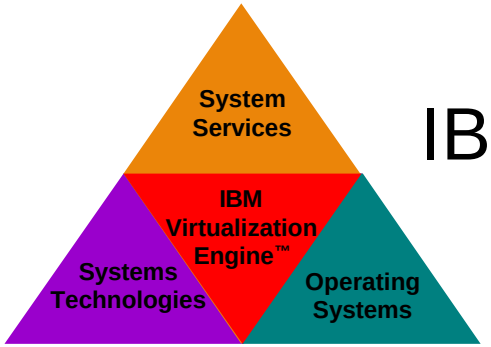


# IBM Virtualization Engine

**Tom Monza**

**IBM**

**Systems & Technology Group**

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# Preview Announcement of IBM Virtualization Engine™

Previews provide insight into IBM plans and direction. All statements regarding IBM's future direction and intent are subject to change without notice.


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# IBM Virtualization Engine Agenda

- **This Presentation Focuses on :**
  - Priorities for on demand
  - Infrastructure Simplification and the Virtualization Engine
  - What is the Virtualization Engine?


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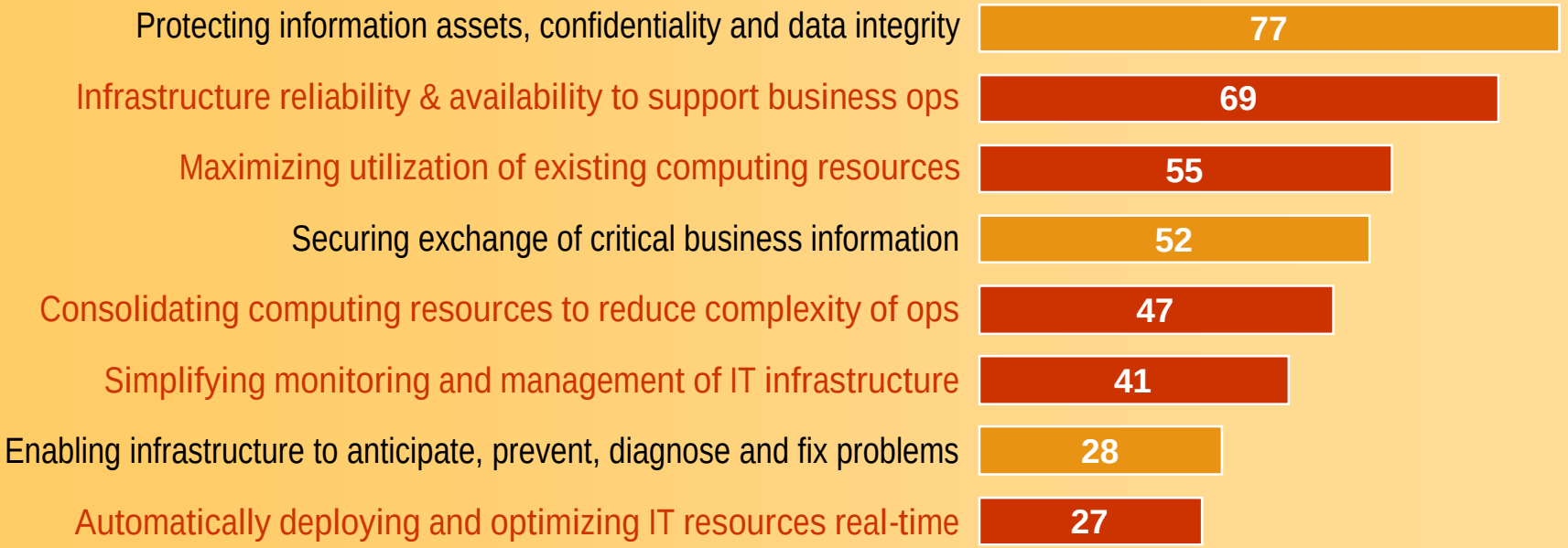
# Priorities in an on demand operating environment

***Business Drivers: Reduce Costs, Deliver Better Service Levels, Respond Rapidly to Business Change***

**Infrastructure Management**




Source: IBM Corporate Market Intelligence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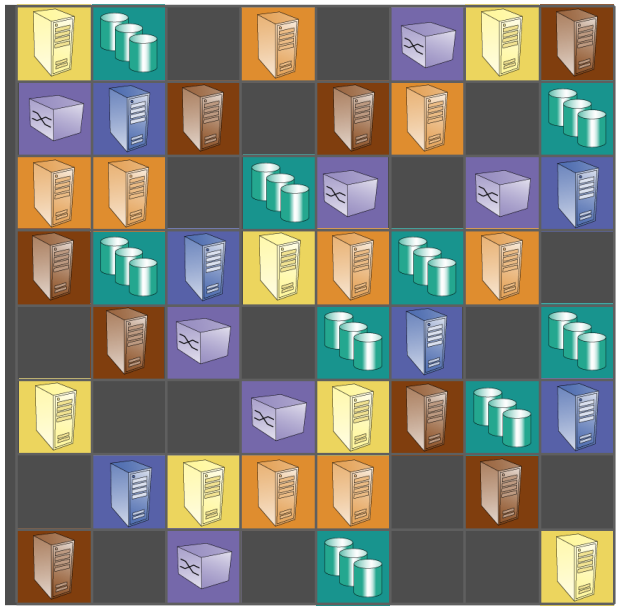
# Reducing complexity is a journey



- Storage
- Linux OSServer
- UNIX® OS Server
- Management Server
- Windows® OS Server
- Networking

## Complex

- One workload per server
- Disparate management tools
- Manual provisioning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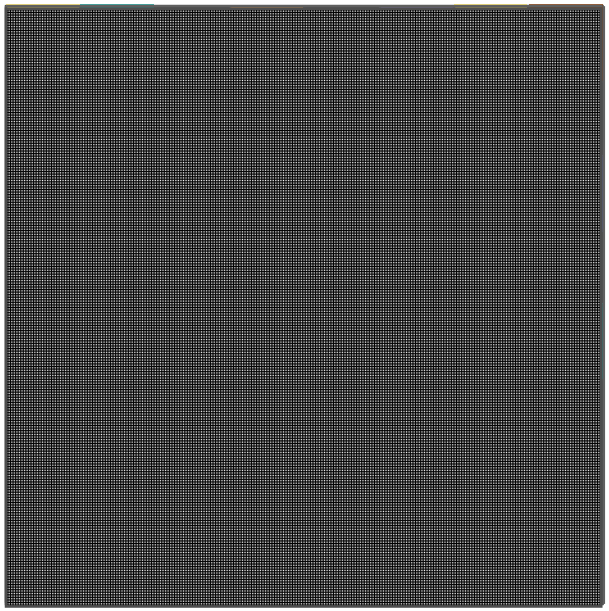
# Reducing complexity is a journey



- Storage
- Linux OS Server
- UNIX OS Server
- Management Server
- Windows OS Server
- Networking

## Complex

- One workload per server
- Disparate management tools
- Manual provisioning

## Consolidated

- Fewer servers and licenses
- Disparate management tools
- Labor-intensive provisioning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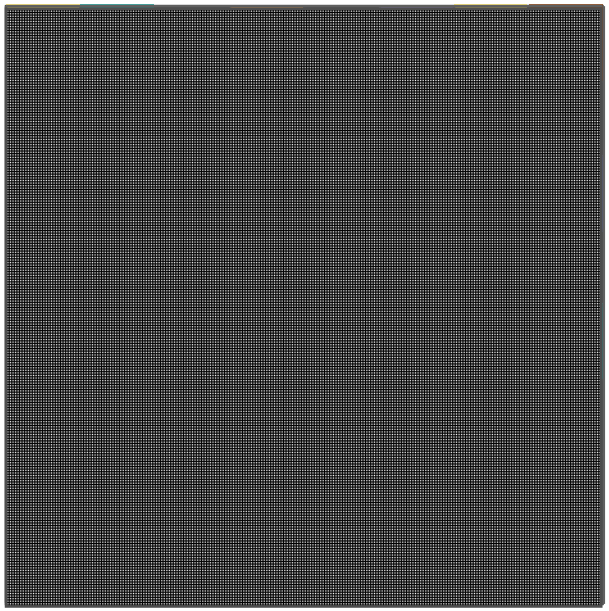
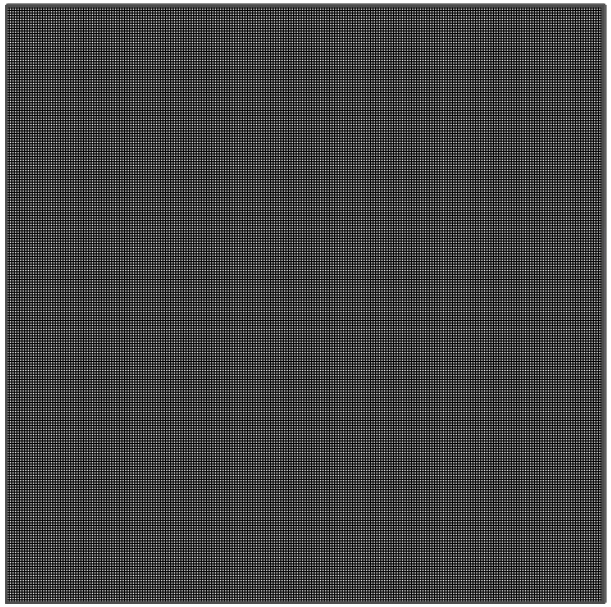
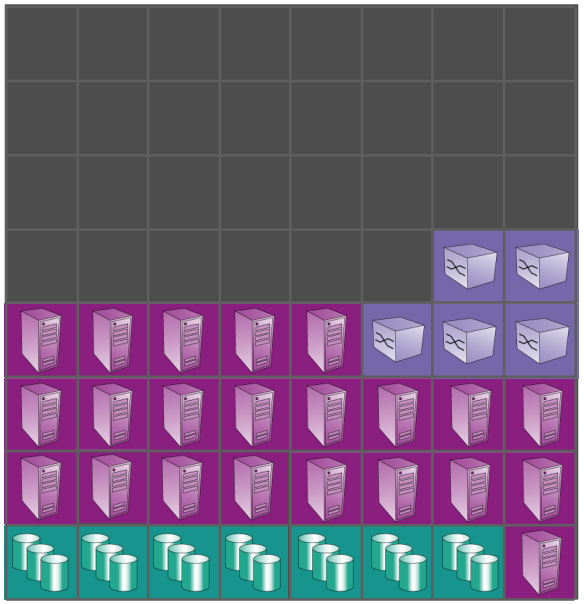
# Reducing complexity is a journey







## Complex

- One workload per server
- Disparate management tools
- Manual provisioning

## Consolidated

- Fewer servers and licenses
- Disparate management tools
- Labor-intensive provisioning
- Fixed usage assignment

## Simplified

- Systems managed as one
- Flexible and shared
- Multiple OSs per server
- Enterprise workload mgmt
- Rapid provisioning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# The capabilities you require to become an on demand business…

***IT Simplification addresses the need to simplify a) the business processes and b) the infrastructure hardware-software environment .***

**Business Flexibility**

**Infrastructure Simplification**

***IBM Virtualization Engine™ addresses this set of requirements .***

## People and Processes

Business flexibility through integration of people, processes and information within and beyond the enterprise.

- Business Modeling
- Process Transformation
- Application & Information Integration
- Access
- Collaboration
- Business Process Management

## Infrastructure

Simplification through management, virtualization, creation of consolidated, and logical view of resources.

- Availability
- Security
- Optimization
- Provisioning
- Infrastructure Orchestration
- Business Service Management
- Resource Virtualization of Servers, Storage, Distributed Systems/Grid and the Network


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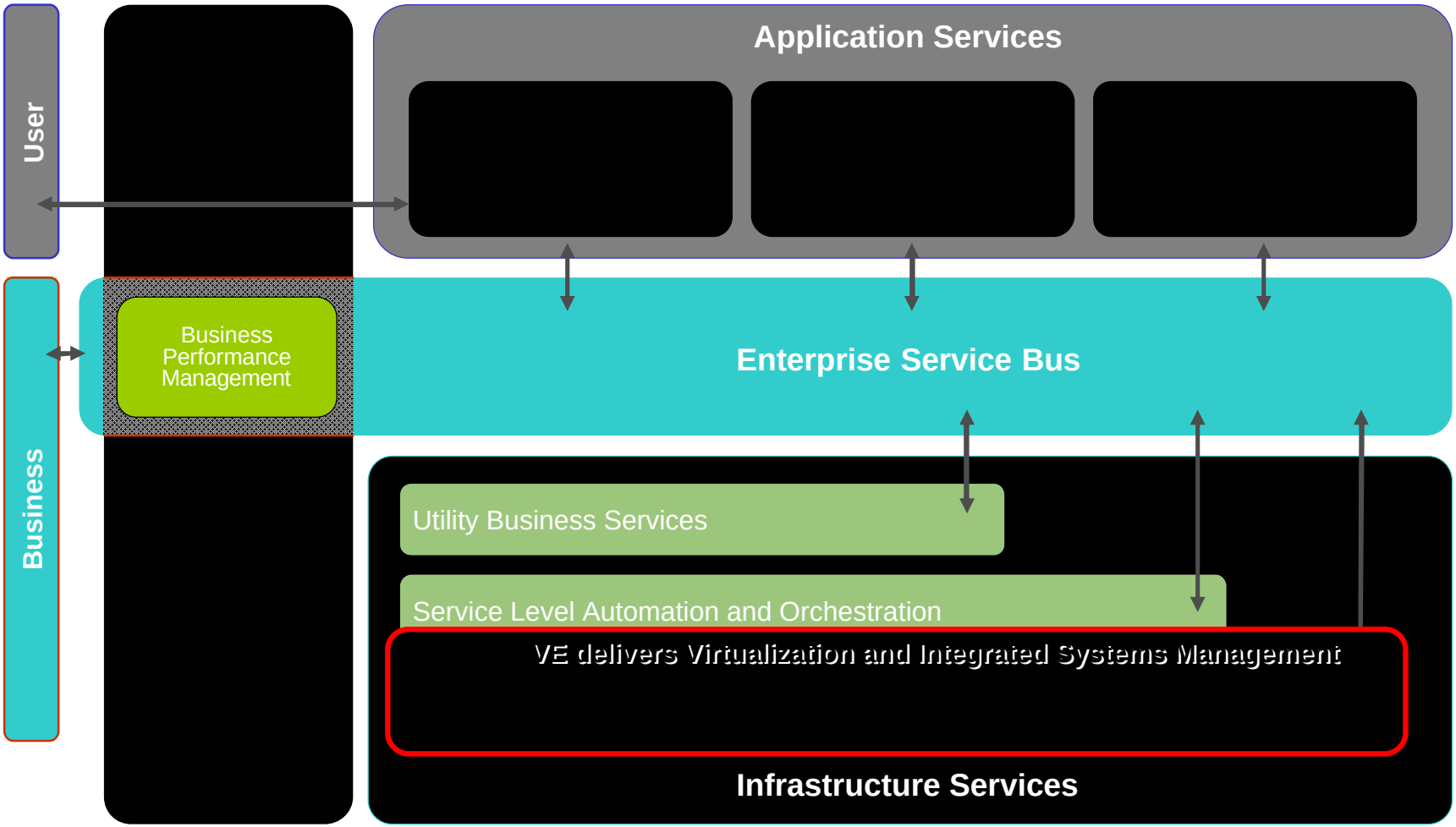
# On Demand Operating Environment Architecture

*ODOE is based upon the concepts of a Service Oriented Architecture.*
*Each element is a service that together implement the ODOE capabilities*





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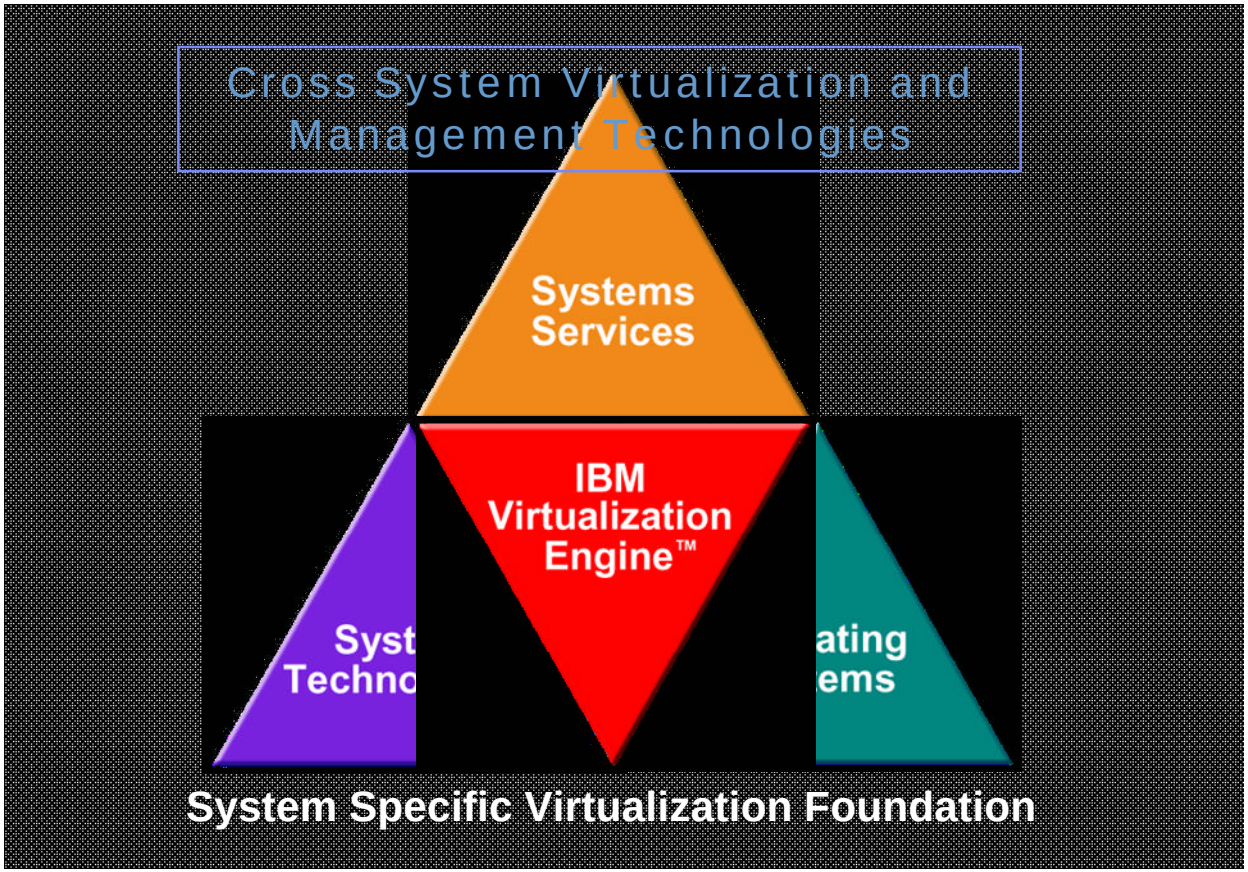
# Announcement Preview of the IBM Virtualization Engine™

*Born From IBM's World Class Virtualization Heritage*




*Deepening the Integration of IT with Business …*
*Reducing Management Complexity …*
*Simplifying the Infrastructure …*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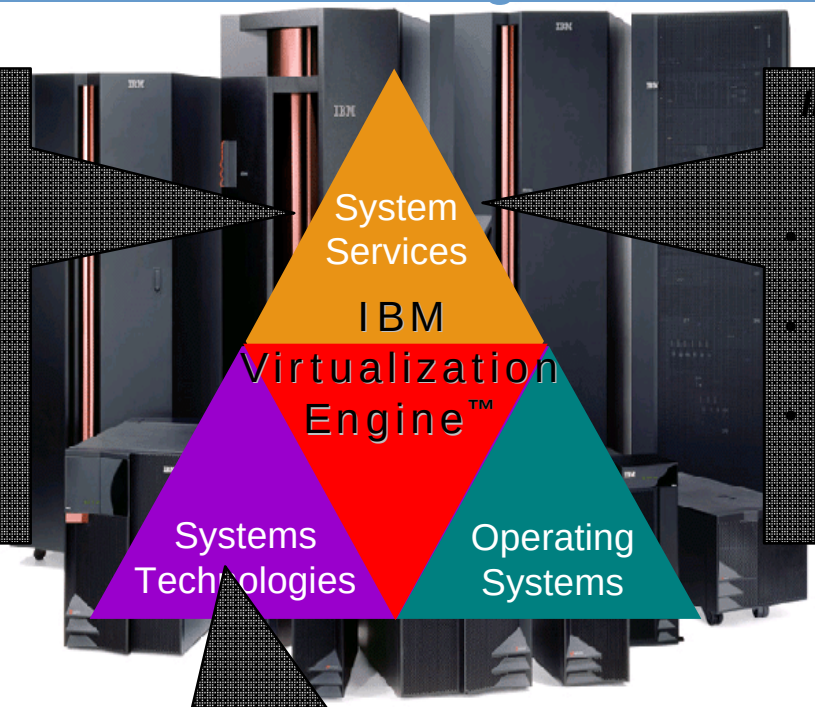
# How IBM simplification leadership offerings are delivered…

## IBM Virtualization Engine™ Portfolio

***IBM Virtualization Engine™ Suite for servers***
Delivered as a suite
- IBM Enterprise Workload Manager
- IBM Director MultiPlatform
- IBM Tivoli Provisioning Manager
- IBM Grid Toolbox
- IBM VE Console




***IBM Virtualization Engine™ Suite for storage***
Delivered individually
- IBM TotalStorage SAN Volume Controller
- IBM TotalStorage SAN File System
- IBM TotalStorage Productivity Center

***IBM Virtualization Technologies***
Built into products
- Hypervisor - VLANs - Virtual I/O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# Virtualization Engine Topology

**Operations Management UI**

Administrator's or CE's view into management applications

(e.g. Browser)

**Management Servers and Managed Thru Servers**

The set of single Control points

- EWLM Domain Manager
- Systems Provisioning
- IBM Director Multiplatform
- VE Console

**Managed Nodes** are the endpoints that run actual customer workload.



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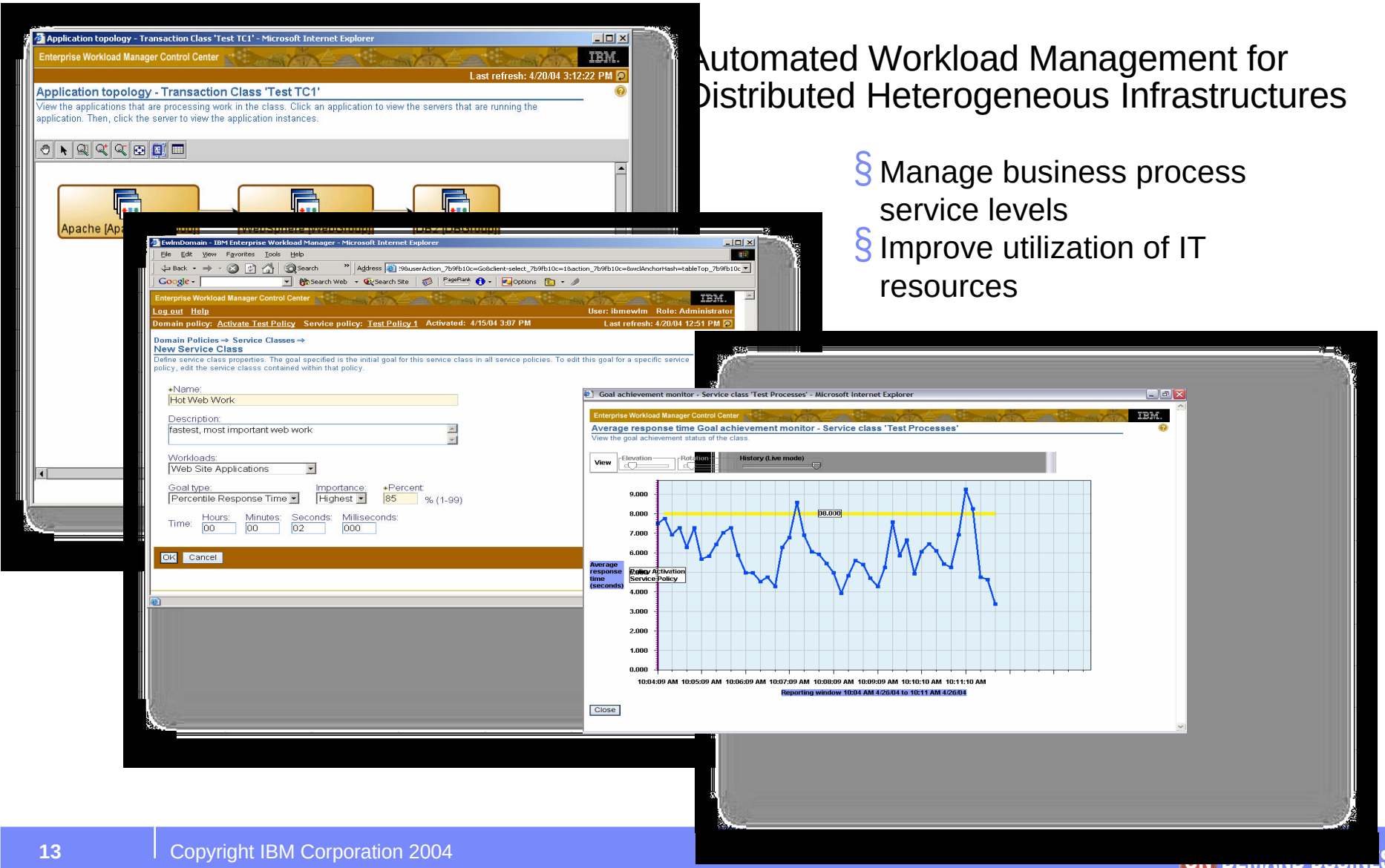
# Enterprise Workload Manager




## Automated Workload Management for Distributed Heterogeneous Infrastructures

- Manage business process service levels
- Improve utilization of IT resources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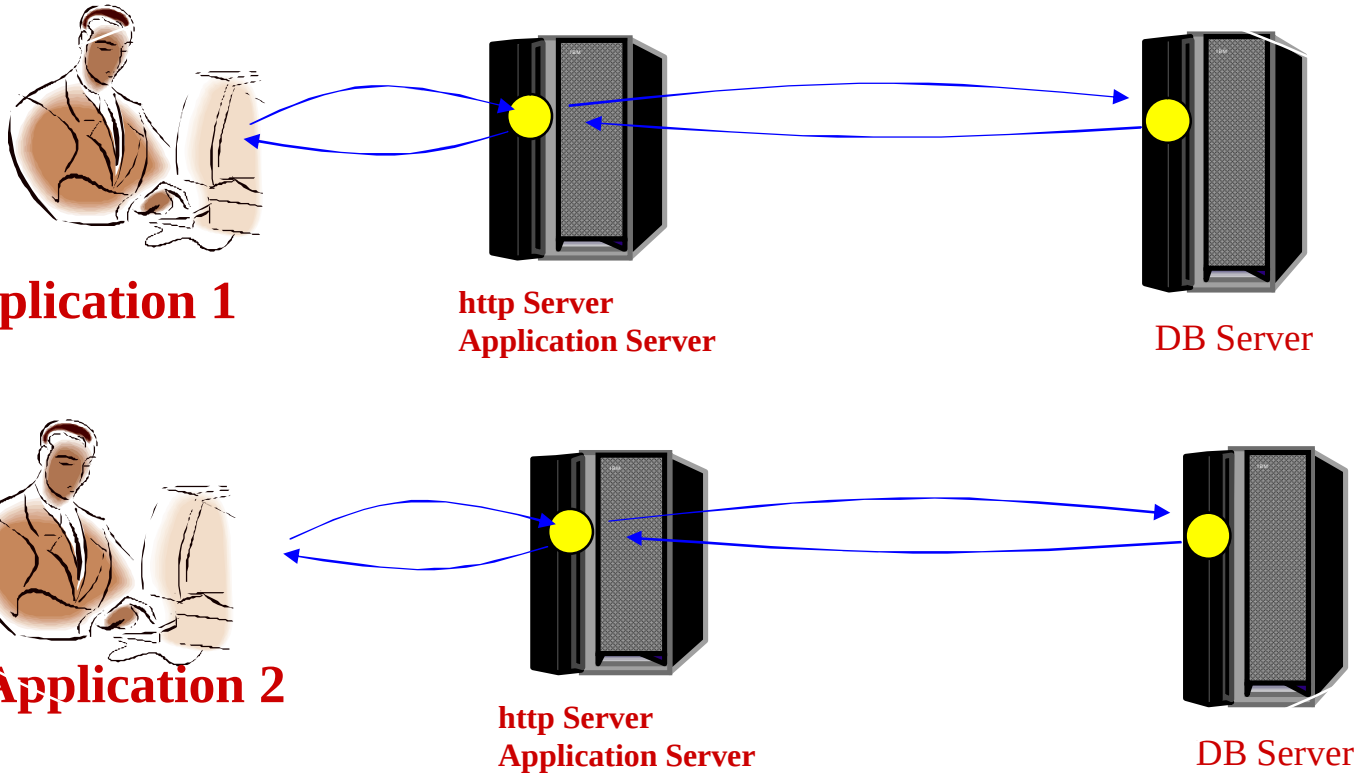
# Simple two tiered scenario




**Application performance monitored**
**Resource usage identified**
**Input for SLA management**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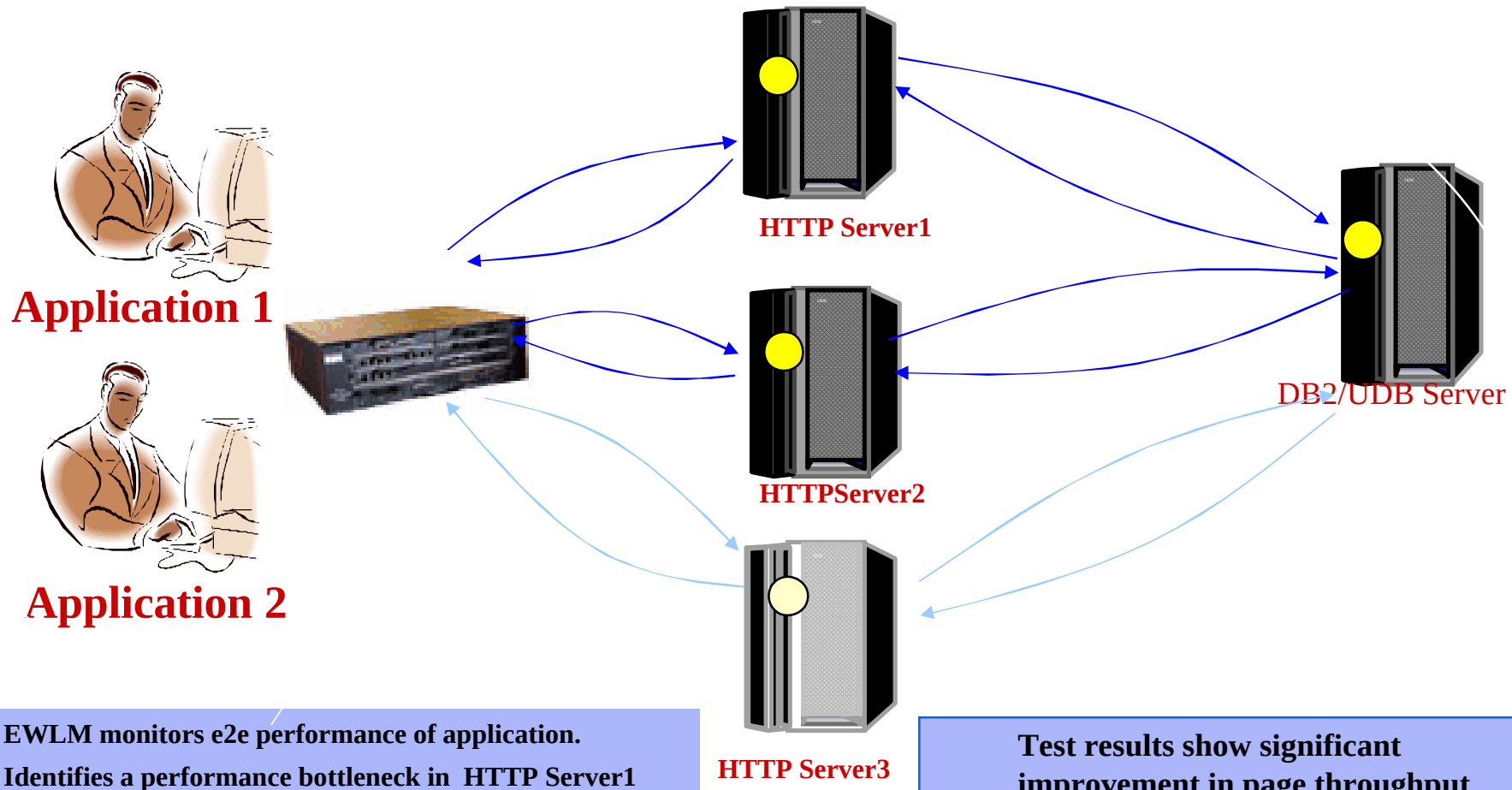
# EWLM Load balancing with Intelligent Routers




1. EWLM monitors e2e performance of application.
2. Identifies a performance bottleneck in HTTP Server1
3. Feeds updated routing table weights to router
4. Cisco router sends more work to HTTP Server 2

**Test results show significant improvement in page throughput and response time with more standardized results.**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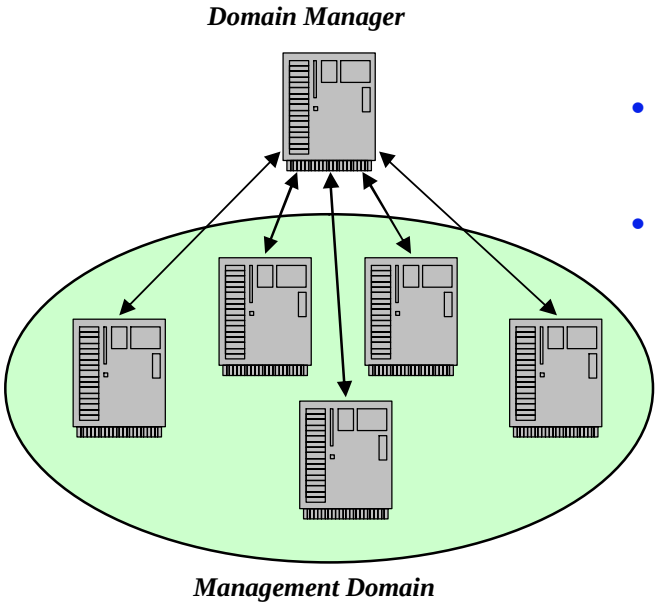
# Some Applications Can Currently Exploit EWLM




- **EWLM uses open interfaces based on ARM**
  - Websphere 5.1.1 & DB2 instrumented to use ARM
  - Apache and IIS ARM plug-ins provided
  - Applications inherit the benefit of Websphere & DB2 ARM-enablement
- **Customer defines transaction class & policy**
  - Definitions portable across all supported platforms
- **EWLM monitors operating system, HTTP server, Websphere & DB2**
  - Provides input for workload balancing decisions – server utilization, trans response time & topology


***Provides consistent information across supported platforms***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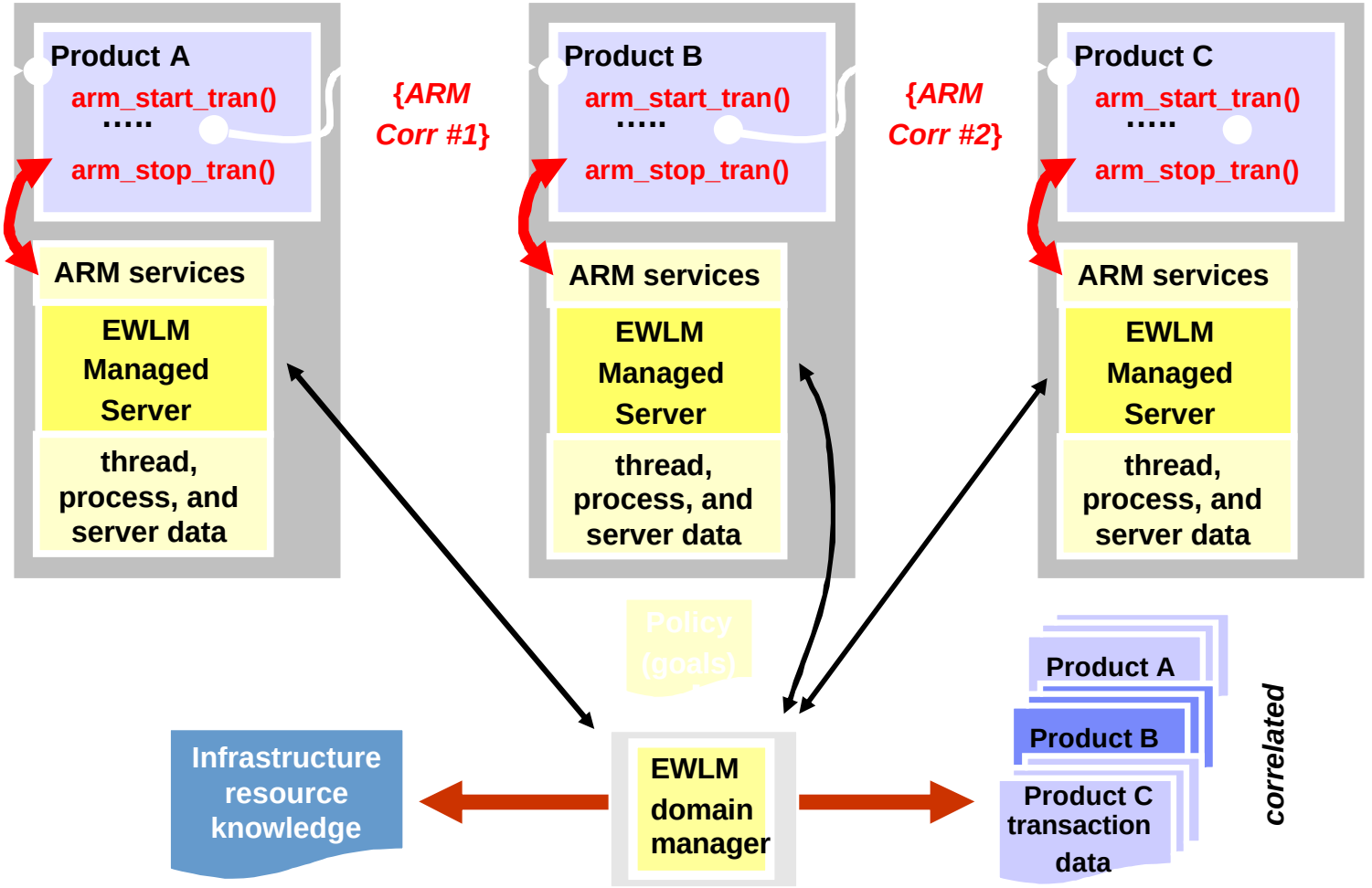
# The big EWLM picture: marriage of transaction data to infrastructure resources knowledge





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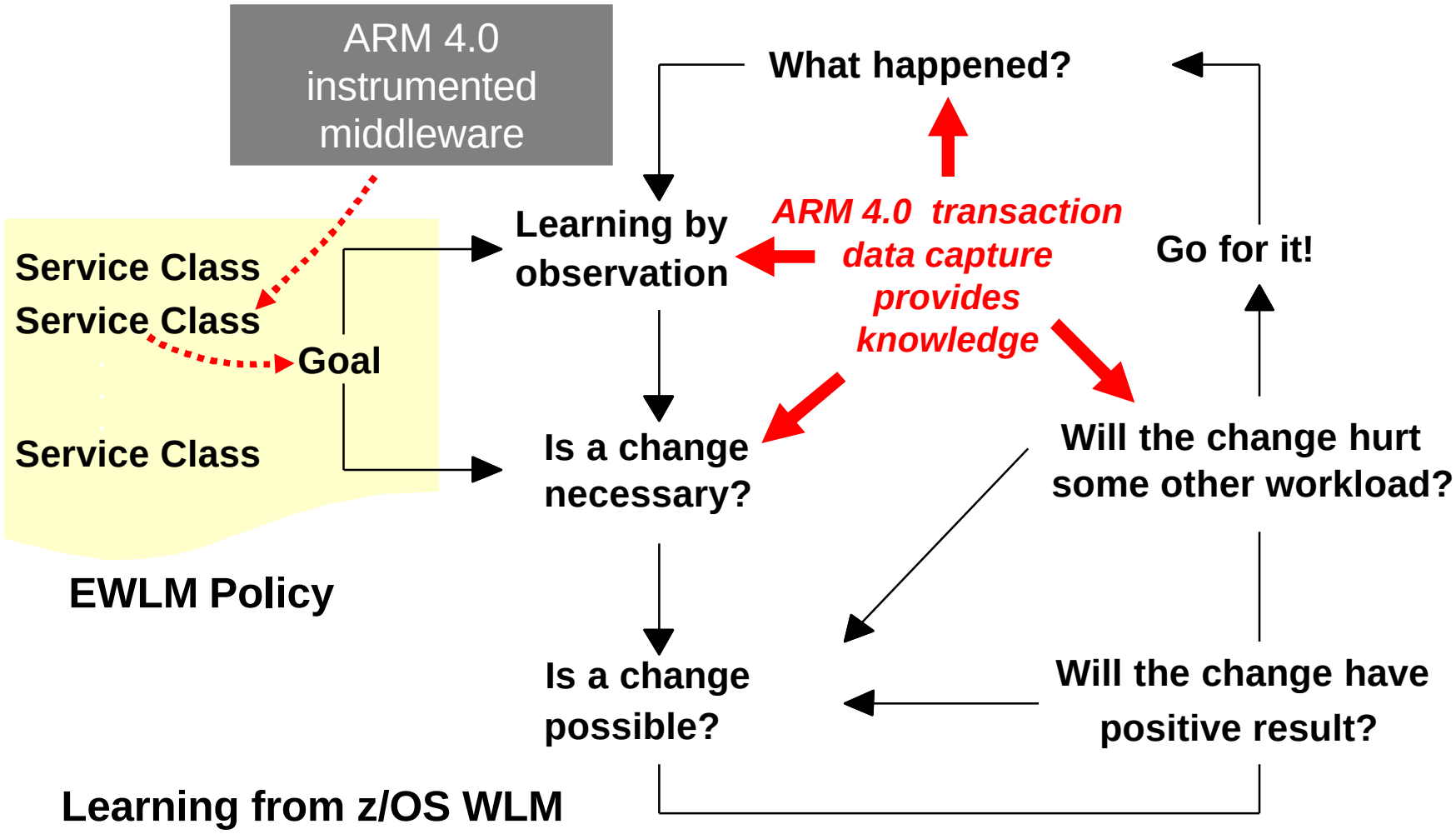
# EWLM goal-based analysis and management





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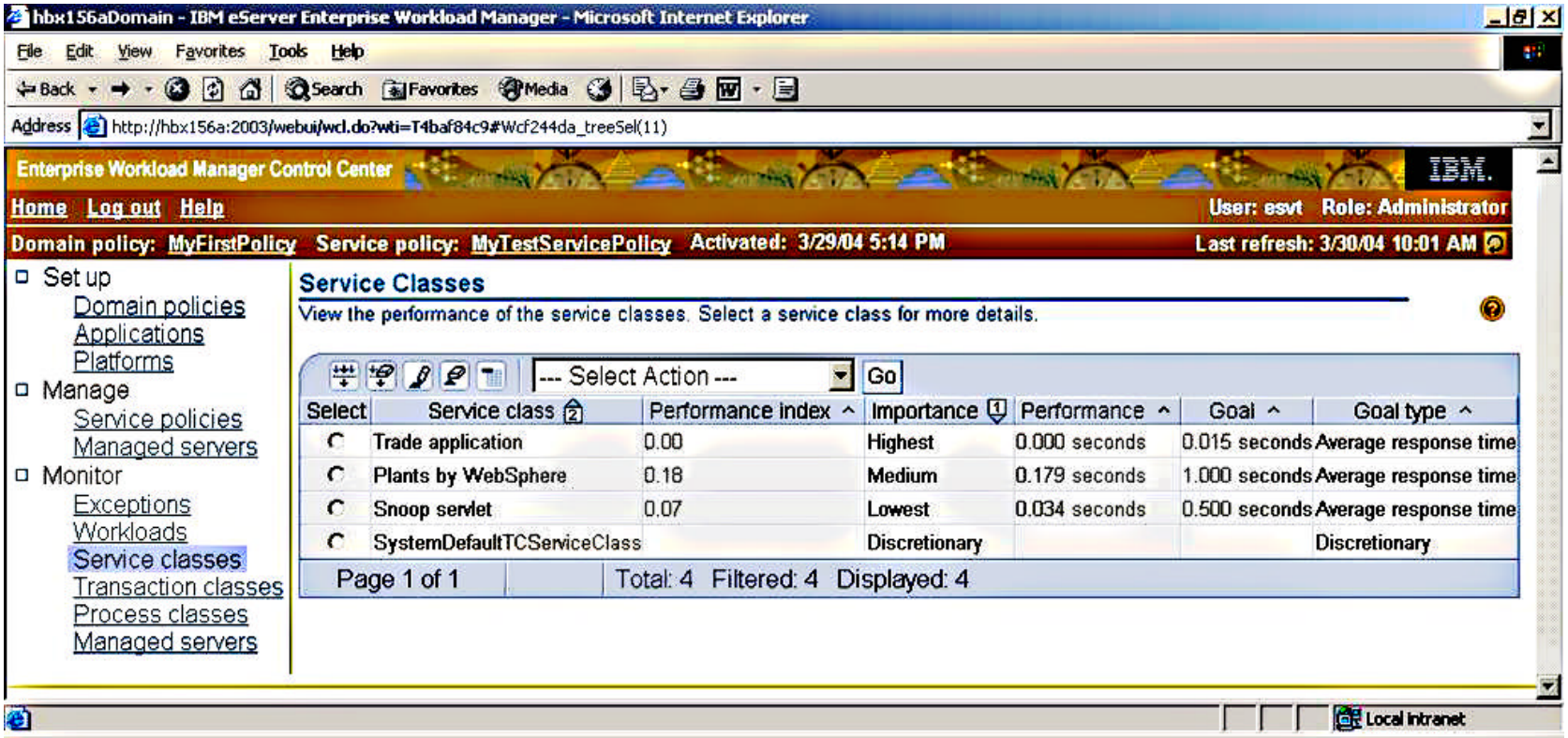
# EWLM results: analysis and reporting




**Enabled via ARM 4.0 instrumentation – EWLM transaction classification**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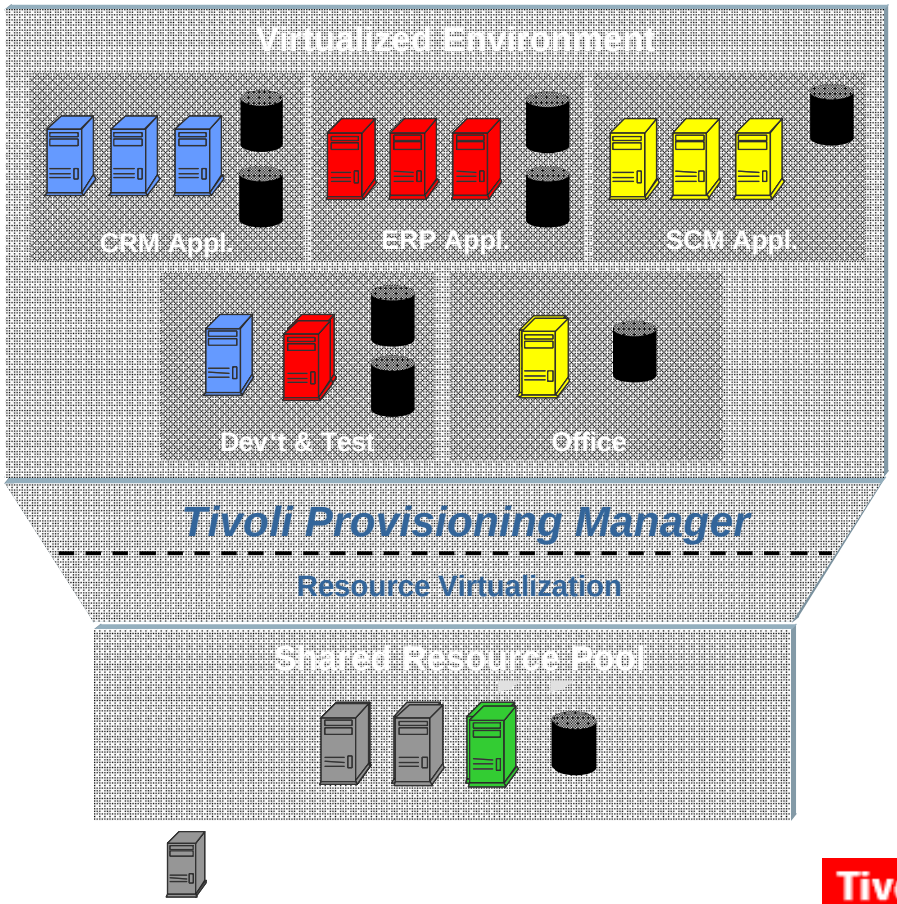
# Tivoli Provisioning Manager




- Adds, deletes, moves and configures servers, partitions, storage and network resources dynamically
- Satisfy changing business and workload needs.
- Makes VE based platforms "orchestration ready"
- Examples…
  - *Development & Test*
  - *Networked Gaming*
  - *mySAP*

Tivoli.

Dynamically deploying and optimizing IT resources real-time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# Example: A Systems Provisioning Show Case

**Stateless client workload – http server**

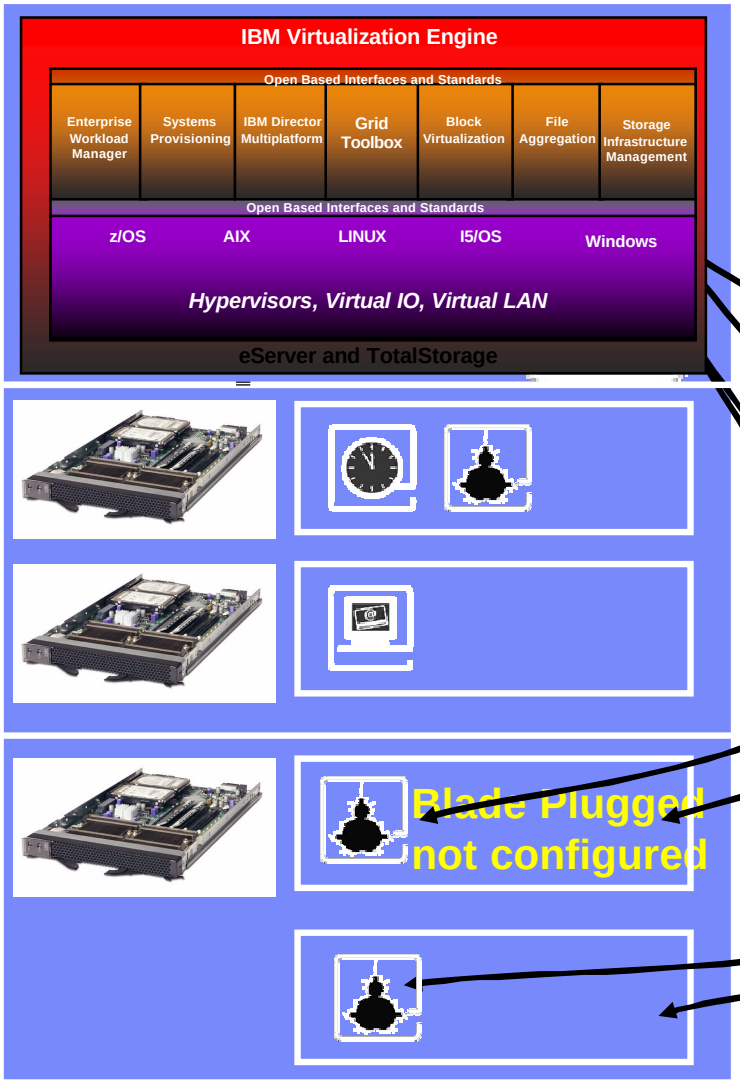
**Compute intensive workload**

**Stateful workload – websphere-based order transaction**

**Failure**

**Disaster**

Blade Unplugged not configured





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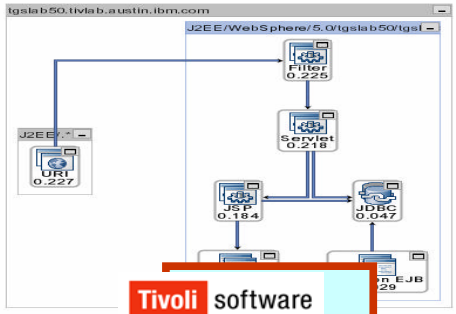
# Maintaining Application Performance Goals

1. **An IT administrator notes performance problems for a critical application using EWLM**

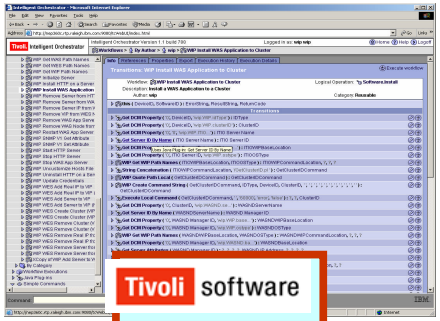
2. **Because of past application problems, the Administrator uses TMTP to determine the root cause of the problem – the diagnosis: limited server capacity**

3. **She then uses TPM to execute a workflow to move a free resource from the Linux pool into the HTTP cluster**

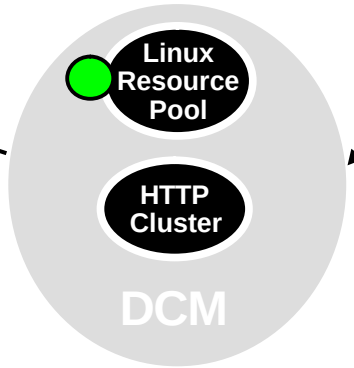
EWLM




Tivoli software TMTP



Tivoli software TPM




4. **EWLM discovers the new server in its topology view and immediately begins leveraging it to rebalance workload and maintain the application performance**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# Systems Management with IBM Director Multiplatform

**Planned common cross platform infrastructure**


Event management allows clients to define actions to be taken automatically when specific alerts are issued reducing manual effort within a system and across systems


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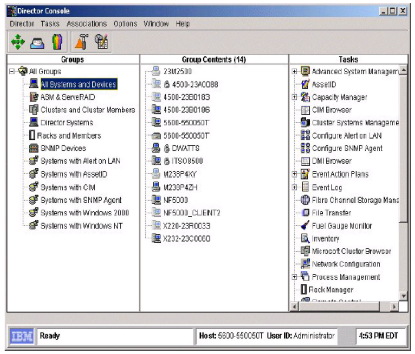
# IBM Director Multiplatform and IBM Director

***IBM Director Multiplatform empowers users to efficiently and effectively manage their heterogeneous IBM platform resources.***

## IBM Director

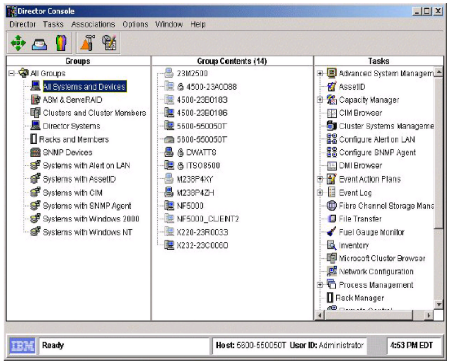


Windows | Linux on xSeries | AIX | Linux on Power

xSeries

BladeCenter (includes JS20)

## IBM Director Multiplatform



Windows | Linux on xSeries | AIX | Linux on Power | I5/OS0

xSeries

BladeCenter (includes JS20)

p5

i5



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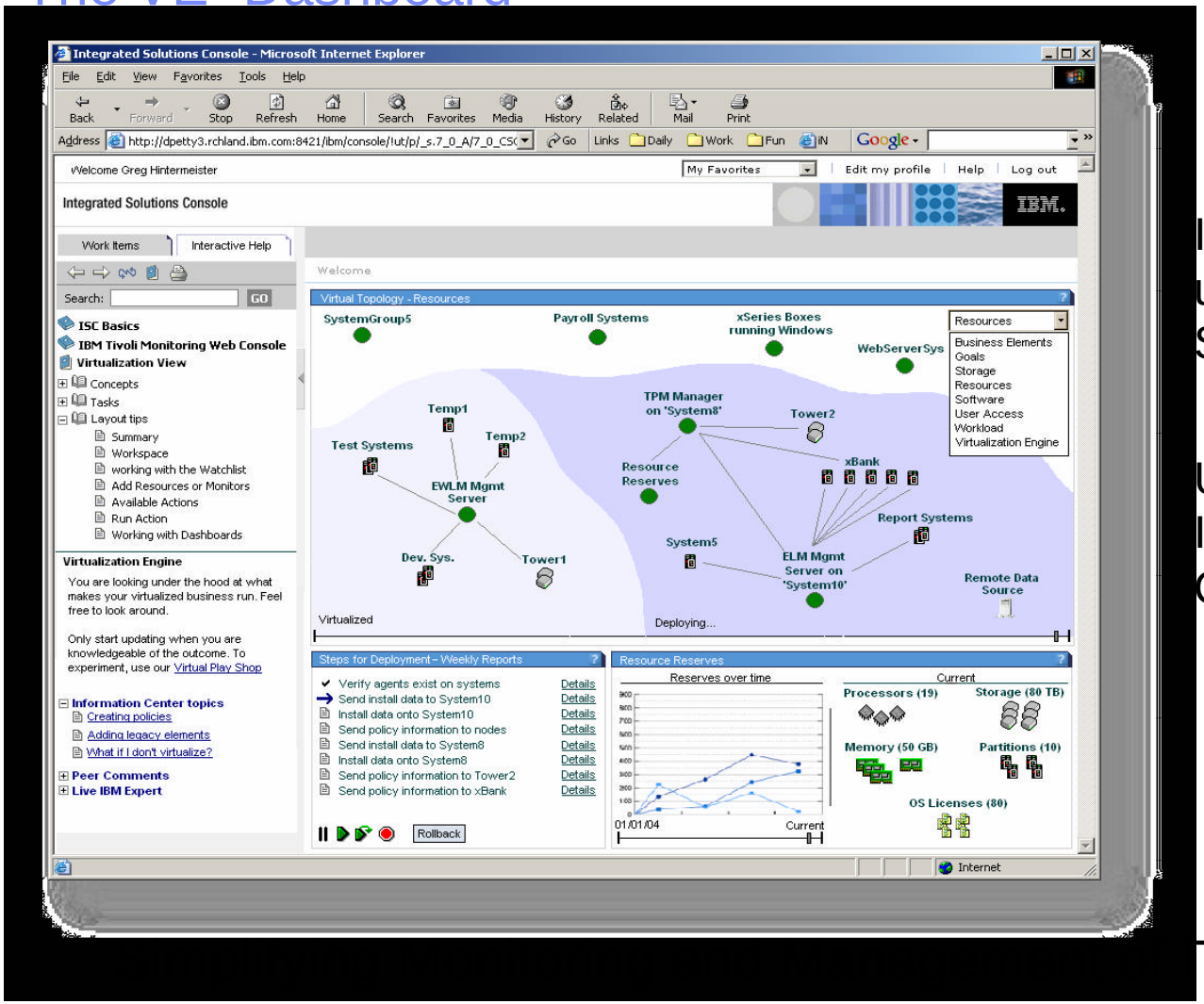
# IBM Virtualization Engine™ Console

## The VE "Dashboard"




Intuitive, web-based user interface for VE Systems Services

Utilizes IBM's Integrated Solutions Console

T Infrastructure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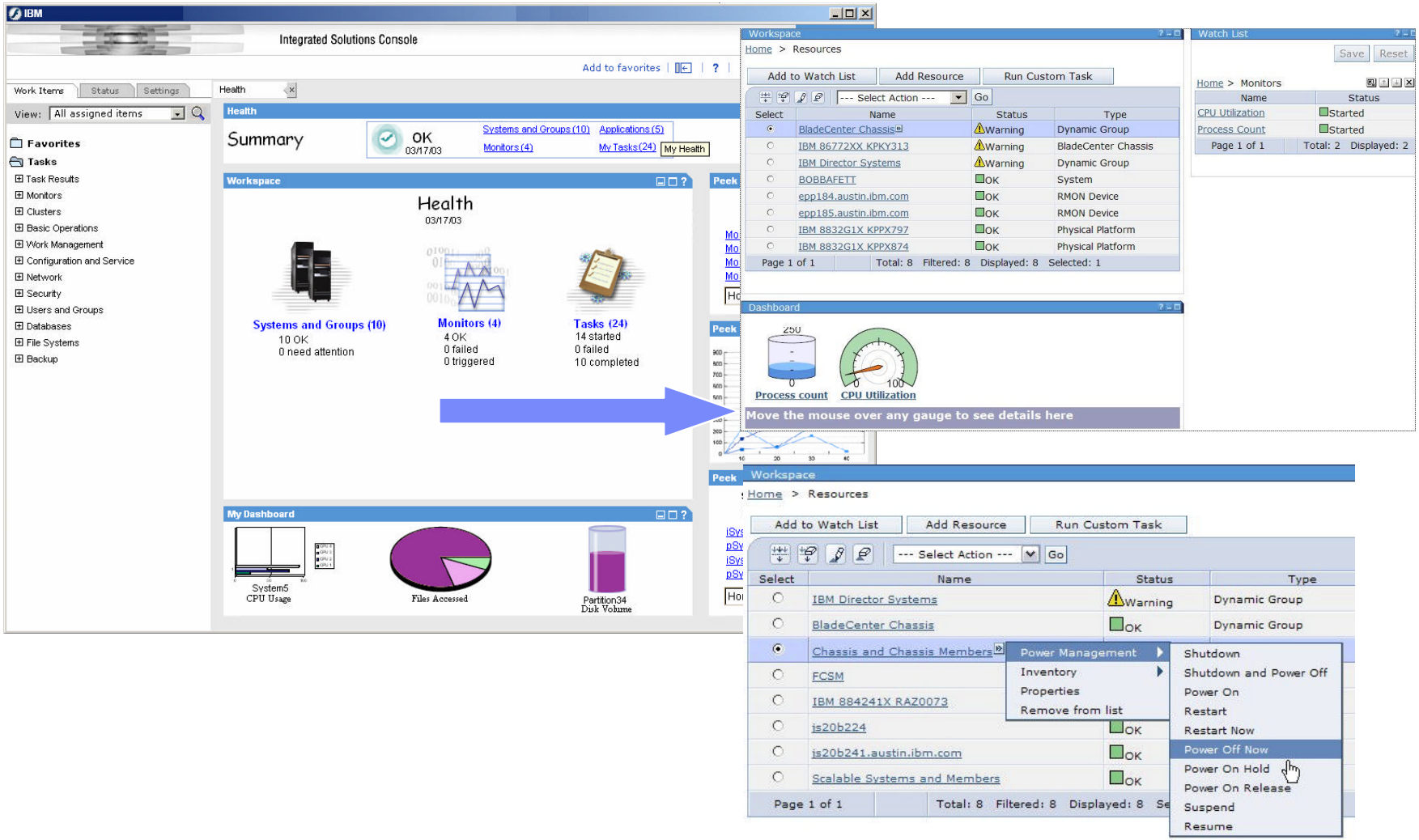
# Virtualization Engine Console for IBM Director Multiplatform and IBM Director





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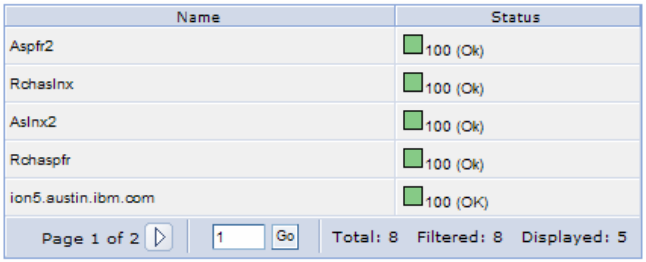
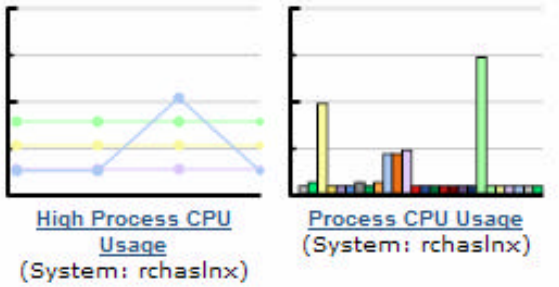
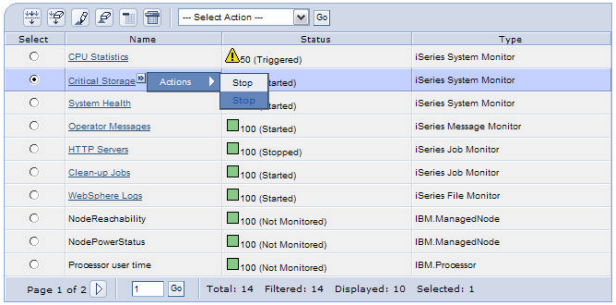
# 2004 Functions for VE Console

- **Resource/Monitor/Task Health**
  - Gather health information from multiple mgmt sources
  - Consolidated Monitoring
    - Monitor status (e.g. normal, triggered, etc.)
    - Metric graphs (e.g CPU utilization, transaction rates, etc.)
    - Monitor control (start, stop, reset, etc.)
  - Access to logs and message queues
- **Corrective Management**
  - System Control (e.g. shutdown, restart, etc.)
  - Job/Process Management and Control (e.g. kill a process)
  - Resource Management and Control (e.g. delete an event,
  - Task Execution (e.g. run a predefined task, run a command)
- **Console Launching**
  - Storage Launchpad with storage consoles
    - MDM, Tivoli SAN Mgr, Tivoli Storage Resource Manager
  - Server Platform Launchpad with iSeries Navigator,IBM Director, Web SM





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# IBM Grid Toolbox V3 for Multiplatforms*

## *VE Systems are "Grid Ready"*

### *Globus Toolkit V3.0 Core (with IBM Contributions)*

- OGSi, OGSi Logging
- Notification
- Container Management
- Registry
- Command Line Tooling

### *Globus Toolkit V3.0 Services*

- Job Execution Services
- Resource Management Services
- Information Services
- GT3-Security-Compatible

### *IBM Substitutions and Enhancements*

- Grid Services – CMM, Management User Interface Administration
- Enhanced installation – graphical, wizard-based, tightly integrated with platform install technology

### *Embedded Technologies*

- Install, configuration and administration transparent to the user
  - WebSphere Application Server
  - Database

§ Provide a Foundation for Distributed Systems Virtualization

§ Fabric for Distributed Systems Management

§ Toolkit for the Virtualization of Appropriate Applications


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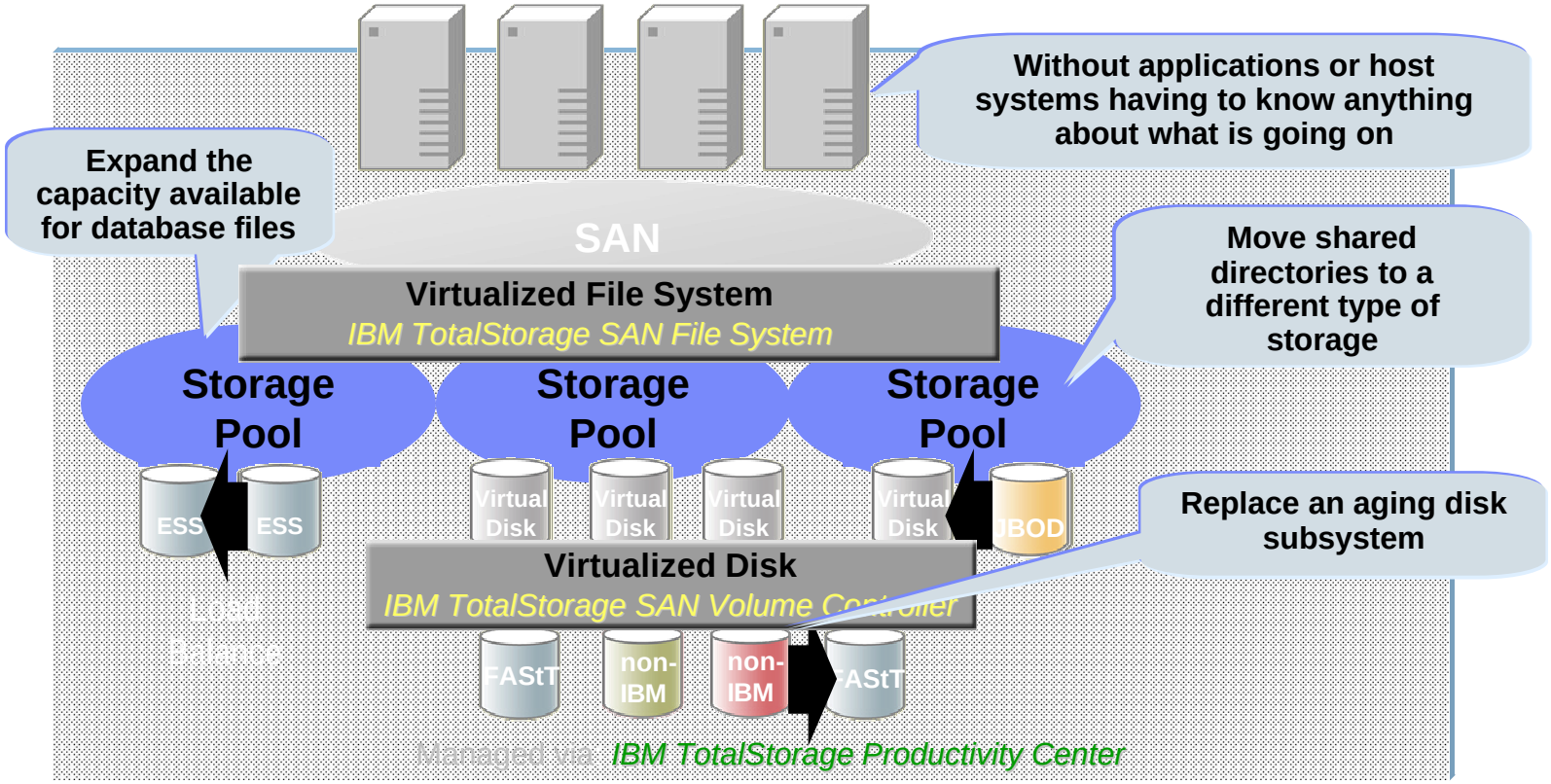
# On Demand Storage Environment

## More seamless infrastructure changes possible




This can enable

- § Improved Application Availability
- § Optimized Storage Resource Utilization
- § Enhanced Storage Personnel Productivity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# IBM Virtualization Engine Offerings

***IBM Virtualization Engine Suite for Servers***

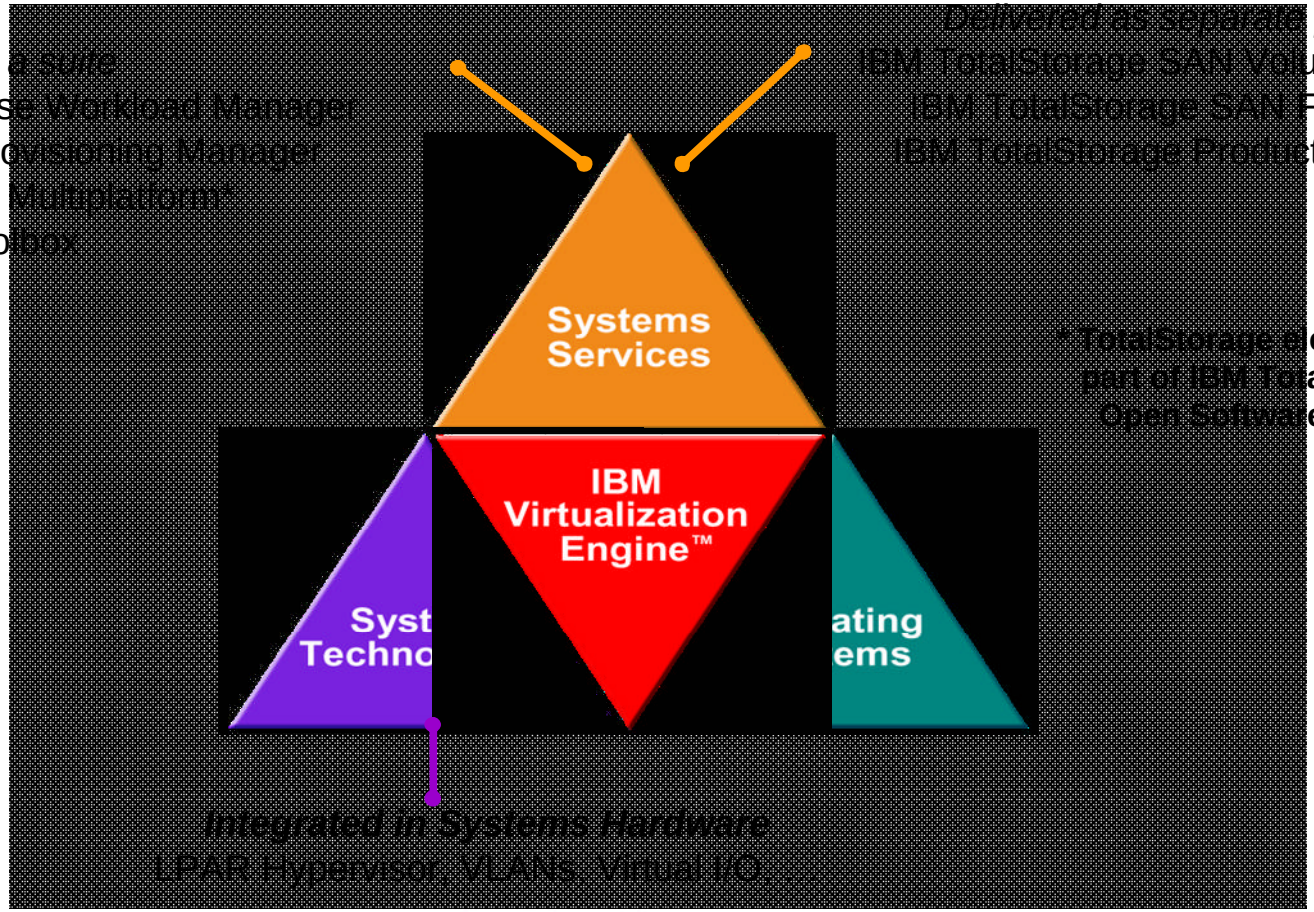
*Delivered as a suite*

IBM Enterprise Workload Manager
IBM Tivoli Provisioning Manager
IBM Director Multiplatform*
IBM Grid Toolbox
VE Console

***IBM Virtualization Engine Suite for Storage****

*Delivered as separate products*

IBM TotalStorage SAN Volume Controller
IBM TotalStorage SAN File System
IBM TotalStorage Productivity Center




*** TotalStorage elements are part of IBM TotalStorage Open Software Family**

***IBM Director 4.2 will be shipped with xSeries and BladeCenter Servers**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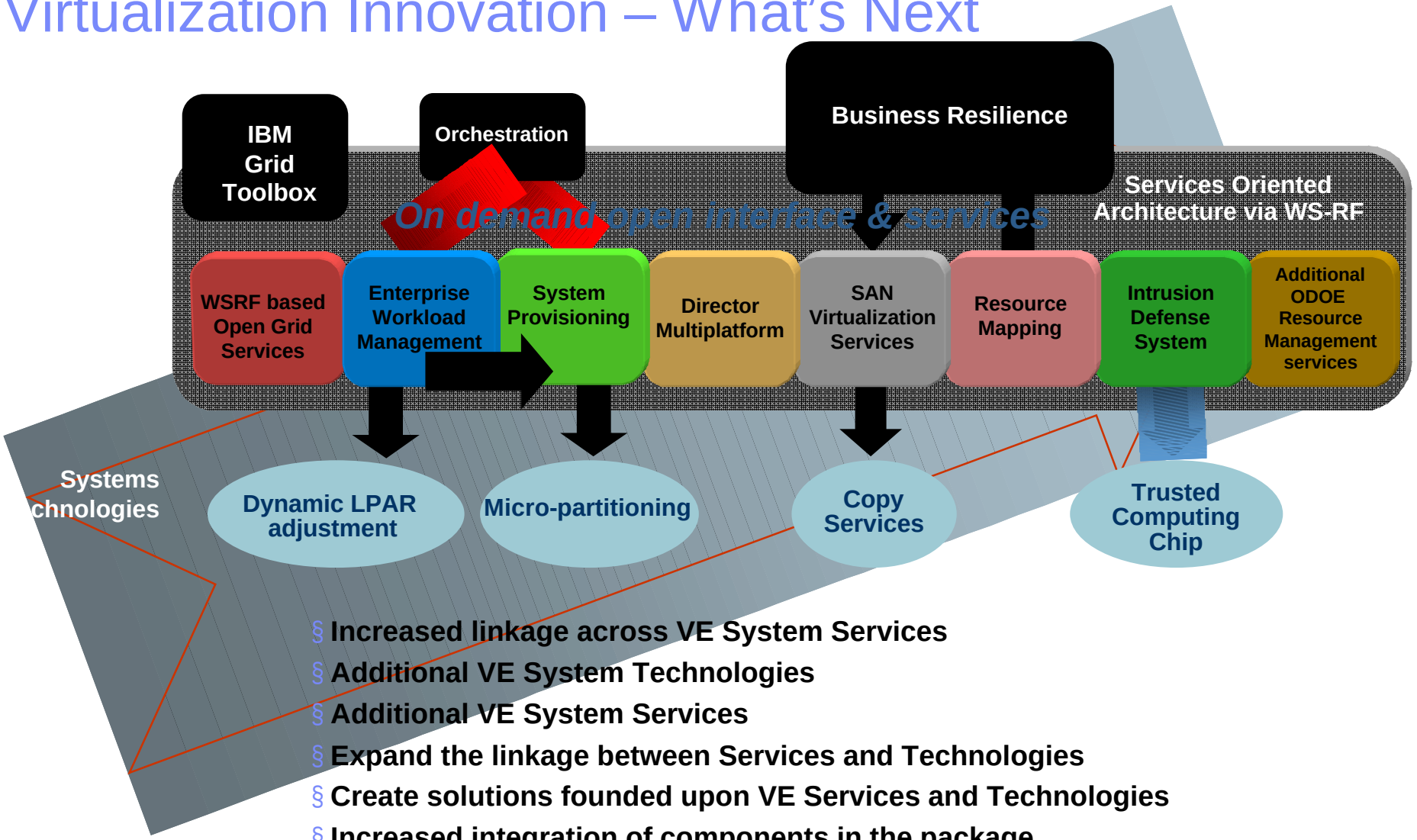
# Virtualization Innovation – What's Next




- Increased linkage across VE System Services
- Additional VE System Technologies
- Additional VE System Services
- Expand the linkage between Services and Technologies
- Create solutions founded upon VE Services and Technologies
- Increased integration of components in the package
- Broadening usage of the Web Services Reference Framework (WSRF)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# VMware and VE - Summary


- What is VMware?
  - Software that provides virtual infrastructure solutions for Intel compatible systems
- What is VMware's relationship with IBM?
  - Strong partnership to deliver industry leading virtualization solutions for IBM eserver xSeries and BladeCenter
  - Joint Development Agreement to provide enhanced management in VMware environments and optimization for IBM xSeries and BladeCenter systems
- What is the difference between VMware and VE?
  - VE provides virtualization solutions across multiple, different server hardware platforms; VMware is designed for Intel compatible systems only


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# Positioning VMware with the IBM Virtualization Engine


- Virtualization Scope
  - VMware provides virtualization for Intel compatible systems only
  - IBM Virtualization Engine (VE) virtualizes across different server and storage hardware platforms (x, I , p, z and TotalStorage)
- Virtualization Services
  - All of the VE services operate across different platforms
    - Workload management
    - Hardware management
    - Provisioning
- Workload Management
  - VE provides granular, application based workload management
  - VMware focus is at the VM level and has no application based workload management


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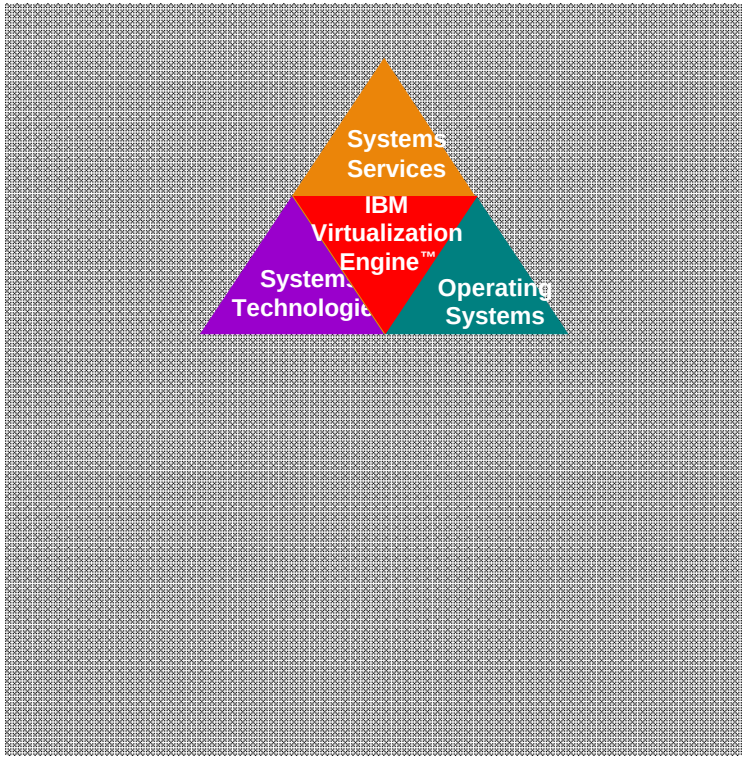
# Where to begin with xSeries and BladeCenter?




## xSeries and BladeCenter

- Leverage IBM Director and it's capability to manage not only xSeries, but extending to other systems
- Provisioning enhances RDM, accelerating time to make a blade or server part of the application pool
- Use EWLM capability to tie Windows systems with work extending to the rest of the infrastructure.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