IBM Software Group

Managing Service Execution

IBM Tivoli Workload Scheduler

Tivoli software

ON DEMAND BUSINESS

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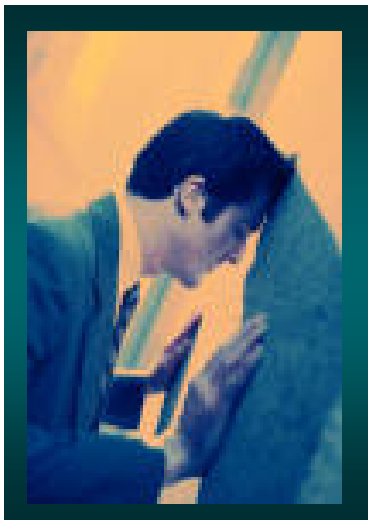
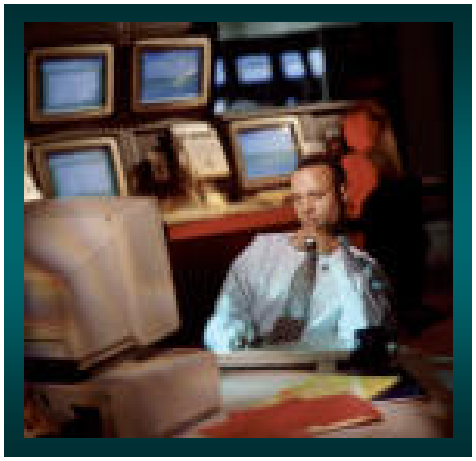
Agenda

- Workload Management Overview

Why worry about automated workload scheduling?

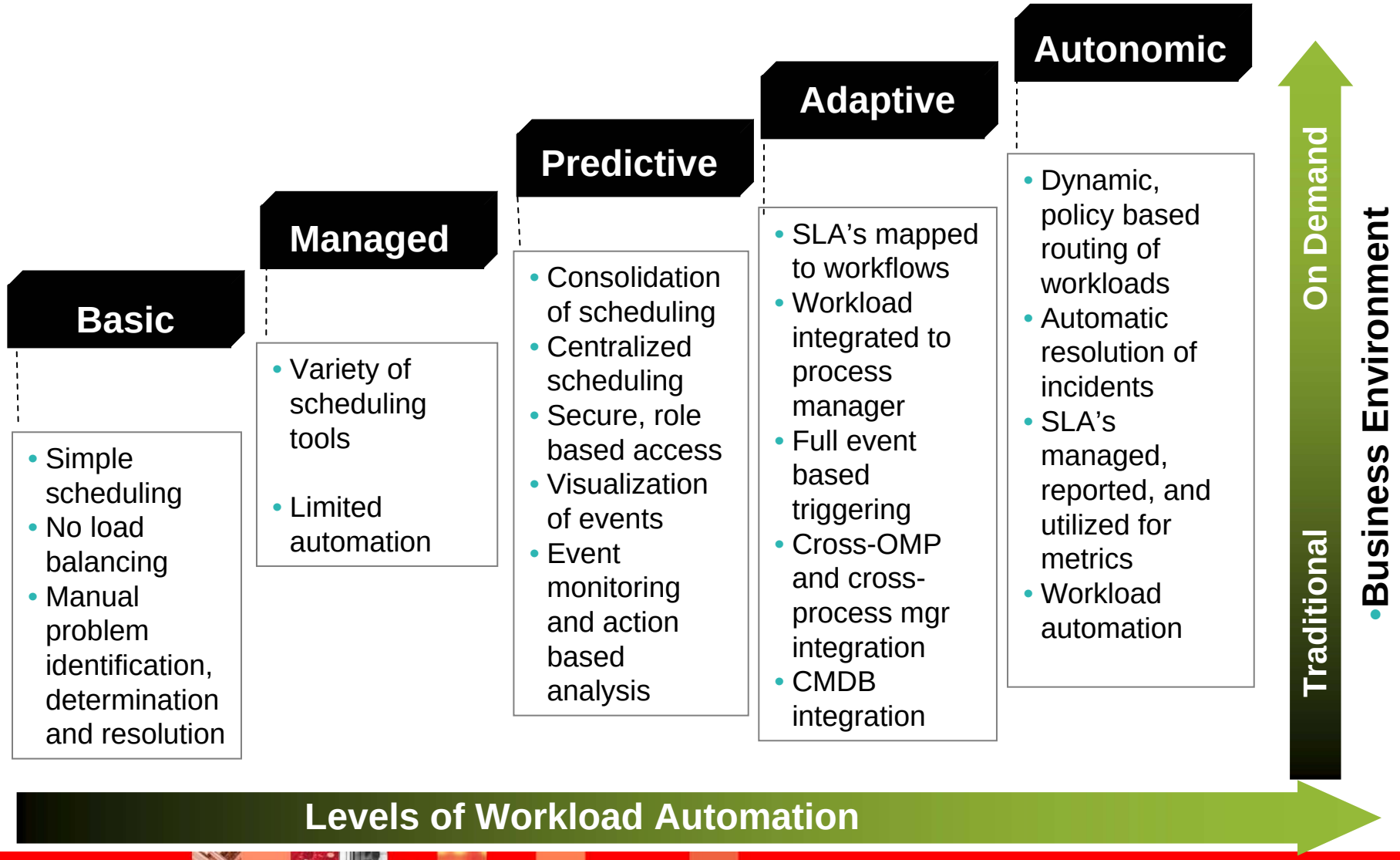
- Today's organizations need a way to effectively manage execution of their business-critical applications in a secure, fault-tolerant and scalable IT infrastructure, including:
  - Preparing jobs for execution
  - Managing complex interdependencies
  - Launch and track each job
  - Managing workloads from a central point of control





- ***Tivoli Workload Scheduler*** enables you to automate, monitor and manage your enterprise workload — on both local and remote systems -- from a single, centralized point of control

Steps to Autonomic Workload Management



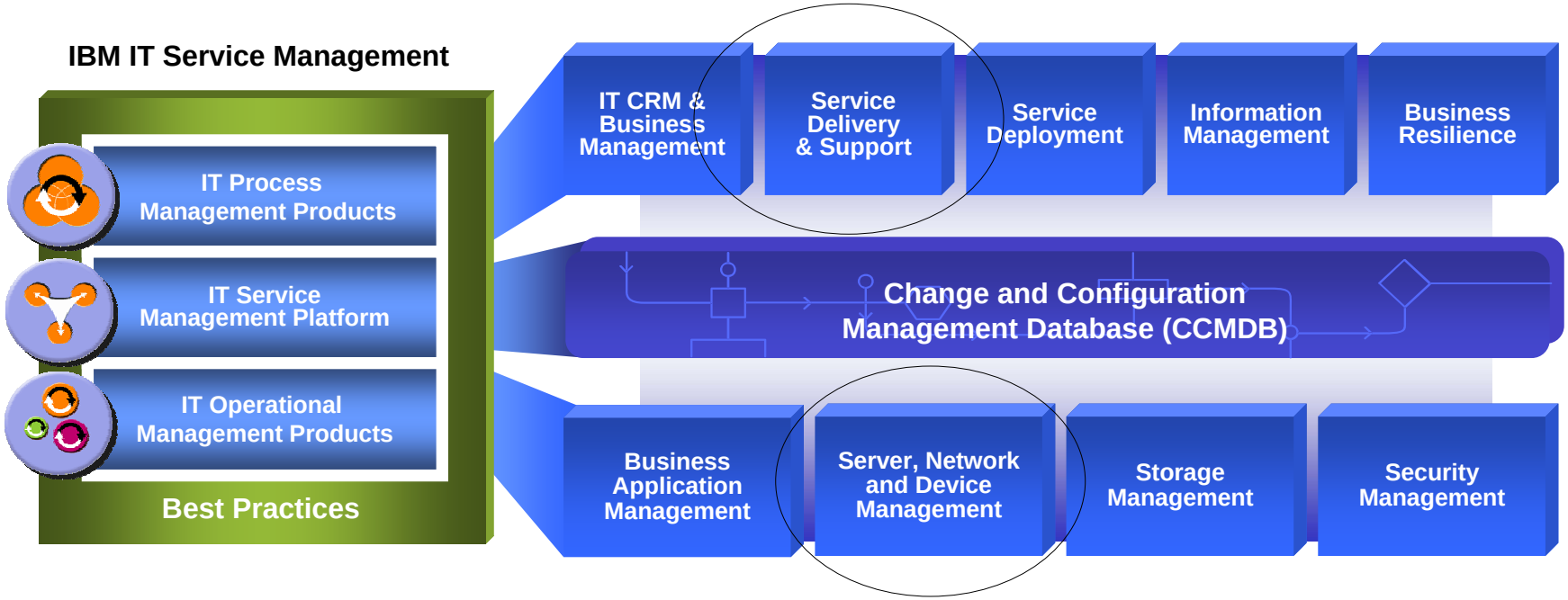
Aligning the Steps with People, Process and Technology

Basic	Managed	Predictive	Adaptive	Autonomic
PEOPLE • Limited training • No “scheduler” **PROCESS** • Simple scheduling • Manual problem ID **TECH.** • Simple scheduler • Single env. for prod & test	**PEOPLE** • Segregated **PROCESS** • Limited automation • Manual reporting **TECH** • Variety of tools • Dependency based • No HA • No load balancing	**PEOPLE** • Some interaction **PROCESS** • Secure, role based access • Cross-silo policies • Consolidation of scheduling **TECH.** • Centralized scheduler • Visualization and action based monitoring and analysis • HA	**PEOPLE** • Cross-ent • Full interact. **PROCESS** • SLA’s mapped to workflows • Workload integrated to process manager **TECH** • Full event based triggering • Cross-OMP and cross-process mgr integration • CMDB integration • WLM & LB	**PEOPLE** • Biz user based • ESB visualization **PROCESS** • Dynamic, policy based routing of workloads • Automatic resolution of incidents • SOA **TECH** • SLA’s managed, reported, and utilized for metrics • Dynamic triggers • Workload automation

Levels of On Workload Automation

IBM IT Service Management – Innovation that Matters

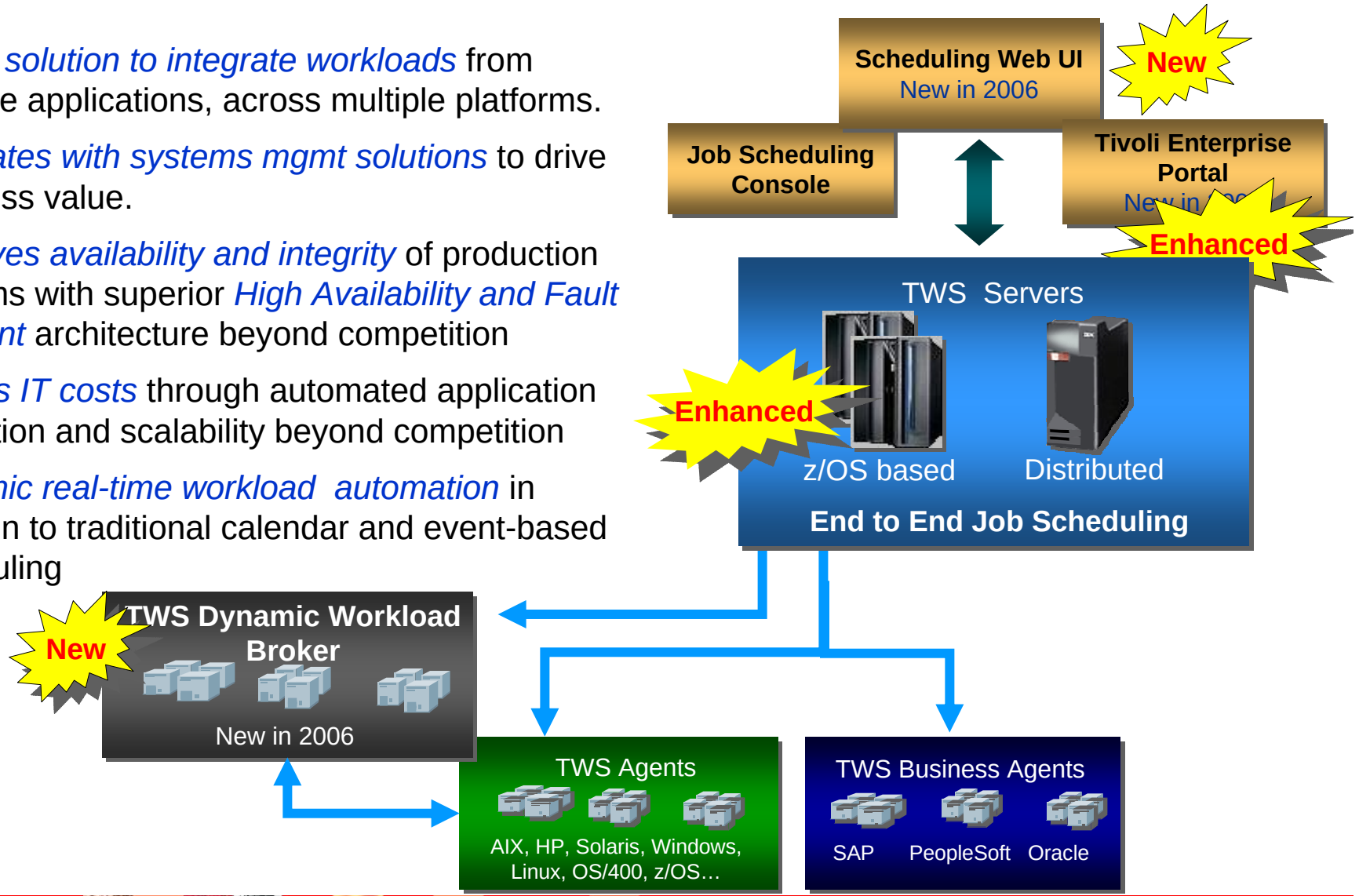
– *A better way to manage the business of IT*



- Open and federated Change and Configuration Management Database (CCMDB)
- Proven technology for integrating 'Process to Product' – including third-party vendors
- Based on self-managing autonomic technologies and best practices such as ITIL and eTOM
- Built on SOA, and can manage and secure SOA environments

IBM Tivoli Workload Scheduler → Solution Overview

- *Single solution to integrate workloads* from multiple applications, across multiple platforms.
- *Integrates with systems mgmt solutions* to drive business value.
- *Improves availability and integrity* of production systems with superior *High Availability and Fault Tolerant* architecture beyond competition
- *Lowers IT costs* through automated application execution and scalability beyond competition
- *Dynamic real-time workload automation* in addition to traditional calendar and event-based scheduling

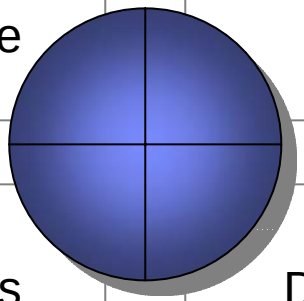


Business Process Alignment

- Product components can deploy to accommodate any customer need
- Maximum flexibility without feature limitations
- Meets any customer organization requirements
- All solutions provides consistent benefits
  High Availability, Scalability and Fault Tolerance
- Any deployment scenario can leverage dynamic workload brokering solution

Parallel Schedulers with Common Console

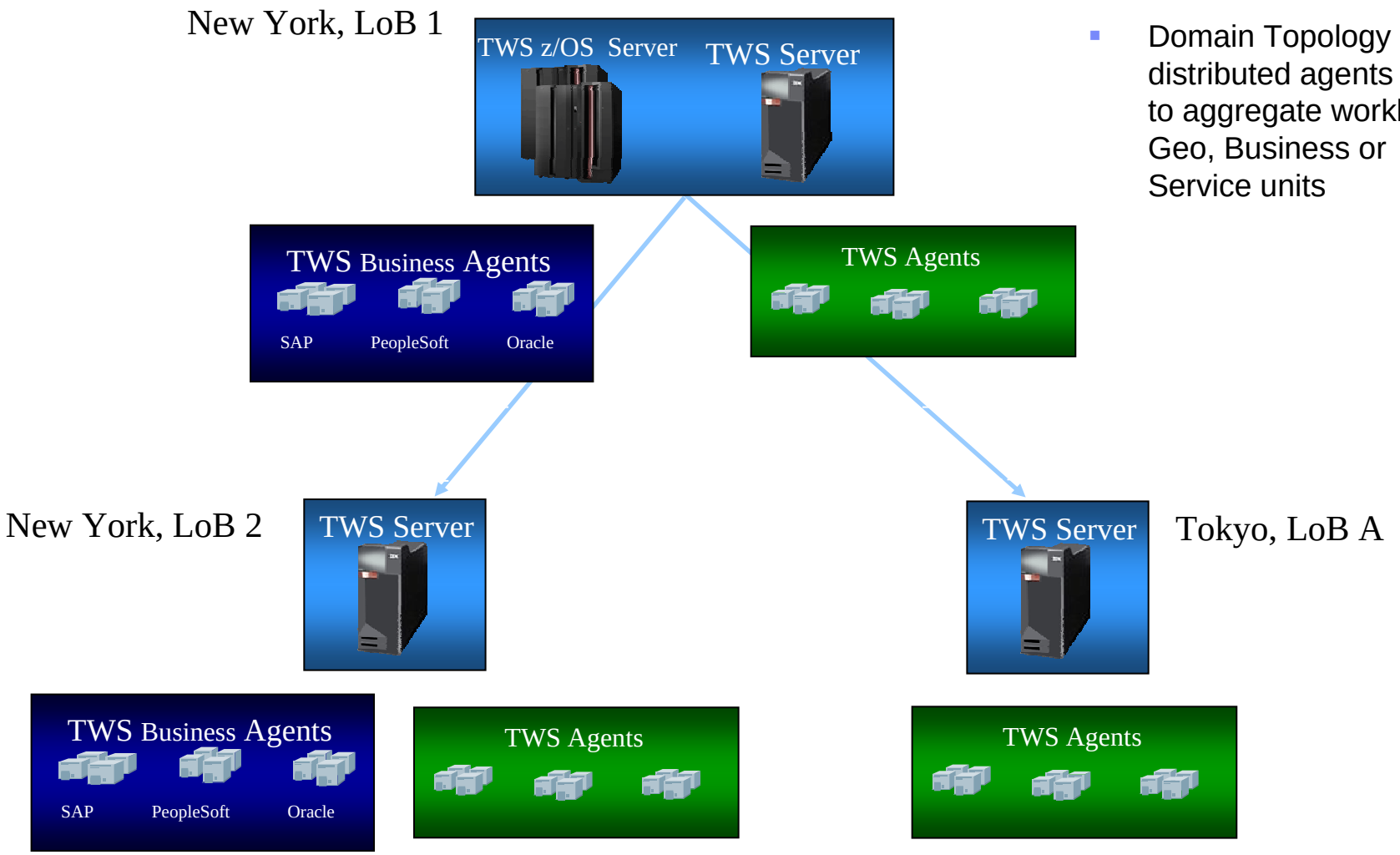
Mainframe-centric Configuration



Peer to Peer Schedulers with Common Console and Connected Agents

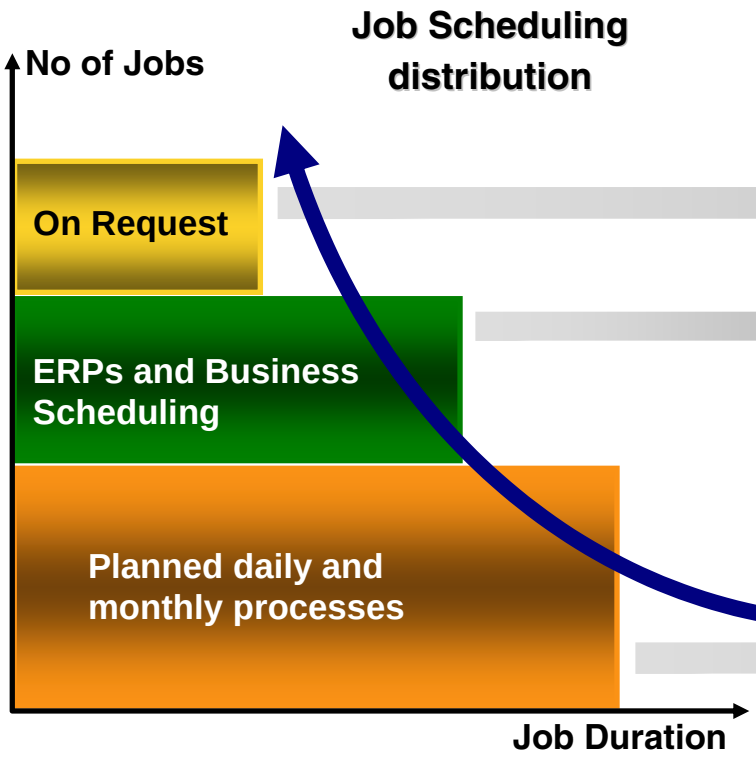
Distributed-centric Configuration

Business Process Alignment → Configuration Flexibility



- Domain Topology of distributed agents allows to aggregate workload in Geo, Business or Service units

Business Process Alignment → Scheduling Flexibility



- Dynamic add of jobs
- File Triggering
- Job Triggering
- Application triggering
- Event triggering

- SAP jobs
- Oracle Applications
- PeopleSoft Reports
- IBM WebSphere applications
- J2EE Applications

- Job templates and rules to Schedule it day to day
- Daily or weekly Production Plans
- Forecast and Trial Plans
- Flexible Start of Production Day
- Job Dependencies
- Job reruns and recoveries

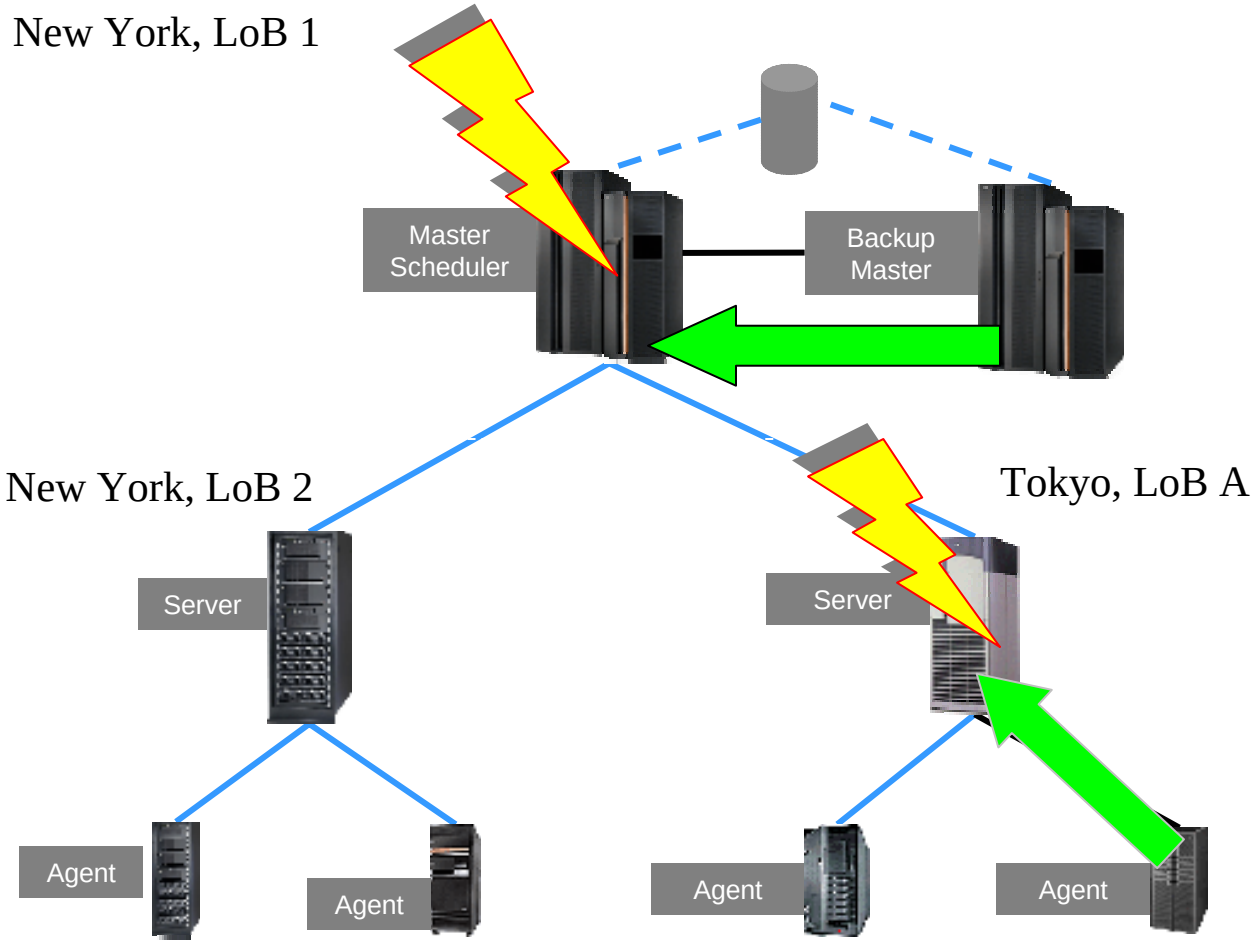
Quick Time to Value

- Efficient Implementation
- Real-time information
- Easy Management

Business Process Alignment → Unlike the Competition….

- Multiple scheduler and component installs to manage all platforms, applications and organizational requirements
  - License costs increases
  - Human intervention to support expands
- Proprietary, non commercial, or Open Source Database repositories
  - Dramatically increases complexity and TCO, often just does not work
- Commercial Database must be licensed
  - Only IBM can offer a cost free IBM DB2 for Job Scheduling
- Too much event based, not well suited for planned ordinarily workload
  - Too costly to operate
  - Consume too many machine processing resources
  - Consume to much network capacity to exchange events

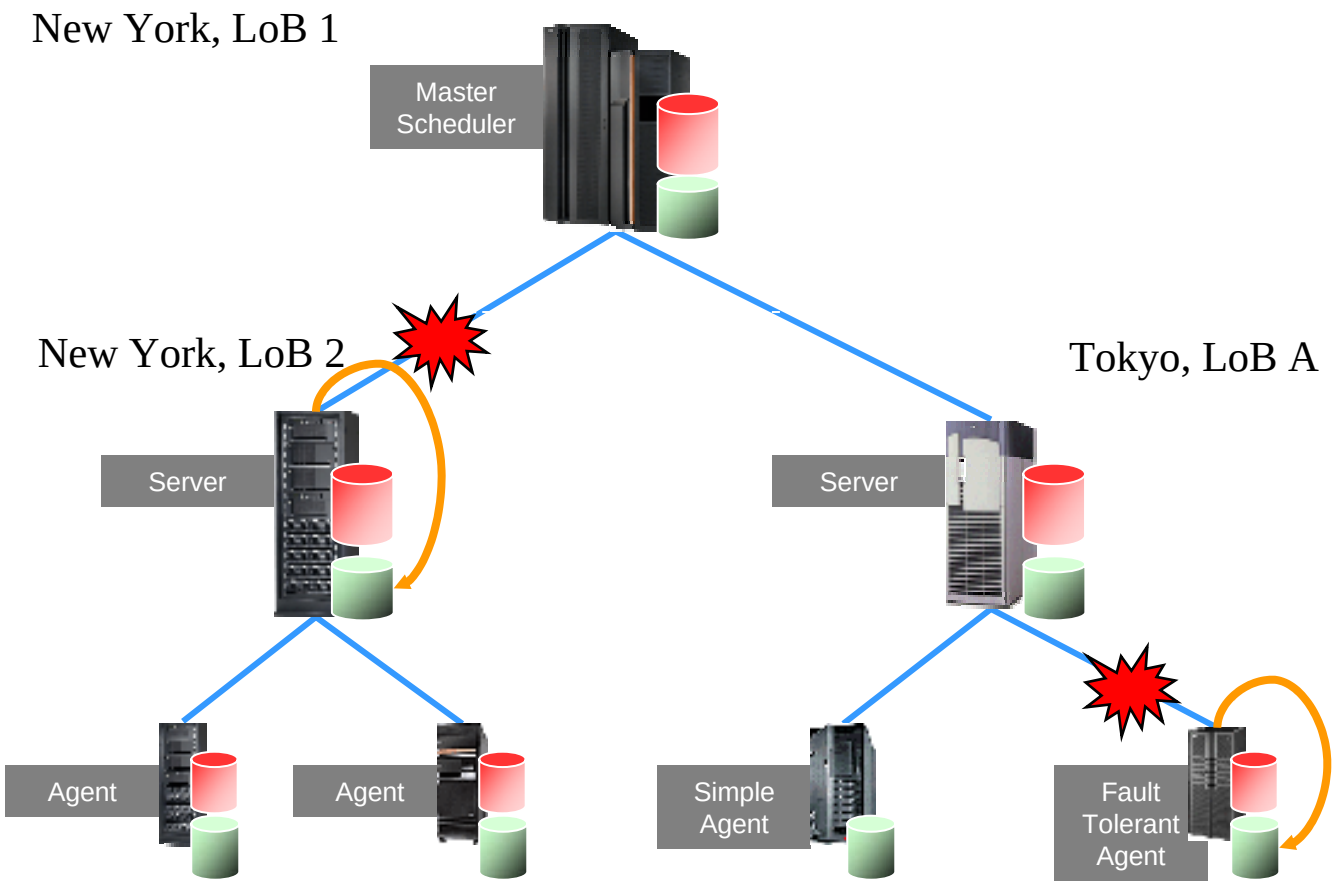
Business Continuity & Scalability : High Availability, Fault Tolerance



Node level:

- If the Master Scheduler goes down, it can be backed-up by the Standby Server. The Agents will reconnect to the new back-up Master automatically.
- If a Server goes down, it can be backed-up by any Fault Tolerant Agent in its domain.
  The Agents will reconnect to the new back-up Server automatically.

Business Continuity & Scalability : High Availability, Fault Tolerance



Network FT:

- If a link to a Server goes down, the Server keeps handling the workload for its domain and collecting events locally
- If a link to a Fault Tolerant Agent goes down, the Agent keeps running job streams and jobs and collecting results locally

Business Continuity & Scalability → Unlike the Competition…

- Schedulers stop workload submission during network connectivity problems
  - Event based schedulers rely on Network availability. Workload execution is stopped till network is resumed
- High Availability requires stand-by machines of the same size of the Primary servers
  - Capital and software license costs increase.
  - Stand-by Masters cannot elaborate workload during normal operation and while switching over
- Fail-over is a very critical and risky process
  - Status information of running workload is lost when event driven schedulers initiate fail over
  - Recovery procedures often requires lot's of manual steps for synchronization of Primary and Stand-By shadow schedulers
  - SNMP events are used for failover notification – insecure protocol

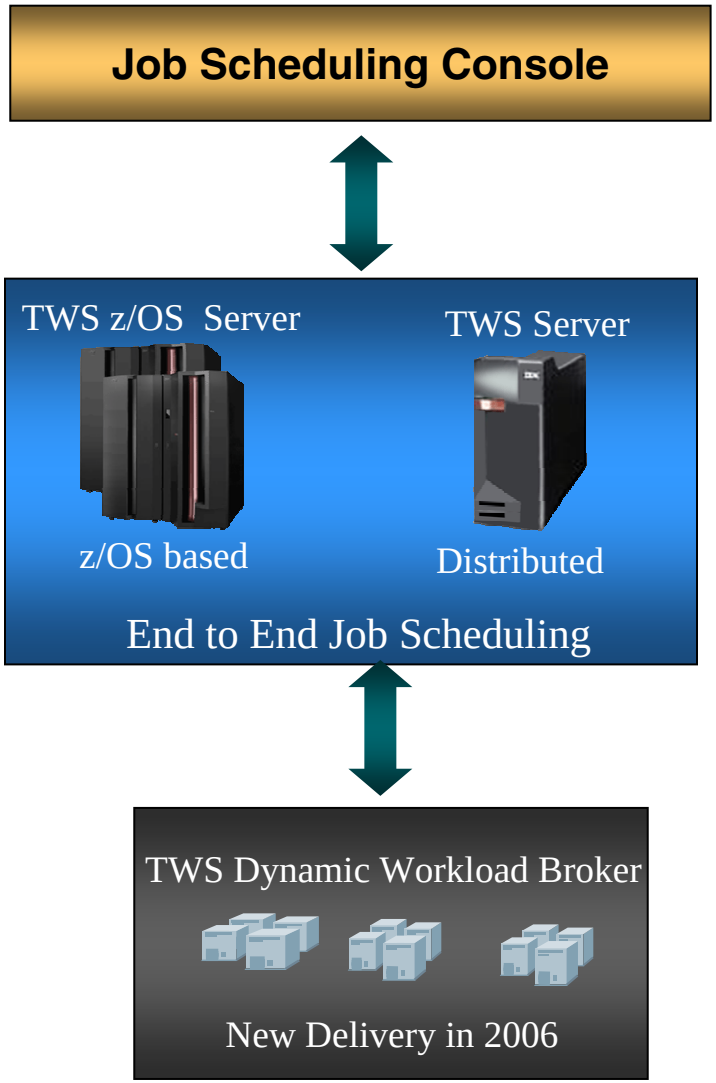
Financial Impact of Disasters

Type of Business	*Average Hourly Impact*
Retail Brokerage	$6,450,000
Credit Card Sales Authorization	$2,600,000
Home Shopping Channel	$113,750
Catalog Sales Centers	$90,000
Airline Reservations Centers	$89,500
Cellular Service Activation	$41,000
Package Shipping Service	$28,250
On-line Network Connect Fees	$25,250
ATM Service Fees	$14,500

Source: Contingency Planning Research (12/95)

Dynamic Workload Broker

- **Optimize capacity of IT infrastructure to execute more workload with less hardware**
  - Based on current resource load and usage needs jobs can be submitted to the less loaded resource
  - Load policy can limit the consumption of available resource.
- **Improve Business Efficiency and reduce TCO by automatically adapting execution to environment changes**
  - Distribute workloads to “best available” resource across dynamically shifting, cross-enterprise resource pool
  - labor intensive process of manually planning job assignment to resources is eliminated
  - Provides Automatic Routing: job can be routed to any available node that matches the resource requirement
  - Automatic detection of Servers: newly discovered server are automatically part of the pool of possible job targets



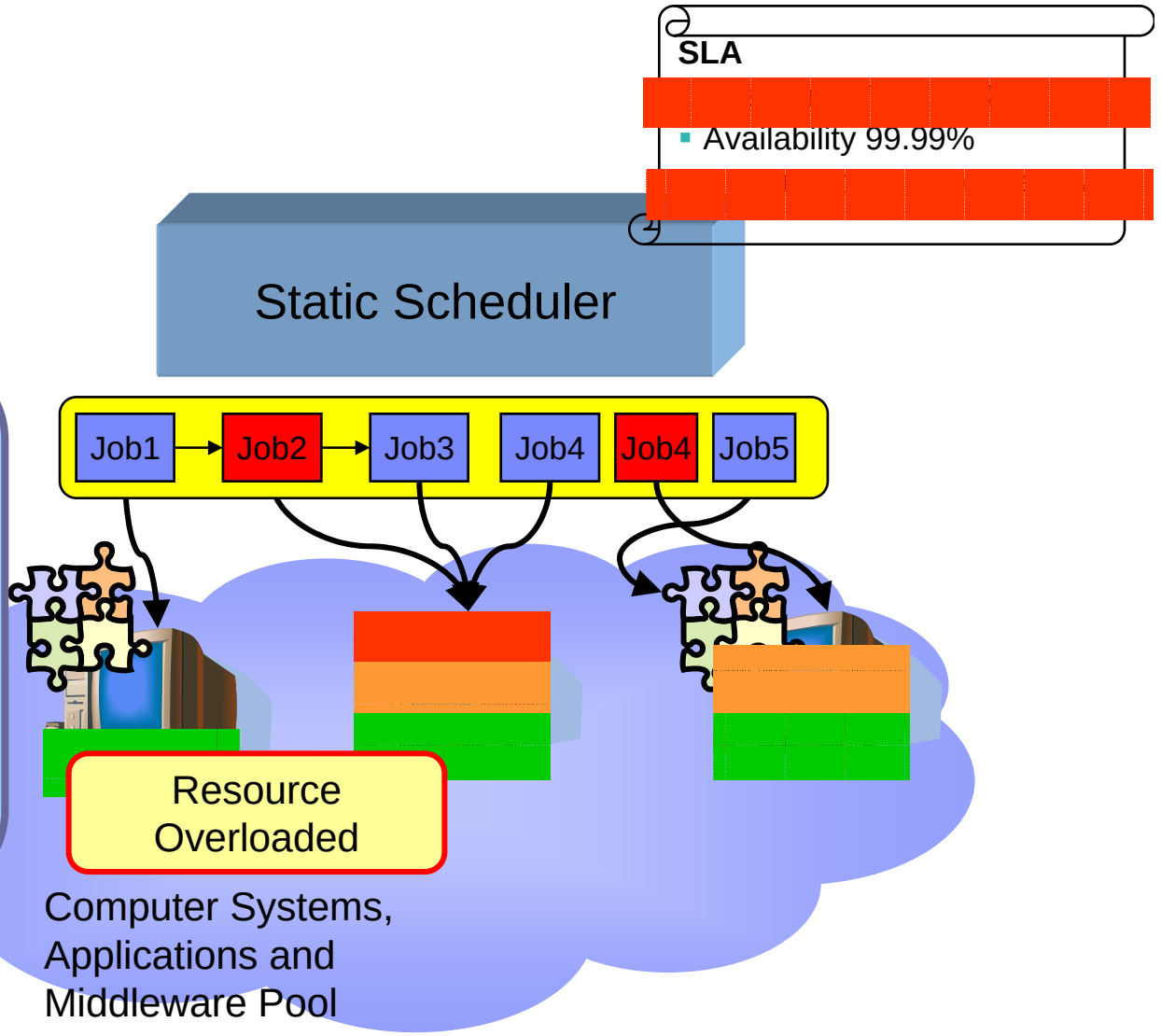
Customer Scenario

Objectives

The business applications SLA targets must continue to be met also during peak days

Static Scheduler Limitations

- During peak times some resource may get overloaded
- If new resources are provisioned the jobs must be reconfigured in order to leverage new possibilities.



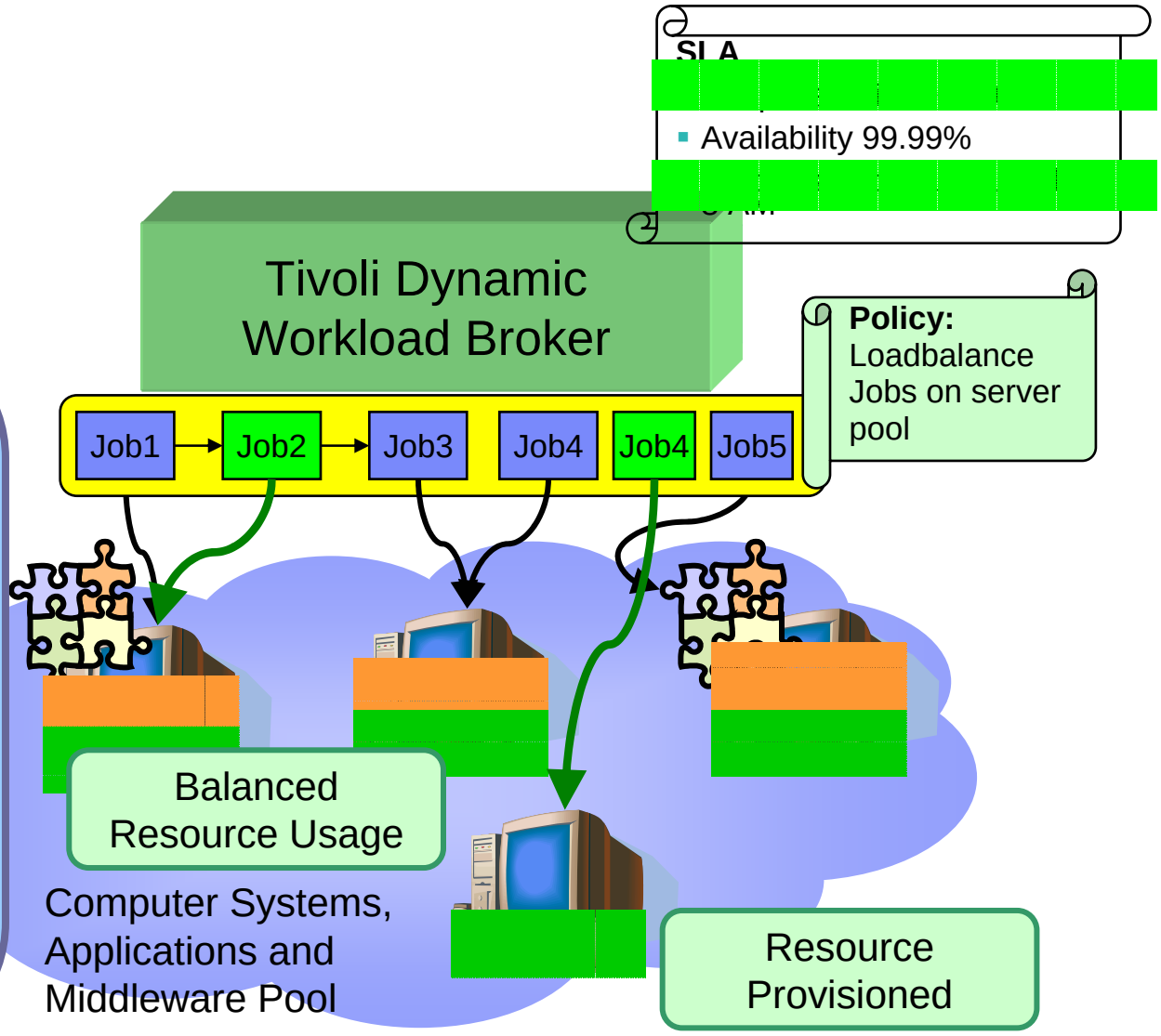
Customer Scenario

Objectives

The business applications SLA targets must continue to be met also during peak days

TDWB

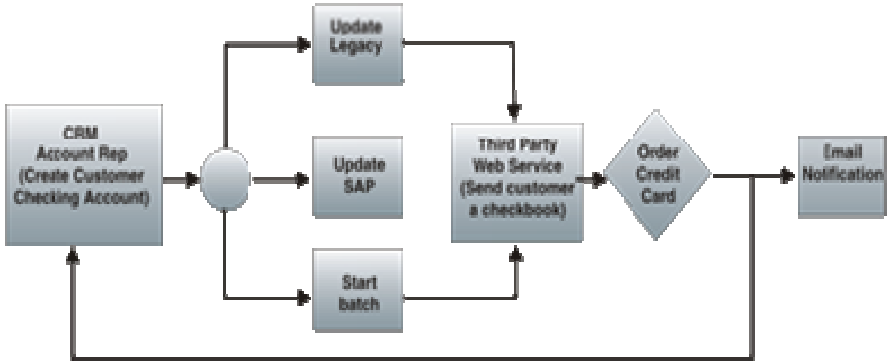
- Load balancing distributes workload across resource pool
- Resource allocation distribute workload over time
- New provisioned resources are immediately discovered
- Jobs automatically run on those resources



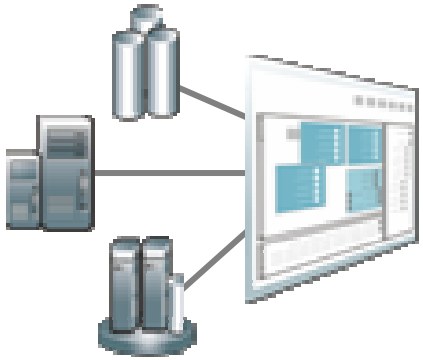
Service Driven business integration Workload scheduling and the SOA

- *Batch Scheduling is one of the most common services used in the typical Business integration scenarios (i.e. the end-user requests a service that starts a transaction that finally kicks off the execution of a batch job)*

- *Customers can call the TWS execution services from their business process to trigger the execution of a batch job in TWS.*



- *Customers can use TWS to schedule and choreograph the execution of business processes containing services invocations, system commands, ERP applications, etc..*



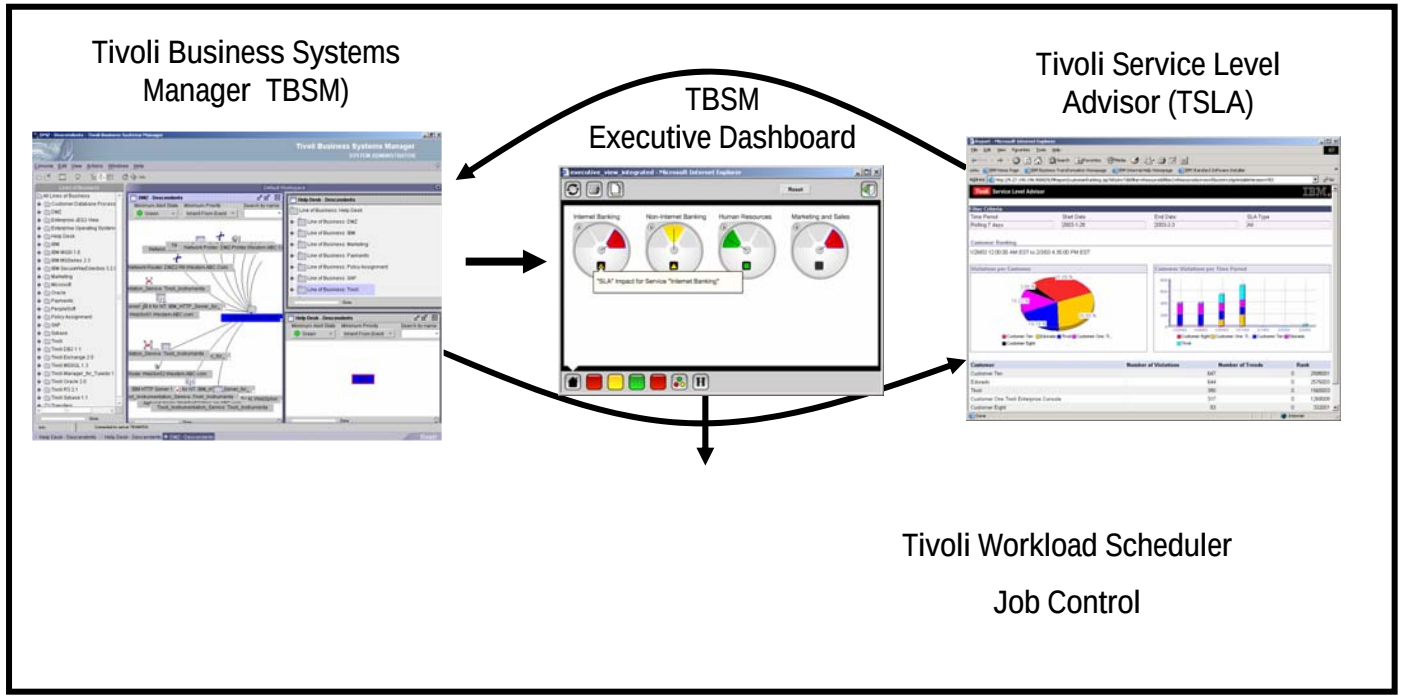
Service Driven business integration ERP applications support

- *TWS provides Extended-Agents for scheduling jobs on the following ERP applications*
  - *Sap R/3 (SAP certified)*
  - *PeopleSoft*
  - *Oracle E-business suite*

- *TWS Extended-Agents architecture provides an open interface to integrate with any external application*

IT Service Management Integration

Policy based batch management: sample scenario



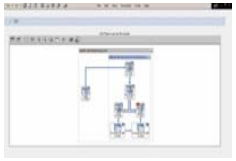
Enables a common definition of service levels from a single console, allows for monitoring of critical paths between jobs and job streams, and provides for policy based recommendations for capacity adjustments

IT Service Management Integration

Facilitate Business Integration and Automation

Implemented Tivoli Solution

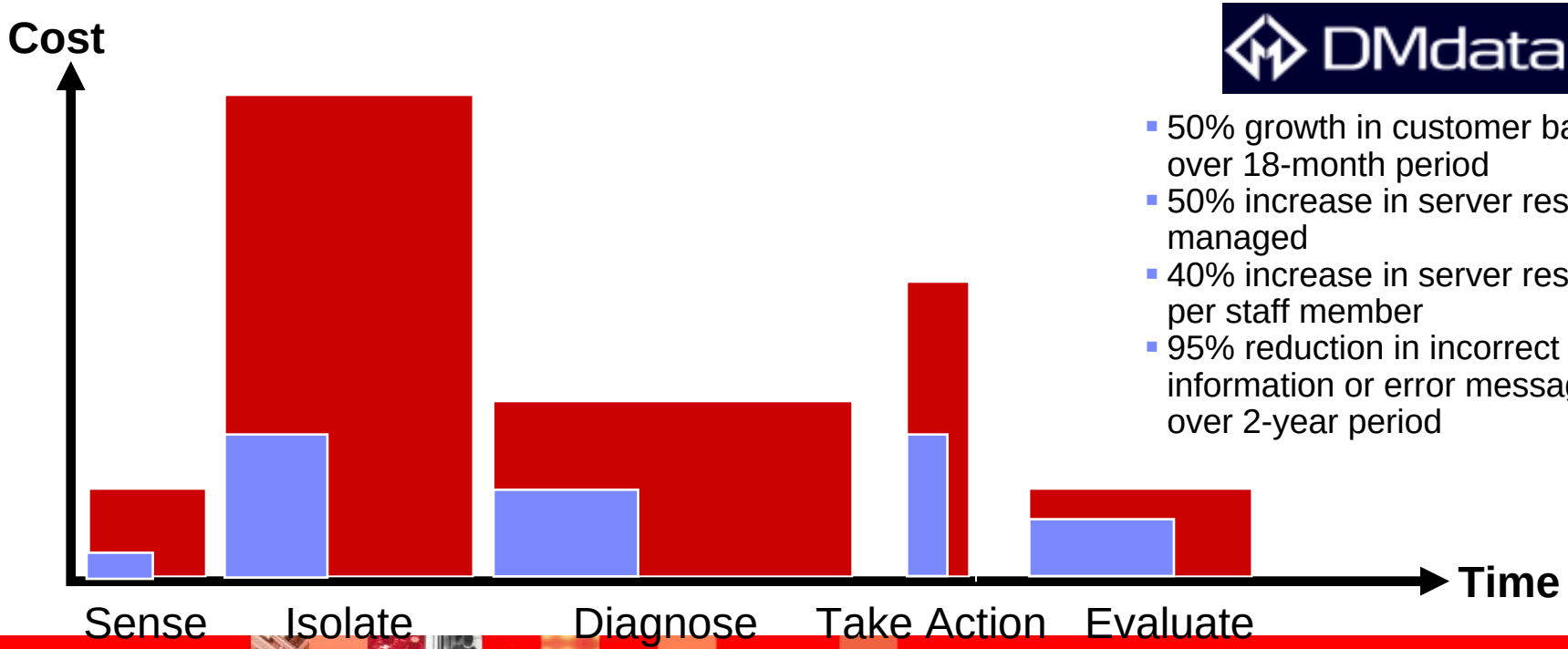
Tivoli Business Systems Manager on z/OS



Tivoli Monitor For Transaction Performance

Tivoli Workload Scheduler on z/OS

Tivoli Service Level Advisor



DMdata

- 50% growth in customer base over 18-month period
- 50% increase in server resources managed
- 40% increase in server resources per staff member
- 95% reduction in incorrect information or error messages over 2-year period

Summary

- We have doubled our investment in the scheduling market
- Our development team is tied directly to solving business pains for our customers
- Tivoli Workload Scheduling is tied directly to IBM's on demand strategy and is a foundational component for Tivoli's IT process automation solution focus
- Nobody gets left behind moving to new version and products
- We hit all development targets in 2005, and have a committed roadmap through 2007 and we are delivering on our promises.

Our End Game is Well Defined, We are Aligned to Our Customer Needs, and We are Investing to Lead the Market

IBM Software Group

Backup

Tivoli software

ON DEMAND BUSINESS

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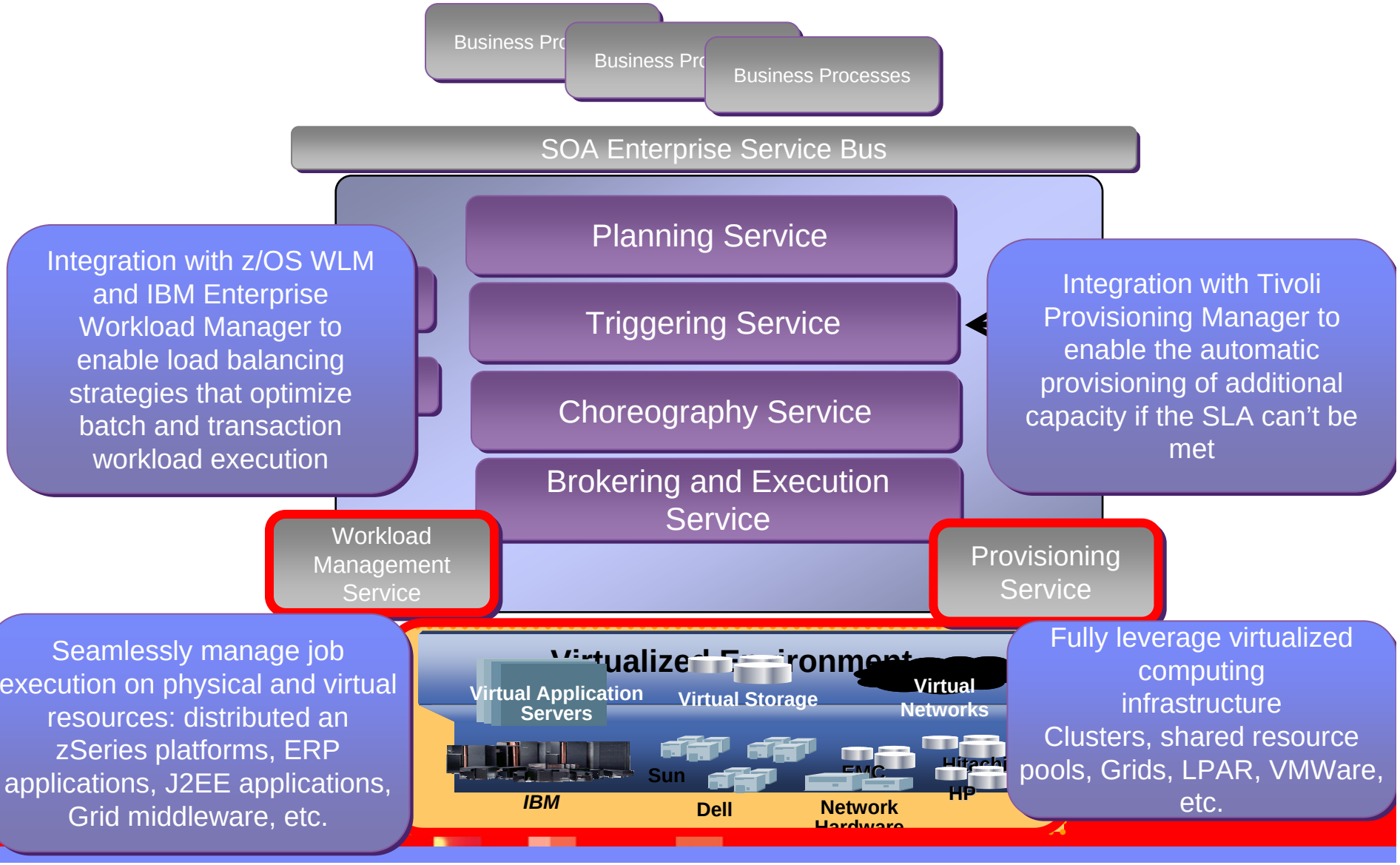
Vision

Business Pro
Business Pro
Business Processes
Vision
Evolve the job schedulers to become the enterprise-wide “workload broker” that dynamically plans, manages, and monitors workload leveraging SOA - in an on demand infrastructure where IT resources can be optimized across virtualized enterprises - based on SLA and business process
Servers
Virtual Storage
Networks
IBM
Sun
Dell
EMC
Hitachi
HP
Network Hardware

Architecture



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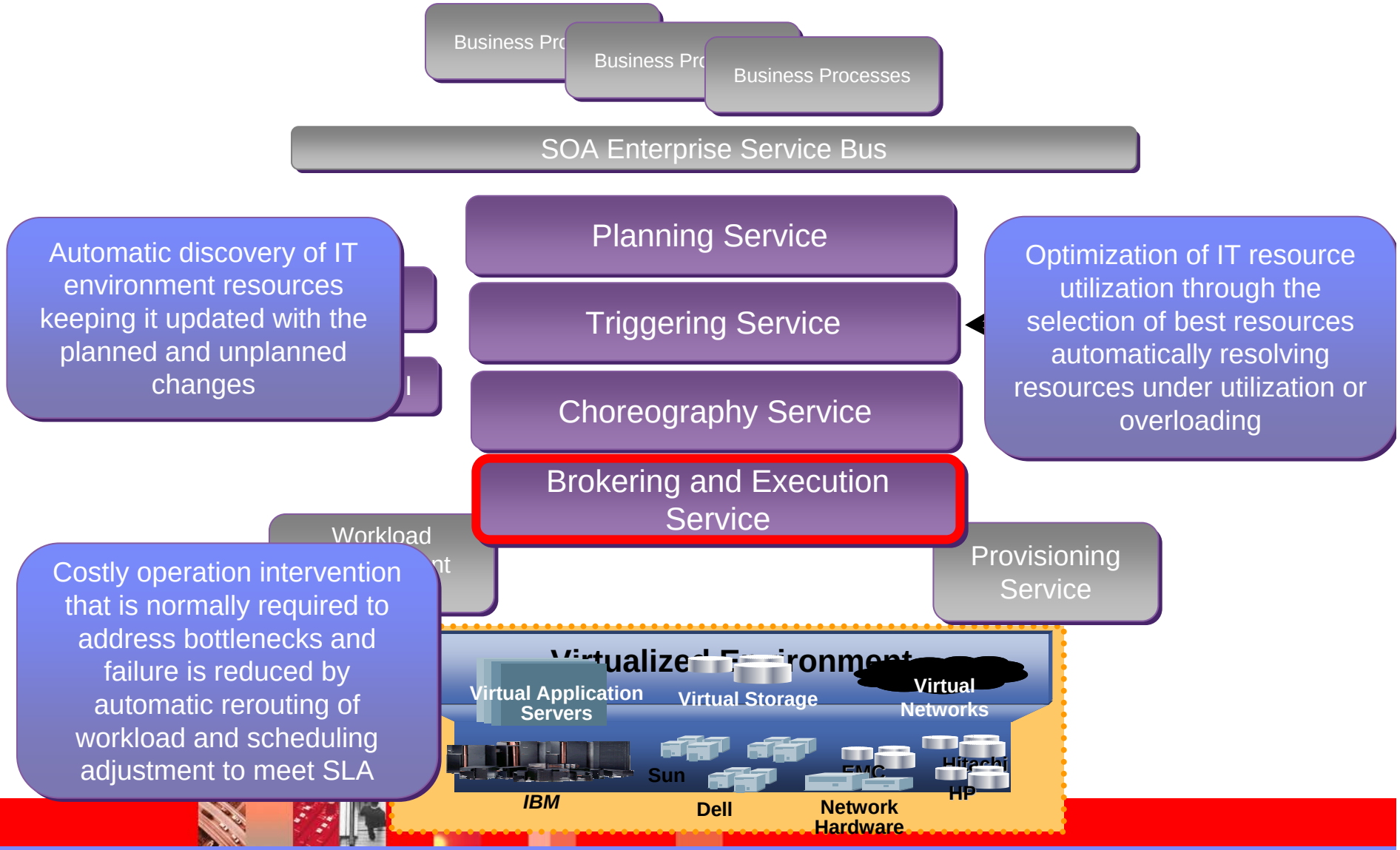

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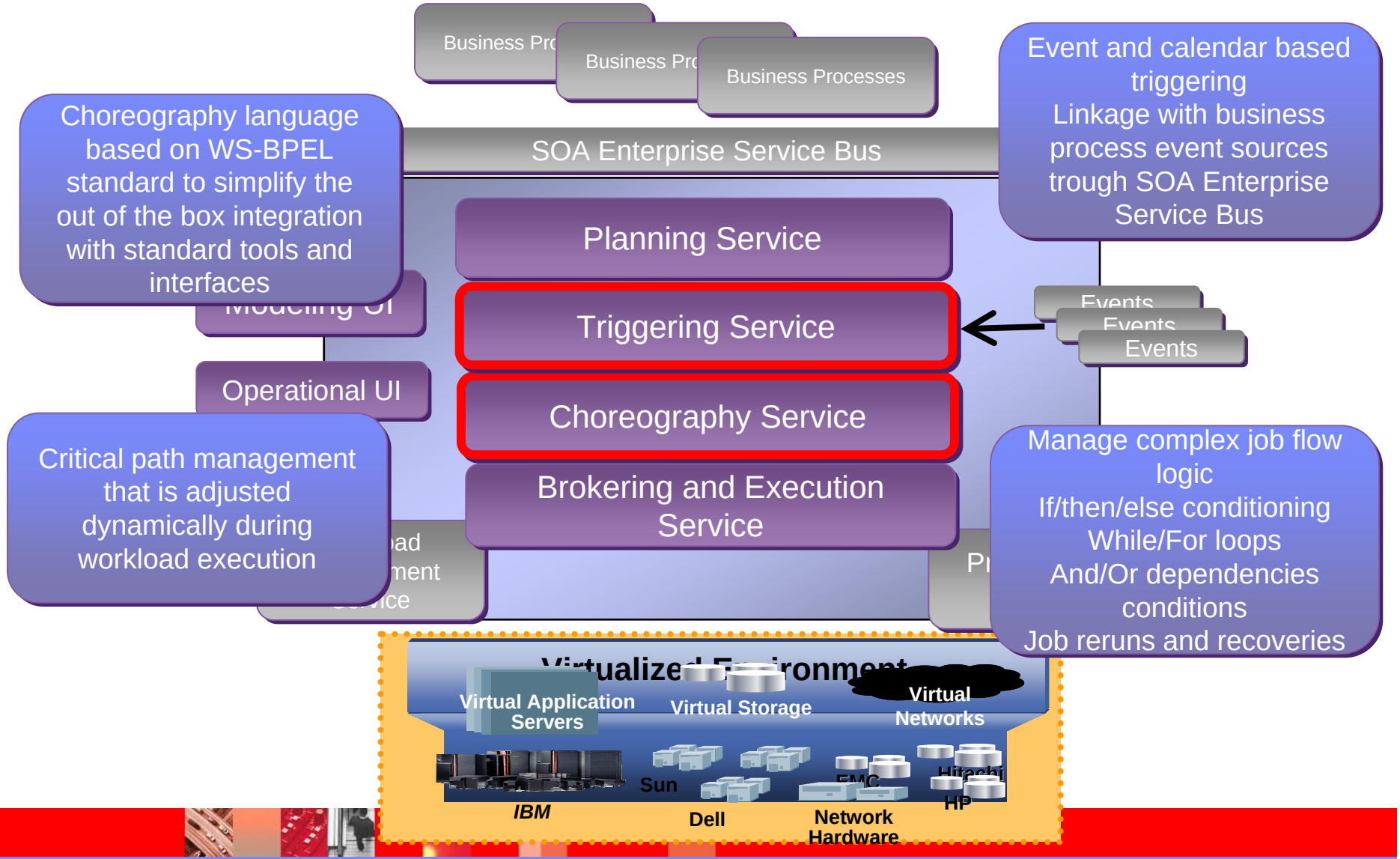

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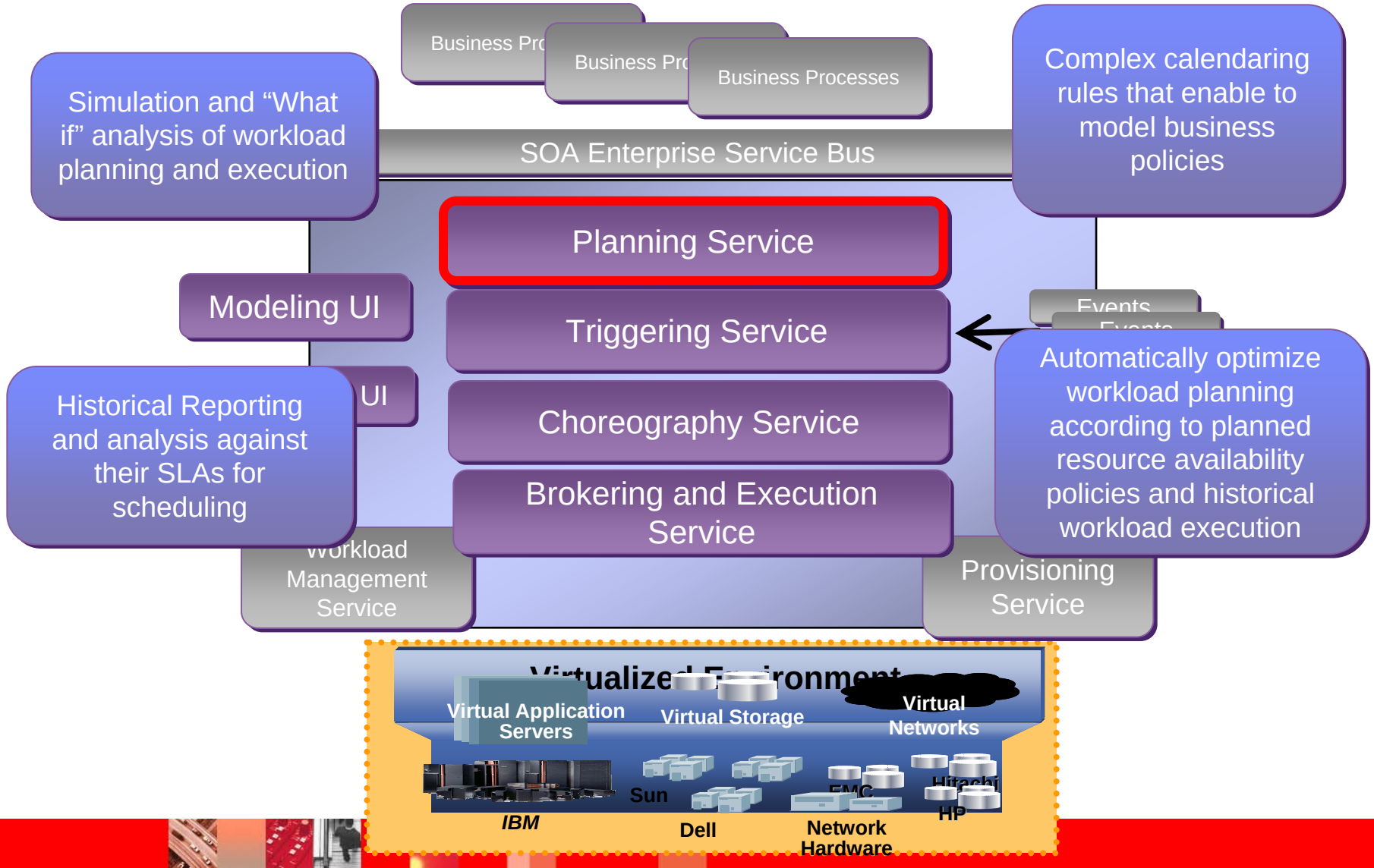

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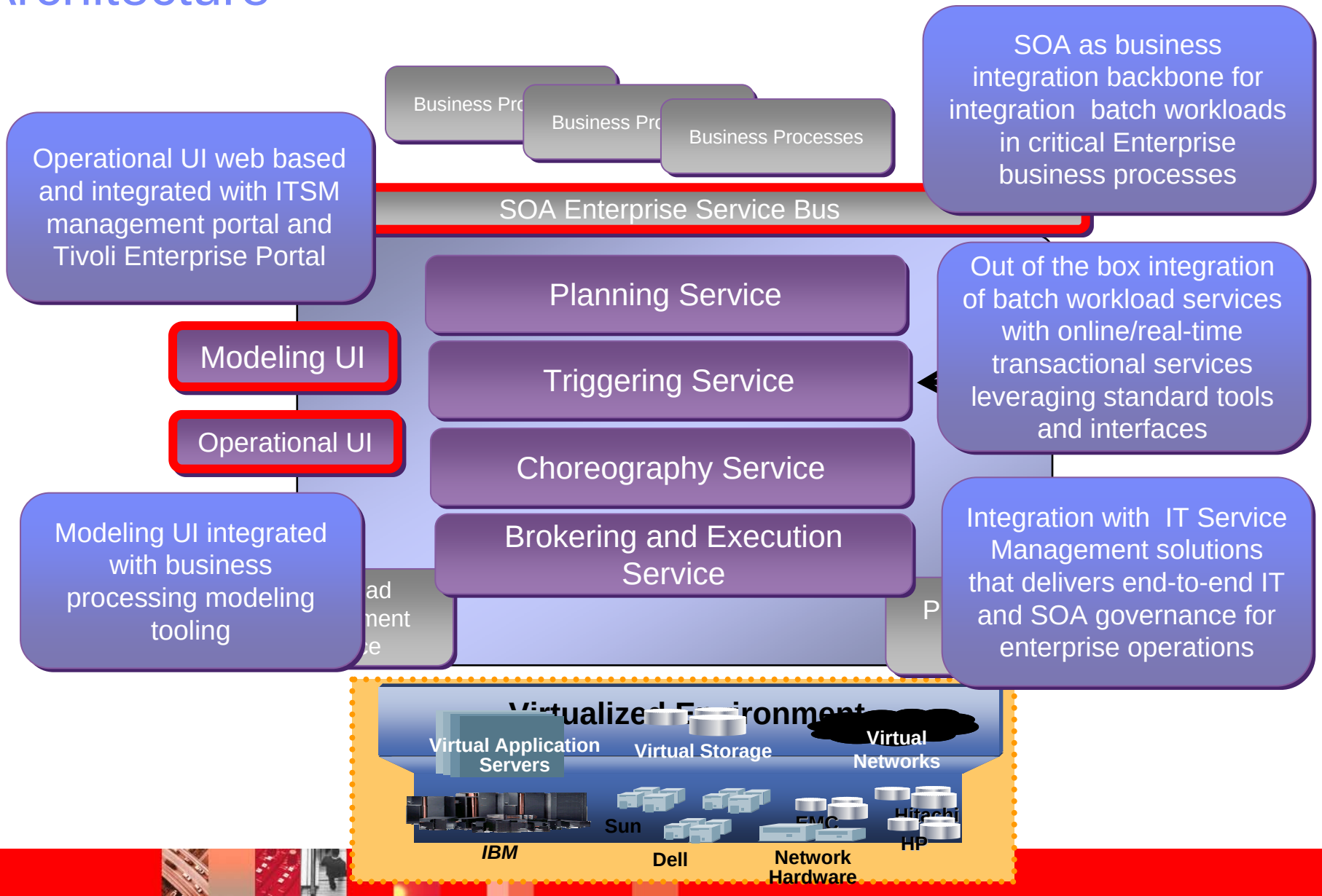
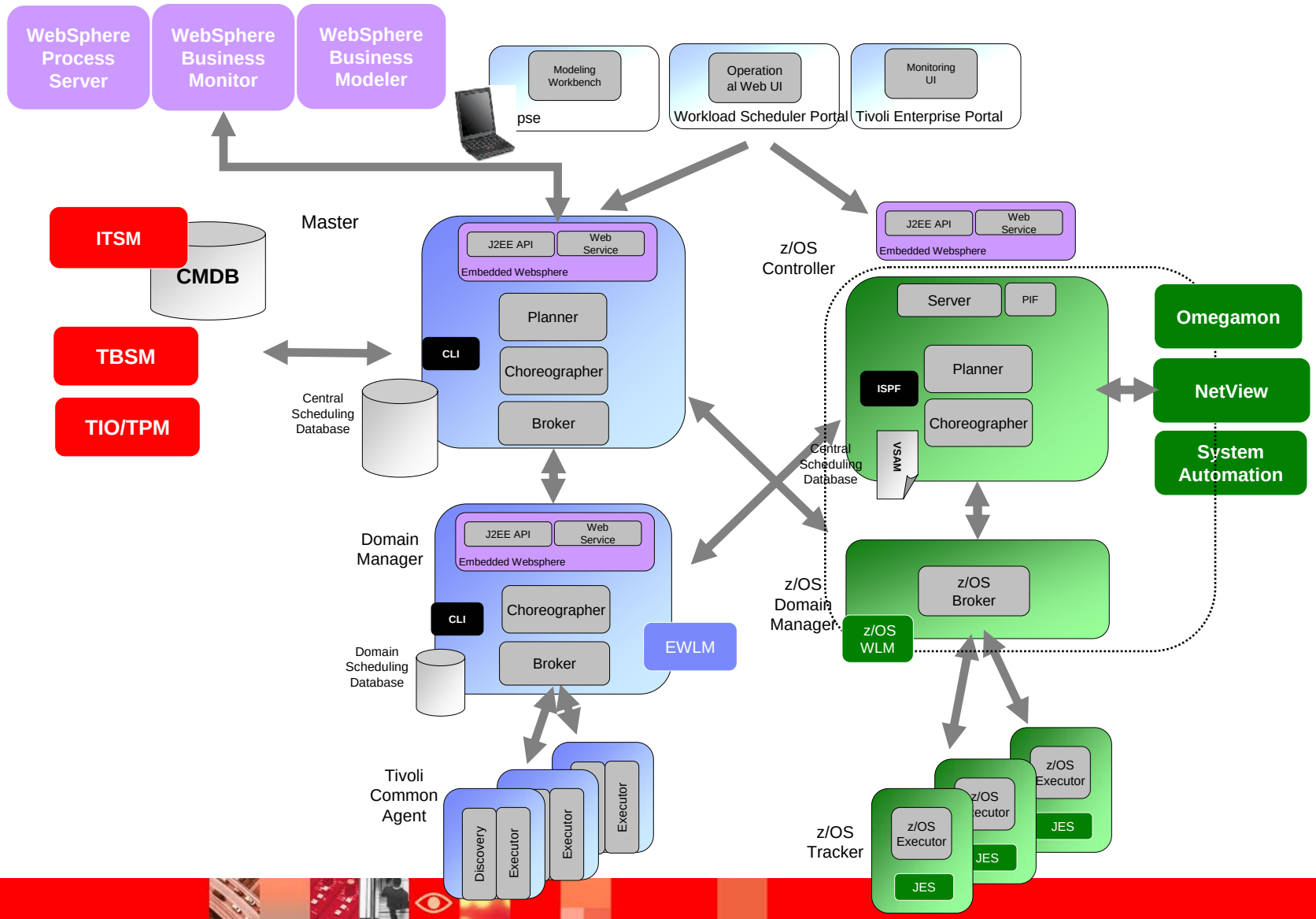


Business Integration– value points



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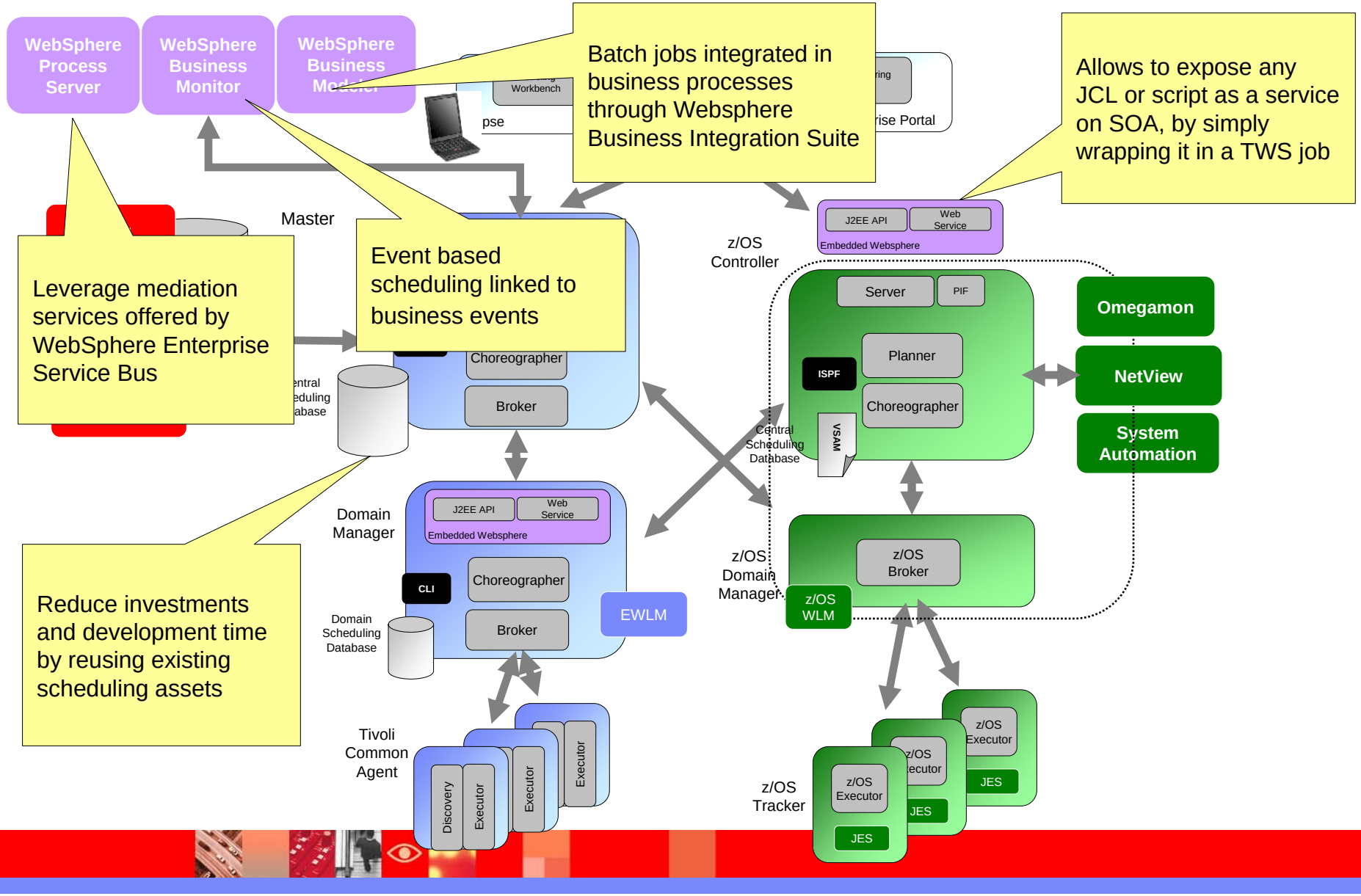
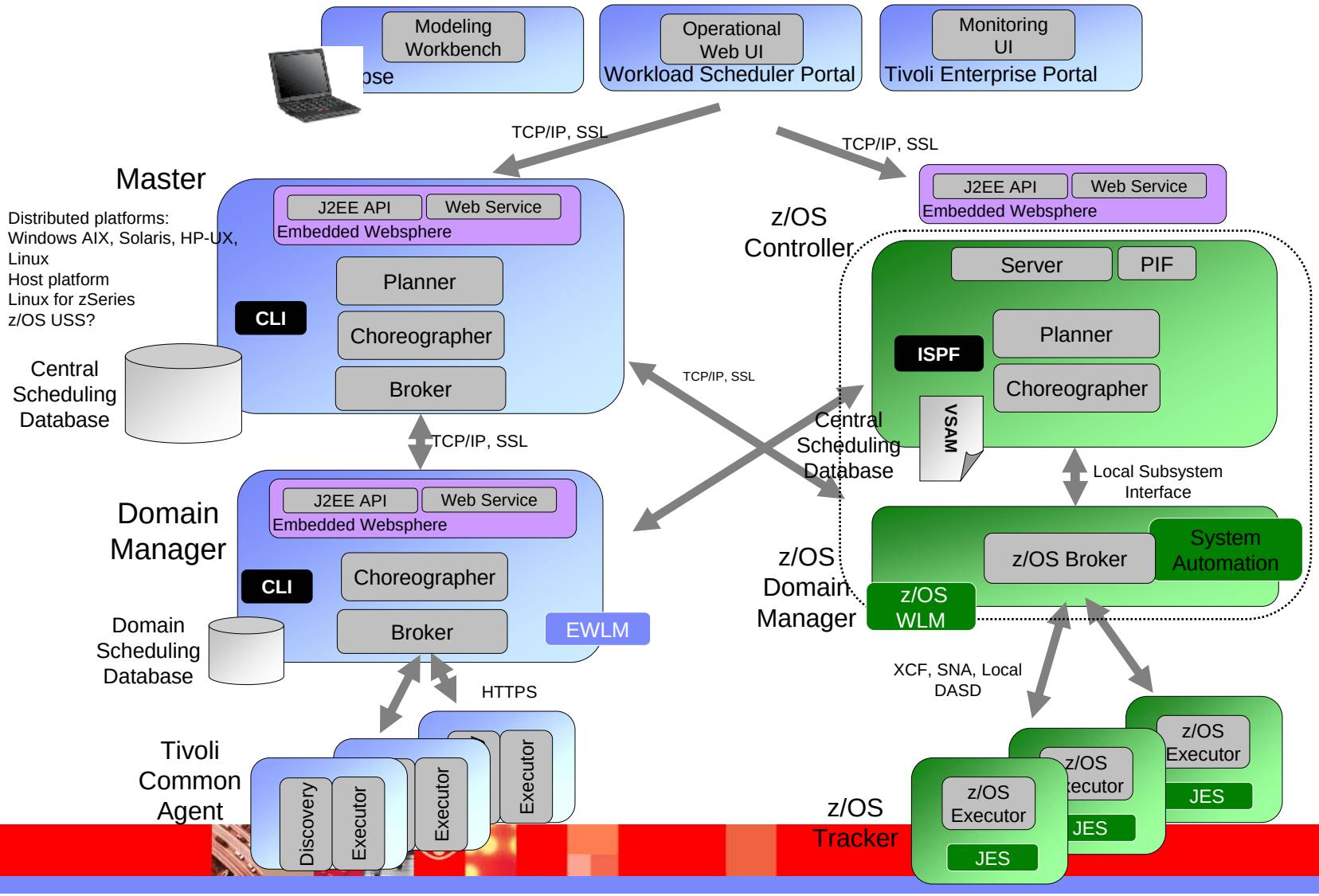


E2E value points



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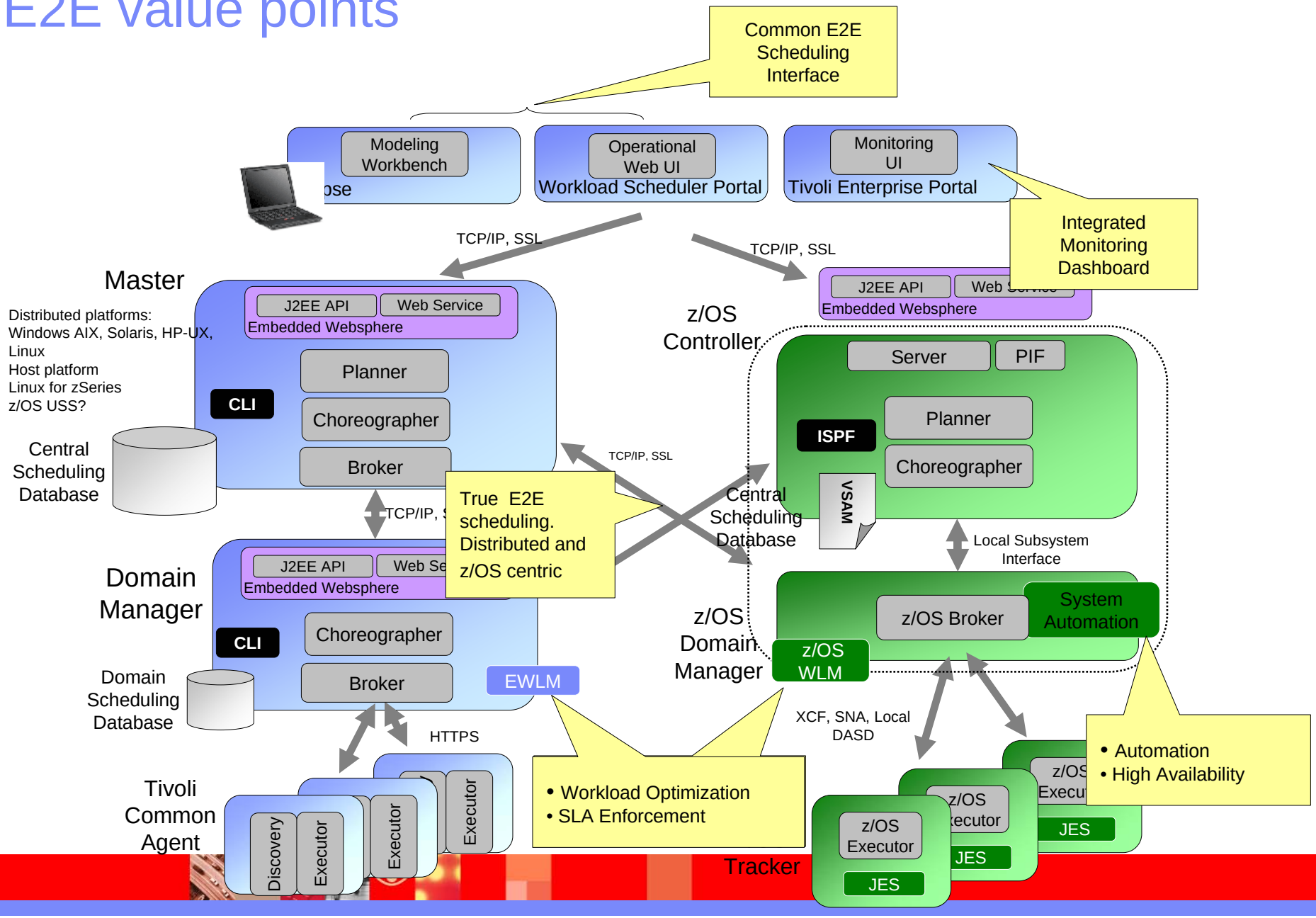
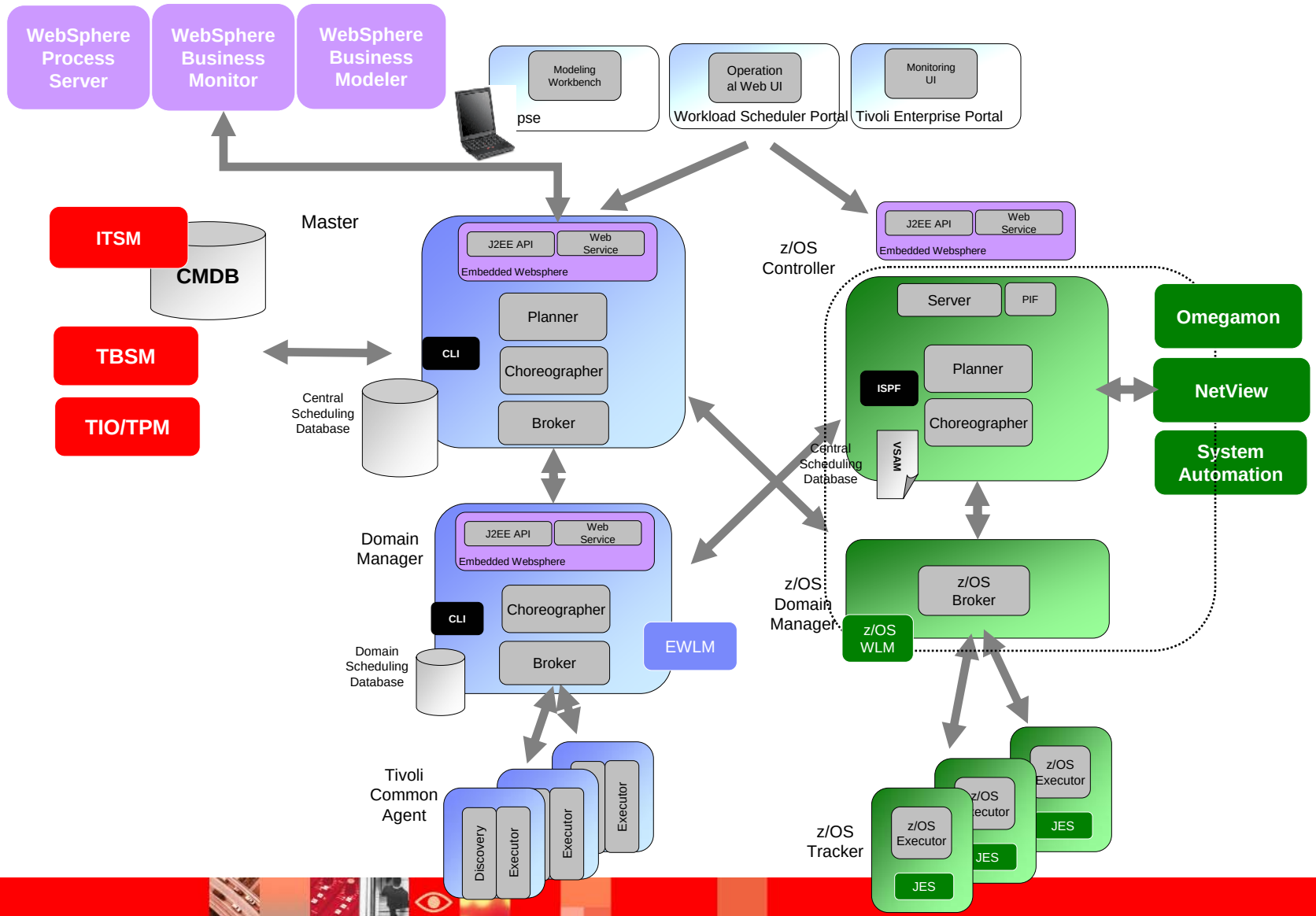
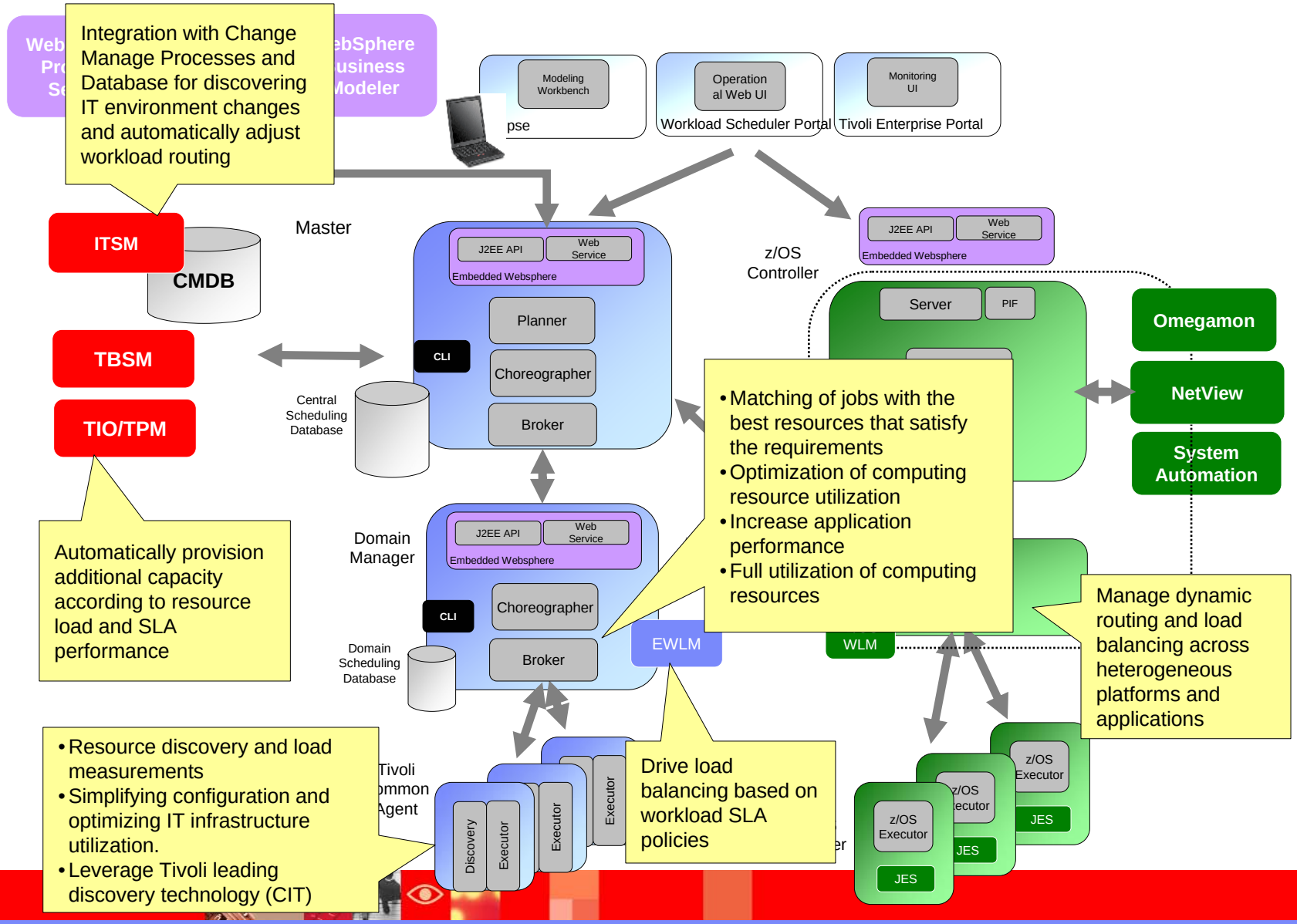


On Demand Dynamic Scheduling Value Points



On Demand Dynamic Scheduling Value Points