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Managing Heterogeneous Platform Environments

Course #:

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Agenda

- **Heterogeneous Systems Management**

  – Background

  – Virtualization Engine approach

- **Enterprise Workload Management**

  – EWLM Motivation

  – Policy-based monitoring and management

  – Middleware Instrumentation Strategy

  – Load Balancing

  – LPAR Management

  – Provisioning

  – Future Work

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Learning Objectives

At the conclusion of this presentation, you should be able to:

– Identify how the Virtualization Engine addresses enterprise IT infrastructure complexity and management problems through an integrated set of systems technologies.

– Identify the components of the Virtualization Engine. Position the relationship between EWLM, TPM and IBM Director

– Describe how to use EWLM to define an end to end business policy.

– Describe the IBM middleware instrumentation strategy and the value to customers.

– Describe the rollout plan of EWLM in terms of functionality and platform support.

– Explain the future direction of EWLM and the Virtualization Engine

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On Demand Business Needs

Integration

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

Business Flexibility

IT Simplification

Infrastructure Management

IT simplification through automation and virtualization, enables access to and helps create a consolidated, logical resource view.

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

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Integrated Approach

The IBM Virtualization Engine integrates a set of systems technologies and systems services, lab tested and built-in to our systems, that helps to *simplify the infrastructure* and *reduce management complexity .*

Built-in

- **Discovers and pools all resources** — servers, storage, networks, both IBM and non-IBM — into one virtual environment

- **Shares and optimizes resources** within a box and across the network

- **Consistent across the IBM eServer and TotalStorage brands** and extends distributed control to manage non-IBM platforms

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IBM Virtualization Engine™ Offerings
IBM Integrated & Tested

IBM Virtualization Engine Suite for Servers

Delivered as a suite
Enterprise Workload Manager
Director Multiplatform
Tivoli Provisioning Manager*
with eServer workflows
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
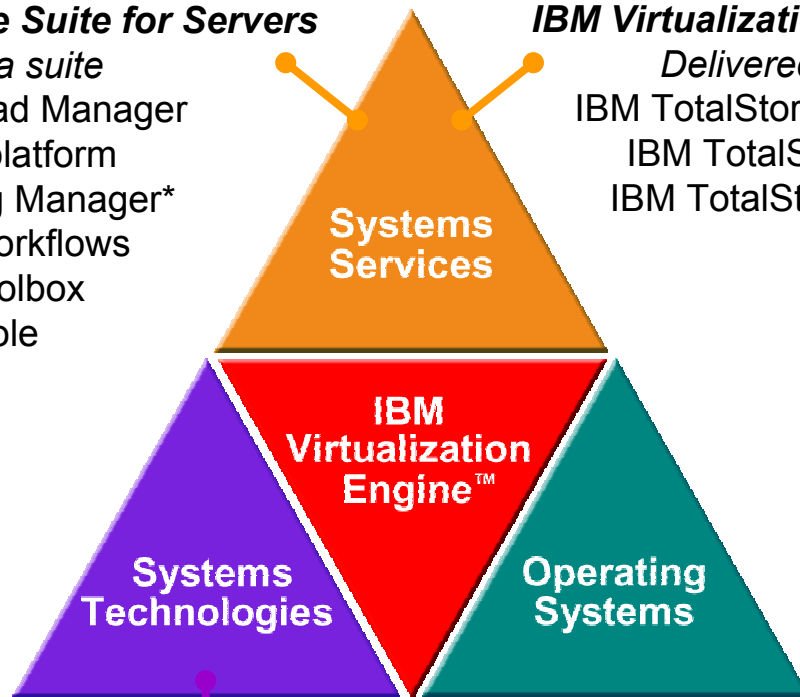
(TotalStorage elements are part of IBM TotalStorage Open Software Family)

Systems Services

IBM Virtualization Engine™

Systems Technologies

Operating Systems

Integrated in Systems Hardware
LPAR Hypervisor, VLANs, Virtual I/O, …

*VE suite pricing includes full TPM solution pricing

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IBM Director Multiplatform
## *Converging IBM Out-of-the-box Systems Management*
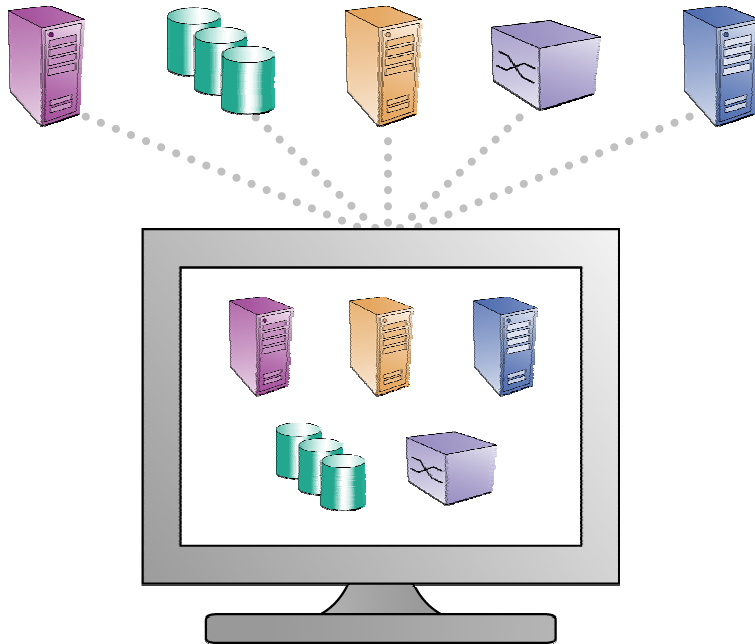
- Eliminates platform unique management approaches for hardware and virtual partition management

- Provides standards-based management infrastructure for servers, network and storage

- Supports real-time health monitoring of servers and storage

- Supports upward integration with IBM and third party systems management products and solutions

Can Help Improve IT Staff Productivity and Versatility

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Systems Provisioning
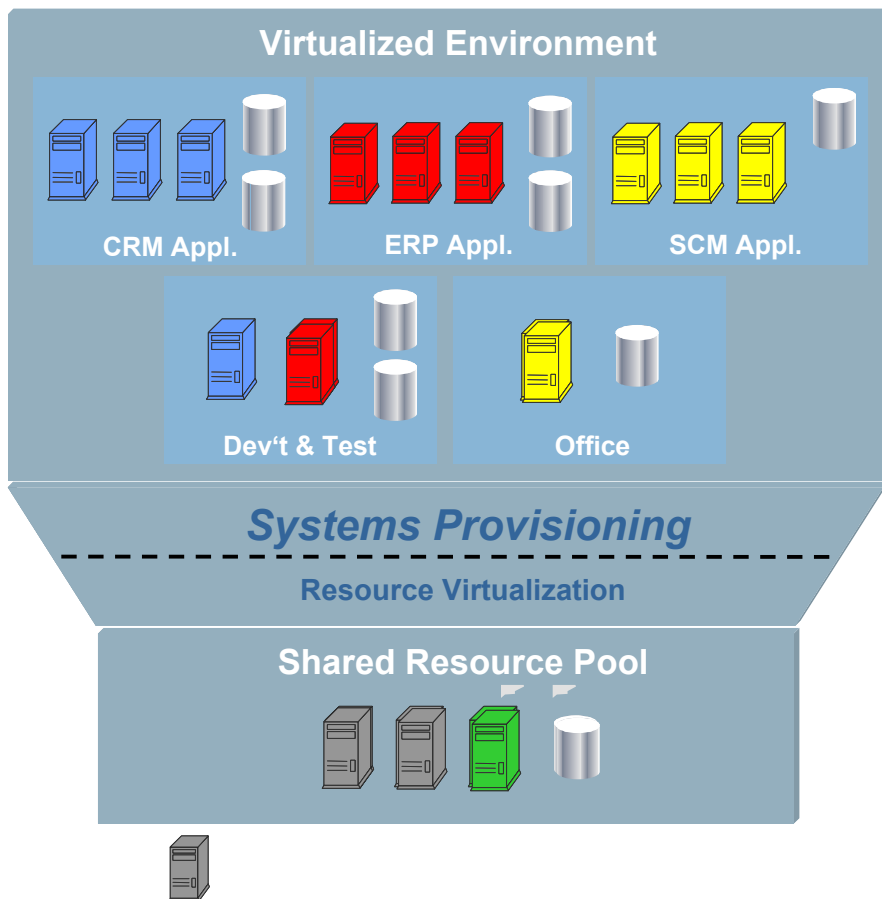
- Adds, deletes, moves and configures servers, partitions, storage and network resources dynamically

- Satisfy changing business and workload needs.

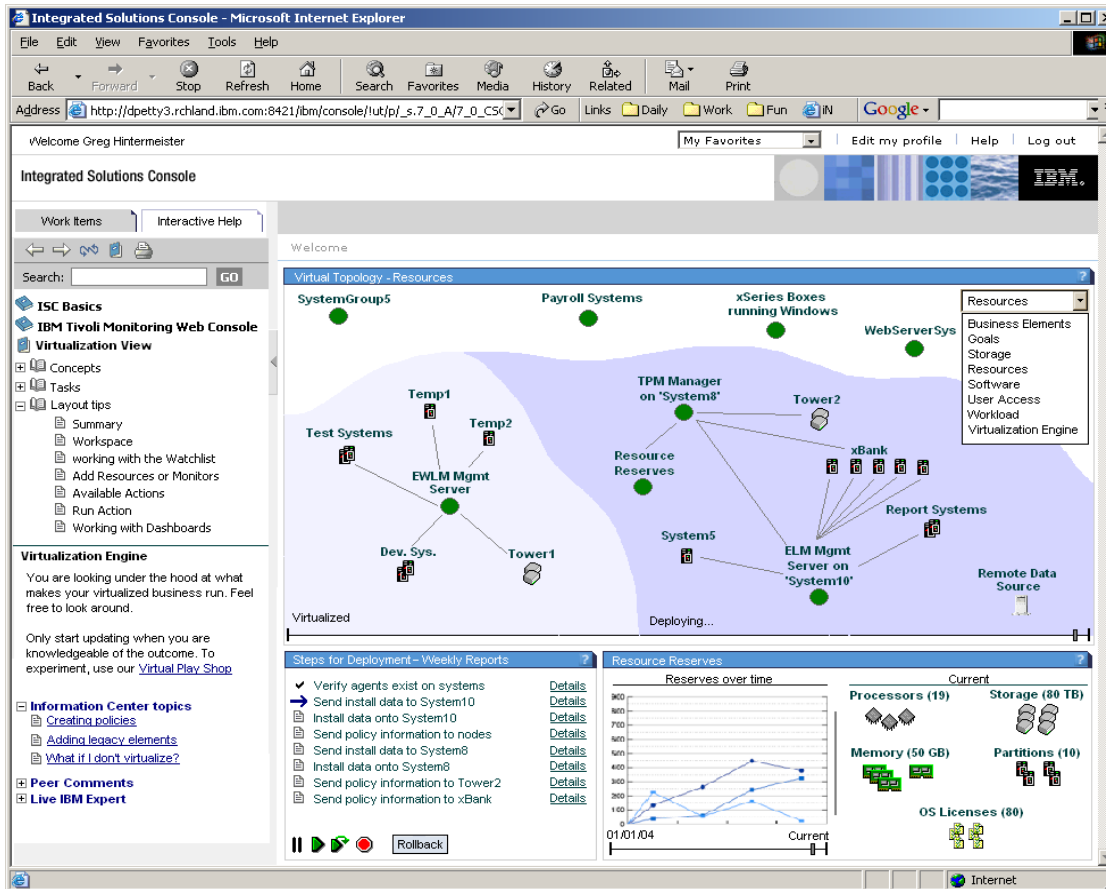- Makes Virtualization Engine based platforms "orchestration ready"

Dynamically deploying and optimizing IT resources real-time

IBM Virtualization Engine Console
The Virtualization Engine "Dashboard"

- Intuitive, Web-based user interface for Virtualization Engine systems services
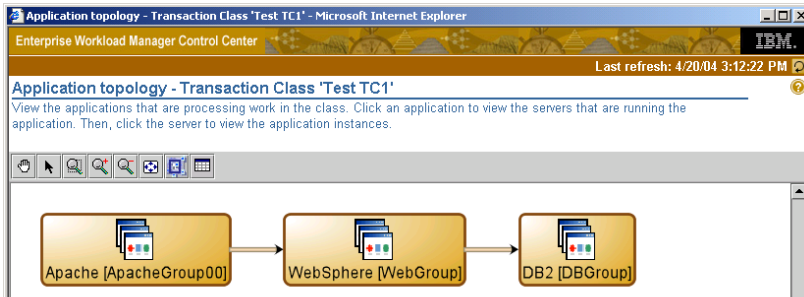
- Utilizes IBM's integrated solutions console

Simplifying Monitoring and Management of IT Infrastructure

Enterprise Workload Manager

- Manage business process service levels
- Improve utilization of IT resources

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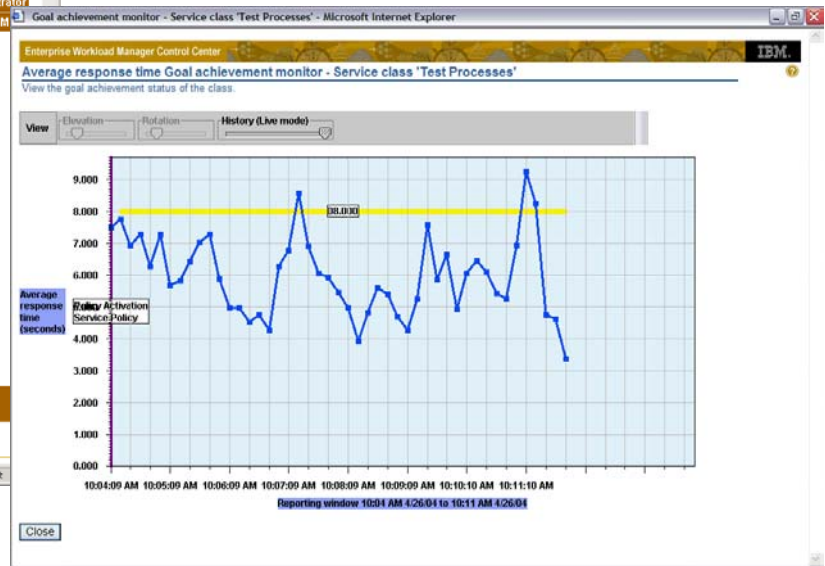
EWLM Value

- **The EWLM value for customers**

  – Insight into individual application component performance to assist with problem determination and capacity planning

  – Transaction-based reporting that can assist administrators in understing the performance seen by their clients

  – Business Goal-based load balancing through EWLM communication and interaction with load balancers.

  – Increase integration between administrative divisions through the aggregation of system and application performance data in single easy to use interface.

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EWLM and Business Goals

- **Policy Based**
  - ► XML representation

- **Example Business Priority based goals**
  - ► 90% less than 2 seconds, critical to the business
  - ► Avg. response time 3 seconds, important, but not critical
  - ► Discretionary
  - ► Defined by user group and / or business process

- **Dynamic, learned topology controls**
  - ► No static definitions of servers / application environments

Batch Work

Data and
Transaction
Servers

Traders

Appliance
Servers

Web
Application
Servers

Internet

Internet/
Extranet

Portfolio quotes

Business Partners

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EWLM Reporting & Analysis

Domain Manager Statistics

Service Classes

Policy Objective

End-to-End Results

Relational Topology

Participating Servers

Server Identity

State Information

Summary Statistics

Transaction Classes

Policy Objective

End-to-End Results

Application Environments

Application Identity

Summary Statistics

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EWLM Policy Demonstration
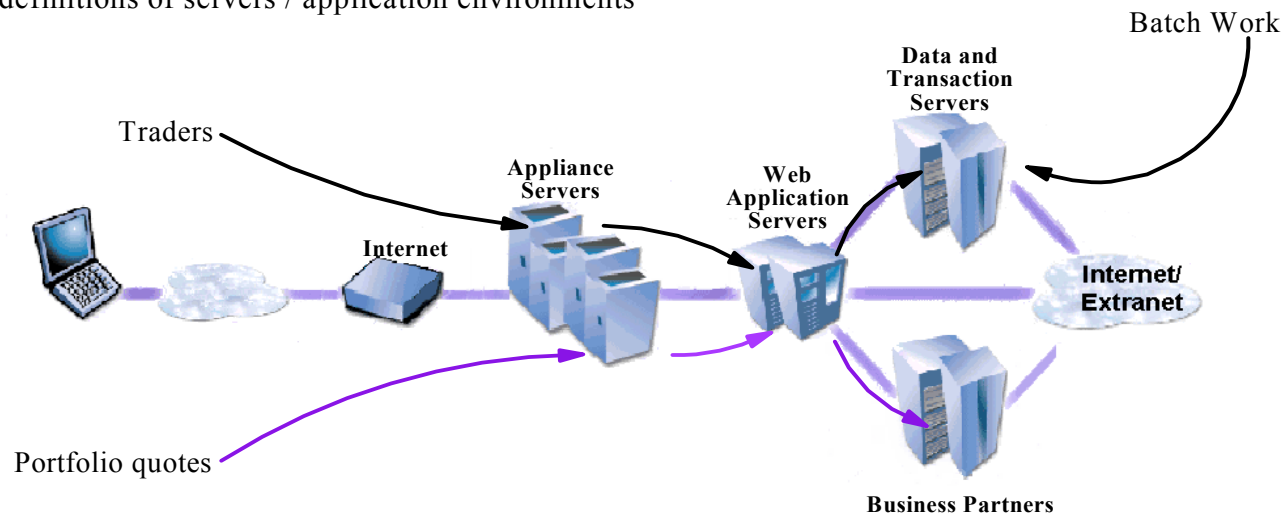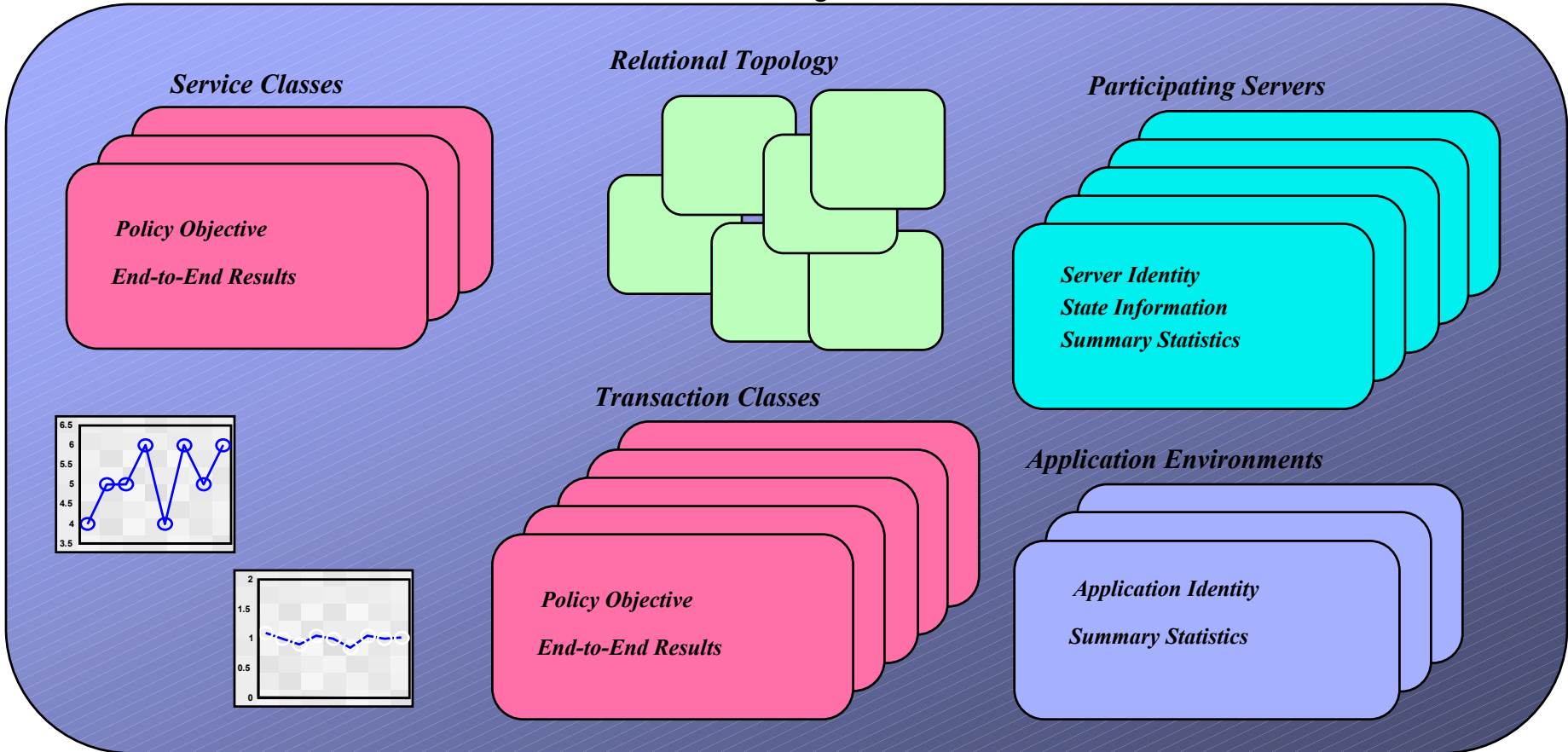
Middleware Instrumentation Strategy

Web Servers

WebSphere

DB2

User Request

Product A
arm_start_tran()
.....
arm_stop_tran()

{ARM Corr #1}

Product B
arm_start_tran()
.....
arm_stop_tran()

{ARM Corr #2}

Product C
arm_start_tran()
.....
arm_stop_tran()

ARM services

EWLM Managed Server

thread, process, and server data

ARM services

EWLM Managed Server

thread, process, and server data

ARM services

EWLM Managed Server

thread, process, and server data

Policy (goals)

Infrastructure resource knowledge

EWLM domain manager

Product A

Product B

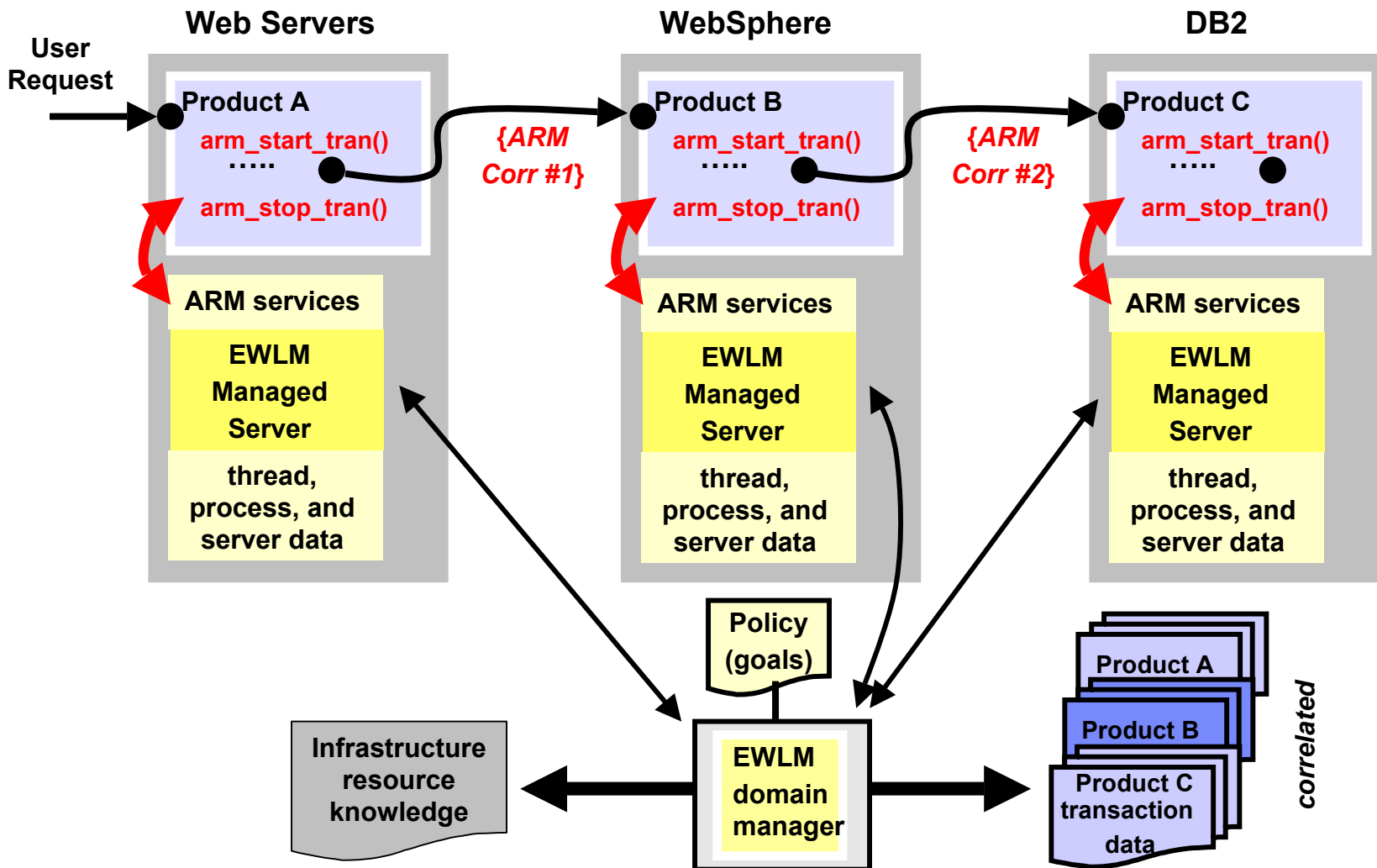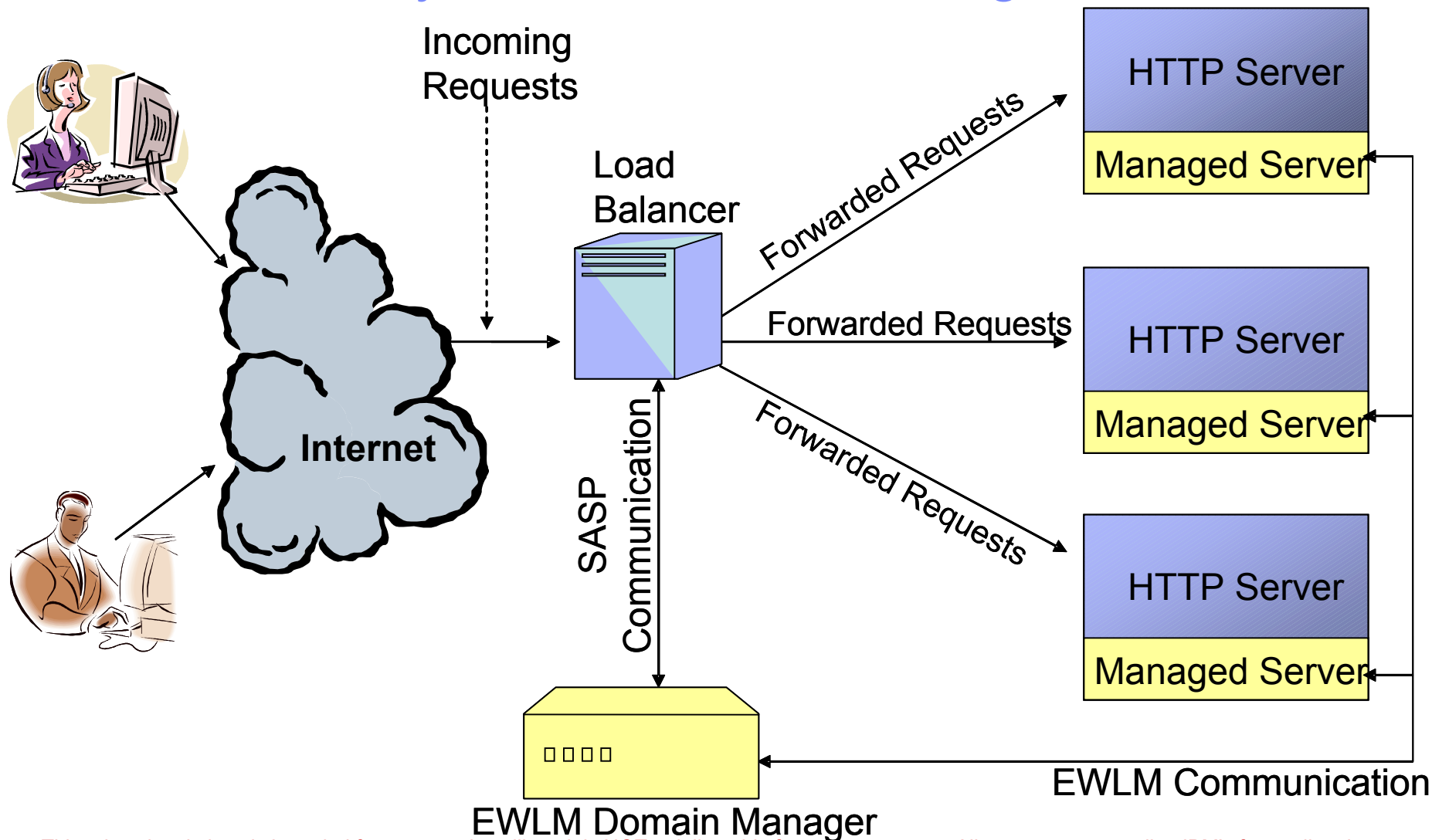**Product C transaction data**

correlated

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EWLM Load Balancing

- **EWLM has an in depth knowledge of application health, performance and relation to specified business goals**

  – ARM instrumentation

  – Knowledge of downstream systems

  – Policy oriented statistical monitoring

  – General system monitoring

  – Hierarchical view in the Domain Manager

- **Load Balancers currently have little information about application health or performance**

  – Currently use pure algorithmic techniques

  – Currently use general system statistics

What is meant by EWLM load balancing?

Incoming Requests

Load Balancer

Internet

Forwarded Requests

Forwarded Requests

Forwarded Requests

HTTP Server

Managed Server

HTTP Server

Managed Server

HTTP Server

Managed Server

SASP Communication

EWLM Domain Manager

EWLM Communication

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EWLM Load Balancing Demonstration

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Future Enhancements - EWLM LPAR Management
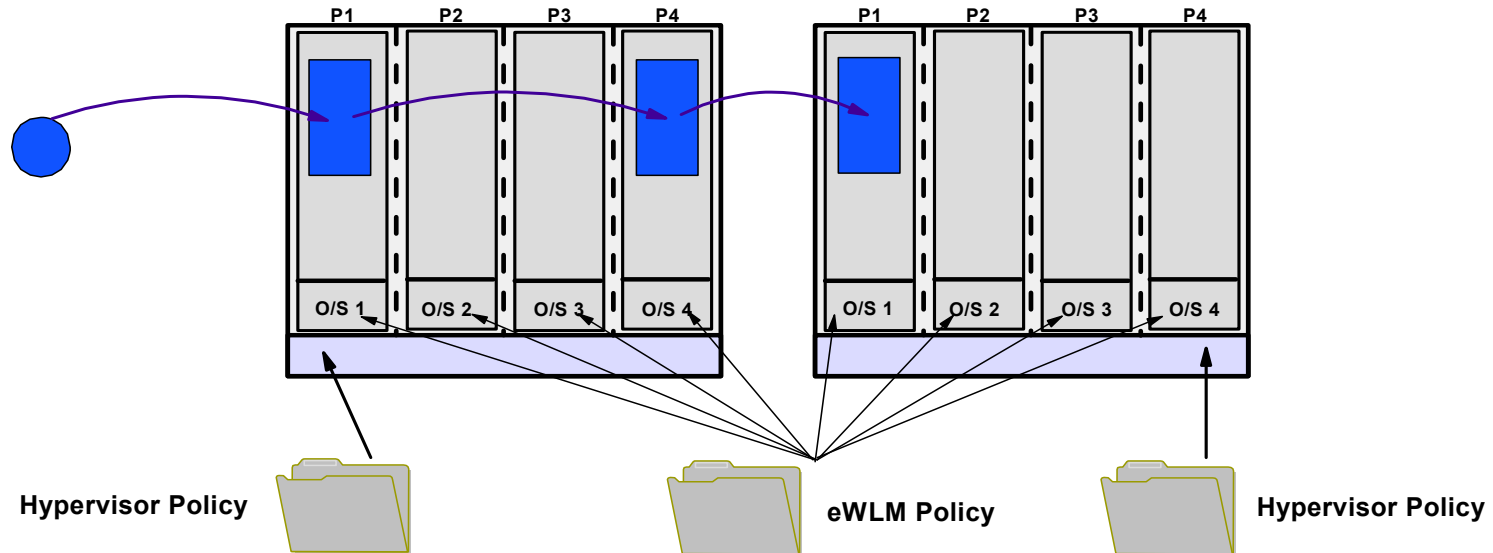
► eWLM Partition Resource Adjustments...

- Ability to satisfy goals for work requests
- Relationship between resource reallocation and workload rebalancing
- Shared resource consumption / contention
- Pain / gain analysis, cross-CEC adjustments

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Orchestrated Provisioning JCS 1Q05

- **Tivoli Provisioning Manager provides manual provisioning through specialized workflows.**

- **Tivoli Intelligent Orchestrator (TIO), not currently packaged with VE, acts as an advisor to TPM requesting provisioning actions on demand.**

- **EWLM can understand when a particular application tier requires more or fewer servers to meet business policy goals.**

- **EWLM advises TIO to add and remove servers.**
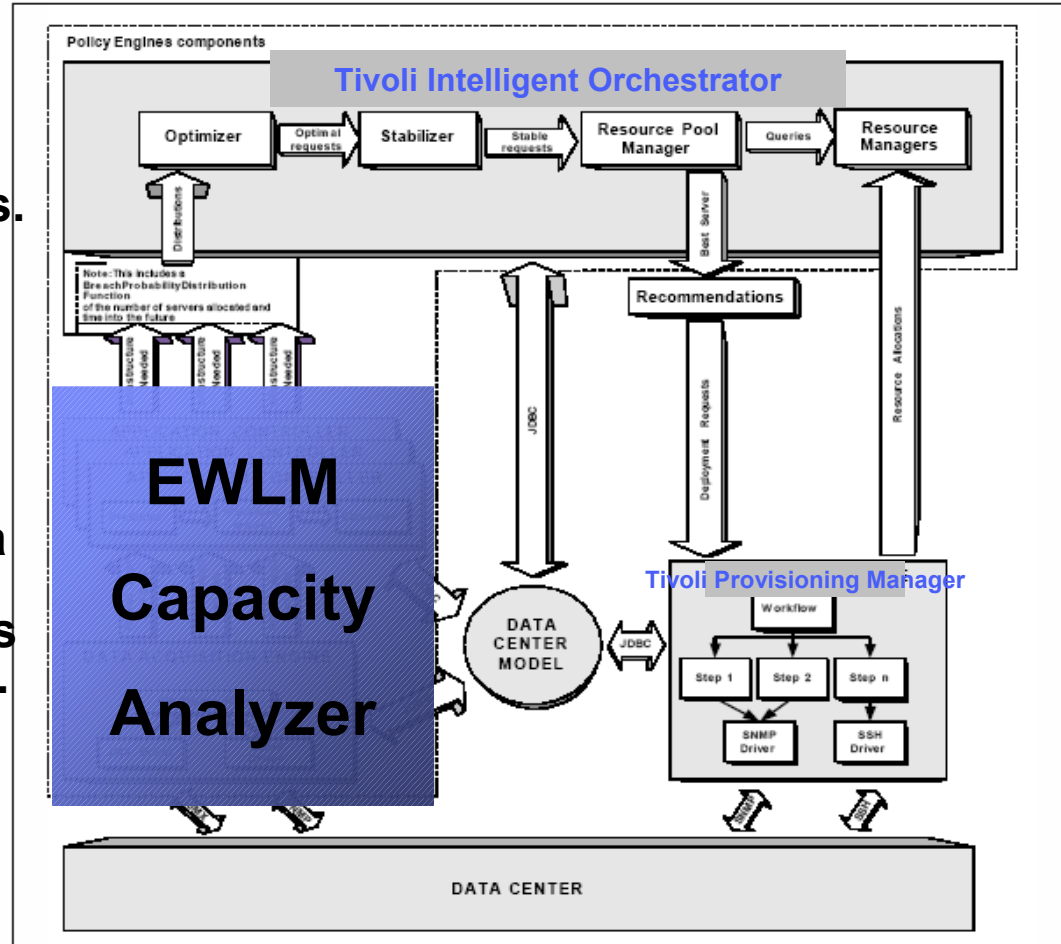
EWLM Provisioning Demonstration

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Future work

- ## 2005 and beyond: Policy based Resource Management and Optimization

  – CPU dispatch and priority management

  – Network, storage, memory and IO management

- ## Integration with Middleware management controls

- ## Integrated Global Policy

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EWLM Roadmap

When	What	State
2004-08	Distributed monitoring, platform set 1, Load Balancing	GA
2004-12	zOS Distributed monitoring	Planned GA
1Q05	Provisioning	Joint Customer Study
2005	Virtual Server Mgmt (LPAR) Provisioning	Planned GA
4Q05	VMWare Mgmt	Joint Customer Study
2006 and beyond	Storage Management, Server Dispatch Priority Mgmt, Middleware Management	Plan Candidates

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EWLM Product Information

- **Domain Managers**
  - RedHat / SuSe Linux (Platform set supported by WebSphere 5.1)
  - AIX 5.2F, i5/OS V5R3, Windows 2000 / 2003
  - 2005: zOS

- **Managed Servers**
  - AIX 5.2F, i5/OS V5R3, Windows 2000 / 2003, Solaris 8 / 9
  - 2005: zOS
  - 12/2004: Linux, SLES 9

- **Middleware:**
  - WebSphere V5.1.1, UDB V8.2, IIS Filter, Apache 2.0.x plugin, WebSphere webserver plugins
  - 12/2004: JMS, Web Services, zOS DB2
  - 2005: zOS MQ
  - 2006: zOS CICS, IMS

- **Load Balancers**
  - Cisco - CSM
  - 2005: Nortel Alteon Application Switch / BladeCenter Switch

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Conclusion / Wrap-up

- **EWLM is poised to be the leader in Autonomic Management Products**

  – Close integration with other IBM products and outside vendors

  – Transaction-level reporting is essential in understanding effectiveness, and provides precise data for which to make decisions

  – Its integration with Enterprise Load Balancing products is the first of its kind and can quickly provide performance and reliability improvements in data centers/serverfarms.

- **The Virtualization Engine offers a comprehensive customer solution**

  – IBM Director for task automation and monitoring

  – VE Console for aggregated viewing of system behavior

  – EWLM for System and Application Monitoring and Management

  – TPM for System provisioning

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Lessons Learned

- Identified some current enterprise business problems and how the Virtualization Engine and EWLM address them through an integrated set of systems technologies.

- Identified the components of the Virtualization Engine. Positioned the relationship between EWLM, TPM and IBM Director

- Described how to use EWLM to define an end to end business policy and saw a demonstration of policy creation.

- Described the IBM middleware instrumentation strategy and the value to customers.

- Described the rollout plan of EWLM in terms of functionality and platform support.

- Explained the future direction of EWLM and the Virtualization Engine and identified ways to involve customers early through joint customer studies.

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Additional Resources

- ## The Campus for more education:

  - BPs: http://www.ibm.com/partnerworld/sales/systems/education
    - Includes link to IBM PartnerWorld University (Web lectures for key topics)
    - http://www.ibmweblectureservices.ihost.com/pwu
  - IBMers: w3.ibm.com/sales/systems/education
    - Includes links to the Online Universities for Cross-Brand and each Brand (Web lectures for key topics)
  - Customers: www-1.ibm.com/servers/eserver/education

- ## EWLM Specific Educational Resources:

  - eServer Information Center:
    http://publib.boulder.ibm.com/eserver/v1r1/en_US/index.htm?info/icmain.htm
    - Includes Virtualization Engine documentation
    - Includes platform specific installation and configuration information

  - IBM Redbook "IBM Enterprise Workload Manager":
    http://www.redbooks.ibm.com/abstracts/sg246350.html

  - Whitepaper "CISCO Load Balancing with SASP and Enterprise Workload Management"

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End of presentation

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