

Pulse

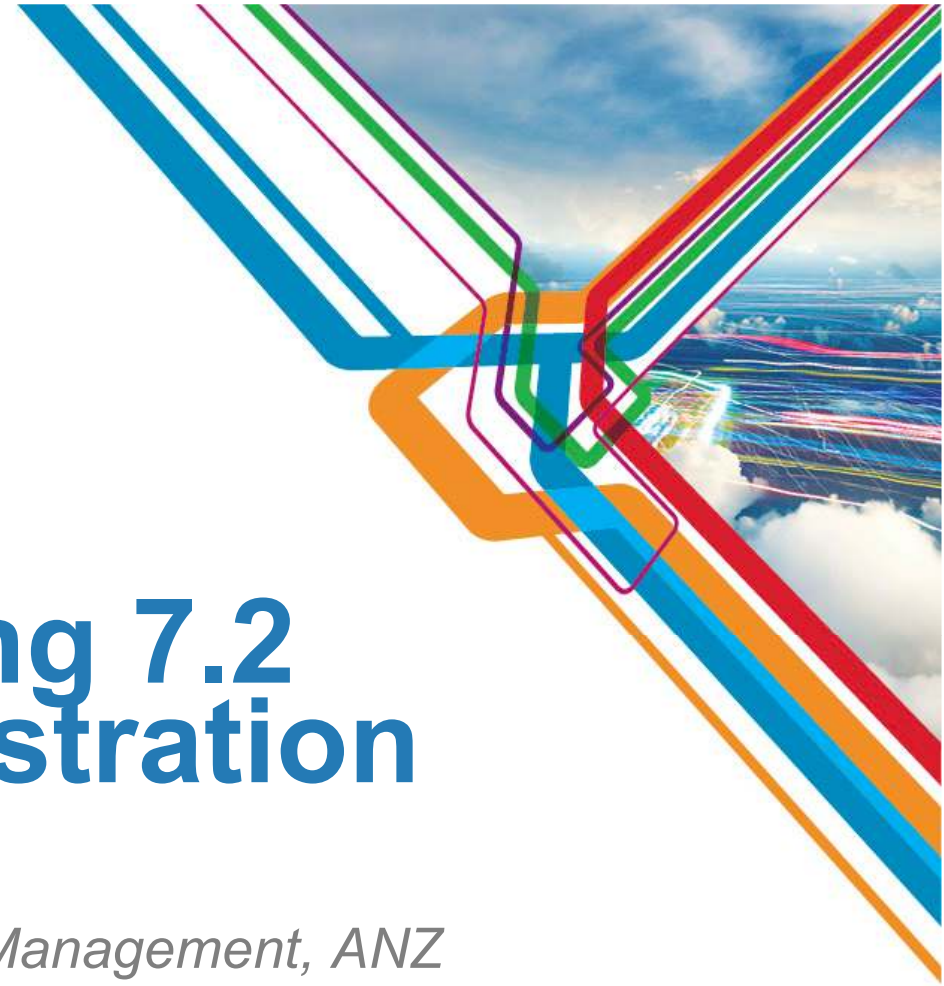
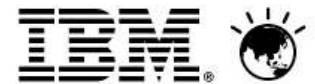
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SmartCloud Monitoring 7.2 Overview and Demonstration

Tze Ping Yeo

IBM Lead SmartCloud Application Performance Management, ANZ

12/06/2013





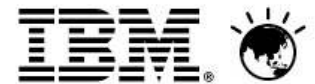
Agenda

- Introduction to SmartCloud Monitoring
- Monitoring and Reporting
- Power Systems Monitoring & Capacity Planning

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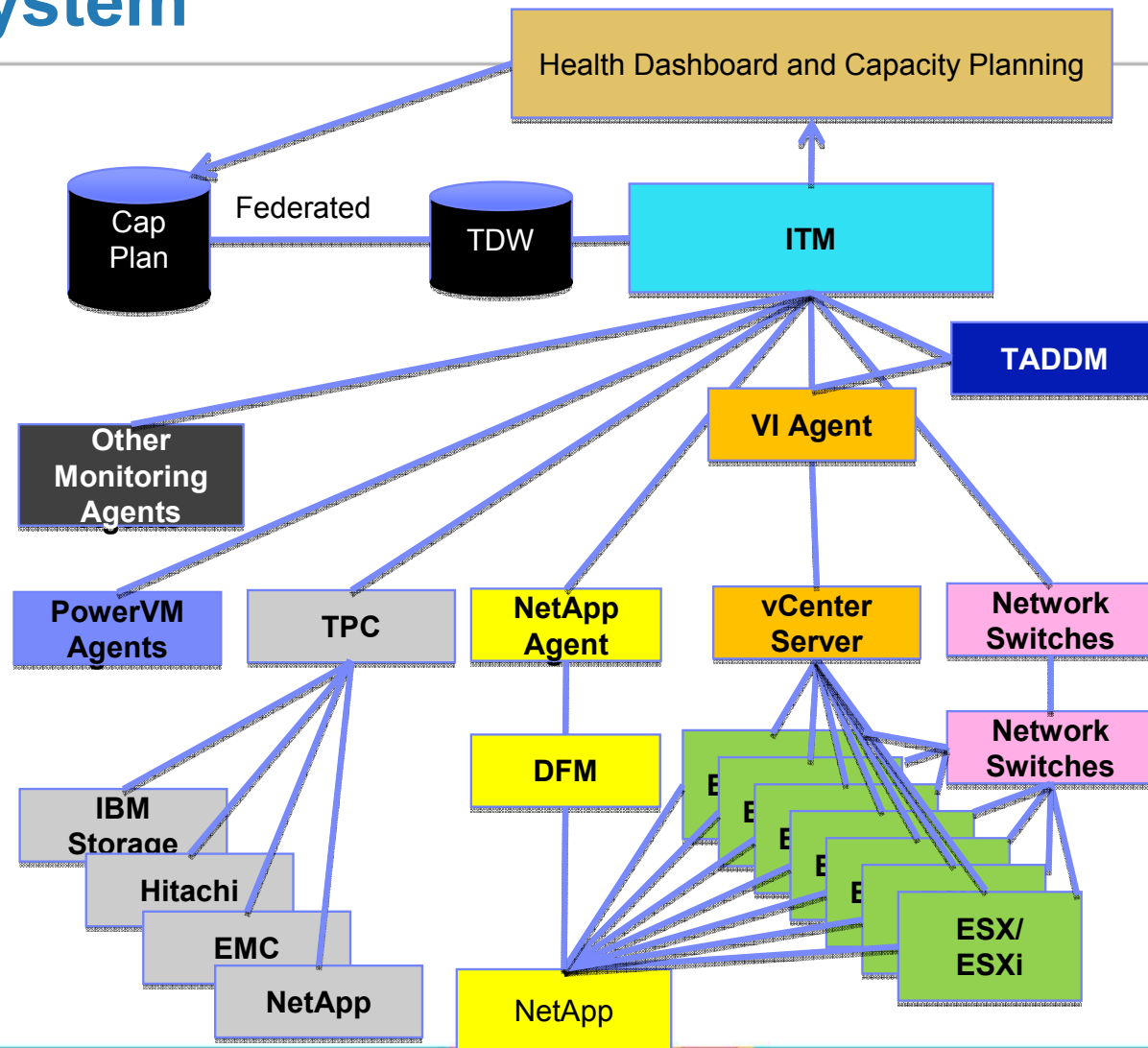
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Virtualization Monitoring



Cloud Monitoring Ecosystem

- Hypervisor Agents:
 - Vmware, PowerVM, Hyper-V, XenServer, KVM, z/VM
- NetApp Storage Agent:
 - Provides Monitoring data in ITM
 - Integrates into Health Dashboard
- IBM Systems Director Integration
 - ITM Agent provides integration with Director Server
 - Management of VMware resources
 - Historical Collection of HW data
- Tivoli Storage Productivity Center:
 - Agent provides storage metrics in TEP
 - Integrates into Health Dashboard
 - Warehouse storage metrics
- Network Monitoring Agent
 - Monitor switches used by VMware
 - Integrate Network Events into Dashboard
- Monitoring Suite includes monitoring for:
 - OS's, Applications, Middleware, Response Time, Transaction Tracking, etc.
- Predictive Analytics/Dynamic Thresholding





Key Features in SmartCloud Monitoring 7.2

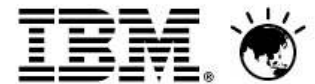
- **Completely rewritten VMware Health Dashboard**
 - Lighter weight/Faster Response Time
 - More intuitive and easy to navigate
 - Fewer clicks to drill down to root cause
- **New DASH user interface**
 - Single User Interface where multiple Tivoli products are integrated
 - Includes TCR 3.1 which includes Active Reporting
 - Self-Service dashboarding capabilities. Build dashboards using any ITM data and data using Tivoli Directory Integrator
 - Support for tablet devices
- **Improved VMware Capacity Planning:**
 - Can save existing customization
 - Can do partial loads of the VMware environment
 - New VMware Expense Reduction Report and other reports
 - Improved benchmark matching
 - Evaluates CPU, Memory, Network I/O, Storage, and Storage Topology
- **Power Systems :**
 - Capacity Planning: What-if scenarios, server sizing, etc. for Power Systems
 - Enhanced Power Systems Agents including consolidation of UNIX OS Agent and Premium AIX Agent
- **Enhancements to other hypervisors**
 - Other hypervisors such as Citrix and Cisco UCS have been enhanced



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VMware Dashboard Walkthrough



High level Vmware dashboard showing all clusters, events, and key KPI's



Click to drill down

Single Cluster view showing events and KPI's
Can be real-time or historical



Select any of the links below to go to Servers, VMs, or Datastores

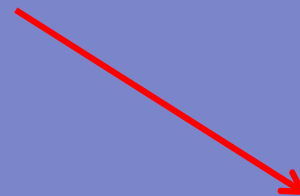


← Bread crumbs allow for easy navigation

Change History data from discovery tool

Virtual Machine Page showing real-time or historical KPI's and Events

Link to OS Dashboard for the VM



OS Dashboard with metrics and Events from the OS Agent

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VMware Reports Walkthrough

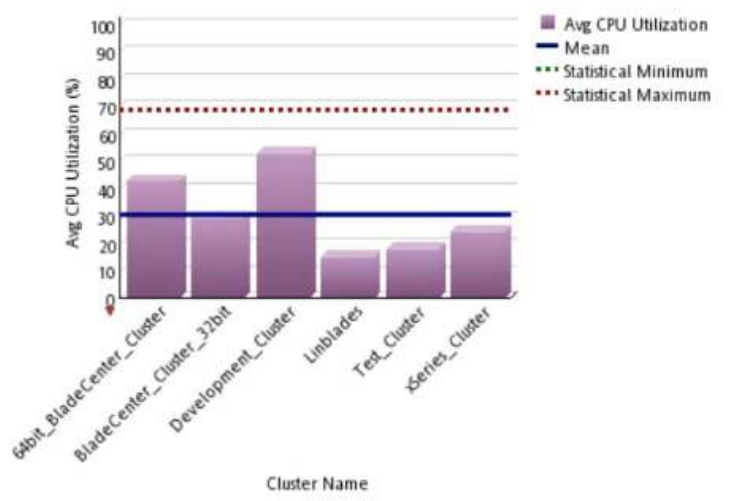


This report is a quick indicator showing a common problem we see in VMware environments.

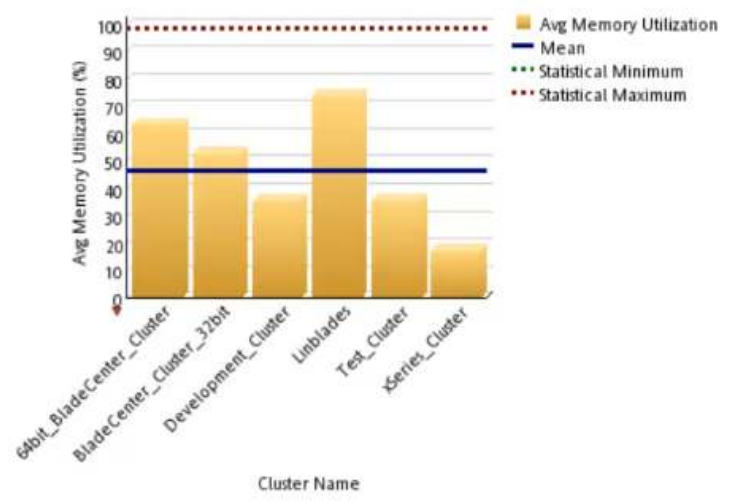
Viewer - VMware VI Balanced and Unbalanced Clusters

Unit Periods: All days

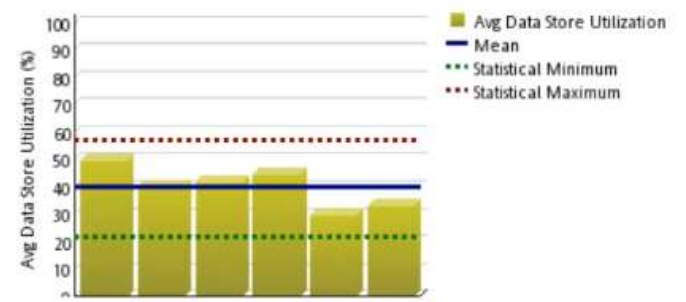
CPU Utilization (%)



Memory Utilization (%)



Data Store Space Utilization (%)

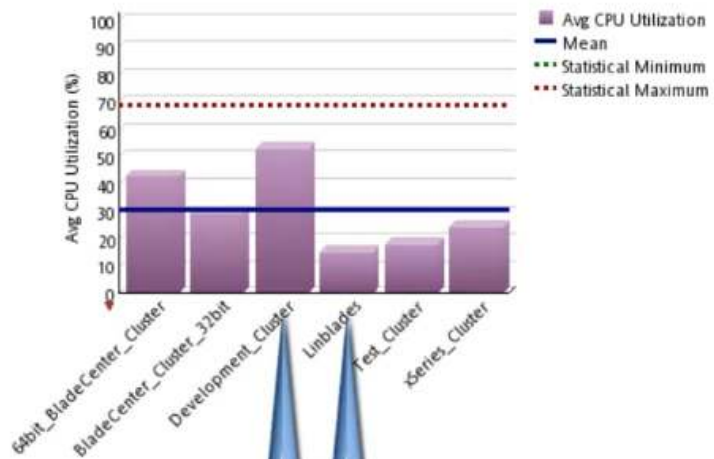


If I see imbalances in CPU, Memory, Space, I/O, etc., then I know my environment is not optimized.

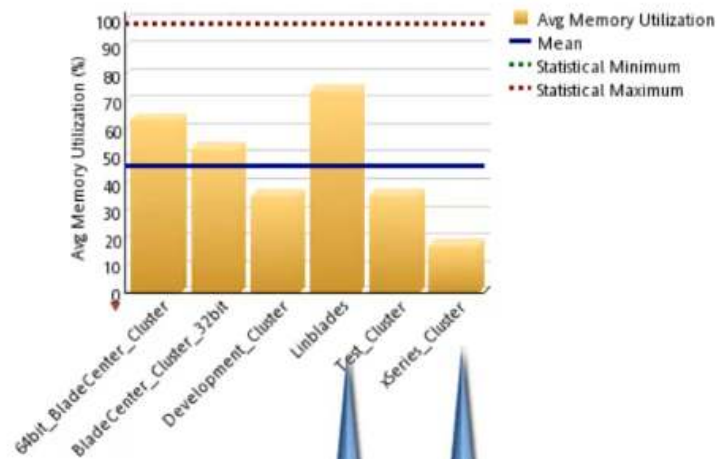
Viewer - VMware VI Balanced and Unbalanced Clu

Shift Periods | All Shifts
Vacation Periods | All days

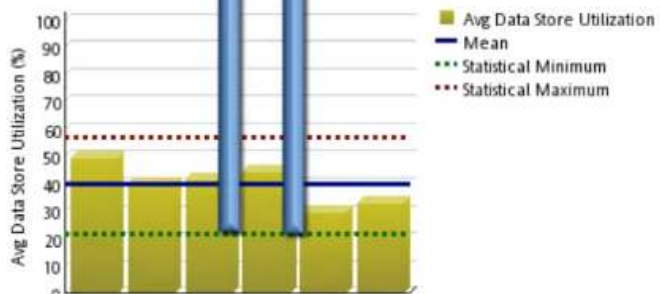
CPU Utilization (%)



Memory Utilization (%)



Data Store Space Utilization (%)



Cluster Name

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Capacity Planning





Why is Capacity Planning Critical to Cloud Mgmt?

- **Helps consolidate and reduce IT costs**
 - Reduces HW and labor costs
 - Fewer physical servers needed
 - Reduce hypervisor license costs
 - Increase VM density to drive Cloud ROI
 - Predict how many more customers / VMs can be serviced
- **Helps ensure application availability and reduce risk**
 - Are any resources overloaded? When will physical resources reach their limits?
 - Have there been any significant changes in my environment recently?
 - Identify trends to predict bottlenecks, or free up space and balance workloads
 - Ensure supply can meet demand
 - Ensure technical and business policies are met to reduce risk
- **Helps optimize resource utilization**
 - Right size virtual machines and allocate based on usage, over-commit within known risk limits
 - Pack VMs on the infrastructure to optimize resources





ROI Case Study – IBM Test & Development Cloud

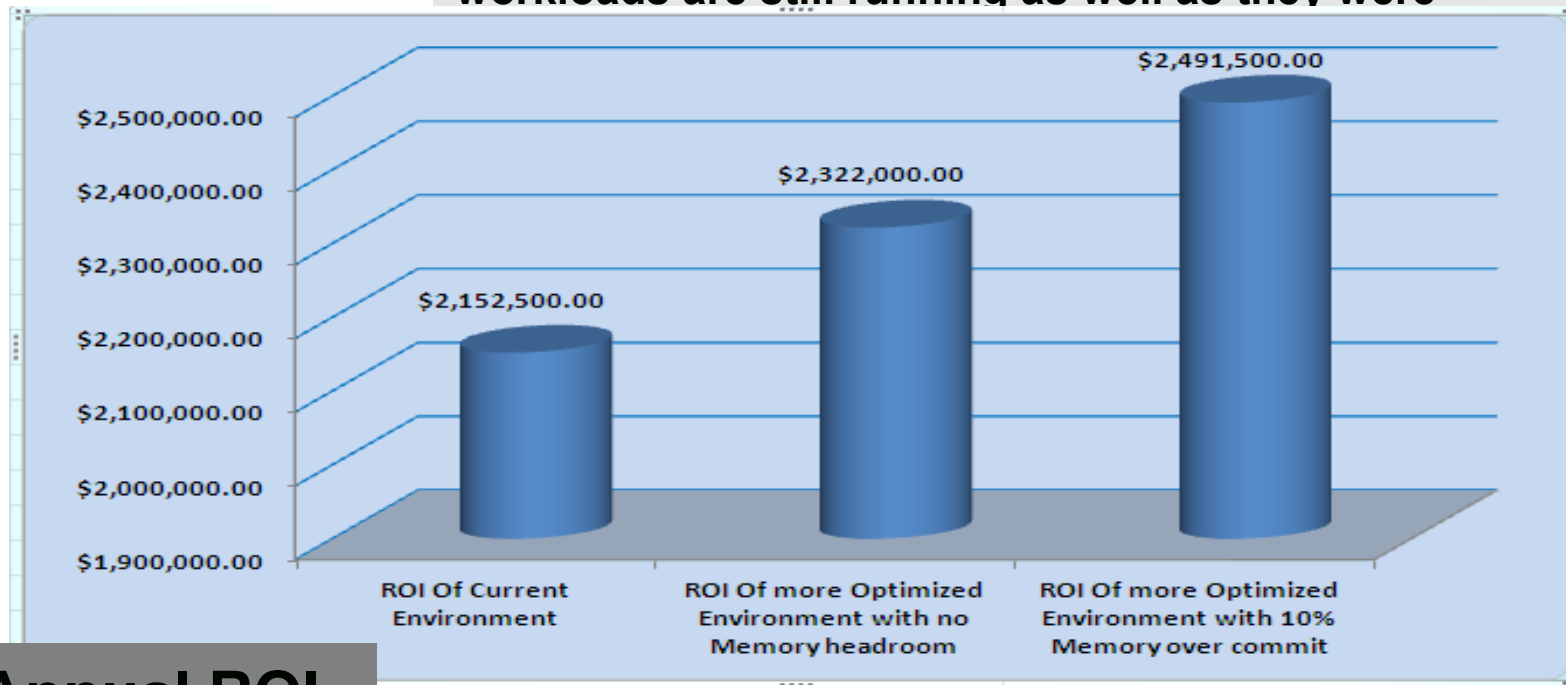
Optimization of an IBM Internal development and test cloud using IBM SmartCloud monitoring results in an additional ROI of 14.2%

“In order to realize true cost savings from a virtualization or cloud investment, customers need to be able to run virtual machines densely enough to maximize consolidation, yet be assured that their workloads are still running as well as they were

Goal: Analyze an existing, production virtual environment in search of further optimization, and show ROI using management and capacity planning

Solution: Used IBM SmartCloud Monitoring to analyze the current environment and perform “what-if” analysis

Results: More Optimized environment uses fewer physical servers, which results in savings in hardware, administrator /support, energy, data center floor space and license costs, resulting in an additional ROI of 14.4.% over a year, and the ability to accommodate an additional 113 virtual machines.



14.4 % Annual ROI

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VMware Capacity Planning Walkthrough



You're looking at the capacity planning tool. The main thing that's important is that it's a very simple tool to use and requires no mathematical knowledge. All it requires is your knowledge of your business objectives.

Planning Center for VMware

Any change in steps 1 to 4 needs a re-generation of the plan in step 5 to view the latest recommendation.

Step 1: Snapshot config data.

Load the latest configuration data for physical servers and virtual machines for analysis. You can change this data for what-if analysis.

Advanced options:

Select the data load options:

- Load data for selected Physical Servers
- Clean database before loading

Load Config

Step 2: Set analysis time period.

Set the time period for which the measurement data in the warehouse can be analyzed corresponding to the virtual machines loaded in **Step 1**. The measurement data is federated from the warehouse.

Set Time

Step 3: Scope the infrastructure for analysis.

Default scope includes all physical servers loaded in **Step 1**. Click **Define Scope** to go to an expert mode page where you can select the subset of physical servers that you want to be part of this analysis.

Advanced options:

While scoping you can also edit the current configuration on the [Edit Current Environment](#) page to add new attributes or clean the data for physical servers and virtual machines, if required.

Define Scope

Step 4: Analyze virtual machine characteristics.

Analyze the warehouse data within the time limit set in **Step 2**, to compute the VM-level sizing estimates using default settings (average daily utilization).

Advanced options:

Experts can customize sizing on the [Edit Current Environment](#) page. While on this edit page, you can trigger several custom actions to characterize virtual machines based on measurement data.

Size VMs

[Current Environment Report](#)

Step 5: Generate optimization plan.

The 3rd step is to define the scope

Planning Center for VMware

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Size VMs

[Current Environment Report](#)

Step 5: Generate optimization plan.

This first screen shows the physical VSphere servers.

Edit VMware Current Environment

Views >> Inventory >> Physical Servers

Views | Actions | Reports | Filter

Select Server	Status	Datacenter*	Cluster*	Server Hostname*	Data Source	Architecture*	Number of CPU Cores*	CPU Speed [MHz]*	Memory Limit [MB]*
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_64bit	sapm-x3650c.tivlab.raleigh.ibm.com	Discovery	Intel(R) Xeon(R) CPU 5150 @ 2.66GHz	2	2,659	24,576
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_64bit	sapm-x3650b.tivlab.raleigh.ibm.com	Discovery	Intel(R) Xeon(TM) MV CPU 3.20GHz	2	3,191	5,120
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_64bit	sapm-x3650a.tivlab.raleigh.ibm.com	Discovery	Intel(R) Xeon(TM) MV CPU 3.20GHz	2	3,191	10,240
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_64bit	sapm-3550a.tivlab.raleigh.ibm.com	Discovery	Intel(R) Xeon(R) CPU E5345 @ 2.33GHz	4	2,327	32,768
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_BladeCenter_64	linblade14.tivlab.raleigh.ibm.com	Discovery	Dual Core AMD Opteron(tm) Processor 280	4	2,392	8,192
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Austin	Austin_BladeCenter_64	linblade12.tivlab.raleigh.ibm.com	Discovery	AMD Opteron(tm) Processor 252	2	2,591	8,192

1 - 25 of 30 items | 5 10 25 50 100 All | 1 2

Edit VMware Current Environment

The next step is to look at the Virtual Machines. This provides a list of the VMs and their current configuration.

Views >> Inventory >> Virtual Machines

Views | Actions | Reports

Filter

Action	Server Hostname*	VM Hostname*	VM Name*	Number of CPU Cores*	Minimum CPU [MHz]*	Minimum Memory [MB]*	OS	Middleware Name	Criticality SL
	sapm-x3650c.tivlab.raleigh.ibm.com	Unavailable	SCM_Hosted_Beta_Clo	2	0	0	Unavailable	MQ	CRIT
	sapm-x3650c.tivlab.raleigh.ibm.com	devvm	adtech-ibd	2	0	0	Red Hat Enterprise Linux 6 (64-bit)	WAS	CRIT
	sapm-x3650c.tivlab.raleigh.ibm.com	sapm-ad1.sapm.tivlab.c	sapm-ad1	1	1,485	2,739	Microsoft Windows Server 2008 R2 (64-bit)	AD	CRIT
	sapm-x3650b.tivlab.raleigh.ibm.com	Unavailable	SCM_Hosted_Beta	1	0	0	Unavailable	SCM	
	sapm-x3650b.tivlab.raleigh.ibm.com	Unavailable	sapm-ad2	2	349	685	Unavailable	AD	CRIT
	sapm-x3650b.tivlab.raleigh.ibm.com	xa6demo	xa6demo	2	349	514	Microsoft Windows Server 2008 R2 (64-bit)	MSSQL	CRIT
	sapm-x3650a.tivlab.raleigh.ibm.com	itmfive	SCM_Trial_v3_test	2	1,175	524	Red Hat Enterprise Linux 5 (64-bit)	SCM	

1 - 25 of 71 items | 5 10 25 50 100 All | 1 2 3

Edit VMware Current Environment

I've tagged the Middleware type, Mission Criticality, and the Business Application running on each VM. We can use that data as we do our analysis.

Views >> Inventory >> Virtual Machines

Views | Actions | Reports | Filter

VM Hostname*	VM Name*	Number of CPU Cores*	Minimum CPU [MHz]*	Minimum Memory [MB]*	OS	Middleware Name	Criticality SLA	Primary Business Application
Unavailable	SCM_Hosted_Beta_Clo	2	0	0	Unavailable	MQ	CRIT	Online Sales
devvm	adtech-ird	2	0	0	Red Hat Enterprise Linux 6 (64-bit)	WAS	CRIT	Online Sales
sapm-ad1.sapm.tivlab.c	sapm-ad1	1	1,485	2,739	Microsoft Windows Server 2008 R2 (64-bit)	AD	CRIT	Infrastructure
Unavailable	SCM_Hosted_Beta	1	0	0	Unavailable	SCM		Infrastructure
Unavailable	sapm-ad2	2	349	685	Unavailable	AD	CRIT	Infrastructure
xa6demo	xa6demo	2	349	514	Microsoft Windows Server 2008 R2 (64-bit)	MSSQL	CRIT	Retail Sales
itmive	SCM_Trial_v3_test	2	1,175	524	Red Hat Enterprise Linux 5 (64-bit)	SCM		Infrastructure

We have to calculate the utilization for each virtual machine so that we can use that data for our capacity planning based on the historical workload characteristics.

Edit VMware Current Environment

Views >> Virtual Machines Utilization

Views | Actions | Reports

Filter

<input type="checkbox"/>	VM Hostname	VM Name	Server Hostname	CPU Usage [MHz]	Memory Usage [MB]	Storage Usage [Kbps]	Network Usage [Kbps]	CPU Deviation	Memory Deviation
<input type="checkbox"/>	Unavailable	SCM_Hosted_Beta_Clo	sapm-x3650c.tivlab.rale	392	2,395	32	27		
<input type="checkbox"/>	devvm	adtech-iwd	sapm-x3650c.tivlab.rale	258	21,658	32	52	STABLE	STABLE
<input type="checkbox"/>	sapm-ad1.sapm.tivlab.c	sapm-ad1	sapm-x3650c.tivlab.rale	266	5,018	20	3	STABLE	STABLE
<input type="checkbox"/>	Unavailable	SCM_Hosted_Beta	sapm-x3650b.tivlab.rale	226	852	32	2	STABLE	STABLE
<input type="checkbox"/>	Unavailable	sapm-ad2	sapm-x3650b.tivlab.rale	392	2,395	10	27		
<input type="checkbox"/>	xa6demo	xa6demo	sapm-x3650b.tivlab.rale	970	3,785	6	26	STABLE	STABLE
<input type="checkbox"/>	itmive	SCM_Trial_v3_test	sapm-x3650a.tivlab.rale	130	5,753	32	2	STABLE	STABLE
<input type="checkbox"/>	sysitmsles	APMSmartPoC-Server-VM1 (sysitmsles)	sapm-x3650a.tivlab.rale	577	2,324	32	4	STABLE	STABLE
<input type="checkbox"/>	sapm-tuning-e.saom.tivlab.com	SAPM-Tuning-e	sapm-x3650a.tivlab.rale	382	2,442	32	12	STABLE	STABLE

1 - 25 of 71 items

5 10 25 50 100 All

1 2 3

You get to select how you want to calculate the utilization. I personally recommend 90th percentile, but you can also choose Hourly Averages, Daily Averages, Min, Max, etc.

Edit VMware Current Environment

Views >> Virtual Machines Utilization

Views | Actions | Reports

VM Hostname	VM Name	Server Hostname
Unavailable	SCM_Hosted_Beta_Clo	sapm-x3650c.t
devvm	adtech-iwd	sapm-x3650c.t
sapm-ad1.sapm.tivlab.c	sapm-ad1	sapm-x3650c.t
Unavailable	SCM_Hosted_Beta	sapm-x3650b.t
Unavailable	sapm-ad2	sapm-x3650b.t
xa6demo	xa6demo	sapm-x3650b.t
itmfv	SCM_Trial_v3_test	sapm-x3650a.t
sysitmsles	APMSmartPoC-Server-VM1 (sysitmsles)	sapm-x3650a.t
sapm-tuning-e.sapm.tivlab.com	SAPM-Tuning-e	sapm-x3650a.tivlab.ral

Compute Usage

	Summarization	Selected Summarization
CPU: Average	Daily	All
Memory: 90th Percentile	Daily	All
Storage: Average	Daily	All
Network: Average	Daily	All

Generate Cancel

Network Usage [Kbps]	CPU Deviation	Memory Deviation
27		
52	STABLE	STABLE
3	STABLE	STABLE
2	STABLE	STABLE
27		
26	STABLE	STABLE
2	STABLE	STABLE
4	STABLE	STABLE
12	STABLE	STABLE

Edit VMware Current Environment

Then, I'm going to save those changes and it's going to update the utilization data.

Views >> Virtual Machines Utilization

Views | Actions | Reports

	VM Hostname	VM Name	Server Hostname	Usage [Kbps]	Network Usage [Kbps]	CPU Deviation	Memory Deviation
<input checked="" type="checkbox"/>	Unavailable	SCM_Hosted_Beta_Clo	sapm-x3650c.tivlab.ra	32	27		
<input checked="" type="checkbox"/>	devvm	adtech-ivwd	sapm-x3650c.tivlab.ra	32	52	STABLE	STABLE
<input checked="" type="checkbox"/>	sapm-ad1.sapm.tivlab.c	sapm-ad1	sapm-x3650c.tivlab.ra	20	3	STABLE	STABLE
<input checked="" type="checkbox"/>	Unavailable	SCM_Hosted_Beta	sapm-x3650b.tivlab.ra	32	2	STABLE	STABLE
<input checked="" type="checkbox"/>	Unavailable	sapm-ad2	sapm-x3650b.tivlab.ra	10	27		
<input checked="" type="checkbox"/>	xa6demo	xa6demo	sapm-x3650b.tivlab.ra	6	26	STABLE	STABLE
<input checked="" type="checkbox"/>	itmfve	SCM_Trial_v3_test	sapm-x3650a.tivlab.ra	32	2	STABLE	STABLE
<input checked="" type="checkbox"/>	sysitmsles	APMSmartPoC-Server-VM1 (sysitmsles)	sapm-x3650a.tivlab.ra	32	4	STABLE	STABLE
<input checked="" type="checkbox"/>	sapm-tuning-e.saom.tivlab.com	SAPM-Tuning-e	sapm-x3650a.tivlab.ra	32	12	STABLE	STABLE

Edit Usage

Absolute Value Growth

CPU Usage: %

Memory Usage: %

Storage Usage: %

Network Usage: %

Now, I'm going to go to the final step. Before I click the "Generate Plan" button, I'm going to show you some customization that you can do.

Planning Center for VMware

Set the time period for which the measurement data in the warehouse can be analyzed corresponding to the v

Set Time

Step 3: Scope the infrastructure for analysis.

Default scope includes all physical servers loaded in **Step 1**. Click **Define Scope** to go to an expert mode page where you can select the subset of physical servers that you want to be part of this analysis.

Advanced options:

While scoping you can also edit the current configuration on the [Edit Current Environment](#) page to add new attributes or clean the data for physical servers and virtual machines, if required.

Define Scope

Step 4: Analyze virtual machine characteristics.

Analyze the warehouse data within the time limit set in **Step 2**, to compute the VM-level sizing estimates using default settings (average daily utilization).

Advanced options:

Experts can customize sizing on the [Edit Current Environment](#) page. While on this edit page, you can trigger several custom actions to characterize virtual machines based on measurement data.

Size VMs

[Current Environment Report](#)

Step 5: Generate optimization plan.

Any change in steps 1 to 4 needs a re-generation of the plan in step 5 to view the latest recommendation.

Generate an optimization plan based on recommended environment settings.

Advanced options:

Custom settings can be made on the [Edit Recommended Environment Settings](#) page where experts can select optimization strategies, such as applicable business and technical policies, optimization goal and so on.

Generate Plan

[Optimized Plan Report](#)

[Additional Workload Analysis Report](#)

[VMware Expense Reduction Report](#)

What we have are a set of rules. There are 3 different types of rules. For example, we have colocation/anti-colocation rules where we can intentionally place certain types of workloads apart or place them on the same servers.

Edit VMware Recommended Environment Settings

Step 1: Select rules to apply in optimization.

▼ Colocation/Anti-colocation

Active	Rule Instances
<input type="checkbox"/>	Do not colocate VMs with DB2 and WAS
<input type="checkbox"/>	Colocate all VMs running Oracle in the same Cluster

▼ Boundary

Active	Rule Instances
<input type="checkbox"/>	Create a Boundary for Critical VMs
<input checked="" type="checkbox"/>	Create a Boundary for Win2003 32-bit VMs

▼ Utilization

Active	Rule Instances
<input type="checkbox"/>	Provide 50% more CPU for Critical VMs
<input type="checkbox"/>	Use 20% for growth on MQ servers

Step 2: Select optimization goal.

● Minimize Systeme

Firefox

https://sapm-rhx64e.tivlab.raleigh.ibm.com:16311/tarf/series/dispatch?b_action=cognosViewer&ui.action=run&ui.object=%2fcontent%2fpackage%40name%3dIBM Infrastructure Management Ca

IBM Dashboard Application S... Capacity Planner Optimized Environment Pl...

Viewer - Capacity Planner Optimized Environment Pl...

bstern About

Add this report

You can see the Capacity Planning and Optimization report. I started with 30 servers and the report is telling me that I can run the workload on 18 servers. Keep

▶ About this report

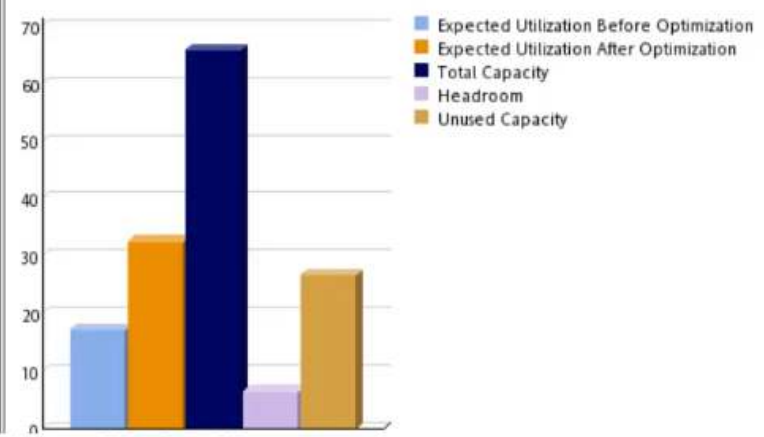
	Current		Recommendation	
Physical Servers	30		18	
Virtual Machines	71		70	
	CPU (GHz)	Memory (GB)	CPU (GHz)	Memory (GB)
Total Capacity	192.07	318.96	142.21	231.97
Total Reservation	40.90	61.44	83.86	138.01
Total Unused Capacity (excluding headroom)	138.66	235.92	44.13	70.77
Capacity Efficiency Index	26.03		68.97	

Detailed Placement

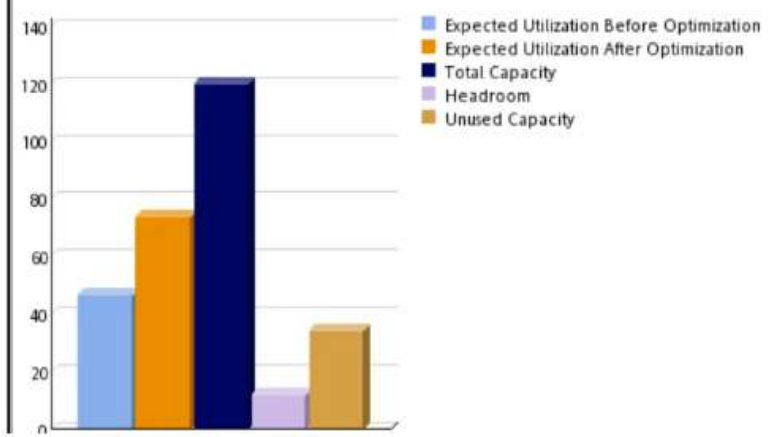
Data Center : Austin

Capacity Efficiency Index : 59

CPU Details (GHz)



Memory Details (GB)

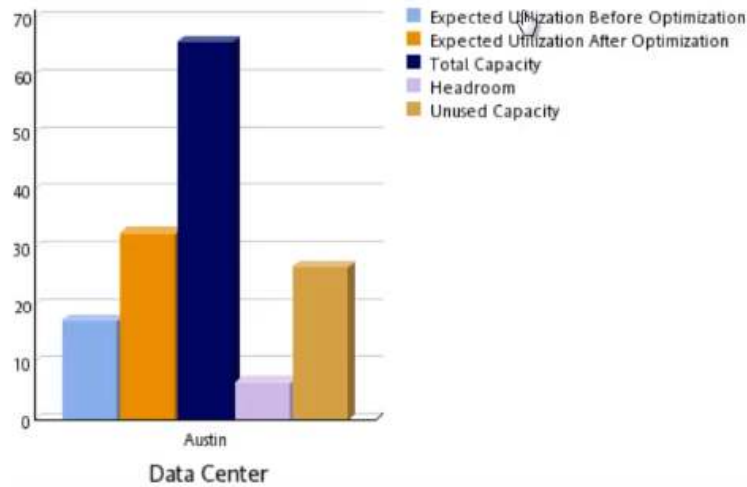


We show you the expected utilization before and after we optimized. These numbers take into account the growth we planned for in the capacity planning tool.

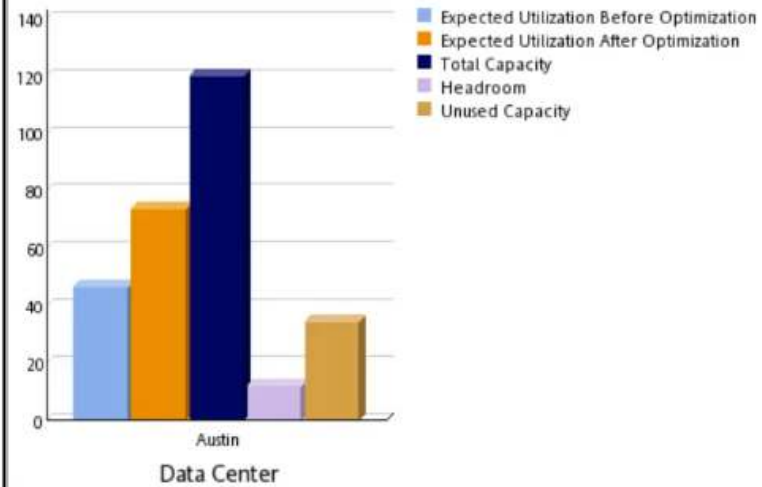
Data Center : Austin

Capacity Efficiency Index : 59

CPU Details (GHz)



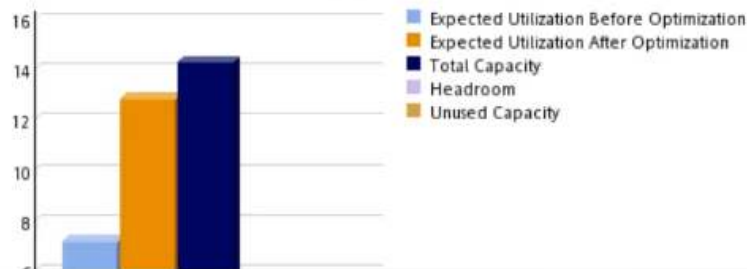
Memory Details (GB)



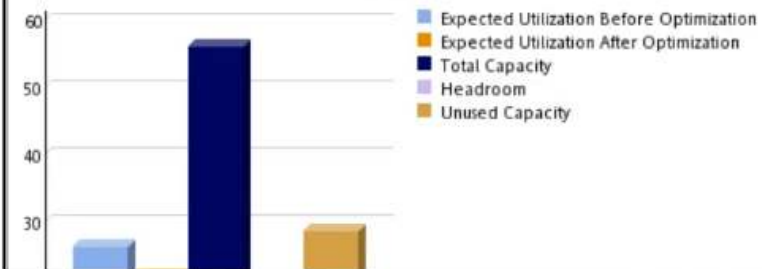
Cluster : Austin_64bit

Capacity Efficiency Index : 49

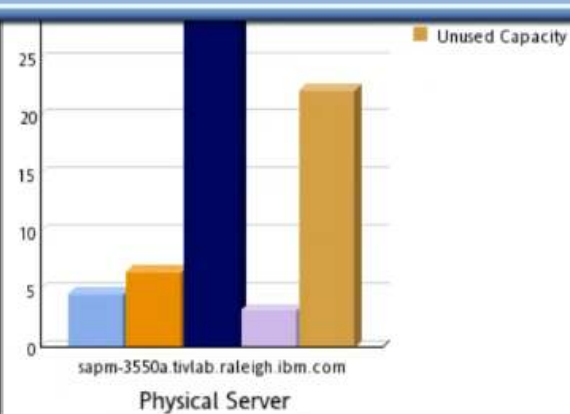
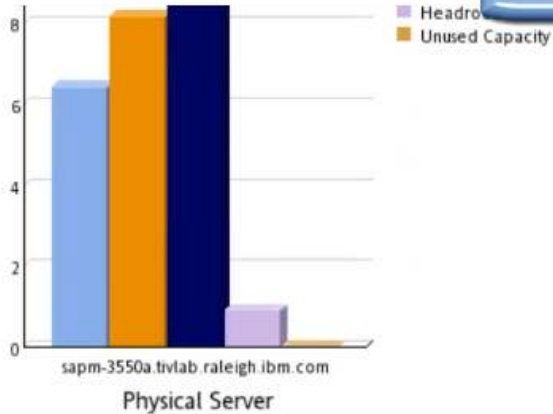
CPU Details (GHz)



Memory Details (GB)



We make a recommendation on which Virtual Machines to run on which VSphere server to get the best optimization



Physical Server	CPU Frequency (GHz)	Number Of CPUs	Total Memory Capacity (GB)	Total CPU Capacity (GHz)	Model	Architecture
sapm-3550a.tivlab.raleigh.ibm.com	2.27	4	32.00	9.09	IBM System x3550 -[7978CBU]-	Intel(R) Xeon(R) CPU E5345 @ 2.33GHz

Virtual Machines :

Virtual Machine	Number Of vCPUs	Current Reservation CPU (GHz)	Recommended Reservation CPU (GHz)	Current Reservation Memory (GB)	Recommended Reservation Memory (GB)	Performance Risk Index	OS	Middleware Name
absm-win32c (Sharepoint%2fMSSQL)	1	1.127	3.687	1.050	1.592	Green	Microsoft Windows Server 2003 (32-bit)	
APMSmartPoC-Portal-VM3	2	0.000	0.145	0.000	1.843	Green	Suse Linux Enterprise 11 (64-bit)	
BarryS	1	0.323	4.268	0.889	1.840	Green	Red Hat Enterprise Linux 5 (32-bit)	
oslctosca-2-53-VmMySQL.11361912	1	0.000	0.072	0.000	1.274	Green	Red Hat Enterprise Linux 6 (64-bit)	

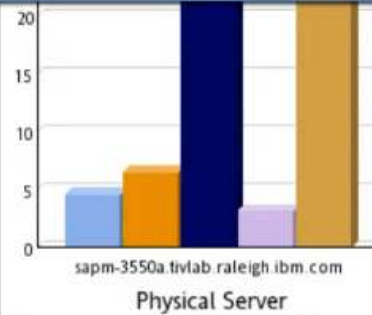
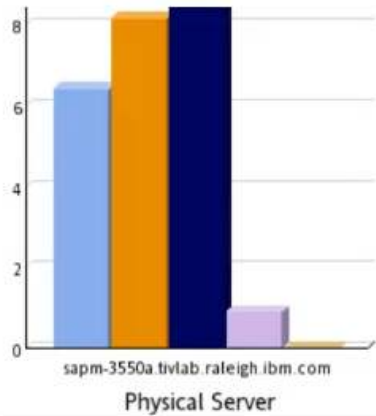
Physical Server : sapm-x3650c.tivlab.raleigh.ibm.com

Capacity Efficiency Index : 74

CPU Details (GHz)

Memory Details (GB)

This is how we're able to balance your workload, right size your virtual machines and ultimately get better capacity out of your existing hardware. Finally, we translate that into monetary savings.



Physical Server	CPU Frequency (GHz)	Number Of CPUs	Total Memory Capacity (GB)	Total CPU Capacity (GHz)	Model	Architecture
sapm-3550a.tivlab.raleigh.ibm.com	2.27	4	32.00	9.09	IBM System x3550 -[7978C8BU]-	Intel(R) Xeon(R) CPU E5345 @ 2.33GHz

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Physical Server : sapm-x3650c.tivlab.raleigh.ibm.com

Capacity Efficiency Index : **74**

CPU Details (GHz)

Memory Details (GB)

I'm going to start by showing you our VMware Expense Reduction Report that's part of our VMware Capacity Planning tool.

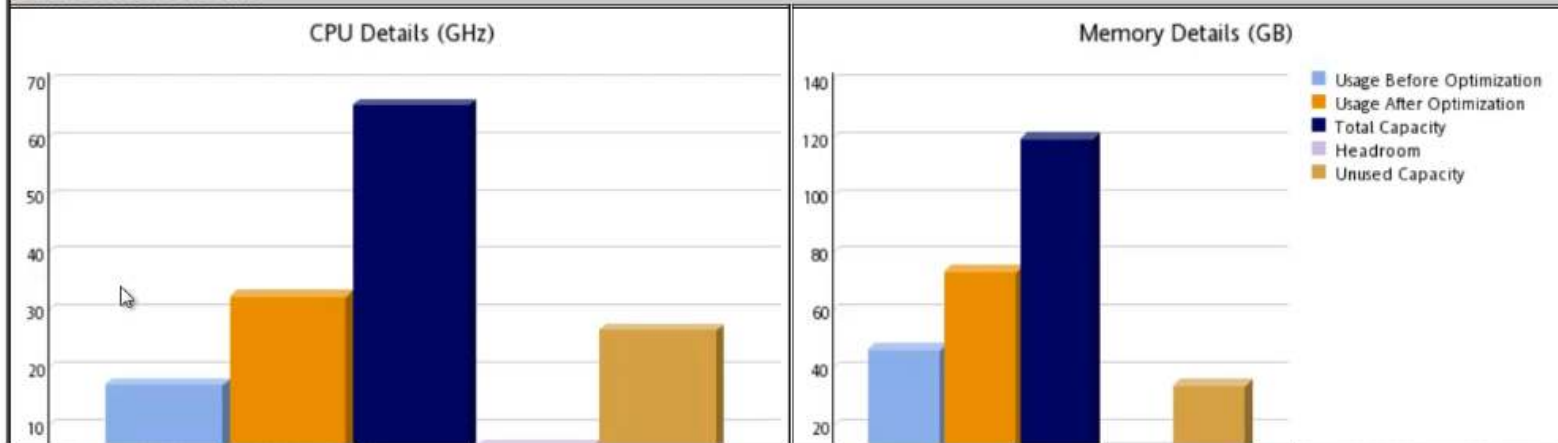
VMware Expense Reduction Report

Optimizations and Savings

Recommended Optimizations

	Current		Recommendation	
Physical Servers	30		18	
Virtual Machines	71		70	
Number of CPUs	75		57	
	CPU (GHz)	Memory (GB)	CPU (GHz)	Memory (GB)
Total Capacity	192.07	318.96	142.21	231.97
Total Reservation	40.90	61.44	83.86	138.01
Total Unused Capacity (excluding headroom)	138.66	235.92	44.13	70.77

Data Center : Austin



Data Center

Capacity clusters	Number of VMs that can be placed on the clusters based on Average VM Profile
63.37	56
7,240.26	129
73,153.72	30
	30

ion (%)

- Avg Data Store Utilization
- Mean
- Statistical Minimum
- Statistical Maximum

Cost Categor

- Server
- Administrative
- Energy cost p
- Floor space
- Virtualization I
- Storage and M
- Systems
- SmartCloud M
- Cost
- Total Savings

Based on the output of the capacity planning tool, we're able to show how you can reduce the number of VSphere servers from 30 down to 18.

VMware Expense Reduction Report

Optimizations and Savings

Recommended Optimizations

Return On

	Current		Recommendation	
Physical Servers	30		18	
Virtual Machines	71		70	
Number of CPUs	75		57	
	CPU (GHz)	Memory (GB)	CPU (GHz)	Memory (GB)
Total Capacity	192.07	318.96	142.21	231.97
Total Reservation	40.90	61.44	83.86	138.01
Total Unused Capacity (excluding headroom)	138.66	235.92	44.13	70.77

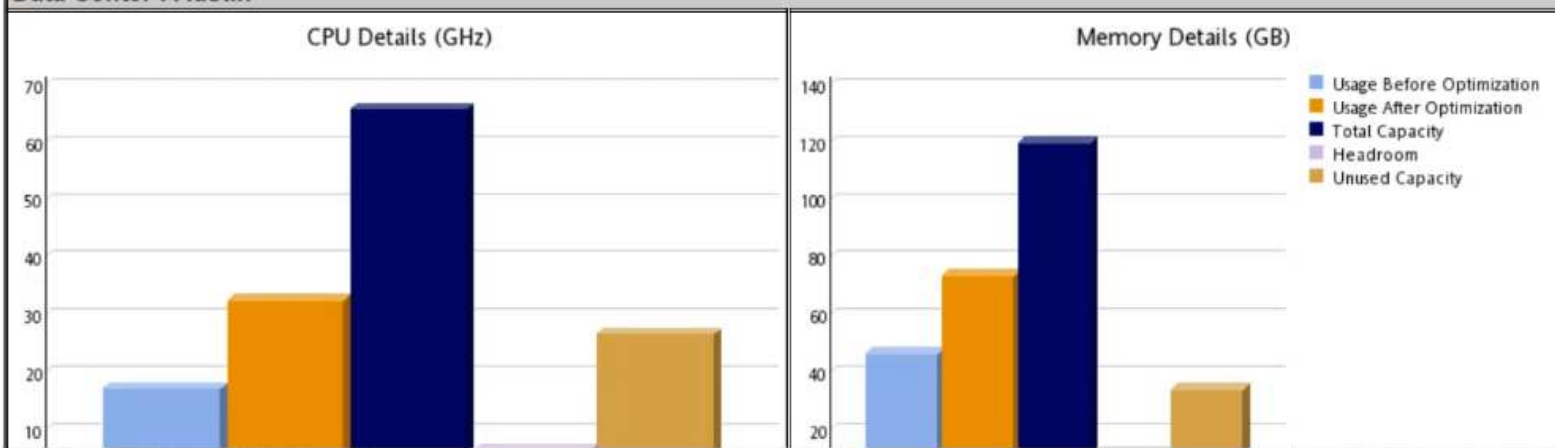
Data Center

Capacity clusters	Number of VMs that can be placed on the clusters based on Average VM Profile
63.37	56
7,240.26	129
73,153.72	30
	30

ion (%)

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- Mean
- Statistical Minimum
- Statistical Maximum

Data Center : Austin



Cost Categor

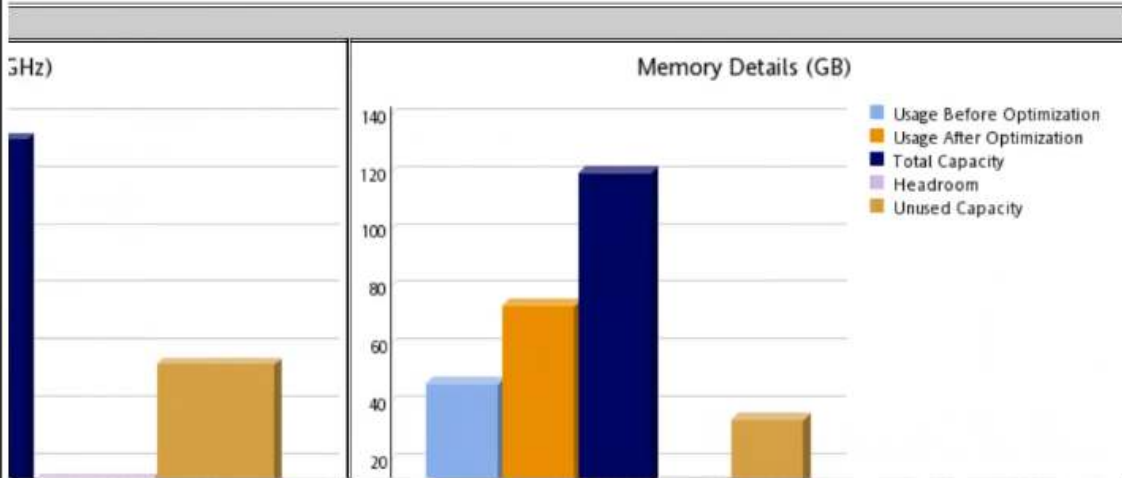
- Server
- Administrative
- Energy cost p
- Floor space
- Virtualization I
- Storage and M
- Systems
- SmartCloud M
- Cost
- Total
- Savings

What the report does is translate that reduction in VSphere servers into a monetary savings.

Reduction Report

Optimizations and Savings

	Current		Recommendation	
	30		18	
	71		70	
	75		57	
	CPU (GHz)	Memory (GB)	CPU (GHz)	Memory (GB)
	192.07	318.96	142.21	231.97
	40.90	61.44	83.86	138.01
(excluding headroom)	138.66	235.92	44.13	70.77



Return On Investment

Cost Basis

Currency: US Dollar
Hardware Cost per Server: 30,000
Administrative Cost per Server: 2,100
Virtualization Licensing per CPU socket: 2,875
Energy Cost per Server per Year: 1,226
Flooring Space per Server: 1,600
Storage Cost per TB: 10,500
Smart Cloud Monitoring software cost per VM: 225

ROI for Evaluated Clusters

Cost Category	Current Environment (US Dollar)	Optimized Environment (US Dollar)
Server	900,000	540,000
Administrative cost per server	63,000	37,800
Energy cost per server	36,780	22,068
Floor space	48,000	28,800
Virtualization License	215,625	163,875
Storage and Management Systems	315,000	315,000
SmartCloud Monitoring Software Cost	15,975	15,750
Total	1,594,380	1,123,293
Savings		471,087

Percent ROI for Evaluated Clusters: 29.55 %

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Power Systems Monitoring & Capacity Planning



Cloud Monitoring Ecosystem

OS Agent

- OS metrics like CPU, Memory, Processes, Network, Disk, etc.
- Entitlement
- LPAR configuration (Sharing, Dedicated, etc.)

HMC Agent:

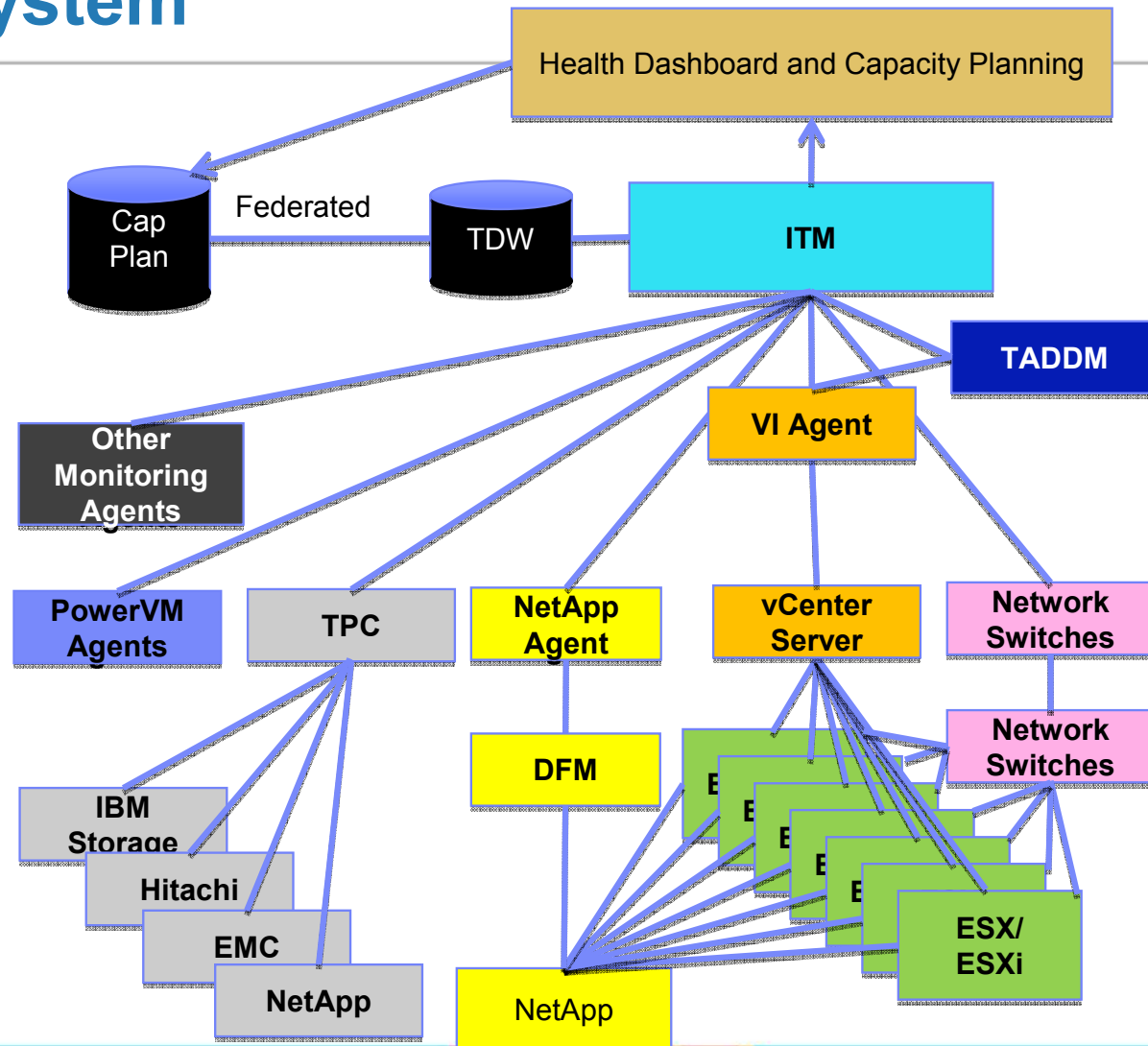
- Monitors Health and performance of the HMC
- Shows configuration data for all LPAR's being managed by the HMC
- Shows Frame-level CPU utilization integrated into the HMC Agent
- Includes AIX, Linux on Power, and i5/OS LPARs
- Agent-less monitoring capabilities

CEC Agent:

- Monitors frame level utilization of the server
- Shows utilization of the LPARs running on the frame
- Agent-less monitoring capabilities or pre-installed in the VIOS

VIOS Agent:

- Monitoring key performance metrics within the VIOS LPAR
- Shows Virtual I/O mappings and utilization





Power Systems Monitoring & Capacity Planning

- OS Agent
 - OS metrics like CPU, Memory, Processes, Network, Disk, etc.
 - Entitlement
 - LPAR configuration (Sharing, Dedicated, etc.)
- HMC Agent:
 - Monitors Health and performance of the HMC
 - Shows configuration data for all LPAR's being managed by the HMC
 - Shows Frame-level CPU utilization integrated into the HMC Agent
 - Includes AIX, Linux on Power, and i5/OS LPARs
 - Agent-less monitoring capabilities
- CEC Agent:
 - Monitors frame level utilization of the server
 - Shows utilization of the LPARs running on the frame
 - Agent-less monitoring capabilities or pre-installed in the VIOS
- VIOS Agent:
 - Monitoring key performance metrics within the VIOS LPAR
 - Shows Virtual I/O mappings and utilization



Capacity Planning...Planning Center





PowerVM Capacity Planning Scenarios

Scenario 1

- As an IT Admin for Power Systems, I want to make sure that there is no risk of outage due to performance. I also want to evaluate if there is sufficient spare capacity available on my existing systems.
- **Provide a sizing recommendation for LPARs by keeping the workloads on the same system**

Scenario 2

- As an IT Admin for Power Systems, I know that there is not enough capacity available on some systems for efficiently running the current workloads and the known growth that is planned. I would like to migrate these workloads to new Power systems.
- **Provide a sizing recommendation for LPARs for a different target system that is automatically picked from the catalog**

Scenario 3

- LPAR Consolidation scenario to reduce power, cooling, space, and admin costs
- **Consolidate older LPARs onto an existing Power 7 system**





Examples of Recommendations

Selected workload Workload definition Selected system

Evaluated Environment

System Information

Tier	System	Immediate Solution
Smart Cloud Monitoring IBM Power System	itmaix17	780-9179-MHD 39 of 4-64 cores, 4420 MHz 89% utilized <input checked="" type="checkbox"/> Select for planning Change base for itmaix17

Physical Server Name	Current Model	Selected Model			
itmaix17	 570-9117-MMA 2-16 Cores, 4700 MHz	 795-9119-FHB 24-256 Cores, 4000 MHz			
		Current	Recommended		
LPAR Name	OS Name	Entitlement	Memory (MB)	Entitlement	Memory (MB)
itmaix17c	VIOS	0.3	1,536	43	60,235
itmaix17d	AIX	2	16,384	1.5	11,893
itmaix17e	AIX	2	10,240	0.8	15,095
itmaix17f	AIX	1	8,192	1	5,980

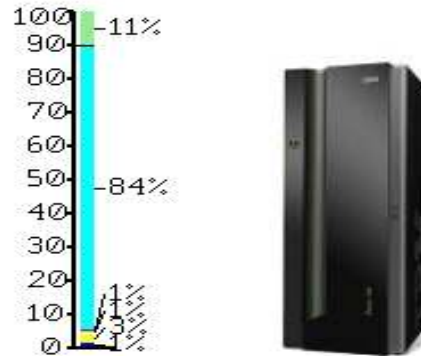
Recommendation



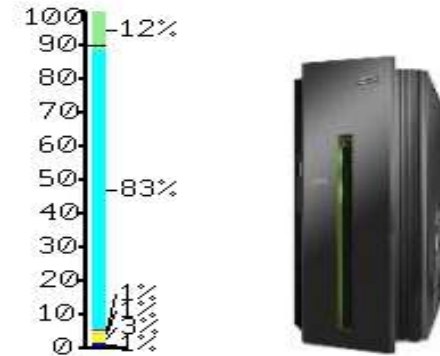
Side-by-side comparison

- Available
- itmaix17c
- SCM #2
- itmaix17e
- itmaix17d
- itmaix17f

Immediate Solution #1



Immediate Solution #2



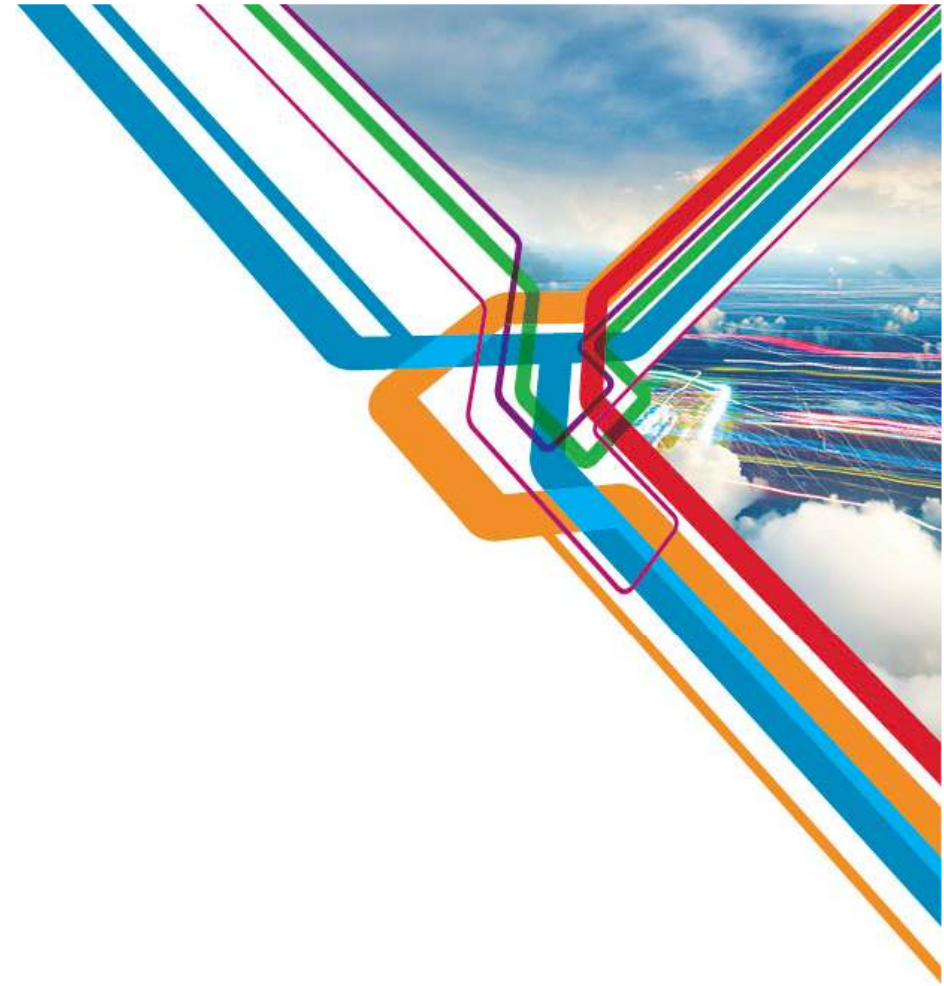
Model/Feature:	780-9179-MHD EPH0 4420 4-64
Number of Systems:	1
rPerf:	538.35 (for 39.0 cores)
Activated Cores:	39 cores of 4-48
CPU Utilization:	89% of 39 cores
Allocated Cores:	38.3 cores
Operating System:	refer to partition detail
Memory (GB):	91 of 3,072
Ext. Disk Systems (DS):	1 system(s)
Ext. Disk Ports:	4 port(s)
Ext. Disk Drives (arms):	8 drive(s)
Int. Disk Drives (arms):	0
Storage Capacity (GB):	449 GB
Offering Family:	IBM Power Systems
Processor:	IBM® POWER7+
Clock Speed:	4420 MHz

Model/Feature:	795-9119-FHB 4700 4000 24-256
Number of Systems:	1
rPerf:	537.72 (for 48.0 cores)
Activated Cores:	48 cores of 24-64
CPU Utilization:	88% of 48 cores
Allocated Cores:	46.3 cores
Operating System:	refer to partition detail
Memory (GB):	91 of 4,096
Ext. Disk Systems (DS):	1 system(s)
Ext. Disk Ports:	4 port(s)
Ext. Disk Drives (arms):	8 drive(s)
Int. Disk Drives (arms):	0
Storage Capacity (GB):	449 GB
Offering Family:	IBM Power Systems
Processor:	IBM® POWER7
Clock Speed:	4000 MHz

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Summary



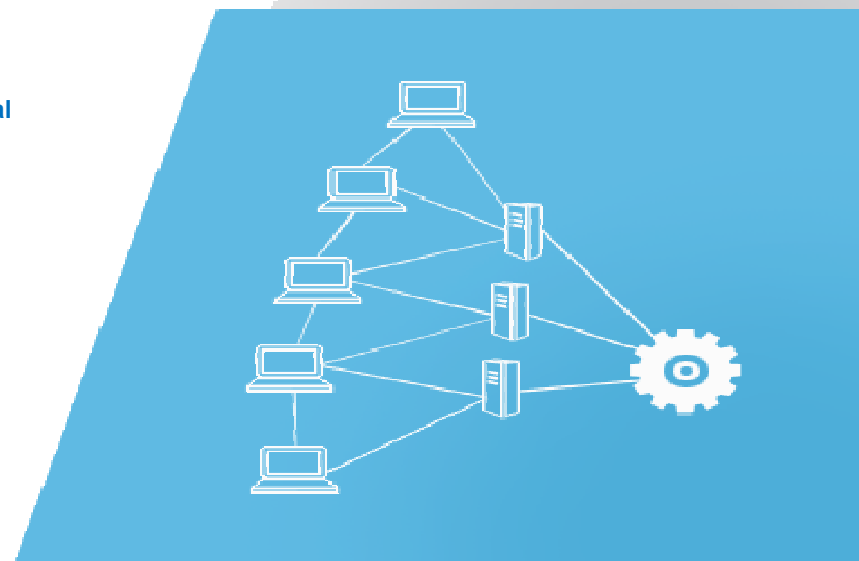


Optimize your virtualized environments and clouds

IBM SmartCloud Monitoring is a virtualization and cloud monitoring tool, providing scale, performance and availability monitoring of the cloud resources and the virtual machines running within it. Enjoy real cost savings with cloud optimization and automation, and resiliency from resource and workload analytics.

Key benefits:

- **Visibility into the cloud infrastructure**
 - Integrated “out-of-the-box” contextual views of health and performance in the complete context of the virtual environment to include physical and virtual servers, storage and network resources, with cluster topology
 - Receive real-time proactive & predictive alerts
 - Real-time dashboard views and Cognos-based historical reports
- **Virtual environment management**
 - Out-of-the-box alerts, best practices, expert advice and workflows for detecting performance problems and identifying their source
 - Web 2.0 dashboards, operational workspaces and reports
- **Capacity planning**
 - Predict physical and virtual resource capacity bottlenecks and trends
 - Gain business agility by determining room for expansion via “what-if” analysis
- **Optimization**
 - Right-size virtual machines
 - Policy-driven workload placement for performance and security optimization
- **Integration with full spectrum of IBM’s Cloud and Smarter Infrastructure offerings**



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Where to get more information





Where to Get More Info

Service Management Connect:

<https://www.ibm.com/developerworks/servicemanagement/>

ISM Library Website:

<https://www.ibm.com/software/brandcatalog/ismlibrary/>

Tivoli Wiki:

<http://www.ibm.com/developerworks/wikis/display/tivoli/Home>

ITM 6 Forum:

http://www.ibm.com/developerworks/forums/dw_forum.jsp?forum=796&cat=15

Reference Materials (Redbooks, Papers):

–<http://www.redbooks.ibm.com/abstracts/sg247444.html?Open>

–<http://www.redbooks.ibm.com/abstracts/sg247217.html?Open>

–<http://www.redbooks.ibm.com/abstracts/tips0617.html?Open>

–<http://www.ibm.com/developerworks/wikis/display/tivolimonitoring/Tivoli+Monitoring>

Historical Collection Best Practices paper:

<https://www.ibm.com/developerworks/wikis/display/tivolimonitoring/Historical+Collections+Best+Practices+in+Tivoli+Monitoring+6.2.>

[2](#)

धन्यवाद

Hindi

多謝

Traditional Chinese

ขอบคุณ

Thai

Спасибо

Russian

Gracias

Spanish

Thank You!

English

شكراً

Arabic

Obrigado

Brazilian Portuguese

多谢

Simplified Chinese

Danke

German

Grazie

Italian

Merci

French

நன்றி

Tamil

ありがとうございました

Japanese

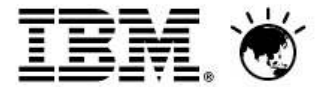
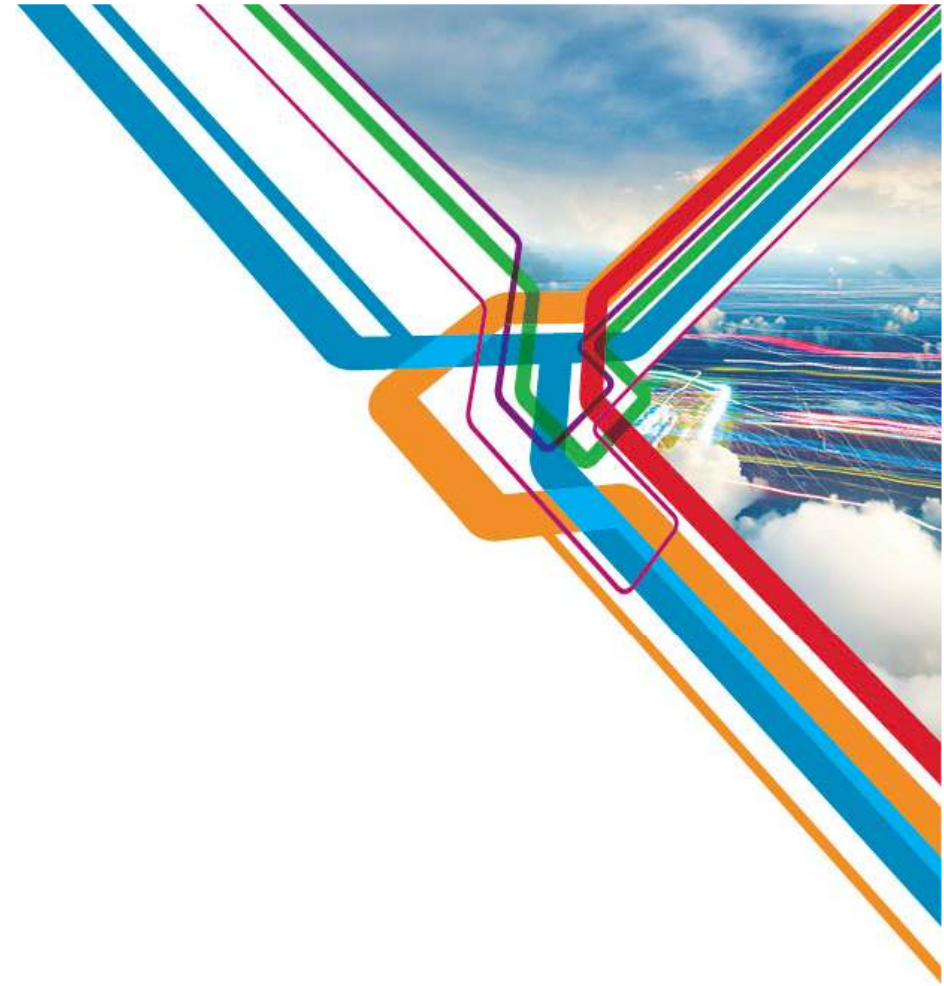
감사합니다

Korean

Pulse

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Thank You



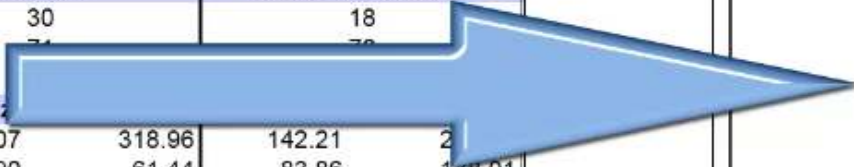
At the top of the screen, the values in blue are all configurable input parameters for the report.

Reduction Report

Optimizations and Savings

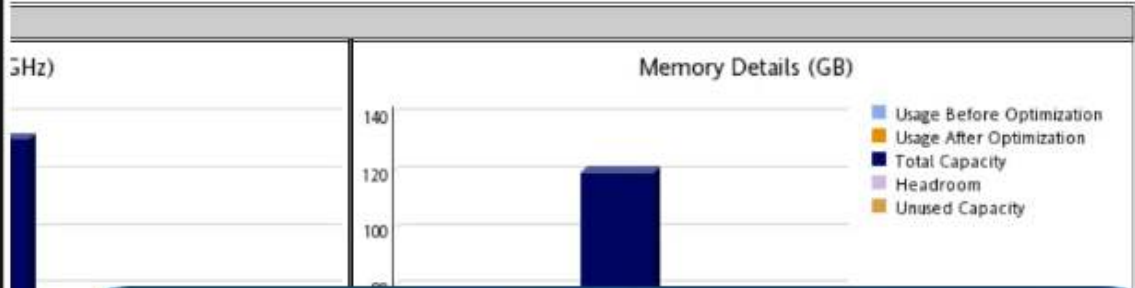
Return On Investment

	Current		Recommendation	
	30		18	
CPU (GHz)	192.07	318.96	142.21	218.01
	40.90	61.44	83.86	138.01
(excluding headroom)	138.66	235.92	44.13	70.77



Cost Basis

- Currency: US Dollar
- Hardware Cost per Server: 30,000
- Administrative Cost per Server: 2,100
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ROI for Evaluated Clusters

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Storage and Management Systems	315,000	315,000
SmartCloud Monitoring Software Cost	15,975	15,750
Total	1,594,380	1,123,293
Savings		471,087

The values shown are the cost for a typical US data center. You can change these to match your currency and the costs for your data center.

Percent ROI for Evaluated Clusters: 29.55 %

I've tagged the Middleware type, Mission Criticality, and the Business Application running on each VM. We can use that data as we do our analysis.

Edit VMware Current Environment

Views >> Inventory >> Virtual Machines

Views | Actions | Reports

Filter

VM Hostname*	VM Name*	Number of CPU Cores*	Minimum CPU [MHz]*	Minimum Memory [MB]*	OS	Middleware Name	Criticality SLA	Primary Business Application
Unavailable	SCM_Hosted_Beta_Clo	2	0	0	Unavailable	MQ	CRIT	Online Sales
devvm	adtech-ird	2	0	0	Red Hat Enterprise Linux 6 (64-bit)	WAS	CRIT	Online Sales
sapm-ad1.sapm.tivlab.c	sapm-ad1	1	1,485	2,739	Microsoft Windows Server 2008 R2 (64-bit)	AD	CRIT	Infrastructure
Unavailable	SCM_Hosted_Beta	1	0	0	Unavailable	SCM		Infrastructure
Unavailable	sapm-ad2	2	349	685	Unavailable	AD	CRIT	Infrastructure
xa6demo	xa6demo	2	349	514	Microsoft Windows Server 2008 R2 (64-bit)	MSSQL	CRIT	Retail Sales
itmfive	SCM_Trial_v3_test	2	1,175	524	Red Hat Enterprise Linux 5 (64-bit)	SCM		Infrastructure

1 - 25 of 71 items | 5 10 25 50 100 All | 1 2 3