



IBM Cognos Forum

Ignite knowledge, ideas, connections

Deploying IBM Cognos 8 BI on VMware ESX

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Cognos.
software

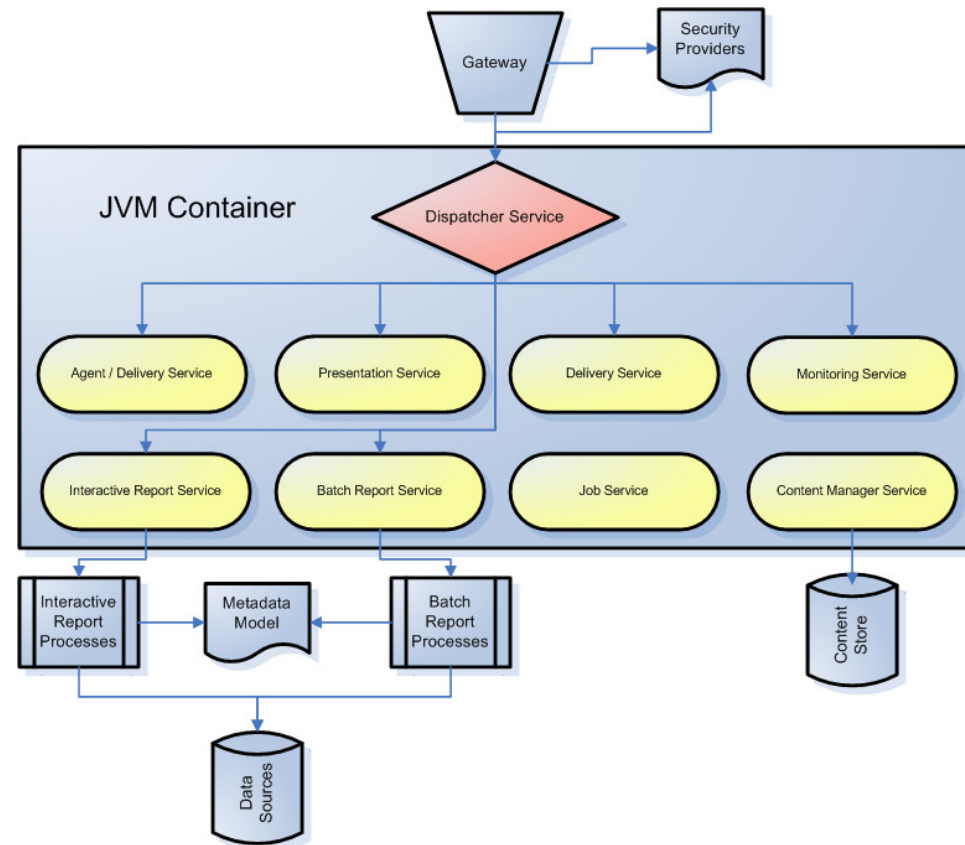
Agenda

- > Overview**
 - **IBM Cognos 8 BI Architecture**
 - **VMware ESX**
- > Deployment Options**
- > Our Testing**
- > Optimization of VMware ESX and IBM Cognos8 BI Servers**
- > Generic ESX Performance**

Architecture Overview

> Cognos 8 is made of 5 major install components

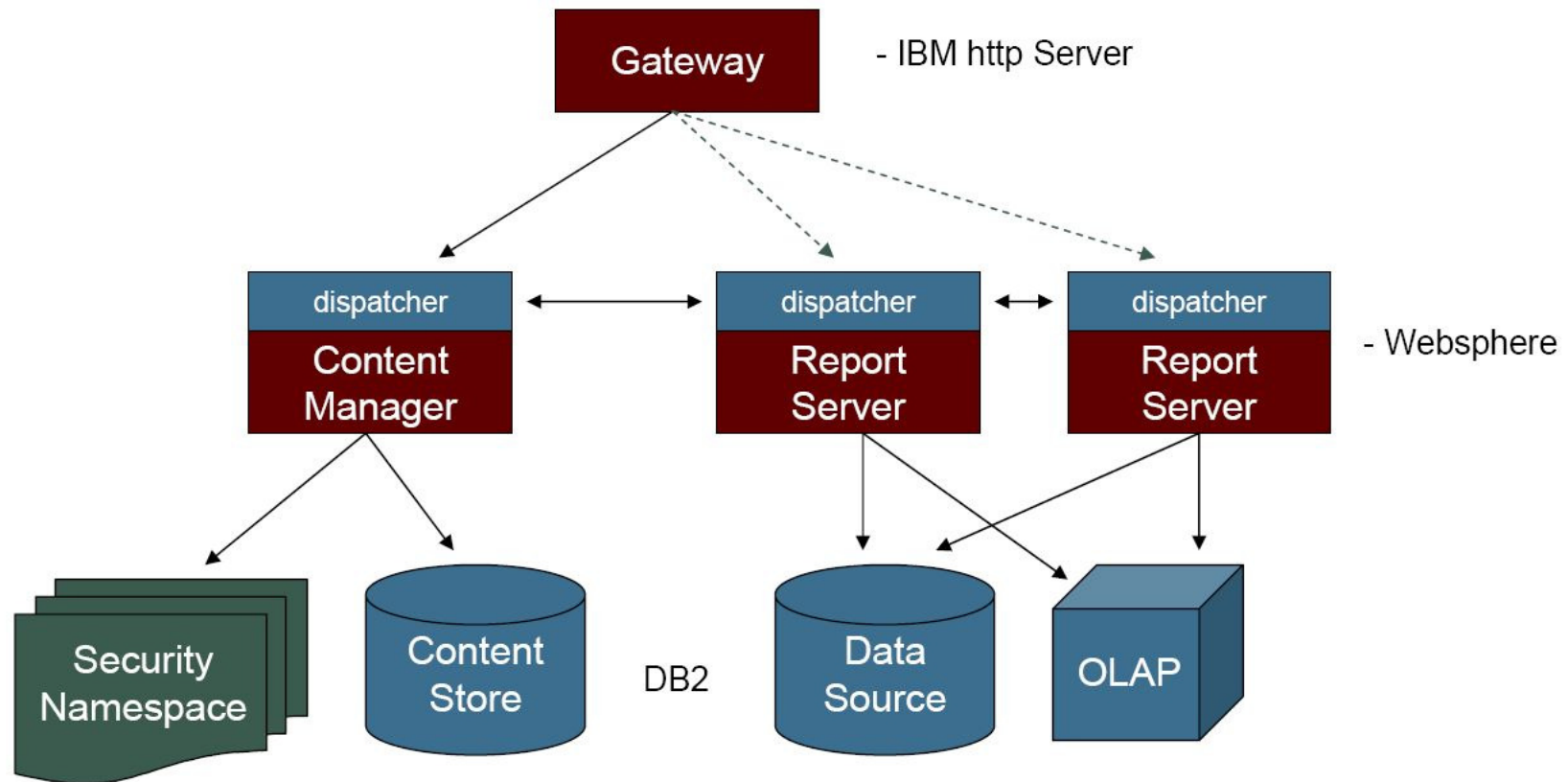
- Application Tier
- Gateway
- Content Manager
- Cognos Content Database (optional)
- Framework Manager



- Cognos 8 Business Intelligence Server
 - Application Tier Components
 - Gateway
 - Content Manager
 - Cognos Content Database

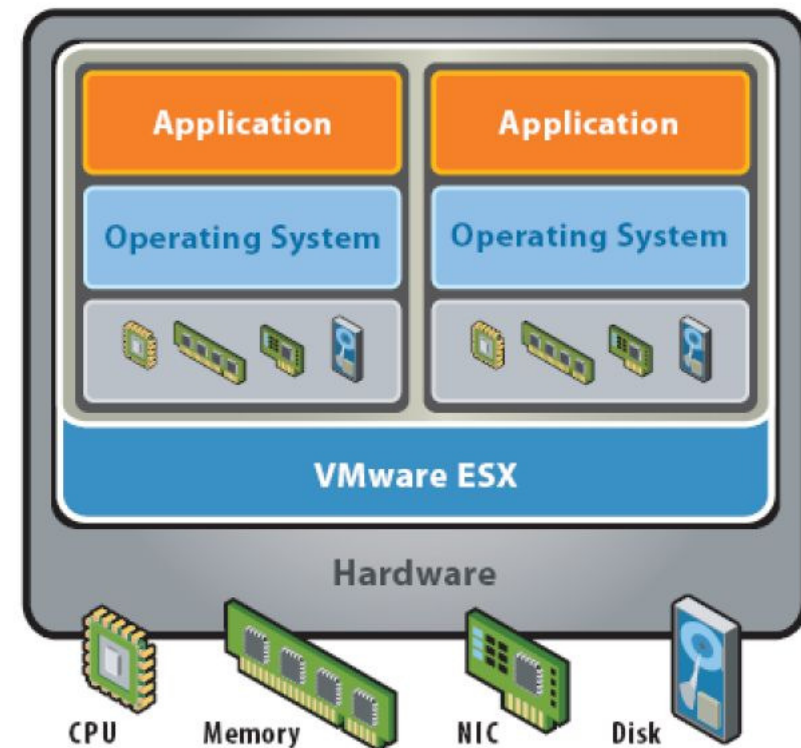
- Cognos 8 Business Intelligence Modeling
 - Framework Manager
 - Map Manager

IBM Cognos 8 Architecture



VMware ESX

- > VMware ESX, the market leading hypervisor
- > Reliably Run Multiple Operating Systems on a Single Server
- > Achieve Higher Consolidation Ratios
- > Build a Dynamic Datacenter with VMware vSphere



VMware ESX Features

> Architecture

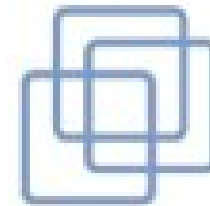
- Virtual Disk Files (VMDK)
- VStorage (VMFS)
- Virtual Networking

> Resource Management

- VM resource allocation
- CPU Virtualization
- Memory Ballooning
- Network and I/O prioritisation

> Performance and Scalability

- Support Powerful Hardware
- Network Performance Optimizations



Deployment Options

- > IBM Cognos 8 BI Servers & Services**
 - **Multiple JVM's in a Single Server or Guest Image**
 - **Separate Content Manager & Report Servers or Guest Images**

- > Use VMware Infrastructure/ESX as oppose to VMware Server or Desktop**

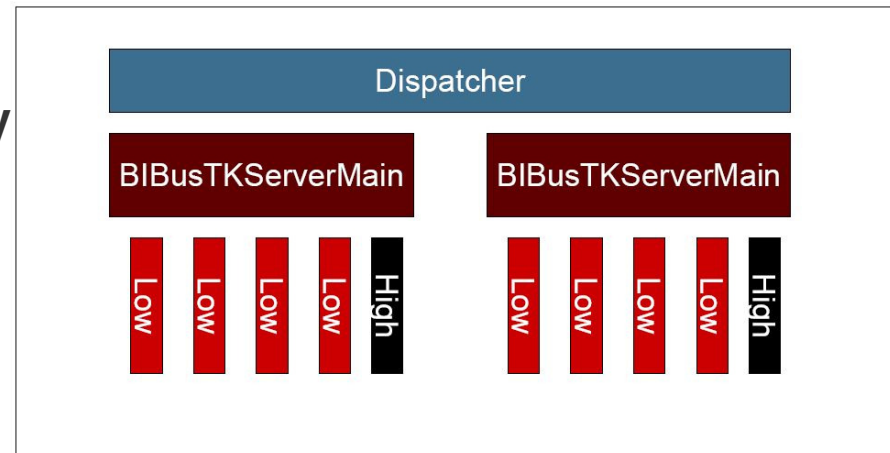
- > Deploy Virtualization-optimized Hardware**

Test Methodology

- > **Objective is to determine optimal configuration for IBM Cognos 8 BI Server Deployment on VMware ESX**
- > **Simulate 20, 40, 80, 120, and 160 concurrent user loads with a blend of tests cases:**
 - **Typical BI Day**
 - 40% Viewing Pre-Generated Content (HTML & PDF)
 - 30% On-Demand reporting
 - 25% Interactive Reporting (Prompts, Drill, Master Detail, OLAP)
 - 5% Complex Analysis
 - **Banded HTML, Banded PDF**
 - **MasterFact MasterDetail HTML, MasterFact MasterDetail PDF**
 - **PMView_HTML**
- > **Vary Guest Image configuration and retest**
 - **Cores per Image**
 - **Memory Handling**

Threads = Units of Work (Affinity Connections)

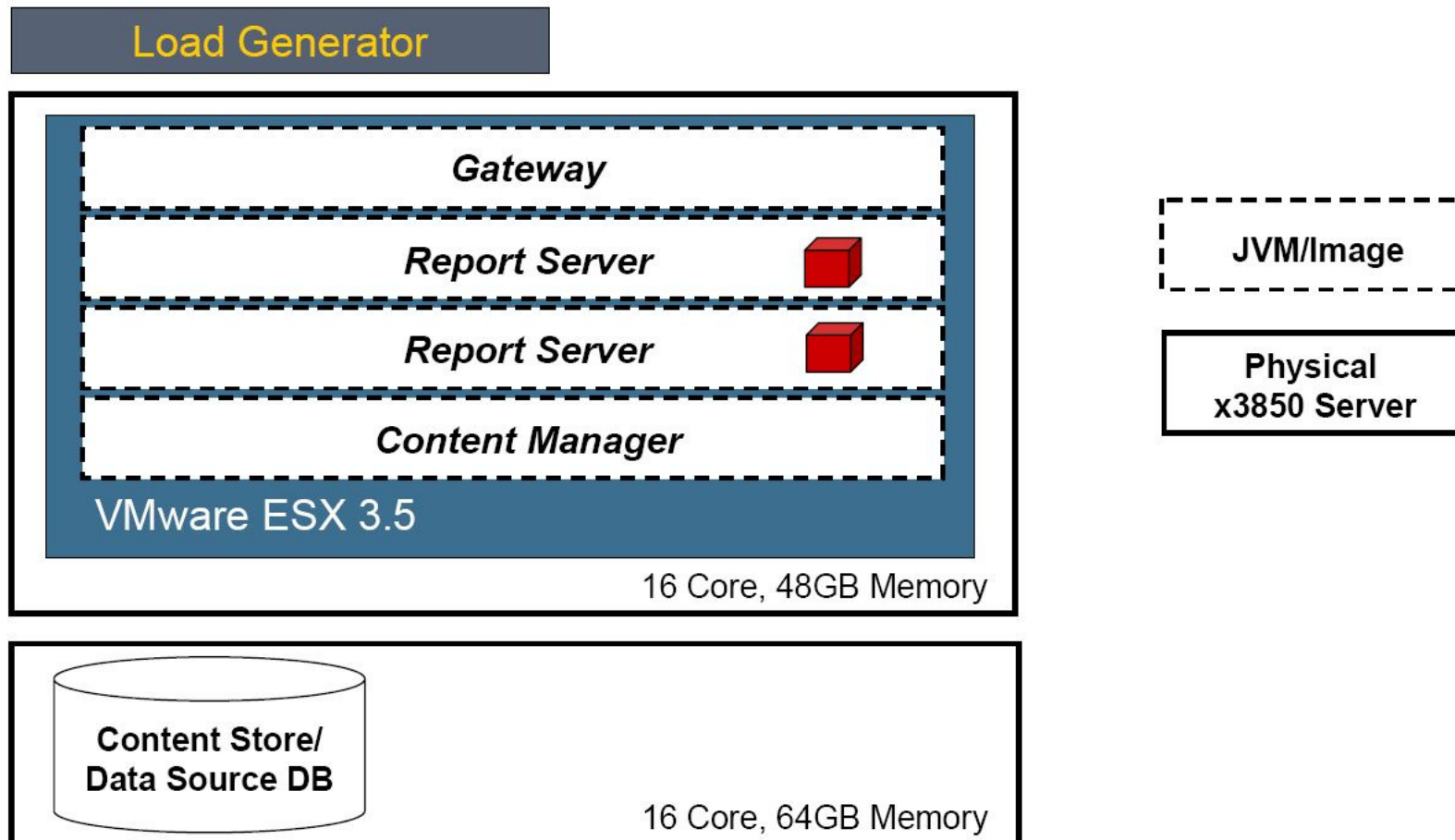
- > The dispatcher manages a queue of requests
- > A queue develops if there are no affinity connections available for processing
- > The pools increase respectively
 - Default low=4: a new BiBus is spawned on every 2 long running reports



| | | | |
|--------------------------|--------|--|--------------------------------|
| <input type="checkbox"/> | Tuning | Number of high affinity connections for the batch report service | <input type="text" value="1"/> |
| <input type="checkbox"/> | Tuning | Number of low affinity connections for the batch report service | <input type="text" value="2"/> |
| <input type="checkbox"/> | Tuning | Maximum number of processes for the batch report service | <input type="text" value="2"/> |

The setting of High and Low affinity connections is set on the Server Administration Configuration page in Cognos Connection.

Test Topology



Optimisation Techniques

- > Balance of resources for Hypervisor vs. Images**
 - Processor allocation
 - Memory Allocation
- > Match server resource impact to each server role**
- > Maximize Disk I/O**

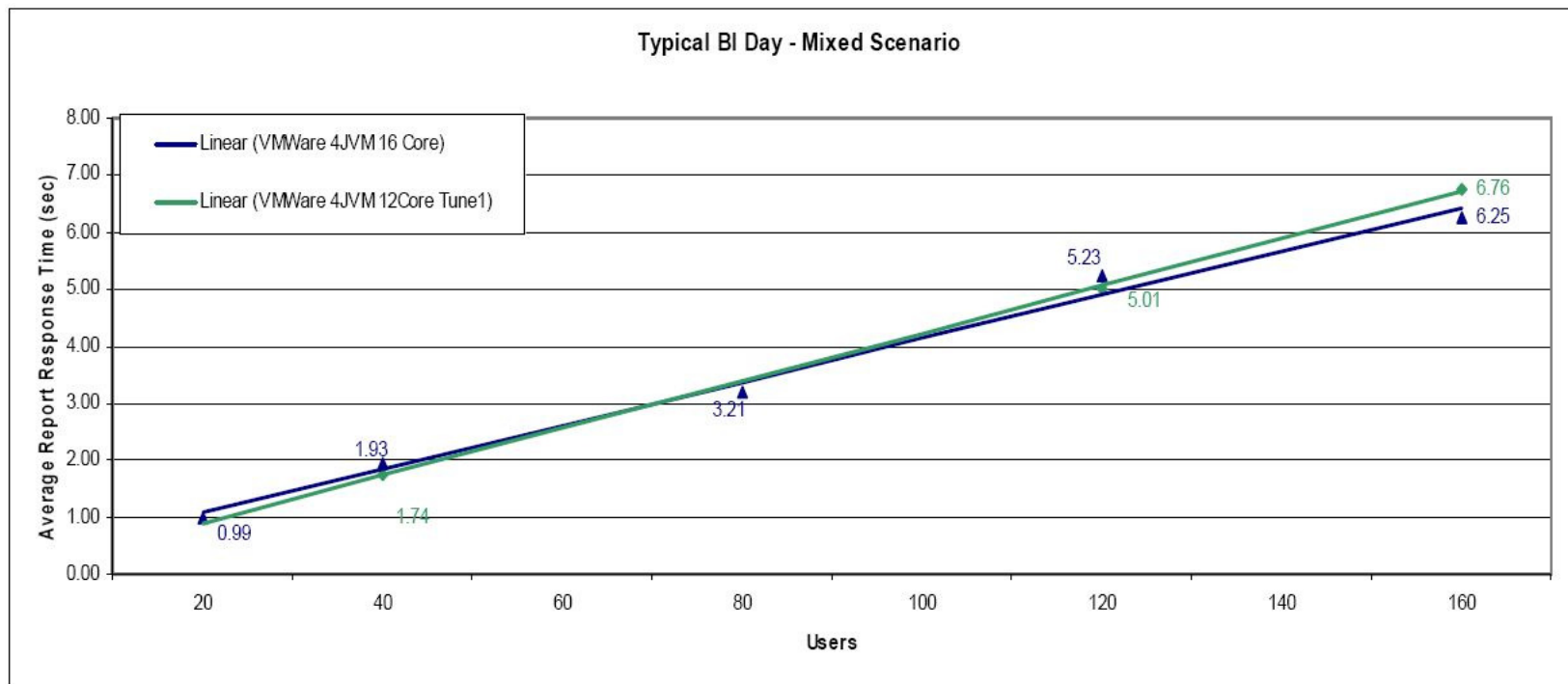
Optimisation – Step 1

| | |
|------------------------|----------------------------------|
| Gateway | <i>Image specs = 2 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Content Manager | <i>Image specs = 2 Core, 8GB</i> |

- > Set “Memory Allocation Shares” to High on RS Images as well as reservation to 2048MB
- > Reduced Cores on GW and CM
- > 40 Total BiBus(20 BiBus/RS)

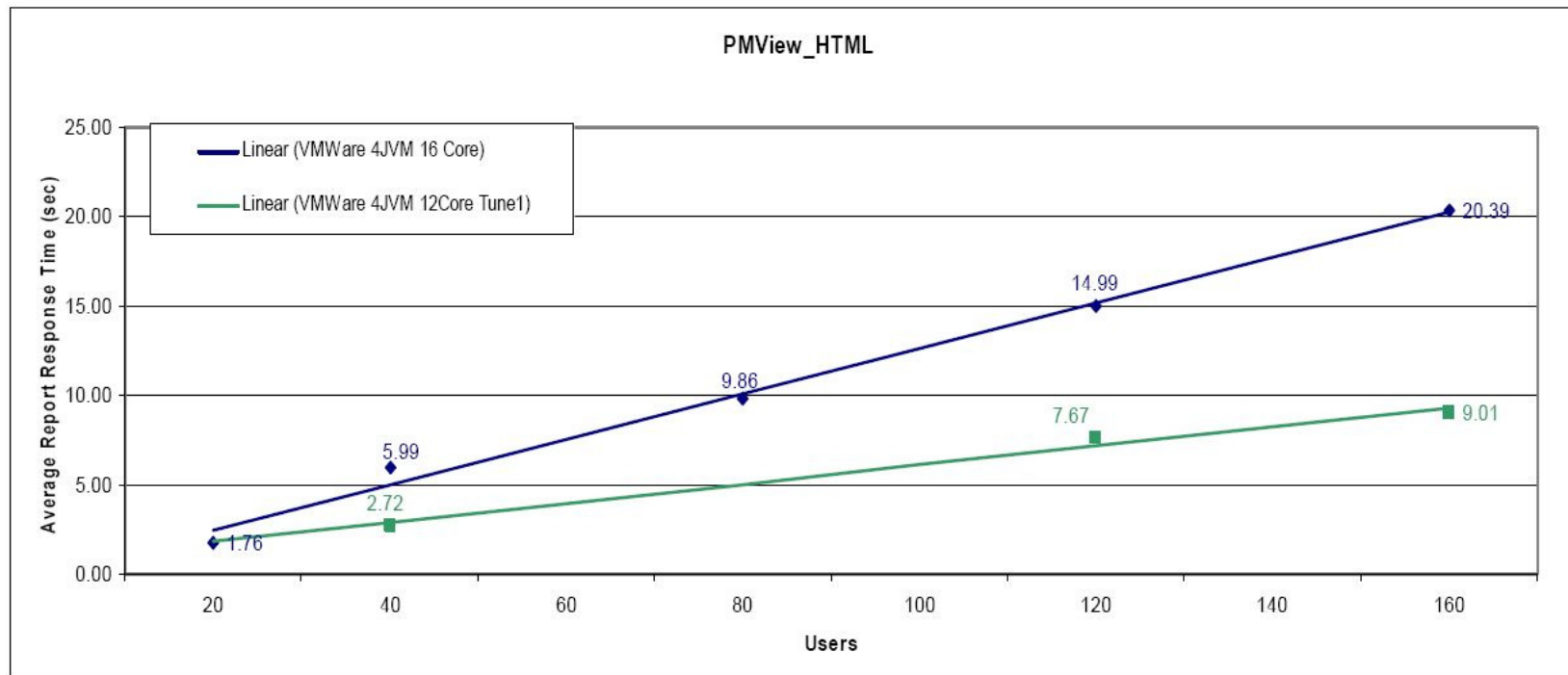
Test Results – Optimization Step 1

➤ Mixed Scenario –very little change



Test Results – Optimization Step 1

> Good Improvement for Viewing Saved Content



Optimization Step 2

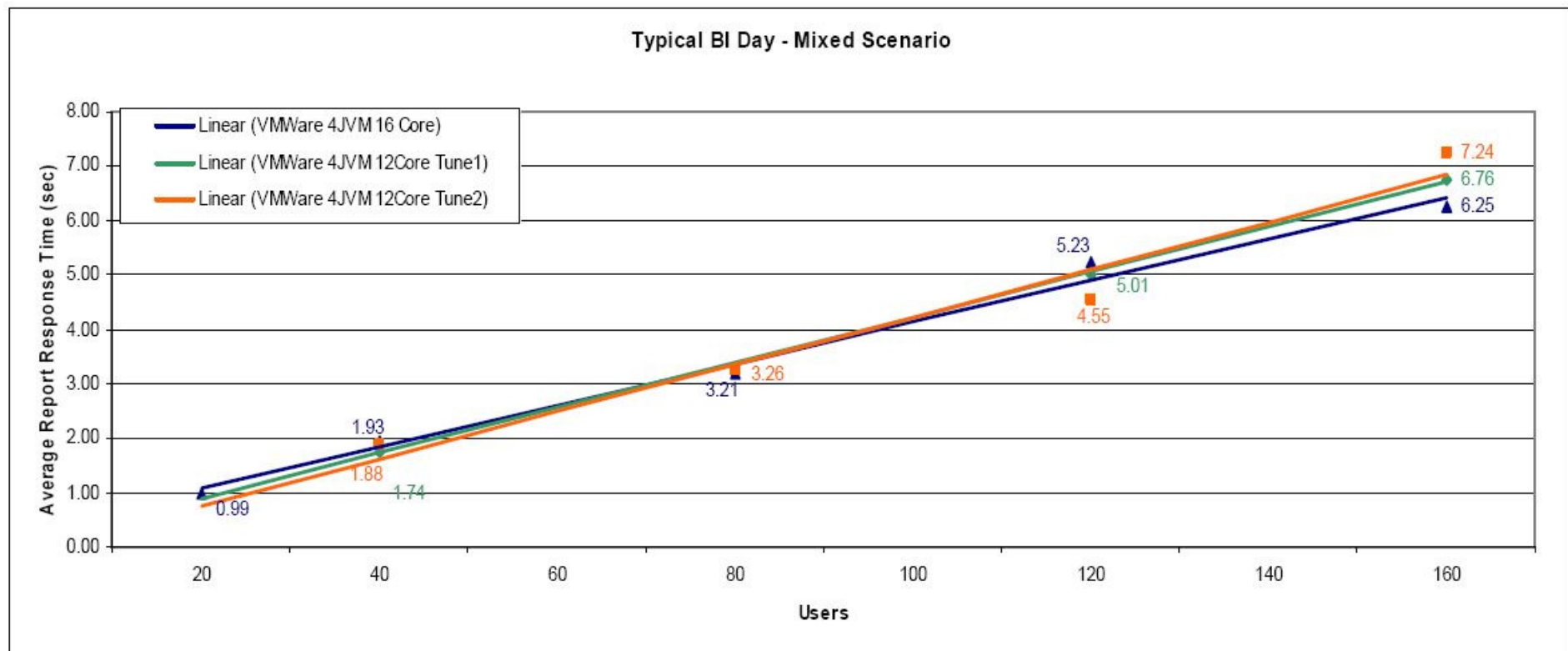
| | |
|------------------------|----------------------------------|
| Gateway | <i>Image specs = 2 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Content Manager | <i>Image specs = 2 Core, 8GB</i> |

> **Set JVM Initial/Max Heap to 1024**

- Set “Memory Allocation Shares” to High on RS Images as well as reservation to 2048MB
- Reduced Cores on GW and CM
- 40 Total BiBus(20 BiBus/RS)

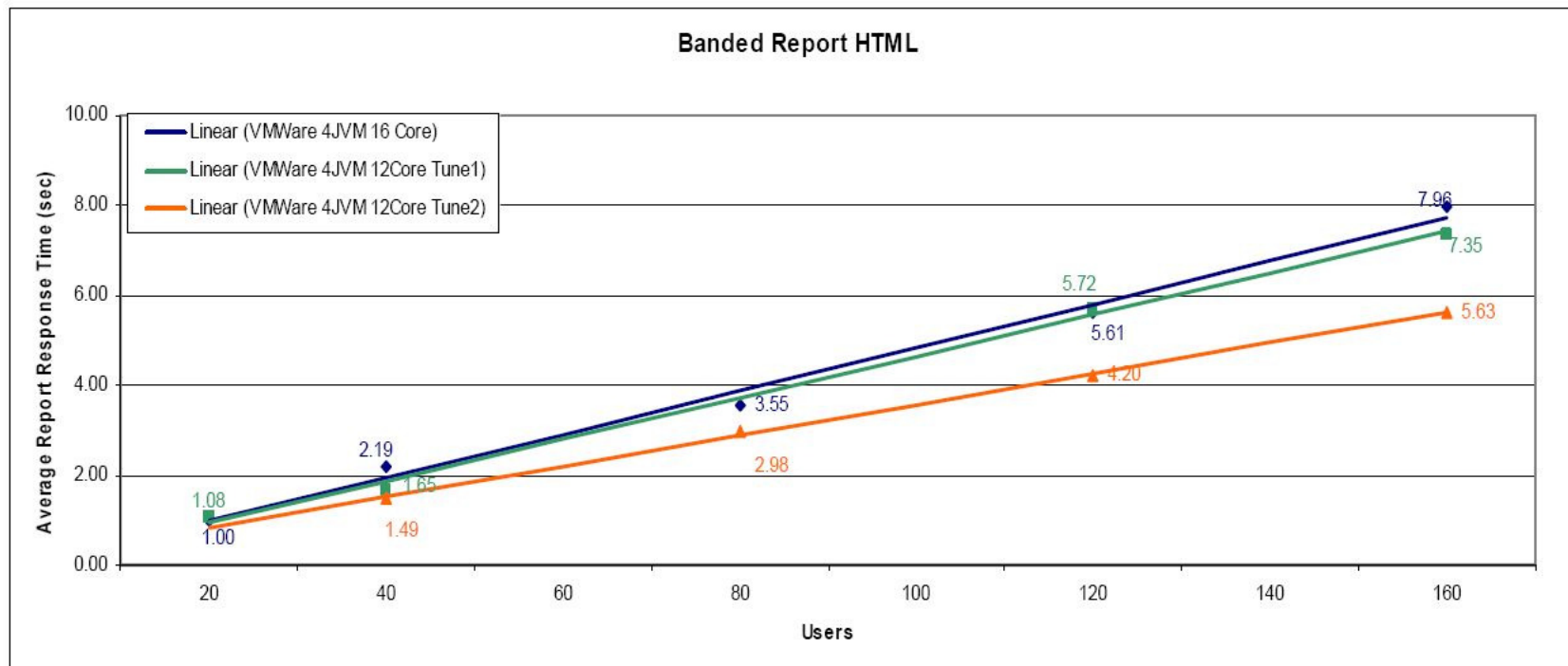
Test Results – Optimization Step 2

> Mixed Scenario –very little change



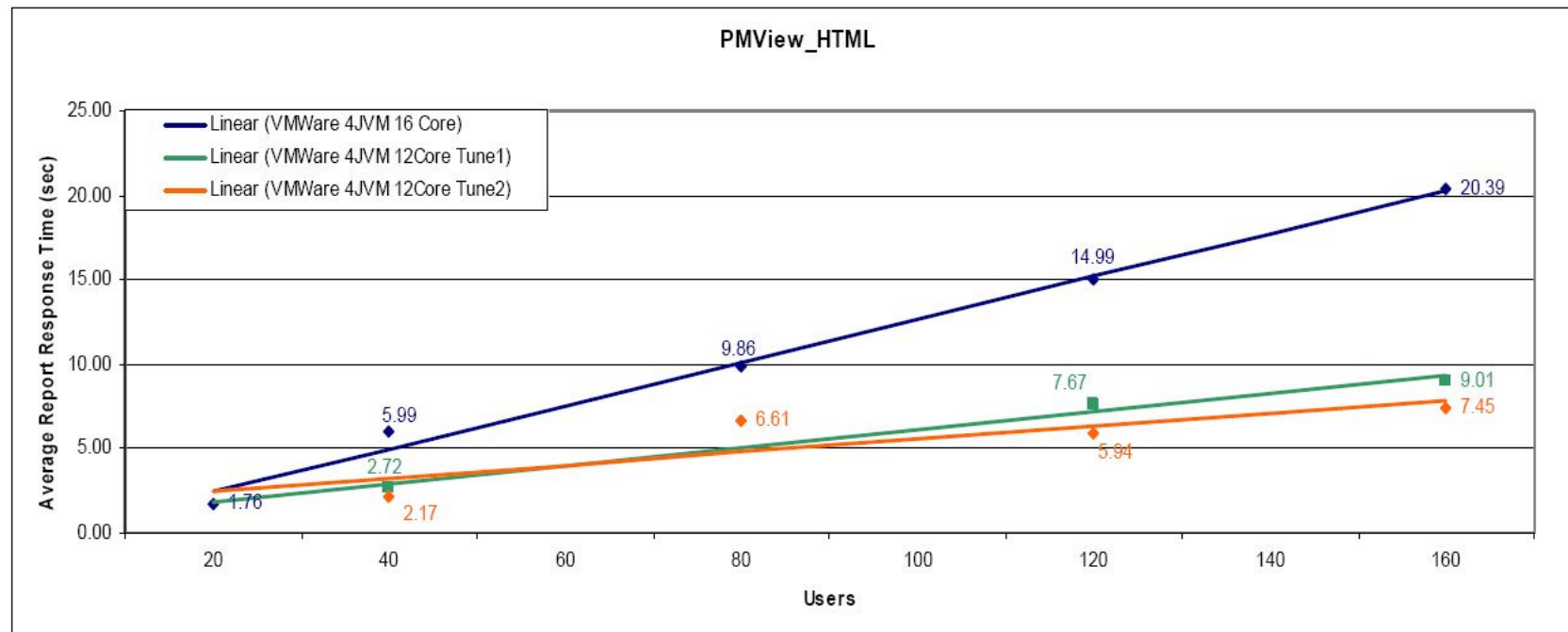
Test Results – Optimization Step 2

- Banded HTML -approx 25% improvement over the initial tests by setting the JVM equal at min/max.



Test Results – Optimization Step 2

- Viewing Saved Reports -also an additional 20% improvement over the first tuning changes



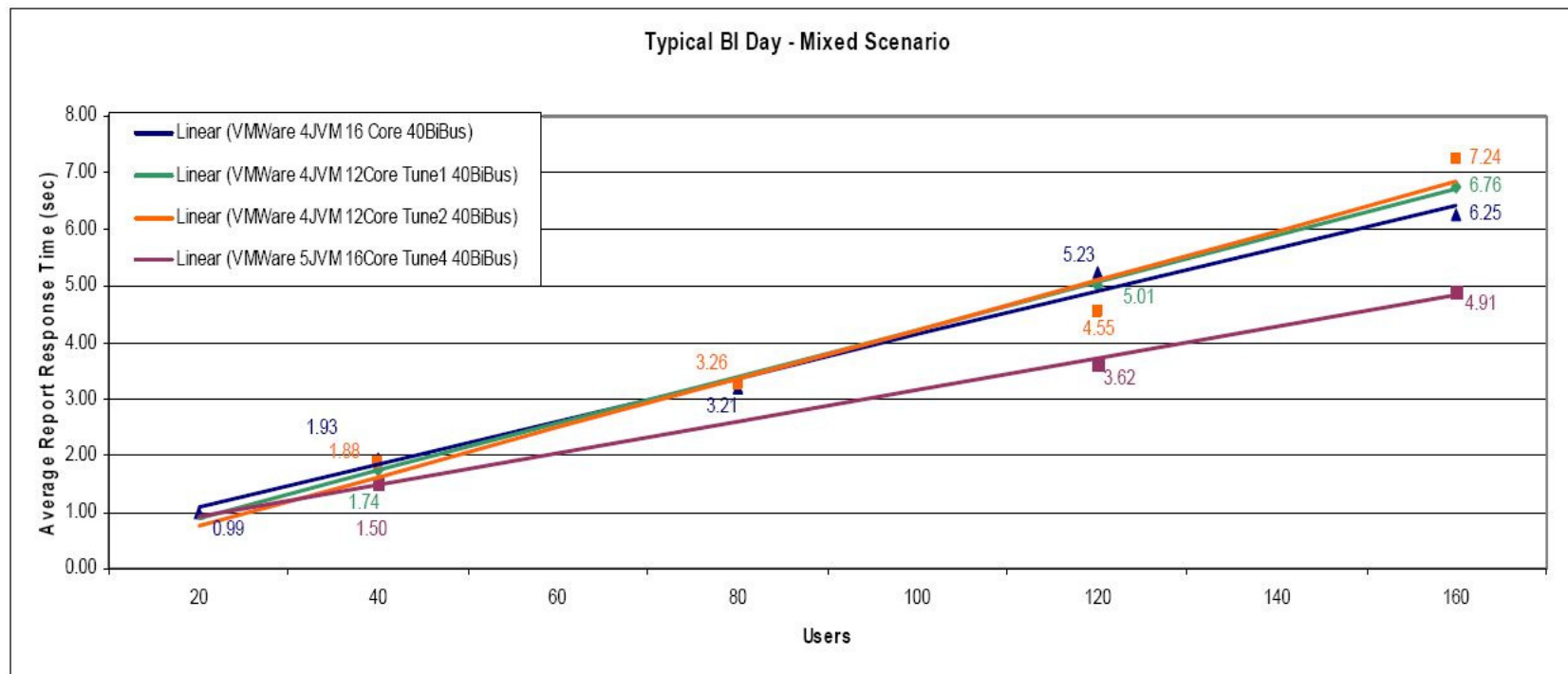
Optimization Step 3

| | |
|------------------------|----------------------------------|
| Gateway | <i>Image specs = 2 Core, 4GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Report Server | <i>Image specs = 4 Core, 8GB</i> |
| Content Manager | <i>Image specs = 2 Core, 4GB</i> |

- > Added an additional Report Server
- > Enable large support page in windows
- > Set JVM Initial/Max Heap to 1024
- > Set "Memory Allocation Shares" to High on RS Images as well as reservation to 2048MB
- > Reduced Cores on GW and CM
- > **40 Total BiBus(13 BiBus/RS (one with 14))**

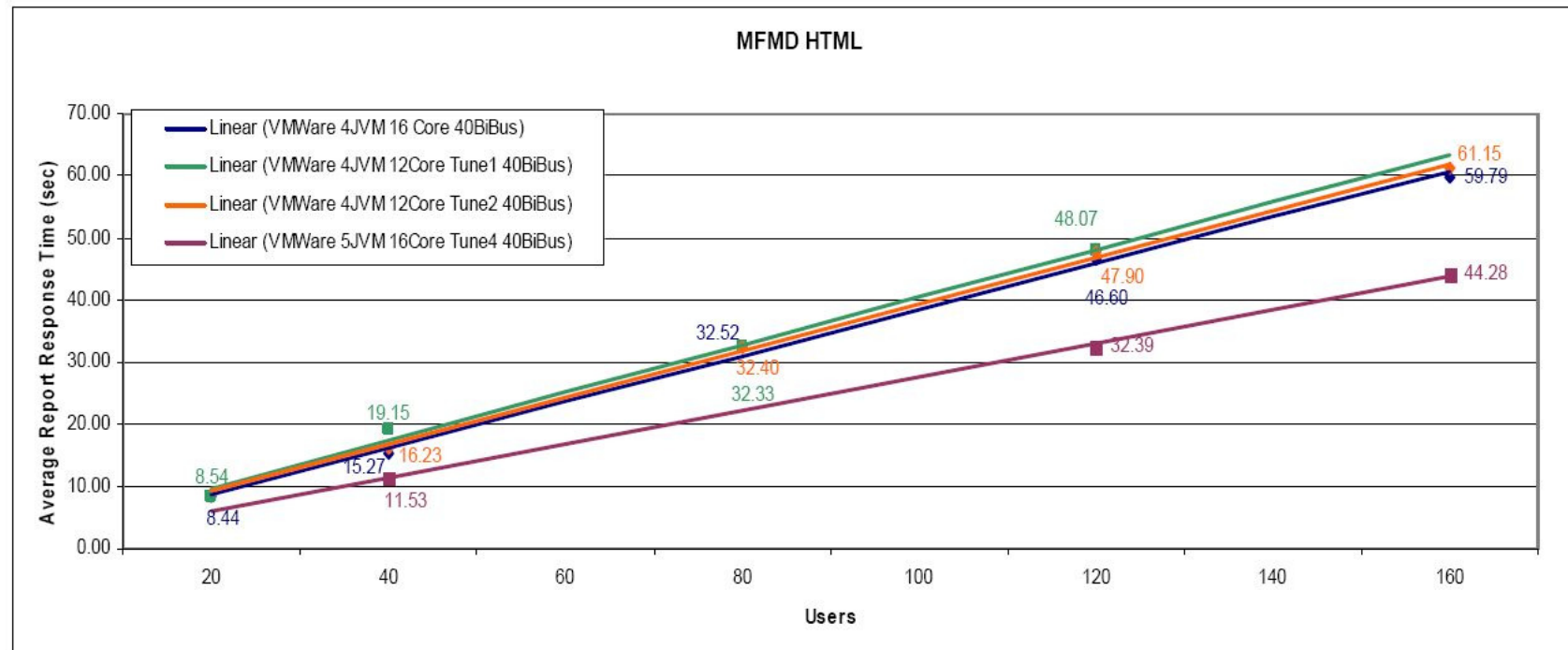
Test Results – Optimization Step 3

> Some Improvement in mixed scenario



Test Results – Optimization Step 3

- Multi-fact Master Details show nice improvement as we had seen very little fluctuation in these results previously -approx 25% improvement



Cognos 8 Configurations

> Gateway

- Low Impact
- Do not over allocate CPU

> Content Manager

- More Memory & I/O Intensive
- Benefits from Memory Optimization in VMware

> Report Server

- CPU Intensive
- Scale out for improved performance and throughput
- More processes and more guest images better than multi-core images

General Recommendations

- > Scale out Report Server over multiple guest images**
- > Enable large support page in Windows Guests**
- > Set JVM Initial/Max Heap to 1024**
- > Set “Memory Allocation Shares” to High on RS Images as well as reservation to 2048MB**
- > Only allocate minimum required cores on Gateway and Content Manager**

Generic ESX Performance

- > Upgrade to VI3**
 - Significant Performance Improvements
 - Faster handling of page faults and memory management
 - Improved Networking

- > Improve your hosts CPU and Memory**
 - Optimize the ratio of virtual machines to physical processors
 - Add as much RAM as possible to ESX Server
 - Avoid over-committing memory within virtual machines

- > Enhance host storage**
 - Use a high performance disk I/O (RAID5 Ultra 320 or SCSI)
 - Use a SAN to offload I/O operations from the ESX host
 - Set Cognos Resource shares to “High”

Generic ESX Performance

- > **Optimize Host Network**
 - Use Gigabit Ethernet network adapters
- > **Be aware of VM-to-host placement**
 - Shut down or suspend unused Virtual Machines
 - Assign the Virtual Machine to a resource pool (DRS)
- > **Remove unneeded virtual hardware**
- > **Update VMware Tools**
- > **Optimise Windows guest operating systems**
 - Defrag the contents of a virtual machine's virtual disk
 - Stop Windows services that are not required
- > **Stop Real-Time Virus Scanning on guest servers**

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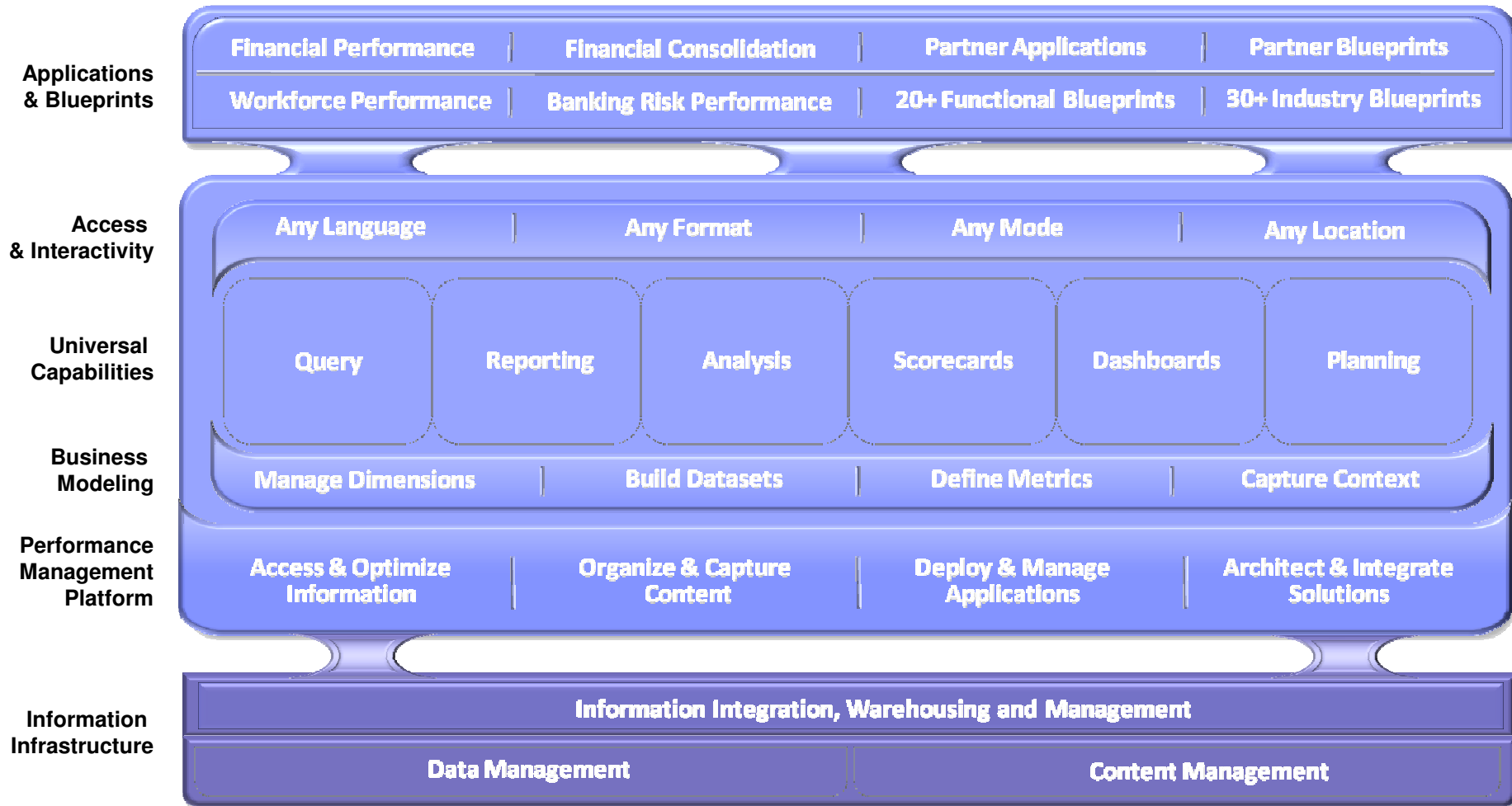
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