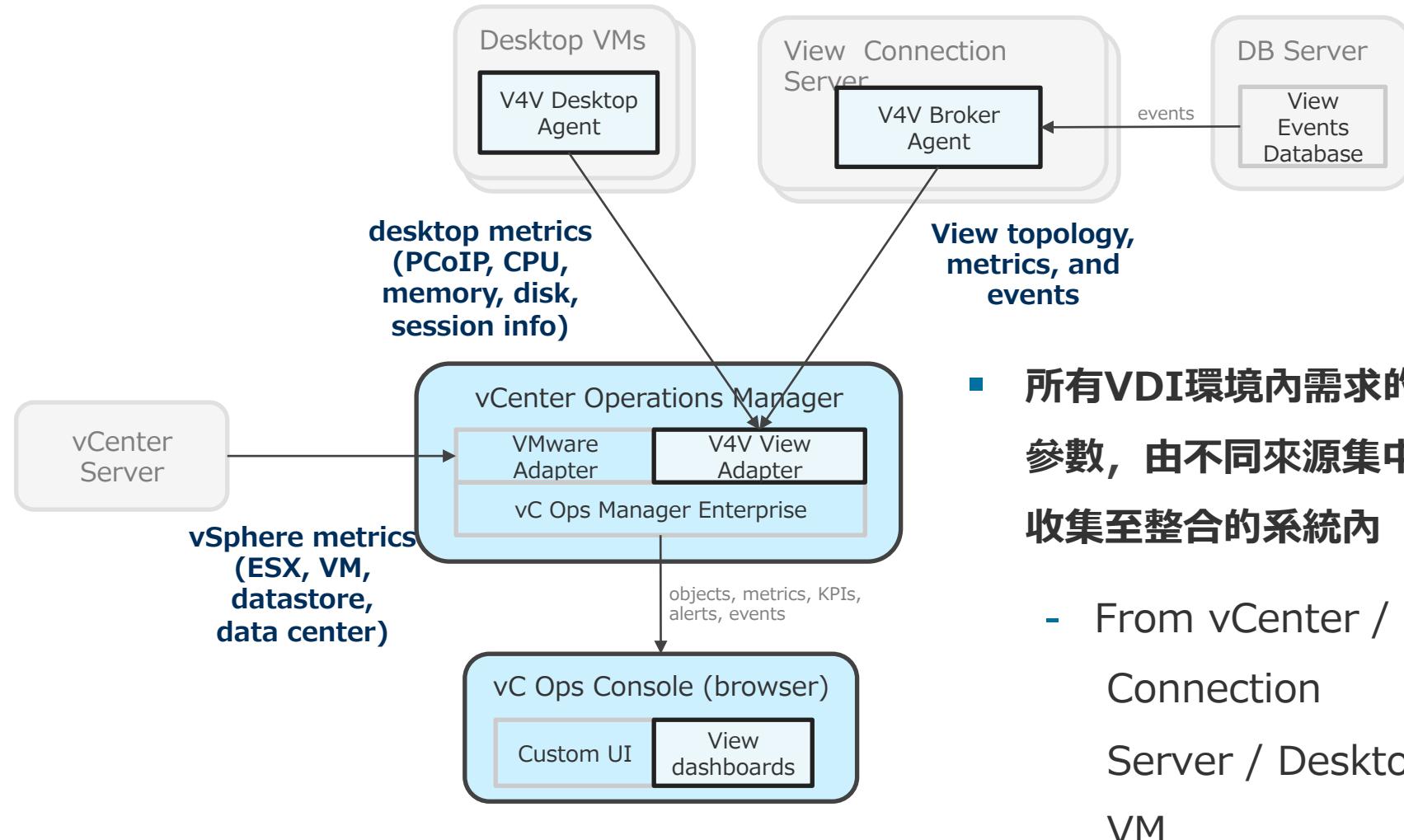
0 0 10 0 94 7 13

The screenshot displays the vCenter Operations Manager (vCO) interface. On the left, a navigation tree shows 'Hosts and Clusters' with nodes like 'World', 'vCOvc', 'vCO', and specific hosts 'm600-1.vcloud.com.tw' and 'm600-2.vcloud.com.tw'. The main area is titled 'vCO' and contains tabs for Dashboard, Operations, Planning, Alerts, Analysis, and Reports. The 'Reports' tab is selected, displaying eight report cards: 'Virtual Machine Capacity Overview Report', 'Capacity Inventory and Optimization Report', 'Virtual Machine Optimization Report', 'Idle Virtual Machines Report', 'Oversized Virtual Machines Report', 'Undersized Virtual Machines Report', 'Powered Off Virtual Machines Report', and 'Host Utilization Report'. Each card includes a brief description, a 'Schedule' section with options for 'New Schedule', 'Remove', and 'Not Scheduled', and a 'Run Now' button. To the right of the reports is a vertical sidebar with performance metrics: 0 red, 0 orange, 10 yellow, and 0 blue indicators, along with numerical values 94, 7, and 13. The bottom right corner features the VMware logo.

vC Ops for View自動化確認VDI環境內的問題



利用vC OPS for View收集並整合整個VDI環境內需求的資訊



vC Ops for View能非常方便地在大型環境內找到用戶連線資訊與使用資源

The screenshot illustrates the vCenter Operations Manager interface, specifically the 'User Search' and 'Metrics' sections.

- User Search:** A search bar at the top of the interface.
- Object tree:** A hierarchical tree view on the right side of the interface, labeled "All Active Sessions" and "Pod Active Sessions".
- Metrics for selected objects:** A section showing metrics for selected objects, with a list of metrics on the left: Badge, CPU Usage, CPU Utilization for Resources, Datastore, Disk Space, Disk, Guest File System, Memory, Network.
- Ordered Anomalies:** A section titled "Ordered Anomalies" from "ALL supporting infrastructure", showing anomalies for "DATASTORE - DATASTORE" and "DATASTORE - DISK SPACE".
- Metric Sparklines:** A section showing metrics over the last 12 hours, with a callout pointing to the "A-Ha !!!" text. Two specific metrics are circled in orange: "VM Health" (97%) and "VM Fault Count" (0).

Annotations with numbers 1 through 4 point to specific features:

1. Top Pools
2. LTH TREE
3. METRIC SPARKLINES
4. Last 12 Hours

Callouts provide additional context:

- "Object tree": all end-user infrastructure
- Metrics exhibiting **MOST MEANINGFUL** anomalies
- "Ordered Anomalies": from **ALL** supporting infrastructure
- User Search

利用預設或客製的Dashboard顯示整體View環境的健康程度

The screenshot displays the vCenter Operations Manager interface with two main dashboards:

- VIEW INFRASTRUCTURE WORKLOAD**: Configuration: Host Overall Workload. This dashboard shows the health of Datacenter hosts (172.16.0.1 and 172.16.0.2) with a green status bar indicating values from 75 to 99.
- USER DESKTOP WORKLOAD**: Configuration: Desktop Overall Workload. This dashboard shows the health of various desktop components:
 - Cluster-VCS**: Contains hosts vcopsxp01 through vcopsxp13.
 - CHTFXPool**: Contains FlexClone2, FlexClone3, FlexClone4, FlexClone5, and VDW7F02.
 - Windows 7 浮動桌面**: Contains VDW7F03.
 - SD 高階池**: Contains CHTCcomposer and Composer2.
 - Win7_Dedicated**: Contains Windows 8 專用桌面.

The left sidebar includes sections for View Main, View Alerts, and Select View Pod, along with links for How to Use Alerts and a navigation bar at the bottom.



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