

Application Performance Mgmt in ambienti fortemente virtualizzati

Angela Molinari



Agenda

- Introduction to Tivoli Virtual Server Monitoring
- ITM for Virtual Servers Key Capabilities
- New Product: IBM Tivoli for Virtual Environments
- Scenarios

Monitoring and management requires visibility at different levels in the Cloud and the ability to cope with change

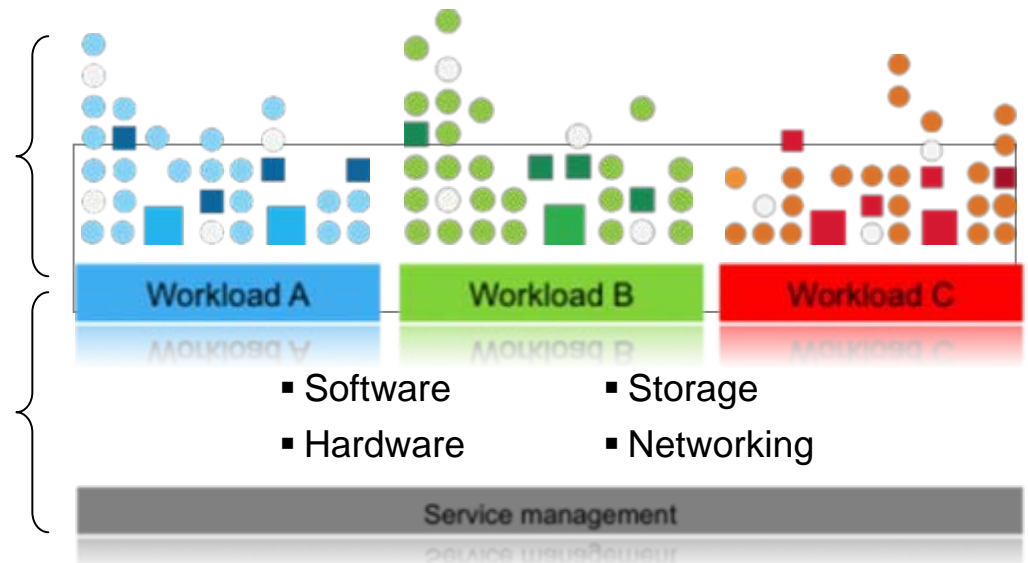
With cloud computing:



- A mix of physical and virtual servers, storage/network devices and applications
- Workloads appears, change and move at the click of a mouse
- Capacity planning for highly virtualized environments is more complex due to
 - High infrastructure sharing and advanced reservation capabilities
 - Resources dynamic change and cloudburst to public clouds
 - ...

Cloud tenants want to understand and optimize performance of the services being delivered

Cloud administrator needs to support changes in demand and understand workload trends



Tivoli Virtual Server Monitoring solutions available today...

- **ITM**
 - IBM PowerVM (CEC, VIOS, HMC, LPARs)

- **ITM for Virtual Servers**
 - Citrix (MetaFrame, XenServer)
 - Linux (KVM, RHEV-H)
 - NetApp (DataFabric Manager)
 - VMware (ESX, ESXi, vCenter)

- **ITCAM for Microsoft Applications**
 - HyperV, Citrix, VMware

- **ITCAM for Applications bundle**
 - Includes ITM for Virtual Servers agents

Monitoring PowerVM

▪ ITM AIX Agent – “Premium Agent”

- Monitors the availability, health and performance of key AIX system resources: LPAR configurations, CPU, memory, storage, network, printers, NIM and Workload Partitions

▪ ITM VIOS Agent

- Monitors the availability and health of the VIOS resources:
 - CPU, memory, storage, and networks
 - View storage and network mappings between the VIOS Server and its clients
 - *pre-installed* on a VIOS system so only agent configuration is required.

▪ ITM CEC Agent

- Monitor and view metrics on:
 - Number of LPARs per CEC
 - CPU, and memory allocations per LPAR
 - LPAR state, LPAR utilization, operating environment, CEC modes and CEC utilization.

▪ ITM HMC Agent for System p

- Monitors the availability and health of the HMC resources:
 - CPU, memory, storage, and network
 - Runs on any available LPAR

Out-of-box alerts and expert advice

AIX LPAR

KPX_memrepage_Info
 KPX_vmm_pginwait_Info
 KPX_vmm_pgfault_Info
 KPX_vmm_pgreclm_Info
 KPX_vmm_unpin_low_Warn KPX_vmm_pgout_pend_Info
 KPX_Pkts_Sent_Errors_Info KPX_Sent_Pkts_Dropped_Info
 KPX_Pkts_Recv_Errors_Info KPX_Bad_Pkts_Recv_Info
 KPX_Recv_pkts_dropped_Info KPX_Qoverflow_Info
 KPX_perip_InputErrs_Info KPX_perip_InputPkts_Drop_Info
 KPX_perip_OutputErrs_Info KPX_TCP_ConnInit_Info
 KPX_TCP_ConnEst_Info
 KPX_totproc_cs_Info KPX_totproc_runq_avg_Info
 KPX_totproc_load_avg_Info KPX_totnum_procs_Info
 KPX_perproc_IO_pgf_Info KPX_perproc_nonIO_pgf_Info
 KPX_perproc_memres_datasz_Info
 KPX_perproc_memres_datasz_Info KPX_perproc_mem_textsz_Info
 KPX_perproc_vol_cs_Info
 KPX_Active_Disk_Pct_Info KPX_Avg_Read_Transfer_MS_Info
 KPX_Read_Timeouts_Per_Sec_Info
 KPX_Failed_Read_Per_Sec_Info
 KPX_Avg_Write_Transfer_MS_Info
 KPX_Write_Timeout_Per_Sec_Info
 KPX_Failed_Writes_Per_Sec_Info
 KPX_Avg_Req_In_WaitQ_MS_Info
 KPX_ServiceQ_Full_Per_Sec_Info
 KPX_perCPU_syscalls_Info KPX_perCPU_forks_Info
 KPX_perCPU_execs_Info
 KPX_perCPU_cs_Info
 KPX_Tot_syscalls_Info
 KPX_Tot_forks_Info
 KPX_Tot_execs_Info
 KPX_LPARBusy_pct_Warn KPX_LPARPhyBusy_pct_Warn
 KPX_LPARvcs_Info
 KPX_LPARfreepool_Warn KPX_LPARPhanIntrs_Info
 KPX_LPARentused_Info KPX_LPARphp_used_Info
 KPX_user_acct_locked_Info KPX_user_login_retries_Info
 KPX_user_idletime_Info

HMC

KPH_Busy_CPU_Info
 KPH_Paging_Space_Full_Info
 KPH_Disk_Full_Warn
 KPH_Runaway_Process_InfoThe

VIOS

KVA_memrepage_Info
 KVA_vmm_pginwait_Info
 KVA_vmm_pgfault_Info
 KVA_vmm_pgreclm_Info
 KVA_vmm_unpin_low_Warn KVA_vmm_pgout_pend_Info Networking
 KVA_Pkts_Sent_Errors_Info KVA_Sent_Pkts_Dropped_Info
 KVA_Pkts_Recv_Errors_Info KVA_Bad_Pkts_Recv_Info
 KVA_Recv_pkts_dropped_Info
 KVA_Qoverflow_Info
 KVA_Real_Pkts_Dropped_Info KVA_Virtual_Pkts_Dropped_Info
 KVA_Output_Pkts_Dropped_Info KVA_Output_Pkts_Failures_Info
 KVA_Mem_Alloc_Failures_Warn
 KVA_ThreadQ_Overflow_Pkts_Info KVA_HA_State_Info
 KVA_Times_Primary_Per_Sec_Info KVA_perip_InputErrs_Info
 KVA_perip_InputPkts_Drop_Info KVA_perip_OutputErrs_Info
 KVA_TCP_ConnInit_Info
 KVA_TCP_ConnEst_Infov Process
 KVA_totproc_cs_Info
 KVA_totproc_runq_avg_Info KVA_totproc_load_avg_Info
 KVA_totnum_procs_Info
 KVA_perproc_IO_pgf_Info KVA_perproc_nonIO_pgf_Info
 KVA_perproc_memres_datasz_Info
 KVA_perproc_memres_textsz_Info KVA_perproc_mem_textsz_Info
 KVA_perproc_vol_cs_Info
 KVA_Firewall_Info
 KVA_memrepage_Info
 KVA_vmm_pginwait_Info
 KVA_vmm_pgfault_Info
 KVA_vmm_pgreclm_Info
 KVA_vmm_unpin_low_Warn KVA_vmm_pgout_pend_Info Networking
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 KVA_Qoverflow_Info
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 KVA_Mem_Alloc_Failures_Warn
 KVA_ThreadQ_Overflow_Pkts_Info KVA_HA_State_Info
 KVA_Times_Primary_Per_Sec_Info KVA_perip_InputErrs_Info
 KVA_perip_InputPkts_Drop_Info KVA_perip_OutputErrs_Info
 KVA_TCP_ConnInit_Info

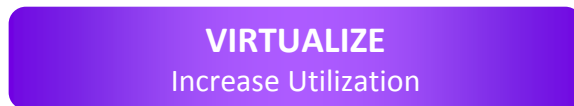
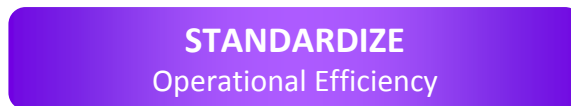
KVA_TCP_ConnEst_Infov Process
 KVA_totproc_cs_Info
 KVA_totproc_runq_avg_Info KVA_totproc_load_avg_Info
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 KVA_perproc_IO_pgf_Info KVA_perproc_nonIO_pgf_Info
 KVA_perproc_memres_datasz_Info
 KVA_perproc_memres_textsz_Info
 KVA_perproc_mem_textsz_Info KVA_perproc_vol_cs_Info
 KVA_Firewall_Info
 KVA_Active_Disk_Pct_Info KVA_Avg_Read_Transfer_MS_Info
 KVA_Read_Timeouts_Per_Sec_Info
 KVA_Failed_Read_Per_Sec_Info
 KVA_Avg_Write_Transfer_MS_Info
 KVA_Write_Timeout_Per_Sec_Info
 KVA_Failed_Writes_Per_Sec_Info
 KVA_Avg_Req_In_WaitQ_MS_Info
 KVA_ServiceQ_Full_Per_Sec_Info
 KVA_perCPU_syscalls_Info
 KVA_perCPU_forks_Info
 KVA_perCPU_execs_Info
 KVA_perCPU_cs_Info
 KVA_Tot_syscalls_Info KVA_Tot_forks_Info
 KVA_Tot_execs_Info
 KVA_LPARBusy_pct_Warn KVA_LPARPhyBusy_pct_Warn
 KVA_LPARvcs_Info
 KVA_LPARfreepool_Warn
 KVA_LPARPhanIntrs_Info
 KVA_LPARentused_Info
 KVA_LPARphp_used_Info KVA_user_acct_locked_Info
 KVA_user_login_retries_Info
 KVA_user_idletime_Info

Major scenarios in Managing Cloud Environments

How do I plan capacity needs to incorporate future consumers?

How do I ensure that my infrastructure is optimized and able to support at the best my current workload ?

How do ensure compliance to business policies?



SCENARIO 3: *Where do I add a new workload in the Cloud and what do I need ?*

SCENARIO 2: *How can I optimize the environment to prevent resource bottlenecks and free up space or plan for growth ?*

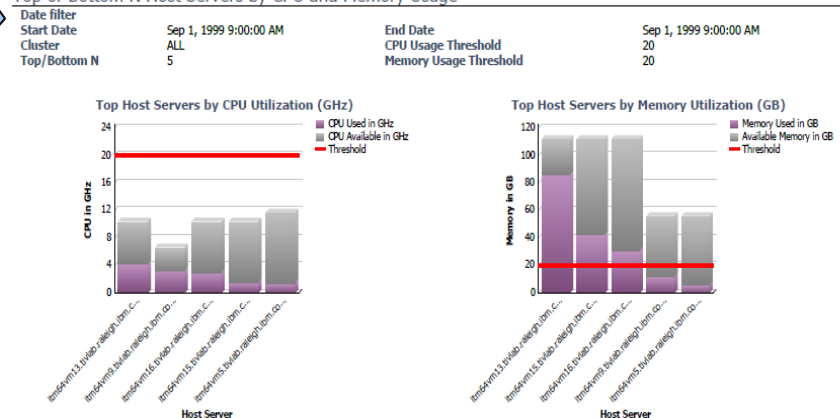
SCENARIO 1: *How do I sense and isolate problems across my virtualized server, storage & network environment?*

ITM for Virtual Environments

- TIP based dashboards with holistic view of health of whole environment
- Out of the box contextual views of health (availability, performance and capacity) in the complete context of the virtual environment to include physical and virtual server, storage and network resources.
- Integrates across our tool set to merge physical & virtual data – TPC, ITNM, ITM, TADDM & ITMfVS
- Views with performance and capacity reports for assessment of environment and long term trend analysis.
- Additional platform support including XenApp and XenDesktop



Top or Bottom N Host Servers by CPU and Memory Usage



ITM for VE Health Summary Dashboard: VMware Sample

Tivoli. View: All tasks Welcome cesar Help Communities Logout

VMware Cluster Dashboard + -- Select Action

Scorecard Widget

Last Update: 10/3/11 12:15 PM

	Datacenter	Cluster	Server	Storage	Network
<input checked="" type="radio"/>	Austin	Austin_Prod	✖	✖	✔
<input type="radio"/>	RTP_SAPM	Test_Cluster	⚠	⚠	✔
<input type="radio"/>	RTP_SAPM	BladeCenter_Cluster_32bit	⚠	✔	✔
<input type="radio"/>	RTP_SAPM	Development_Cluster	⚠	✔	✔
<input type="radio"/>	RTP_SAPM	BladeCenter_Cluster_64bit	✔	✔	✔
<input type="radio"/>	RTP_SAPM	xSeries_Cluster	✔	✔	✔

6 items

Cluster Architecture View

Austin_Prod

Category	Item	Count
Guests	Windows Guests:	7
	Linux Guests:	5
	Other Guests:	0
	Unknown:	5
Data Stores	Data Stores:	13
	NFS:	6
	VMFS:	7
VMs	VMs:	17
	Powered On:	17
	Running:	14
Physical Storage	SAN Volumes:	0
	NAS Volumes:	24
	Total Volumes:	24
ESX Servers	Servers:	4
	Effective Servers:	4
	Maintenance Mode:	0
Virtual Network	Physical NICs:	8
	Physical NICs Down:	0

Cluster Servers

Austin_Prod

Cluster CPU (GHz)

Austin_Prod

Cluster Memory (GB)

Austin_Prod

Cluster Storage Capacity (GB)

Austin_Prod

ITM for VE Problem Diagnose Page: VMware Storage Sample

Tivoli. View: All tasks Welcome cesar Help | Communities | Logou

VMware Cluster Dashboard Storage Details

Austin_Prod : Austin Real Time - Last 4 Hour(s) Eastern Daylight Time

Data Stores

Name	Status	Used Space(%)	Used(GB)	Total Capacity (GB)	Percent Overcommitted
sapm-netapp2a_nfs1	✓	9%	36.67	440	-70.81
sapm-netapp2_nfs	✓	61%	365.5	600	—
LinZigZagPart09	✓	58%	117.11	203	—
sapm-netapp1_home	✓	2%	1.4	95.61	—
sapm-netapp2a_nfs2	✓	21%	32.82	160	—

13 items

Data Store Metrics

Chart Options

sapm-netapp2a_nfs1

Virtual Machines

VM Name	Server	Overall Status	Provisioned (MB)	Committed (MB)
sapm-Tuning-g	absm-365b.tivlab.raleigh.ibm.	✓	—	2,048
sapm-rhx32d	absm-365b.tivlab.raleigh.ibm.	✓	256	256
SAPM-Tuning-f	absm-365b.tivlab.raleigh.ibm.	✓	—	256
SAPM-Tuning-a	absm-365b.tivlab.raleigh.ibm.	✓	352	352
sapm-rhx32m	benblade06.tivlab.raleigh.ibm.	✓	—	2,048

5 items

Virtual Machine Metrics

Chart Options

sapm-Tuning-g

Volumes

Volume Type	Name	Size(GB)	Status	Used Space(%)	Used(GB)	Read Latenc
NAS	sapm-netapp2a:/vol1	440	✓	17.4	76.8	215.5

Volume Metrics

Chart Options

sapm-netapp2a:/vol1

Data Stores

Name	Status	Used Space(%)	Used (GB)	Total Capacity	Percent
sapm-netapp2a_nfs1	✓	9%	36.6		
sapm-netapp2_nfs	✓	61%	365		
LinZigZagPart09	✓	58%	117		
sapm-netapp1_home	✓		1.4		
sapm-netapp2a_nfs2	✓		32.8		

Virtual Machines

VM Name	Server
sapm-Tuning-g	absm-365b.tivlab.raleigh.ibm.com
sapm-rhx32d	absm-365b.tivlab.raleigh.ibm.com
SAPM-Tuning-f	absm-365b.tivlab.raleigh.ibm.com
SAPM-Tuning-a	absm-365b.tivlab.raleigh.ibm.com
sapm-rhx32m	benblade06.tivlab.raleigh.ibm.com

Volumes

Volume Type	Name	Size(GB)	Space(%)	Latency	
NAS	sapm-netapp2a:/vol1	440	17.4	76.8	215.5

Data Store Metrics

Real Time - Last 4 Hour(s) Eastern Daylight Time

Chart Options

sapm-netapp2a_nfs1

Space Used (GB)

Capacity

Provisioned

Committed (MB)

Uncommitted (MB)

Percentage of

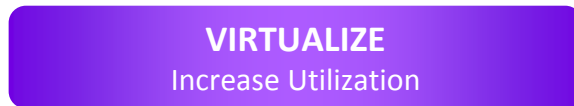
Callout Box: Launch in context to ITM VMware VI agent datastore workspaces for additional details and problem resolution

Managing Cloud Environments – Scenario 1

How do I plan capacity needs to incorporate future consumers?

How do I ensure that my infrastructure is optimized and able to support at the best my current workload ?

How do ensure compliance to business policies?



SCENARIO 3: Where do I add a new workload in the Cloud and what do I need ?

SCENARIO 2: How can I optimize the environment to prevent resource bottlenecks, free up space or plan for growth ?

SCENARIO 1: How do I sense and isolate problems across my virtualized server, storage & network environment?

Sample Scenario

An IT Admin resolves an incident related to storage capacity

Cluster Health Scorecard showing Critical Storage Problem

Cluster Scorecard
Last Updated: 2011.06.16 09:14:05 Eastern Daylight Time

Datacenter	Cluster	Server	Storage	Network
Austin	Austin_Prod	✓	✗	✓
RTP_SAPM	Development_Cluster	✓	✓	✓
RTP_SAPM	Test_Cluster	✓	⚠	✓
RTP_SAPM	BladeCenter_Cluster_32bit	✓	✓	✓
RTP_SAPM	BladeCenter_Cluster_64bit	✓	✓	✓
RTP_SAPM	xSeries_Cluster	✓	✓	✓

6 items

Cluster CPU (GHz)
Austin_Prod

Cluster Memory (GB)
Austin_Prod

Cluster Storage Capacity (GB)
Austin_Prod

Cluster Architecture View
Austin_Prod

Guests Windows Guests: 5 Linux Guests: 3 Other Guests: 0	Physical Network Switch Port: 24 Switch Port Down: 0 Switch: Cisco Switch Down: No
VMs VMs: 8 VMs Powered On: 8 Running VMs: 8	Virtual Network vNICs: 12 vNICs Down: 0 pNICs: 8 pNICs Down: 0
ESX Servers Servers: 4 Effective Servers: 4 In Maintenance mode: 0	Datstores Datstores: 8 Hosts Connected: 4 NFS Based: 4 VMFS: 2
	Physical Storage IBM Devices: 2 NetApp Devices: 3 Hitachi Devices: 0 EMC Devices: 0

14

3. Click to drill down

1. Storage problem in Austin_Prod

2. Overall, Cluster storage has available space. Will need to drill down to datstores to detect where the problem is.

Diagnose Problem with Storage

Cluster Austin_Prod Storage

Resource View

- VMs
- Datstores**
- NICs
- Aggregators
- NAS Volumes

1. First datastore with most critical problem selected

Name	Status	Used(GB)	Used Space(%)	Accessible	Commands #	Device Total	Queue Laten
LinZigZagPart11	✖	181.33	90%	Yes	—	—	—
LinZigZagPart10	⚠	170.88	85%	Yes	0	0	0
LinZigZagPart08	⚠	154.4	77%	Yes	0	3	0
absmfastt	✔	504.36	25%	Yes	0	0	0
LinZigZagPart12	✔	130.04	65%	Yes	0	0	0
sapm-netapp2_nfs	✔	365.2	18%	Yes	0	0	0
LinZigZagPart09	✔	117.09	58%	Yes	0	0	0
sapm-netapp2_nfs4	✔	221.29	11%	Yes	0	0	0
sapm-netapp1a_nfs	✔	37.65	19%	Yes	0	0	0
sapm-netapp1	✔	30.8	18%	Yes	0	4	0

Capacity

Real Time - Last 1 Hour(s) Eastern Daylight Time

3. Storage Growth

4. Change History...new VM

Type	Component	Change
VMware ESX Computer System	benblade06.tivlab.raleigh.ibm.com::benblade06.tivlab.raleigh.ibm.com	Member added
VMware		Member added

5. Scroll down for more information

Situation Event List

Severity	Situation Name	Display It	Timestamp
✖	KVM_Datastore_Usage_LinZigZagPa		2011-06-16 09:11:18 ET

2. Critical Alert on Storage Usage for selected datastore

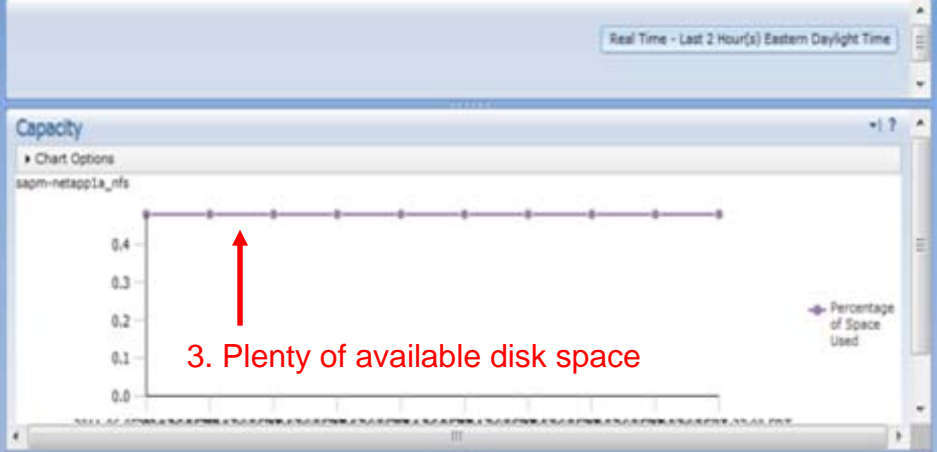
Find a Good Target Datastore for VMs

1. Datastores sorted by usage

Name	Status	Used(GB)	Used Space(%)	Accessible	Commands /	Device Total	Queue Laten
abamfastt	⚠	576.48	<div style="width: 100%;"></div>	Yes	0	0	0
LinZigZagPart10	⚠	170.49	<div style="width: 100%;"></div>	Yes	0	0	0
LinZigZagPart08	⚠	154.4	<div style="width: 100%;"></div>	Yes	0	2	0
LinZigZagPart12	✅	130.04	<div style="width: 100%;"></div>	Yes	0	0	0
sapm-netapp2_nfs	✅	365.2	<div style="width: 100%;"></div>	Yes	0	0	0
LinZigZagPart09	✅	117.09	<div style="width: 100%;"></div>	Yes	0	0	0
sapm-netapp2_nfs4	✅	221.14	<div style="width: 100%;"></div>	Yes	0	0	0
sapm-netapp1a_nfs	✅	37.65	<div style="width: 10%;"></div>	Yes	0	0	0
sapm-netapp1_home	✅	7.68	<div style="width: 0%;"></div>	Yes	0	0	0

2. Select low usage datastore

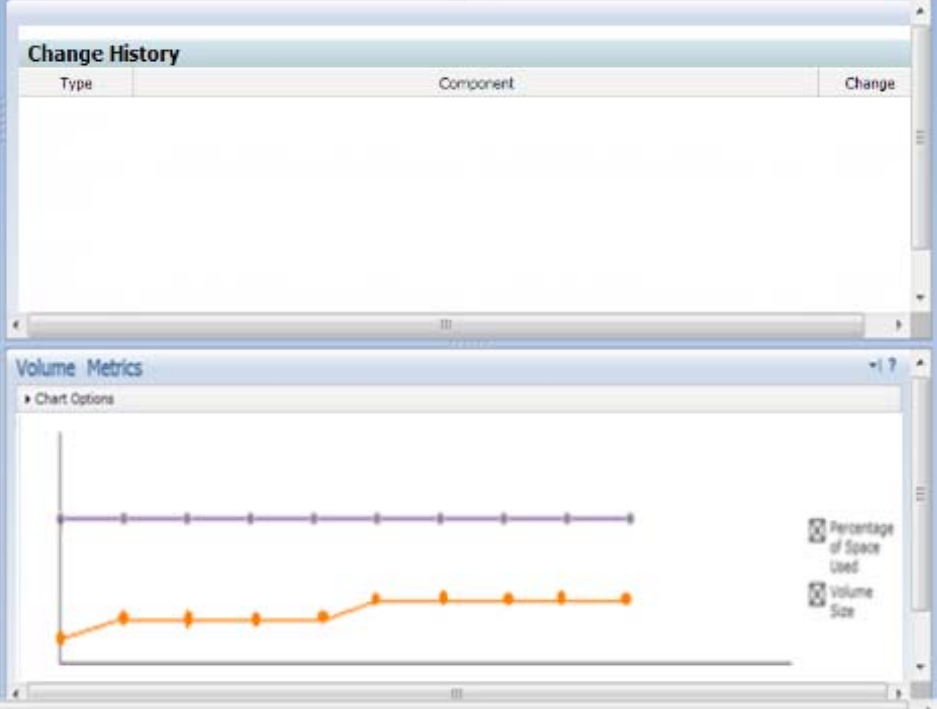
Severity	Situation Name	Display It	Timestamp
No data to display			



3. Plenty of available disk space

Name	Size(GB)	Status	Used Space(%)	Used(GB)	Read Laten	Write Laten	Total Ops
sapm-netapp1a/vol1	100.0	1.0	<div style="width: 73.7%;"></div>	73.7	1754	1812	5.4

4. High Latency...not a good candidate



Found a Suitable Datastore

Tivoli Integrated Portal

View: All tasks

Welcome bstern

Help | Communities | Logout

VMware Cluster Dashboard | Storage Details | Server Details

Datstores

Name	Status	Used(GB)	Used Space(%)	Accessible	Commands #	Device Total	Queue Laten
LinZigZagPart11	✖	181.33	<div style="width: 80%;"></div>	Yes	0	10	0
LinZigZagPart10	⚠	170.88	<div style="width: 75%;"></div>	Yes	0	0	0
LinZigZagPart08	⚠	154.4	<div style="width: 70%;"></div>	Yes	0	4	0
absmfastt	✔	504.36	<div style="width: 95%;"></div>	Yes	0	0	0
LinZigZagPart12	✔	130.04	<div style="width: 65%;"></div>	Yes	0	0	0
sapm-netapp2_nfs	✔	365.2	<div style="width: 85%;"></div>	Yes	0	0	0
LinZigZagPart09	✔	117.09	<div style="width: 60%;"></div>	Yes	0	0	0
sapm-netapp2_nfs4	✔	221.29	<div style="width: 45%;"></div>	Yes	0	0	0
sapm-netapp1a_nfs	✔	37.65	<div style="width: 10%;"></div>	Yes	-	-	-

14 items

1. Select another low usage datastore

Situation Event List

Severity	Situation Name	Display It	Timestamp
No data to display			

Volumes

Name	Size(GB)	Status	Used Space(%)	Used(GB)	Read Latency	Write Latency	Total Ops
sapm-netapp2:/vol4	500.0	1.0	<div style="width: 45%;"></div>	235.6	27	28	73

1 items

3. Low Latency...good candidate.

Real Time - Last 1 Hour(s) Eastern Daylight Time

sapm-netapp2_nfs4

2. Plenty of available disk space

Change History

Type	Component	Change
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Volume Metrics

sapm-netapp2:/vol4

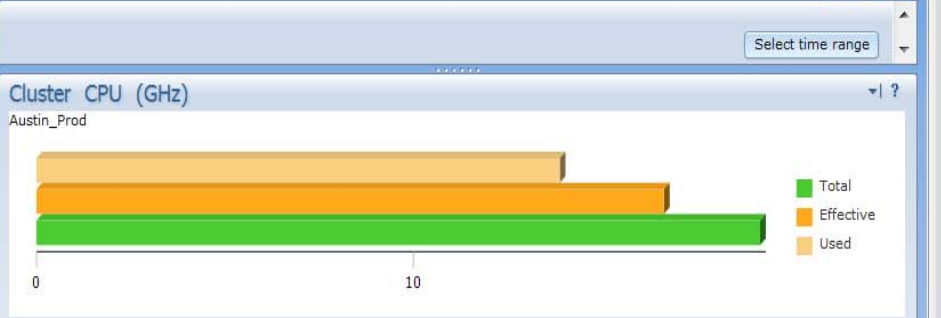
Storage Critical Issue Resolved

Cluster Scorecard

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RTP_SAPM	BladeCenter_Cluster_32bit	✓	✓	✓
RTP_SAPM	BladeCenter_Cluster_64bit	✓	✓	✓
RTP_SAPM	Development_Cluster	✓	✓	✓
RTP_SAPM	xSeries_Cluster	✓	✓	✓

6 items

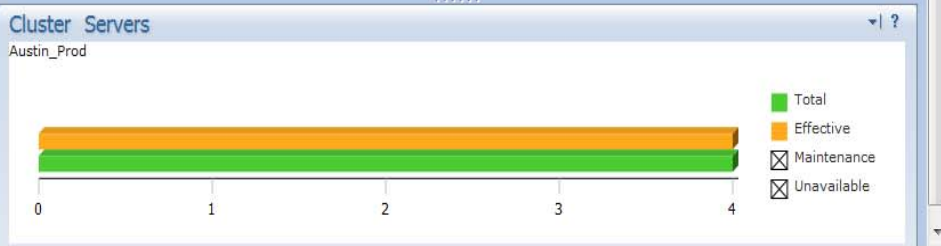
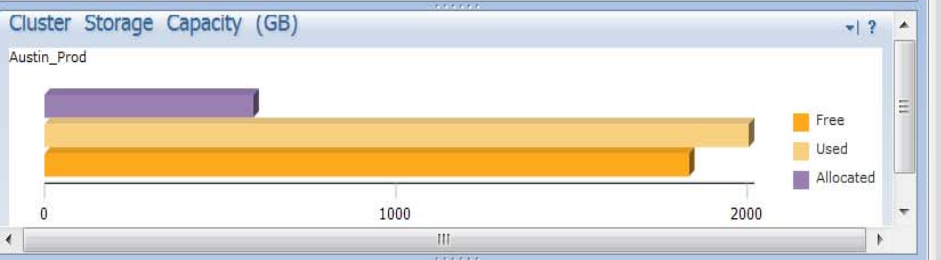
VMs moved to new datastore.
Problem resolved.



Cluster Architecture View

Austin_Prod

Guests Windows Guests: 5 Linux Guests: 3 Other Guests: 0	Physical Network Switch Port: 24 Switch Port Down: 0 Switch: Cisco Switch Down: No
VMs VMs: 8 VMs Powered On: 8 Running VMs: 8	Virtual Network vNICs: 12 vNICs Down: 0 pNICs: 8 pNICs Down: 0
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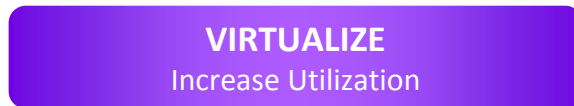
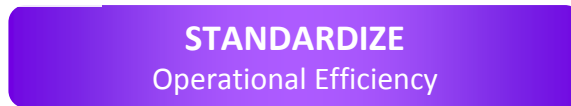


Managing Cloud Environments – Scenario 2

How do I plan capacity needs to incorporate future consumers?

How do I ensure that my infrastructure is optimized and able to support at the best my current workload ?

How do ensure compliance to business policies?



SCENARIO 3: Where do I add a new workload in the Cloud and what do I need ?

SCENARIO 2: How can I optimize the environment to prevent resource bottlenecks, free up space or plan for growth ?

SCENARIO 1: How do I sense and isolate problems across my virtualized server, storage & network environment?

Sample Scenario

An IT Admin rebalances workload to avoid future performance and capacity bottlenecks

Cluster Health Scorecard showing Server Problem

1. Austin_Prod server problem

2. Click to Show Historical View

Cluster Scorecard

Last Updated: 2011.06.16 16:03:02 Eastern Daylight Time

Datacenter	Cluster	Server	Storage	Network
Austin	Austin_Prod	✖	✔	✔
RTP_SAPM	Test_Cluster	✔	⚠	✔
RTP_SAPM	BladeCenter_Cluster_32bit	✔	✔	✔
RTP_SAPM	BladeCenter_Cluster_64bit	✔	✔	✔
RTP_SAPM	Development_Cluster	✔	✔	✔
RTP_SAPM	xSeries_Cluster	✔	✔	✔

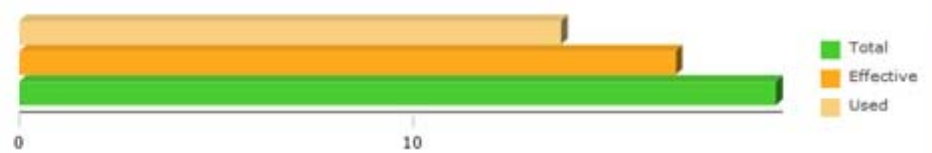
Cluster Architecture View

Austin_Prod

Guests Windows Guests: 5 Linux Guests: 3 Other Guests: 0	Physical Network Switch Port: 24 Switch Port Down: 0 Switch: Cisco Switch Down: No
VMs VMs: 8 VMs Powered On: 8 Running VMs: 8	Virtual Network vNICs: 12 vNICs Down: 0 pNICs: 8 pNICs Down: 0
ESX Servers Servers: 4 Effective Servers: 4 In Maintenance mode: 0	Datastores Datastores: 8 Hosts Connected: 4 NFS Based: 4 VMFS: 2
	Physical Storage IBM Devices: 2 NetApp Devices: 3 Hitachi Devices: 0 EMC Devices: 0

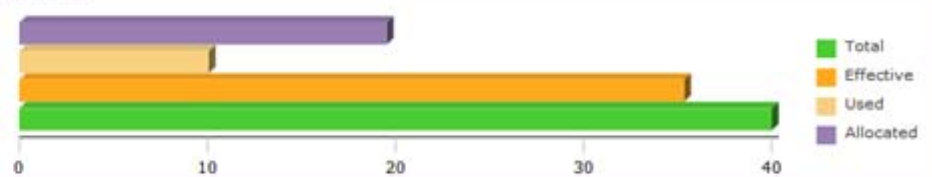
Cluster CPU (GHz)

Austin_Prod



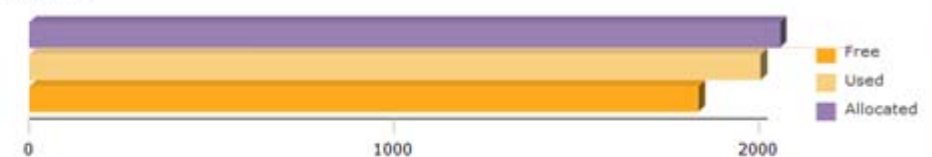
Cluster Memory (GB)

Austin_Prod



Cluster Storage Capacity (GB)

Austin_Prod



Cluster Servers

Austin_Prod



Predict CPU Utilization Critical for Cluster

1. Fly-over to see events affecting resources

Datcenter	Cluster	Server	Storage	Network
Austin	Austin_Prod	✖	✔	✔
RTP_SAPM	Test_Cluster	✔	✔	✔
RTP_SAPM	BladeCenter_Cluster_32bit	✔	✔	✔
RTP_SAPM	BladeCenter_Cluster_64bit	✔	✔	✔
RTP_SAPM	Development_Cluster	✔	✔	✔
RTP_SAPM	xSeries_Cluster	✔	✔	✔

2. Predicted alert that Austin_Prod cluster CPU utilization is trending to critical in 2 weeks

3. Click to display problem diagnose for servers in the cluster

VMware_Cluster_CPU_Trend_Crit VM:itmx31-VC-benblade06:ESX 2011-06-16 14:08:39 EDT benblade06.tivlab.raleigh.ibm.com
KVM_Server_CPU_Util_High VM:itmx31-VC-benblade06:ESX 2011-06-16 14:15:42 EDT benblade06.tivlab.raleigh.ibm.com

Cluster CPU (GHz)
Austin_Prod
Real Time - Last 1 Hour(s) Eastern Daylight Time

Cluster Memory (GB)
Austin_Prod
2011-06-16 14:27:00 EDT

Cluster Storage Capacity (GB)
Austin_Prod
2011-06-16 14:27:00 EDT

Cluster Servers
Austin_Prod
2011-06-16 14:27:00 EDT

Cluster Architecture View
Austin_Prod

Guests Windows Guests: 5 Linux Guests: 3 Other Guests: 0	Physical Network Switch Port: 24 Switch Port Down: 0 Switch: Cisco Switch Down: No
VMs VMs: 8 VMs Powered On: 8 Running VMs: 8	Virtual Network vNICs: 12 vNICs Down: 0 pNICs: 8 pNICs Down: 0
ESX Servers Servers: 4 Effective Servers: 4 In Maintenance mode: 0	Datastores Datastores: 8 Hosts Connected: 4 NFS Based: 4 VMFS: 2
	Physical Storage IBM Devices: 2 NetApp Devices: 3 Hitachi Devices: 0 EMC Devices: 0

Diagnosing Server Problem for Austin_Prod Cluster

Tivoli Integrated Portal

Views: All tasks

Welcome bstern

Help | Communities | Logout IBM

VMware Cluster Dashboard Server Details

Save Cancel

Resource View

Cluster Workload Utilization and Forecast
 Cluster Workload Balance
 Cluster Top Consumers
 Cluster Bottom Consumers

Look into historical usage and trending to confirm utilization pattern

Guest OS VMs ESX Servers

ESX Servers

Last Updated: 2011.06.16 14:41:53 Eastern Daylight Time

Server Hostname	Overall	CPU Uti	CPU Usr	Memory	Memory	Avg VM	Connec
benblade06.tivlab.rz	100	1	12	982.8	23.195	✓	
benblade07.tivlab.rz	21	0.21	16	1,310.4	2.723	✓	
benblade08.tivlab.rz	59	0.59	43	3,522.13	27.009	✓	

4 items

Utilization

Real Time - Last 1 Hour(s) Eastern Daylight Time

benblade06.tivlab.raleigh.ibm.com

Situation Event List

Last Updated: 2011.06.16 15:25:00 Eastern Daylight Time

Severity	Situation Name	Display It	Timestamp
⚠	KVM_Server_CPU_Ubl_	benblade06	2011-06-16 14:15:42 ET
✖	VMware_Cluster_CPU_Trend_Crit	VM:itm31-VC-benblade06:ESX	2011-06-03 11:36:

Virtual Machines

Last Updated: 2011.06.16 15:25:05 Eastern Daylight Time

VM Name	Server	Hostname	Overall	Power	CPU Uti	CPU Usr	Memory	Memory	VM
sapm-rhx32c	benblade06.tivlab.	-	✓	✓	49	0.49	100	10.	
sapm-rhx32b	benblade06.tivlab.	-	✓	✓	21	0.21	99	4.9	

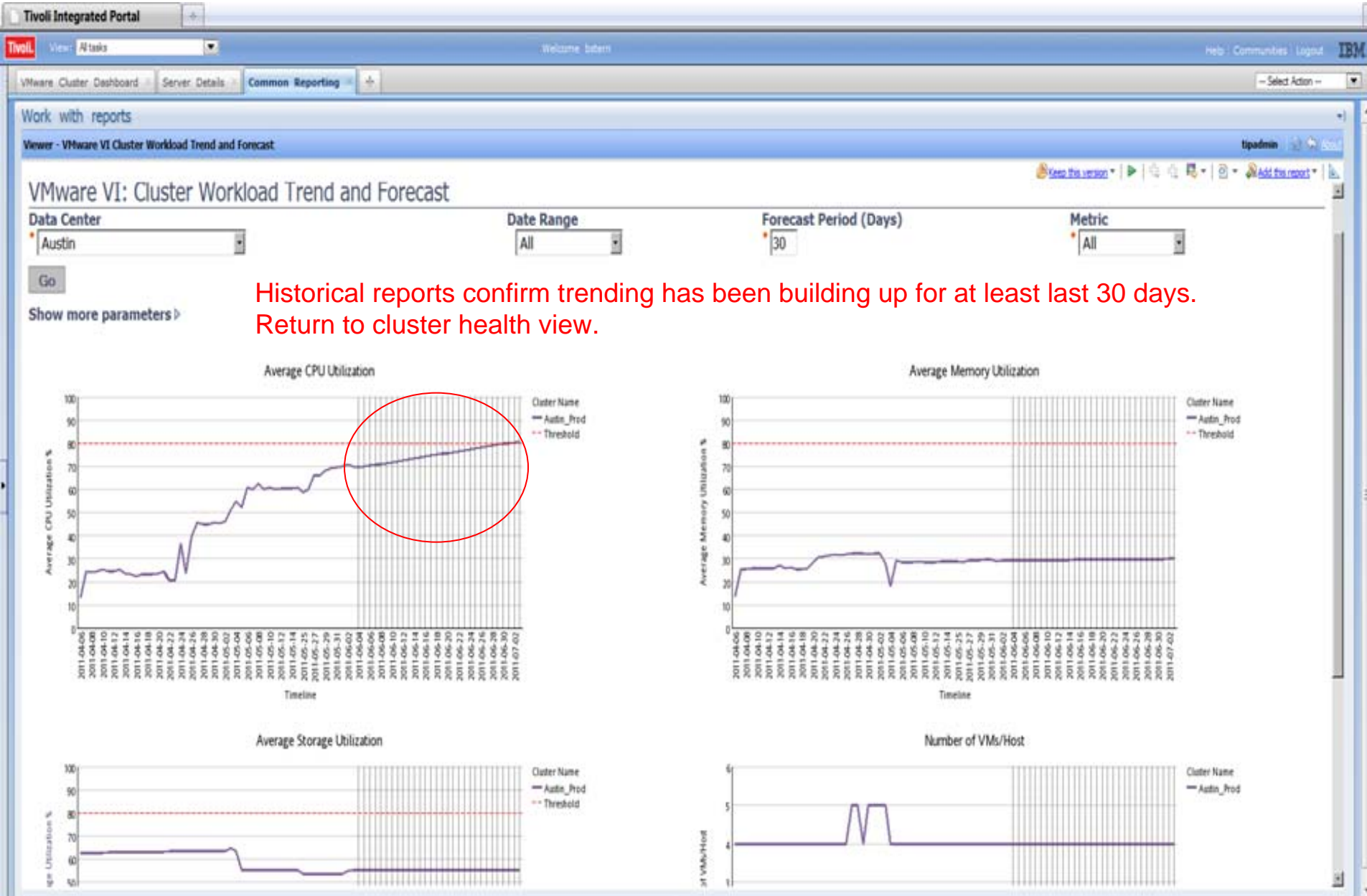
Change History

Type	Component

VM Utilization

sapm-rhx32c

Austin_Prod Cluster Historical View



Need to Find Clusters with available capacity

Tivoli Integrated Portal

View: All tasks

Welcome, bitem

Help | Communities | Logout IBM

VMware Cluster Dashboard Server Details

Look for other clusters with available capacity

Cluster Scorecard

Last Updated: 2011.06.16 10:02 Eastern Daylight Time

Cluster Workload Utilization and Forecast
Cluster Workload Balance
Cluster Top Consumers
Cluster Bottom Consumers

Cluster	Server	Storage	Network
Austin	✗	✓	✓
RTP_SAP	✓	⚠	✓
RTP_SAPM	BladeCenter_Cluster_32bit	✓	✓
RTP_SAPM	BladeCenter_Cluster_64bit	✓	✓
RTP_SAPM	Development_Cluster	✓	✓
RTP_SAPM	xSeries_Cluster	✓	✓

6 items

Cluster Architecture View

Austin_Prod

Guests	Windows Guests: 5 Linux Guests: 3 Other Guests: 0	Physical Network	Switch Port: 24 Switch Port Down: 0 Switch: Cisco Switch Down: No
VMs	VMs: 8 VMs Powered On: 8 Running VMs: 8	Virtual Network	vNICs: 12 vNICs Down: 0 pNICs: 8 pNICs Down: 0
ESX Servers	Servers: 4 Effective Servers: 4 In Maintenance mode: 0	Datastores	Datastores: 8 Hosts Connected: 4 NFS Based: 4 VMFS: 2
		Physical Storage	IBM Devices: 2 NetApp Devices: 3 Hitachi Devices: 0 EMC Devices: 0

Cluster CPU (GHz)

Austin_Prod

Category	Value (GHz)
Total	~40
Effective	~35
Used	~28

Cluster Memory (GB)

Austin_Prod

Category	Value (GB)
Total	~40
Effective	~35
Used	~10
Allocated	~20

Cluster Storage Capacity (GB)

Austin_Prod

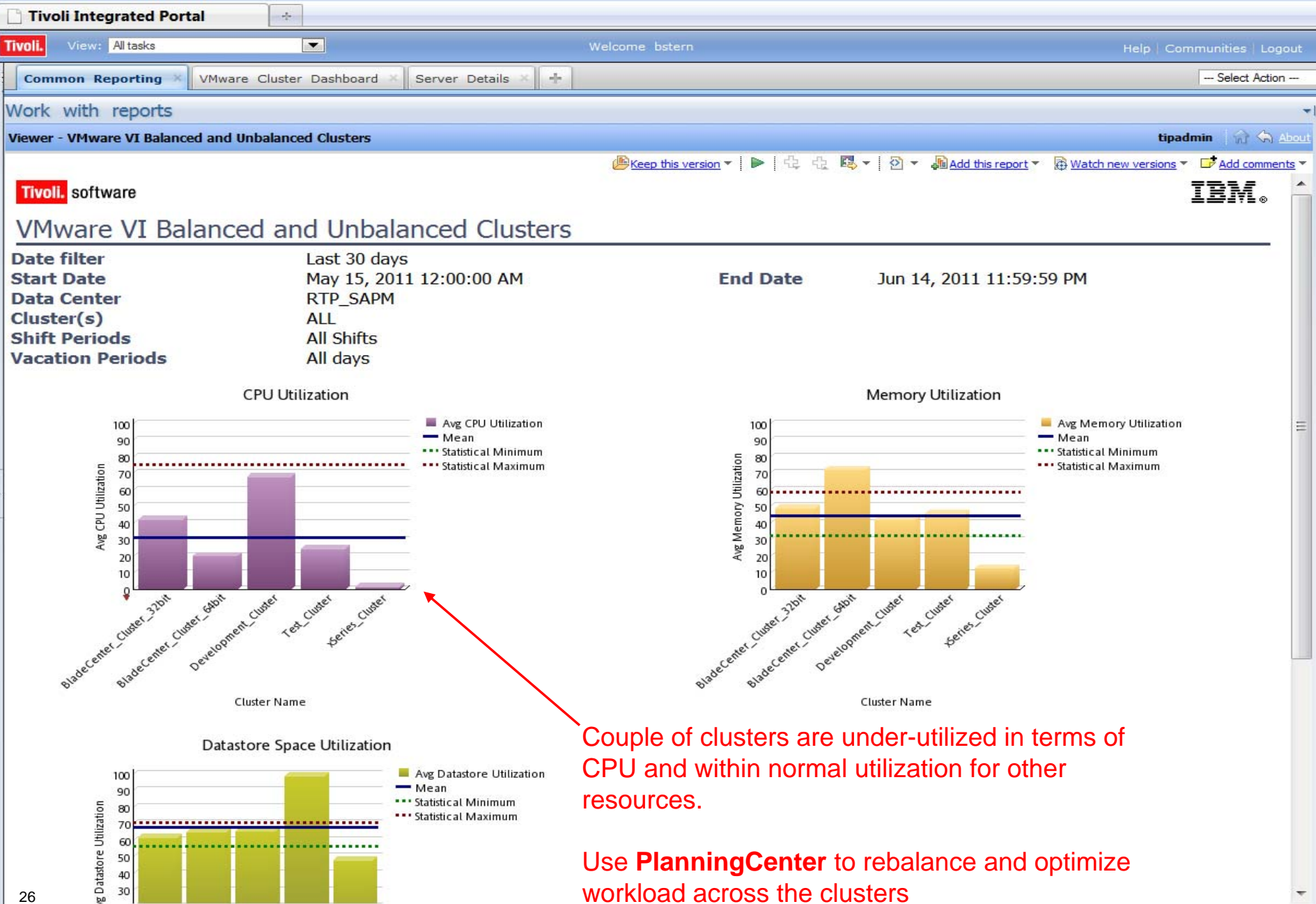
Category	Value (GB)
Free	~1500
Used	~1800
Allocated	~2000

Cluster Servers

Austin_Prod

Category	Value
Total	4
Effective	4
Maintenance	0
Unavailable	0

Found Clusters to Balance Load

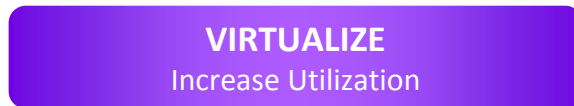
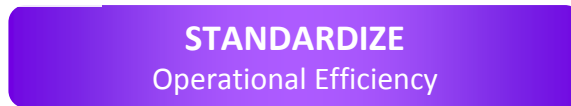


Major scenarios in Managing Cloud Environments

How do I plan capacity needs to incorporate future consumers?

How do I ensure that my infrastructure is optimized and able to support at the best my current workload ?

How do ensure compliance to business policies?



SCENARIO 3: Where do I add a new workload in the Cloud and what do I need ?

SCENARIO 2: How can I optimize the environment to prevent resource bottlenecks, free up space or plan for growth ?

SCENARIO 1: How do I isolate problems across my virtualized server, storage & network environment?

Sample Scenario

An Administrator performs a “what-if” analysis to understand if it possible to accommodate capacity growth

How many new VMs can be hosted on my current infrastructure

The screenshot shows the Tivoli Integrated Portal interface. The main content area displays a report titled "What-If Analysis for Workload Placement" under the "Public Folders" section. The report is presented as a table with the following data:

Name	Modified	Actions
VMware VI Number of Workloads for Clusters	December 3, 2010 4:46:53 PM	More...
VMware VI Number of Workloads for Clusters or Host Servers	December 6, 2010 2:05:21 PM	More...
VMware VI Resources Needed for Additional Workloads on Clusters	December 6, 2010 5:24:51 PM	More...
VMware VI Resources Needed for Additional Workloads on Host Servers	December 6, 2010 2:01:53 PM	More...

A large, rounded rectangular callout box is overlaid on the bottom half of the screen, containing the text: "How many more VMs can I place on a selected cluster, host server or group of hosts?"

At the bottom of the browser window, the status bar shows the URL: `https://localhost:36311/tarj/service/component?b_action=cognos/lever&ui.action=run&ui.object=%2fcontent%2fpackage%5`. The system tray includes a "Trusted sites" icon and a "100%" zoom level indicator.

Specify the infrastructure that should host the new VMs

Tivoli Integrated Portal - Windows Internet Explorer

localhost | Certificate Error | Google

Tivoli | View: All tasks | Welcome, toadmin | Help | Logout | IBM

Common Reporting | Select Action

Work with reports

Parameter Selection

Resources

Data Center * Bld-510

Cluster * Cluster A

Host Server(s) *

- ALL
- itm64vm1.tivlab.raleigh.ibm.com
- itm64vm2.tivlab.raleigh.ibm.com

Select all Deselect all

User Inputs for Analysis

VM Profile *

- Average
- Peak
- User-defined

Select parameters like Data Center, Cluster, Host Server(s), Date Range for historical calculation

Specify typical VM size or use default templates

(1) Can specify to use

- Average VM sizing and resource usage data
- Peak VM sizing and resource usage data
- User defined VM sizing and resource usage data

(2) Run the analysis using user-defined data

Modify buffers and resources a typical VM will use to see resource constraints

Resource	Cluster Name	Server Name	VM Profile based on user-defined resource used by all VMs on this server	Available Capacity(before applying Buffer)	Buffer	Available Capacity(after applying Buffer)	Number of VMs that can be placed on the server based on User-defined VM Profile
CPU (Ghz)	Cluster A	itrn64vm1.tivlab.raleigh.ibm.com	2	22.569	2	20.569	11
		itrn64vm2.tivlab.raleigh.ibm.com	2	22.969	2	20.969	11
CPU (Ghz)							22
Datastore Space Usage (GB)	Cluster A	itrn64vm1.tivlab.raleigh.ibm.com	30	128.03	5	123.03	4

See how many new VMs can be hosted based on the resource constraints of the current infrastructure

Tivoli Integrated Portal - Windows Internet Explorer

localhost

Tivoli Integrated Portal

View: All tasks

Welcome toadmin

Help Logout IBM

Common Reporting

Work with reports

Viewer - VMware VI Number of Workloads for Clusters or Host Servers

Go

Show more parameters

WORKLOAD PLACEMENT FOR CLUSTERS OR HOST SERVERS - USER-DEFINED DEPLOYED VM PROFILE

Resource	Cluster Name	Server Name	VM Profile based on user-defined resource used by all VMs on this server	Available Capacity(before applying Buffer)	Buffer	Available Capacity(after applying Buffer)	Number of VMs that can be placed on the server based on User-defined VM Profile
CPU (Ghz)	Cluster A	ibm64-vm1.tivlab.raleigh.ibm.com	2	22.569	2	20.569	11
		ibm64-vm2.tivlab.raleigh.ibm.com	2	22.969	2	20.969	11
CPU (Ghz)							
Datastore Space Usage (GB)	Cluster A	ibm64-vm1.tivlab.raleigh.ibm.com	10	129.03	2	126.03	12
		ibm64-vm2.tivlab.raleigh.ibm.com	10	71.03	2	69.03	7
Datastore Space Usage (GB)							
Memory Usage (MB)	Cluster A	ibm64-vm1.tivlab.raleigh.ibm.com	256	5,620.82	1,024	4,596.82	21
		ibm64-vm2.tivlab.raleigh.ibm.com	256	4,192.21	1,024	3,168.21	16
Memory Usage (MB)							
Number of VMs that can be added to this cluster or group of servers							19

This report lets the user do what-if analysis to determine the number of additional virtual machines that can be placed on a cluster or group of servers based on the average historical usage and other user inputs. The Server Hostnames shows the names of datastores for the Datastore Space Usage(GB) instead of server hostnames. VM Profile is the amount of resources that would be consumed by each Host Server averaged for the Data Center/Cluster and the Host Server chosen. Available Capacity(before applying Buffer) is the amount of resources available on a whole for each Host Server before applying the Buffer value. Buffer is the amount of resources that cannot be allocated. Available Capacity(after applying Buffer) = Available

Storage is a constraint

- From CPU perspective can host up to 22 new VMs
- From RAM perspective can host up to 37 new VMs
- Storage constraints do not allow more than 19 new VMs

Need to add X new VMs, is the current infrastructure able to support the new Workload ? How much additional resources are needed ?

The screenshot displays the Tivoli Integrated Portal interface. The main content area shows a report titled 'What-If Analysis for Workload Placement' under the 'Public Folders' section. The report contains the following data:

Name	Modified	Actions
VMware VI Number of Workloads for Clusters	December 3, 2010 4:46:53 PM	More...
VMware VI Number of Workloads for Clusters or Host Servers	December 6, 2010 2:05:21 PM	More...
VMware VI Resources Needed for Additional Workloads on Clusters	December 6, 2010 5:24:51 PM	More...
VMware VI Resources Needed for Additional Workloads on Host Servers	December 6, 2010 2:01:53 PM	More...

A text box at the bottom of the screenshot contains the following text:

I want to add X workloads/VMs to my cluster (or group of host servers). How much additional resources like CPU, Memory and Storage will I need?

Current infrastructure is able to host 5 new VMs

Tivoli Integrated Portal - Windows Internet Explorer

localhost:8111/itrac/portal/... Certificate Error

Tivoli software

VMware VI Resources Needed for Additional Workloads on Clusters

Data Center: Bld-510

Clusters: Cluster A

VM Profile: Average

Date Range for computing VM Profile: Last 30 days

Buffer: CPU(GHz): 2, Datastore Space(GB): 5, Memory(GB): 256

Number of VMs to add to the cluster: 5

RESOURCES NEEDED FOR ADDITIONAL WORKLOADS - AVERAGE DEPLOYED VM PROFILE

Resource	VM Profile based on average resource used by all VMs on this cluster	Resources needed by 5 VMs	Available Cluster Capacity(before applying Buffer)	Buffer	Available Cluster Capacity (after applying Buffer)	Capacity Needed
CPU (GHz)	6.258	1.29	44.943	2	42.943	0
Datastore Space Usage (GB)	0	0	147.245	5	142.245	0
Memory Usage (MB)	1,371,478	6,858.39	8,532.12	256	8,276.12	0

To add 5 more VMs there are no constraints

To add 50 VMs you need to add x Memory

The screenshot shows the Tivoli Integrated Portal interface. The main content area is titled "VMware VI Resources Needed for Additional Workloads on Clusters". It includes a search bar with "Bid-510" and "Cluster A" selected. The "VM Profile" is set to "Average". The "Date Range" is "Last 30 days". The "Buffer" settings are: CPU (GHz) = 2, Datastore Space (GB) = 5, and Memory (GB) = 256. The "Number of VMs to add to the cluster" is set to 50.

RESOURCES NEEDED FOR ADDITIONAL WORKLOADS - AVERAGE DEPLOYED VM PROFILE

Resource	VM Profile based on average resource used by all VMs on this cluster	Resources needed by 50 VMs	Available Cluster Capacity (before applying Buffer)	Buffer	Available Cluster Capacity (after applying Buffer)	Capacity Need
CPU (GHz)	0.258	12.901	44.943	2	42.943	0
Datastore Space Usage (GB)	0	0	147,245	5	142,245	0
Memory usage (MB)	1,171,676	68,583,803	8,532,14	256	8,276,14	60,307,781

A callout box with a large arrow pointing to the memory row of the table contains the text: "To add 50 more VMs memory is a constraint. Tells you how much more memory you need to add."

