Discovery, monitoring and automation for IBM zEnterprise ensemble

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Cloud and Smarter Infrastructure System z Development

October 24, 2013

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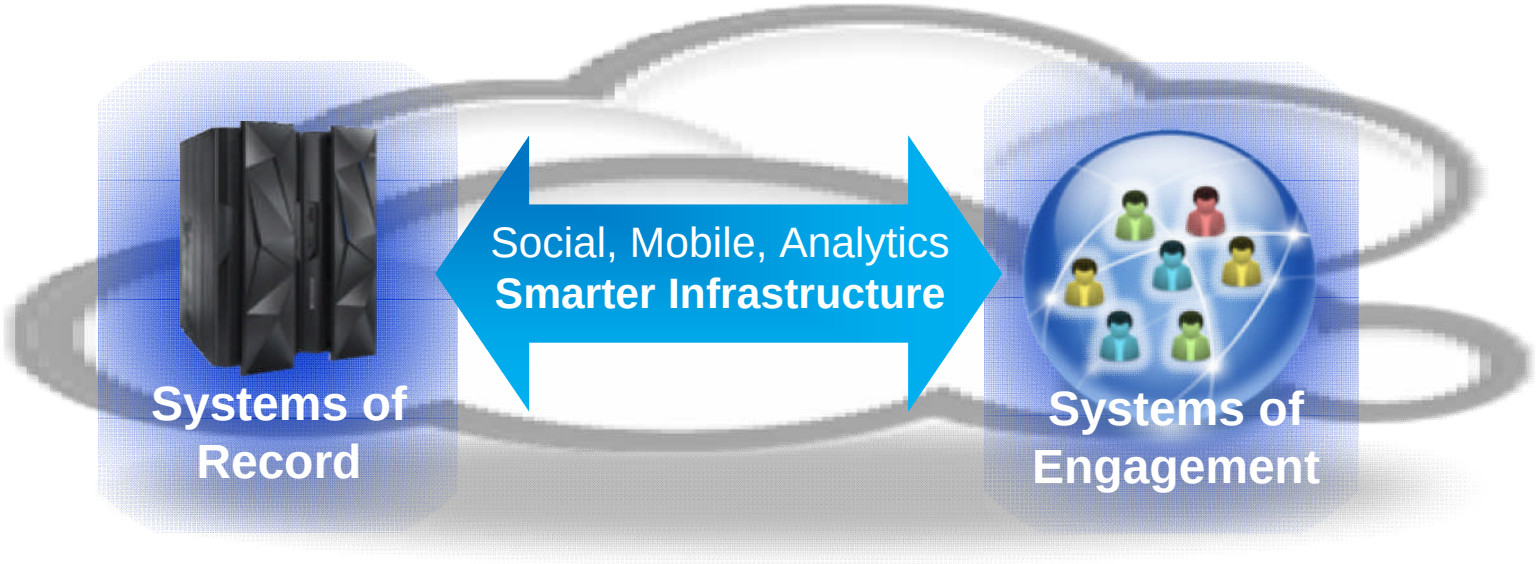
Rapid growth of next generation technologies supported seamlessly on zEnterprise

System z scaling model and security to manage and optimize both



- Business Transactions
- Quality of Service
- Command & Control
- Facts and data “source of truth”
- z/OS

- Mobile and Social
- Dynamic
- Interactions and Collaboration
- Insight, trends, analytics
- Linux on System z
- xBX

IBM zEnterprise Systems – Best in Class Systems and Software

Unified management for a smarter system:
zEnterprise Unified Resource Manager

- Unifies management of resources, extending IBM System z® qualities of service end-to-end across workloads
- Provides hardware, platform, and workload management
- Provides APIs to enable management of Unified Resource Manager from external tools

The world's fastest and most scalable system:
IBM zEnterprise™ EC12 (zEC12)
IBM zEnterprise™ 196 (z196)
or zEnterprise™ 114 (z114)

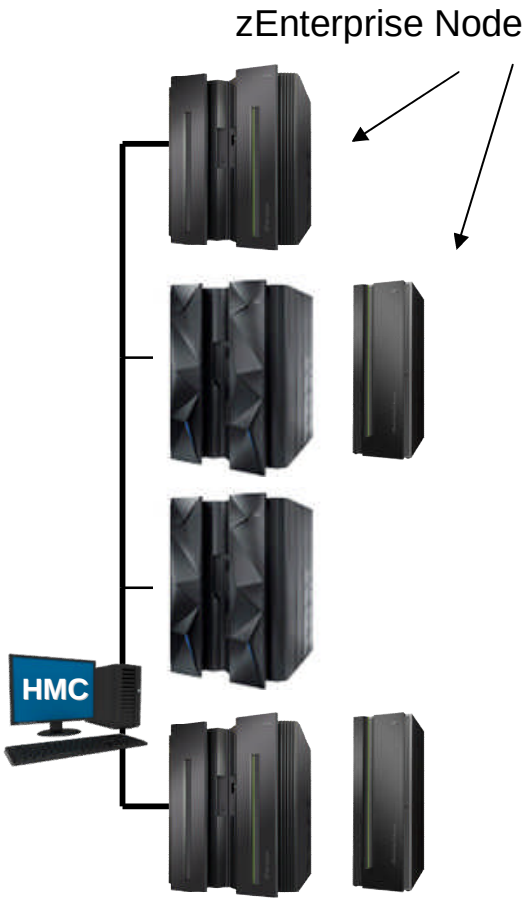
- Ideal for large scale data and transaction serving and mission critical applications
- Most efficient platform for Large-scale Linux® consolidation
- Leveraging a large portfolio of z/OS® and Linux on System z applications
- Capable of massive scale up

Scale out to a trillion instructions per second:
IBM zEnterprise BladeCenter® Extension (zBX)

- Select IBM POWER7® blades and IBM System x® blades for tens of thousands of AIX®, Linux and Windows applications
- High performance optimizers and appliances to accelerate time to insight and reduce costs
- Dedicated high performance private network

zEnterprise Ensemble

- A zEnterprise ensemble is a collection of 1 to 8 zEnterprise nodes
- A zEnterprise node is a zEC12, z196 or z114 CPC with 0 to 4 racks, up to 2 BladeCenters per rack, and up to 112 blades in total
- A zEnterprise node can be a member of at most one ensemble
- Managed collectively by the Unified Resource Manager as a single logical virtualized system



zEnterprise Ensemble

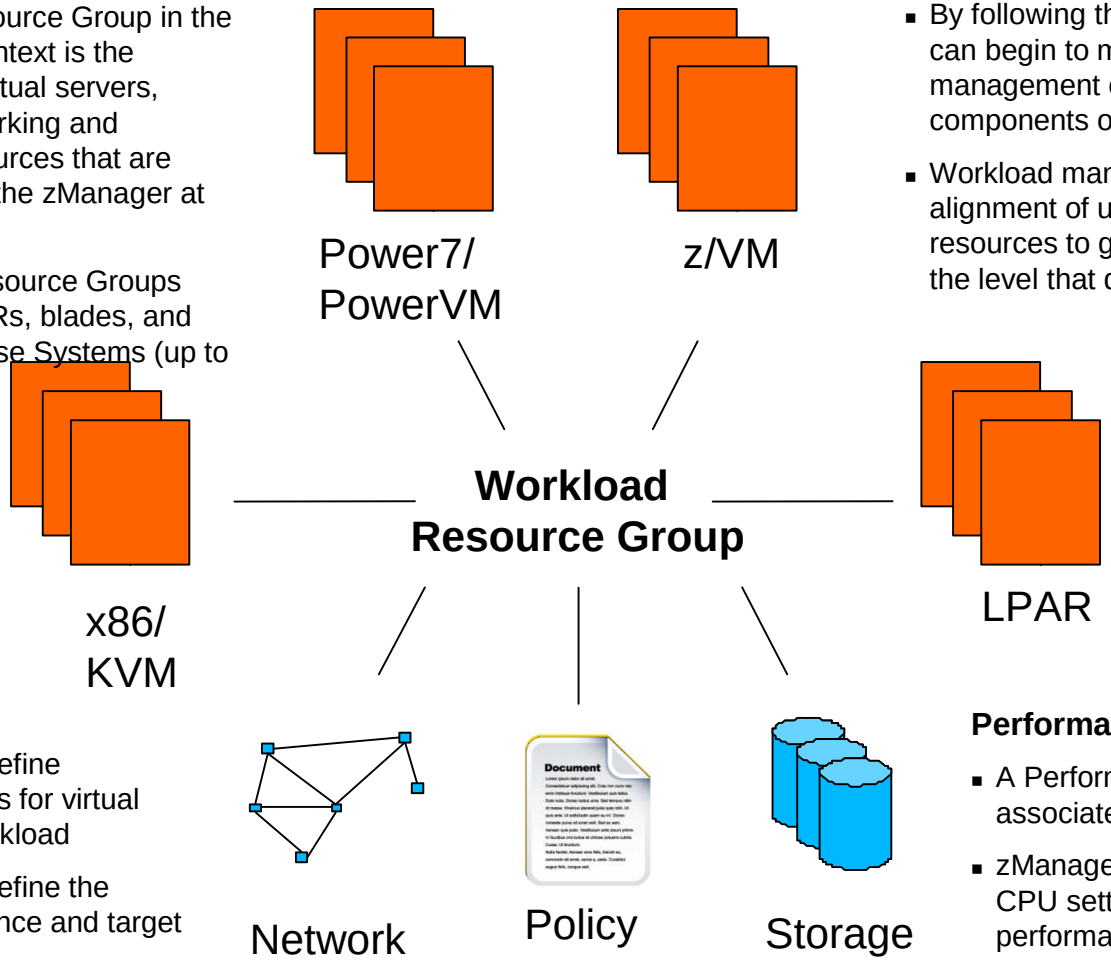
Workload Resource Group in the zEnterprise Context

What is it?

- Workload Resource Group in the zEnterprise context is the collection of virtual servers, storage, networking and hardware resources that are defined within the zManager at creation.
- Workloads Resource Groups can span LPARs, blades, and even zEnterprise Systems (up to eight) .

What is the value proposition?

- By following this construct customers can begin to move beyond the management of resources and components of services.
- Workload management enables the alignment of until now disparate resources to goals and priorities at the level that delivers business value.



Service classes

- Service classes define performance goals for virtual servers in the workload
- Service classes define the Business Importance and target performance goal

Performance policies

- A Performance Policy is associated with a Workload.
- zManager will dynamically adjust CPU settings to achieve performance policy compliance.

Tivoli support of zEnterprise APIs increase value of managing virtualized workloads

New API support intends to increase ability to provide visibility, control and automation across the zEnterprise

Prior to zEnterprise:

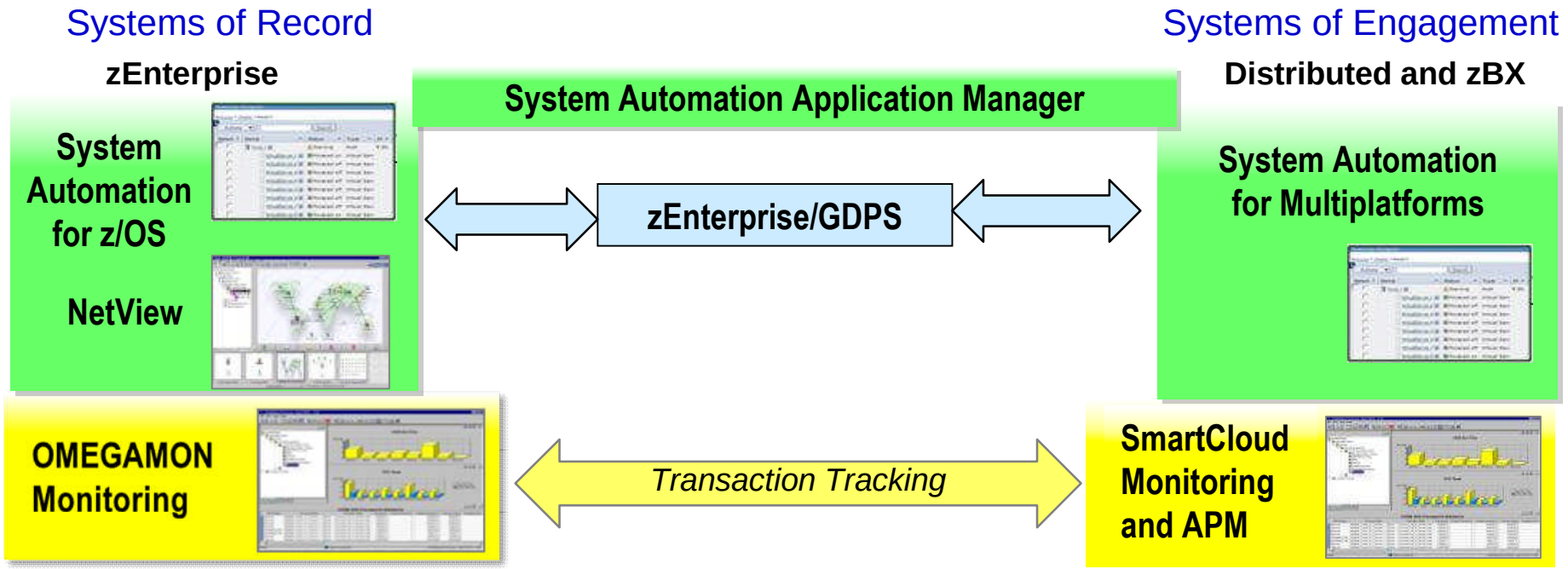
Ability to manage current infrastructure based at an Operating System level with associated middleware and applications across heterogeneous environments

Today:

Ability to manage virtualized workloads across operating environments on zEC12/z196/z114 and zBX based on business rules

Only IBM monitoring and automation seamlessly support entire enterprise, including cloud, mobile and big data

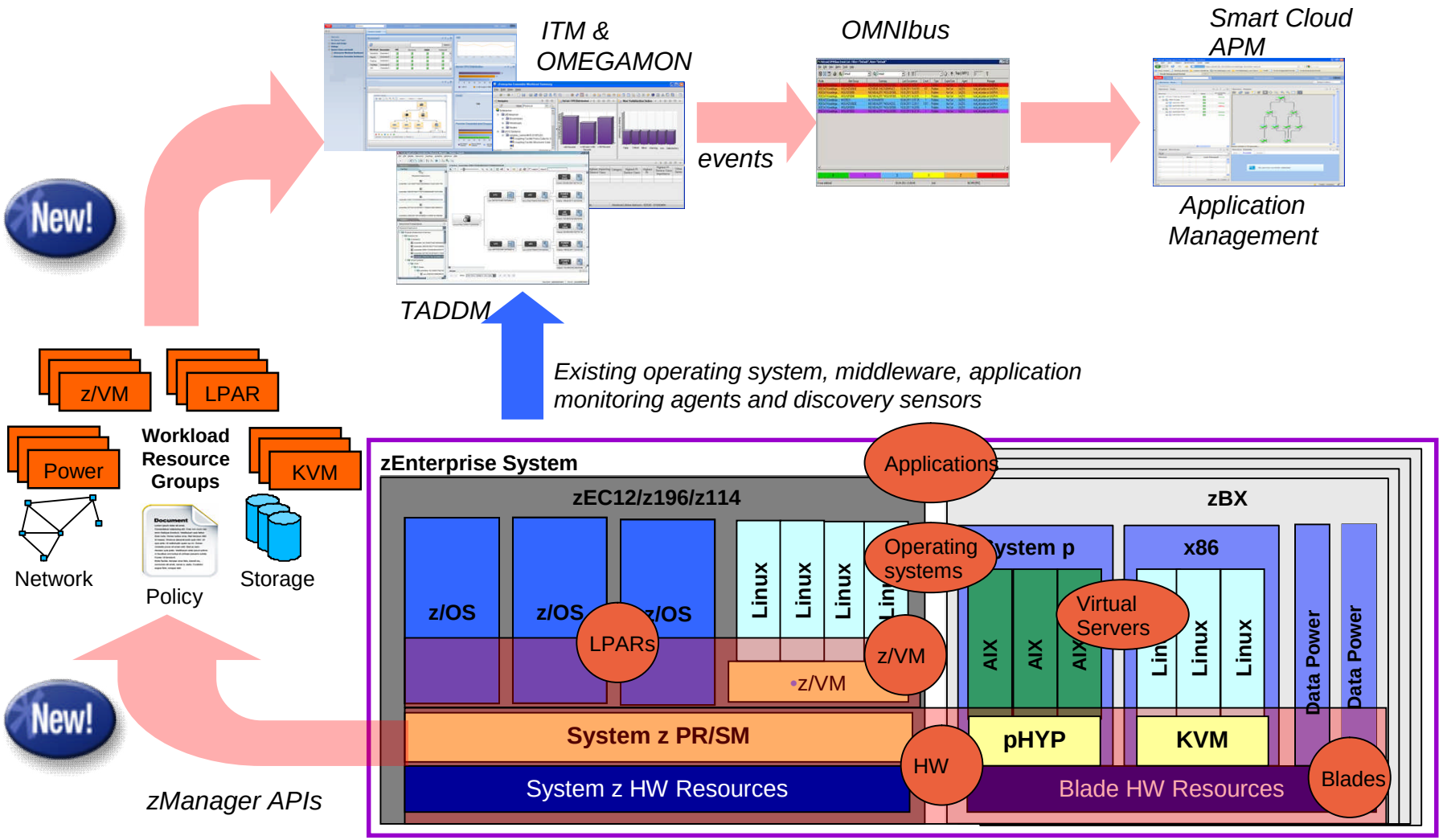
IBM end-to-end visibility, control and automation, including high availability



Benefits:

Ensure resiliency and availability of critical business workloads with recovery time objective of less than one minute

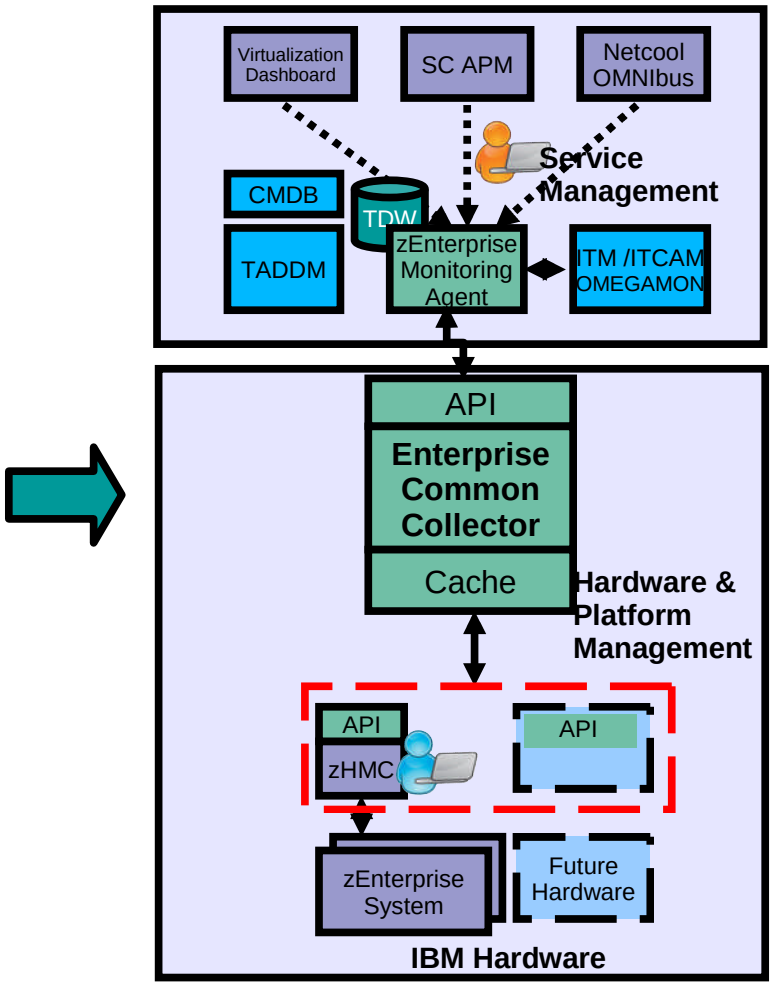
Monitoring, Discovery and Application Management



Role and Value of the Enterprise Common Collector

Enterprise Common Collector

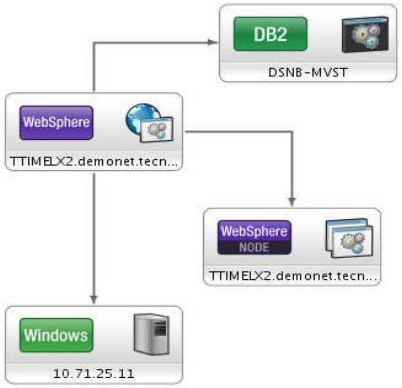
- Serves as a proxy for all IBM products interested in IBM zEnterprise Monitoring and Discovery data
- Can be single instance in an enterprise
  - Scales easily to include additional zEnterprise systems with little or no configuration changes
- Reduces configuration effort
- Avoids multiple similar requests targeted for a single zEnterprise ensemble
- Consistent reporting across products
- Is positioned as a common collector for other future hardware components also



Tivoli Application Dependency Discovery Manager (TADDM)

Universal Discovery Engine

Discovers configuration items and their Actual State. Includes Topology Views and the ability to **discover relationships** between items. **Name Reconciliation And Normalization** of data

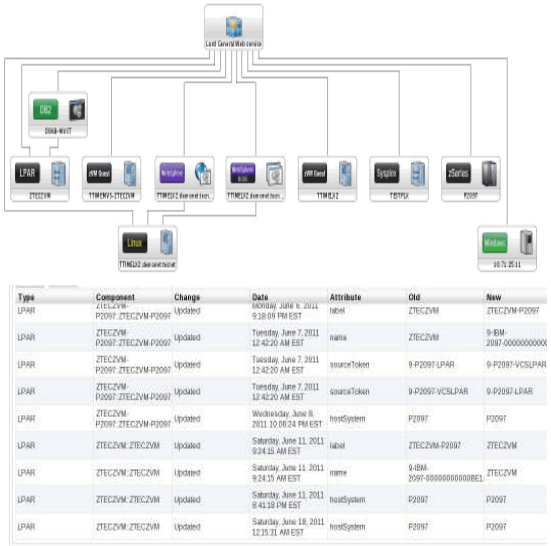


Application Mapping with Dependencies

Customer can understand what they have through **discovery of interdependencies** between applications, middleware, servers and network components and automated application maps

Configuration Auditing

Shows how configuration items are configured and changing over time by capturing the configuration of each CI, tracking changes to it and providing analytics to report on the **history of these configuration changes** over time



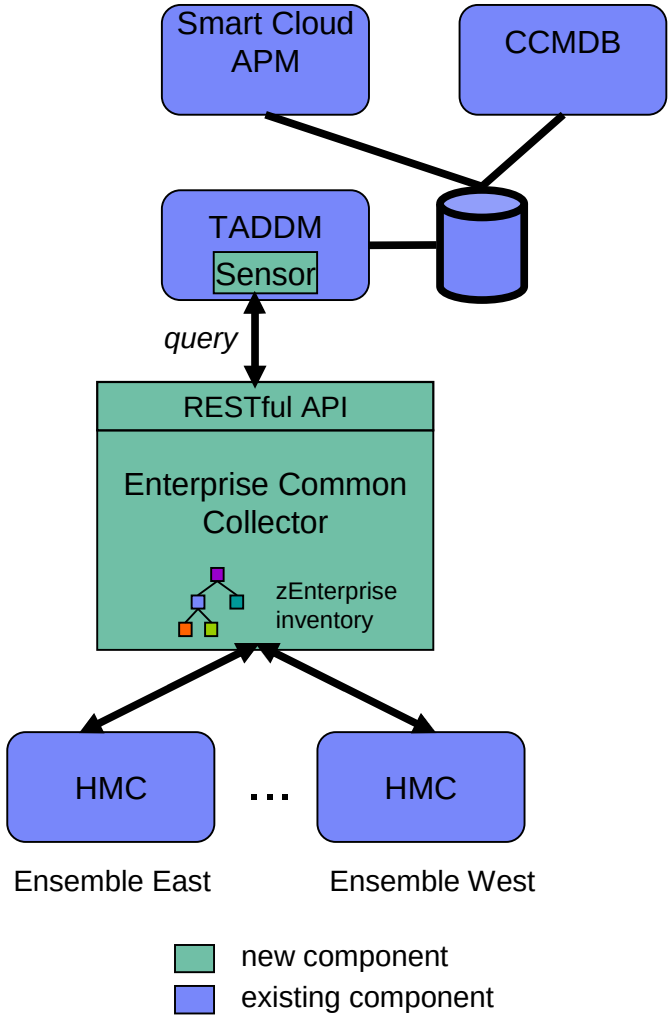
Compliance

Determines if configuration items are compliant by using the capability to compare discovered configuration of CIs to a "reference configuration" and determine the variations that define violations to local policy

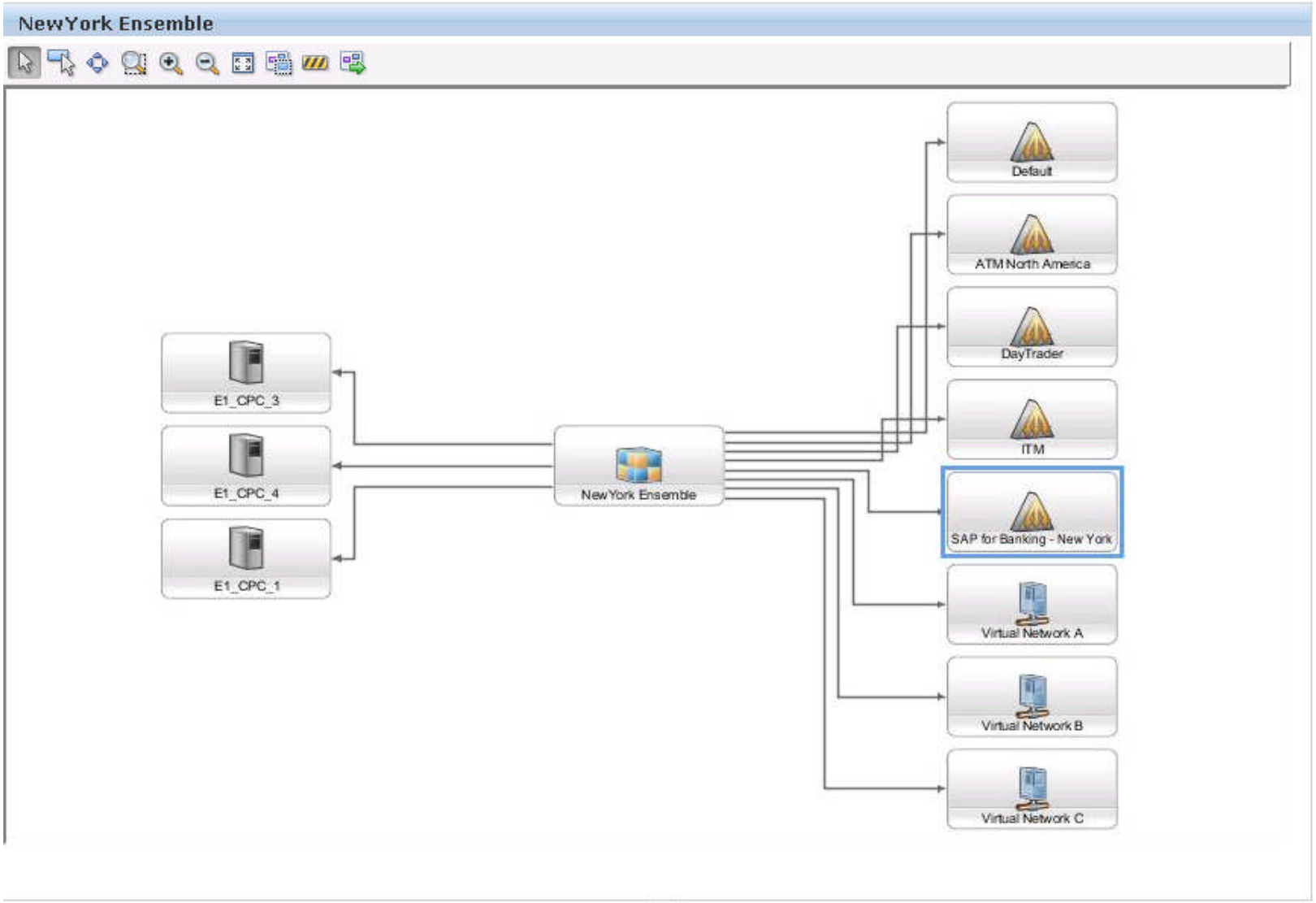
TADDM is Tivoli's discovery tool and provides visibility to what a client has, how it is configured, and how it is changing over time.

Discovery

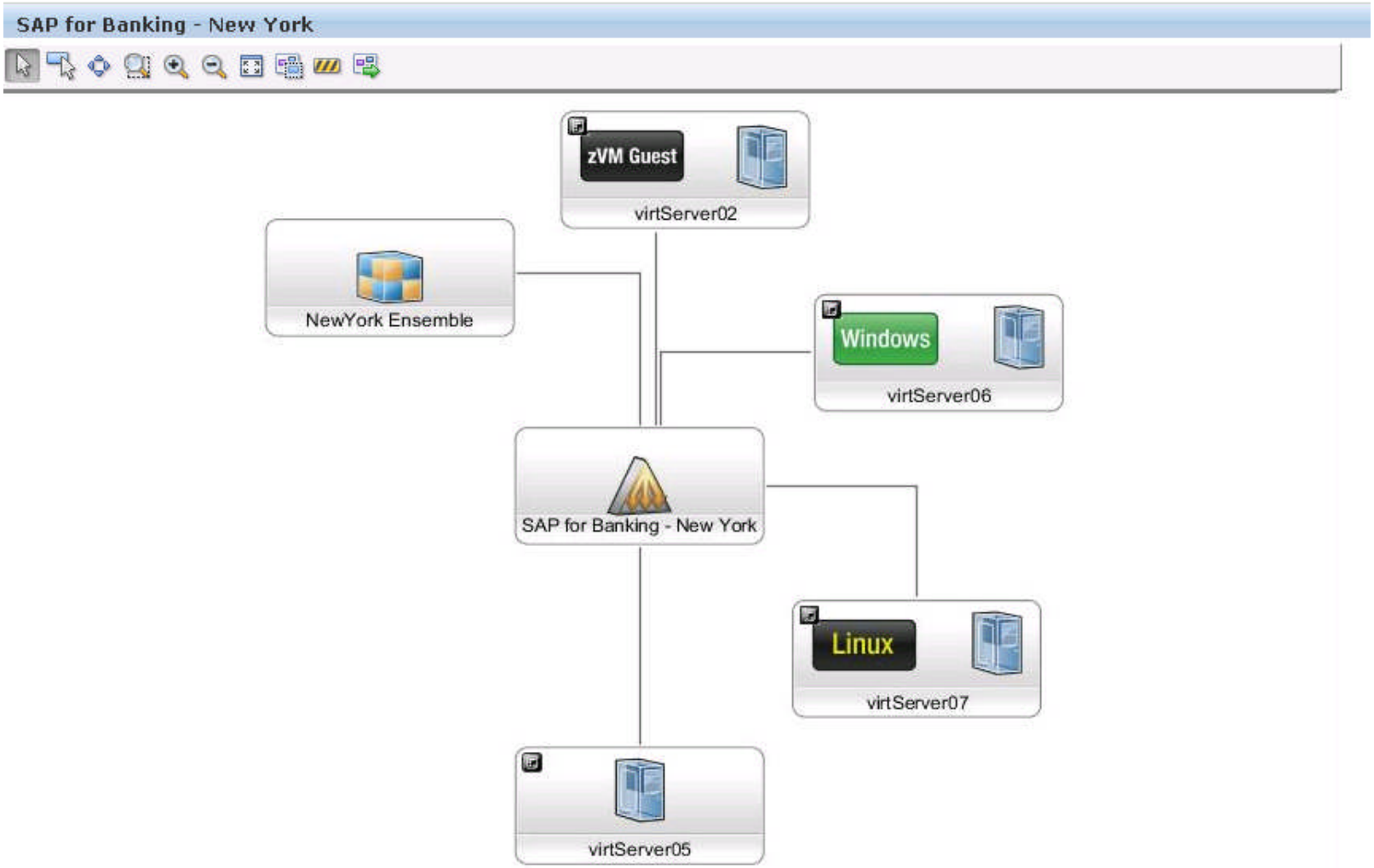
- TADDM sensor uses collector API to discover and visualize objects, some of which are only visible at the HMC (examples: blades, workloads)
  - Configure ONE sensor per enterprise
  - Single data source per enterprise – the Enterprise Common Collector
- TADDM visualizes dependencies, for example
  - Virtual servers in a workload
  - Virtual servers in the same virtual network
  - Storage resources a virtual server is depending on
  - Virtual servers location (zBX, blade, ...)
- TADDM sensor serves as the discovery engine for CCMDB
  - Identify zEnterprise configuration changes
- Smart Cloud APM
  - Correlate business applications to workloads



TADDM Universal Discovery Engine and Reconciliation



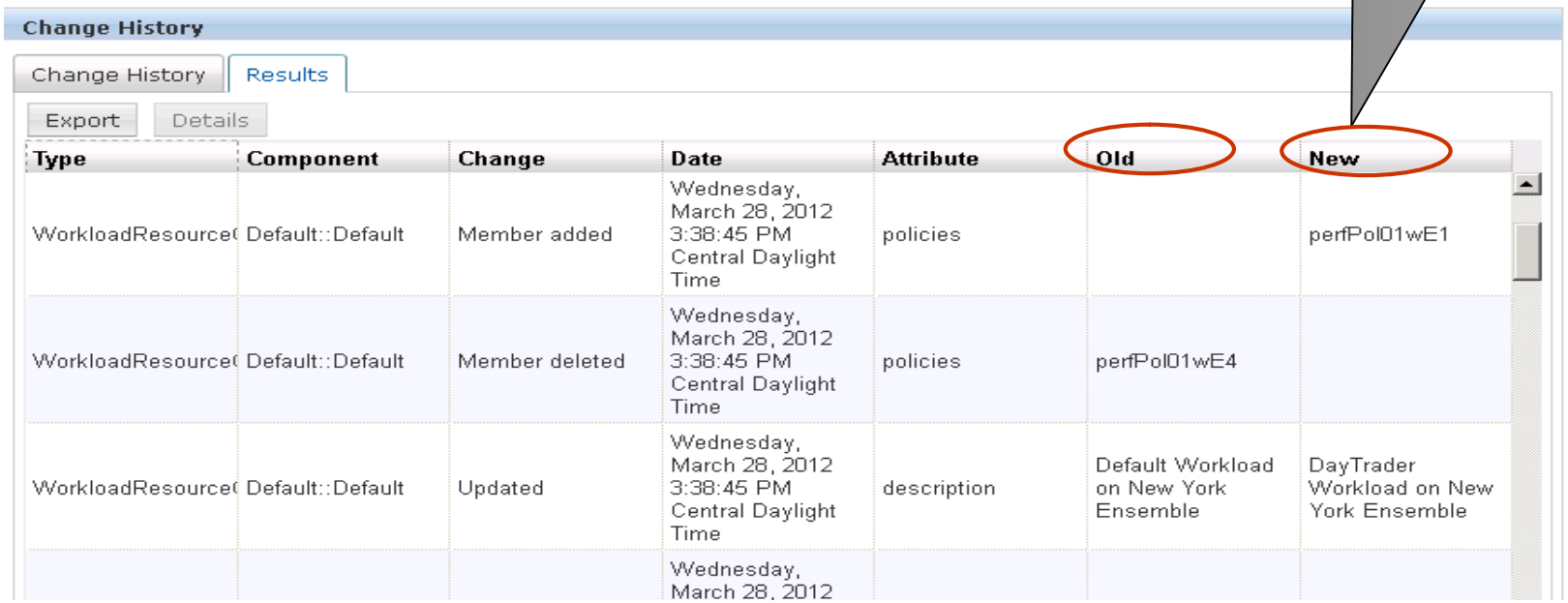
TADDM Workload Resource Group Resource Mapping



TADDM Configuration Audition

–Tracks changes in applications
–Depicts that information on the map
–Depicts that information thru reports

Automatically tracks changes on all attribute values over time…



TADDM Compliance

Compare configuration to “reference master”
–Compare to your standard policy

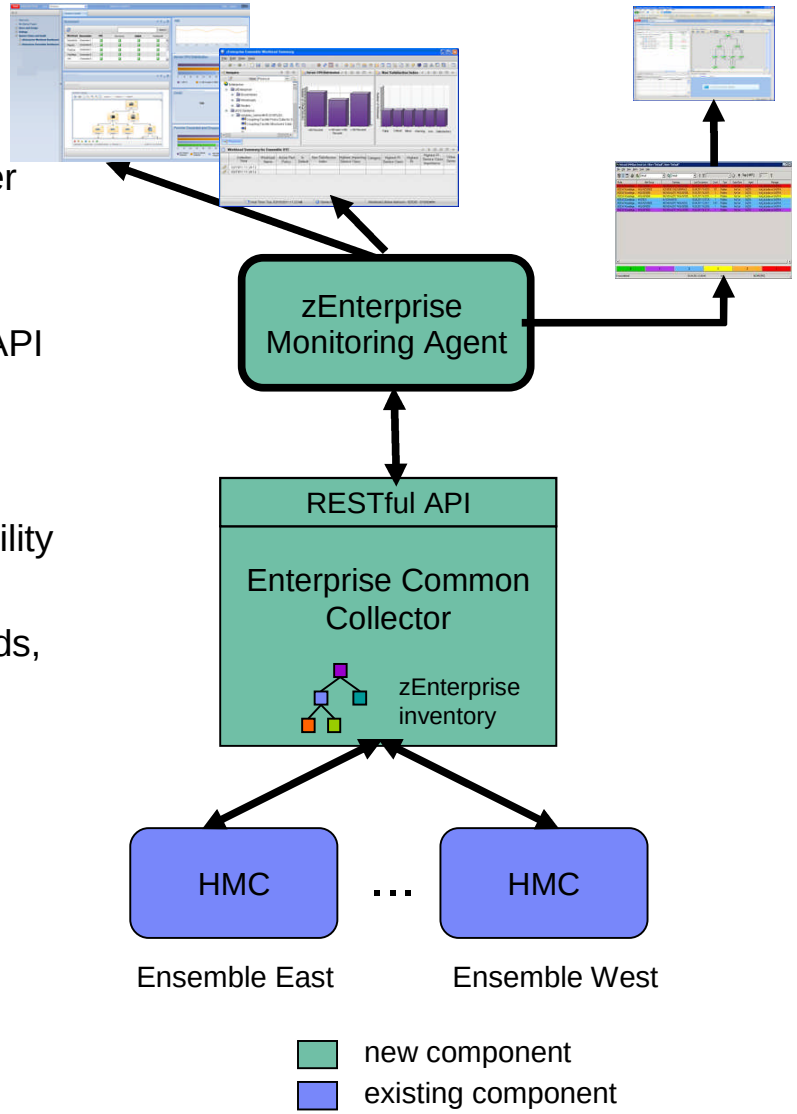
Comparing two instances of a DB2 Subsystem to the reference master

Values in red and blue are policy violations

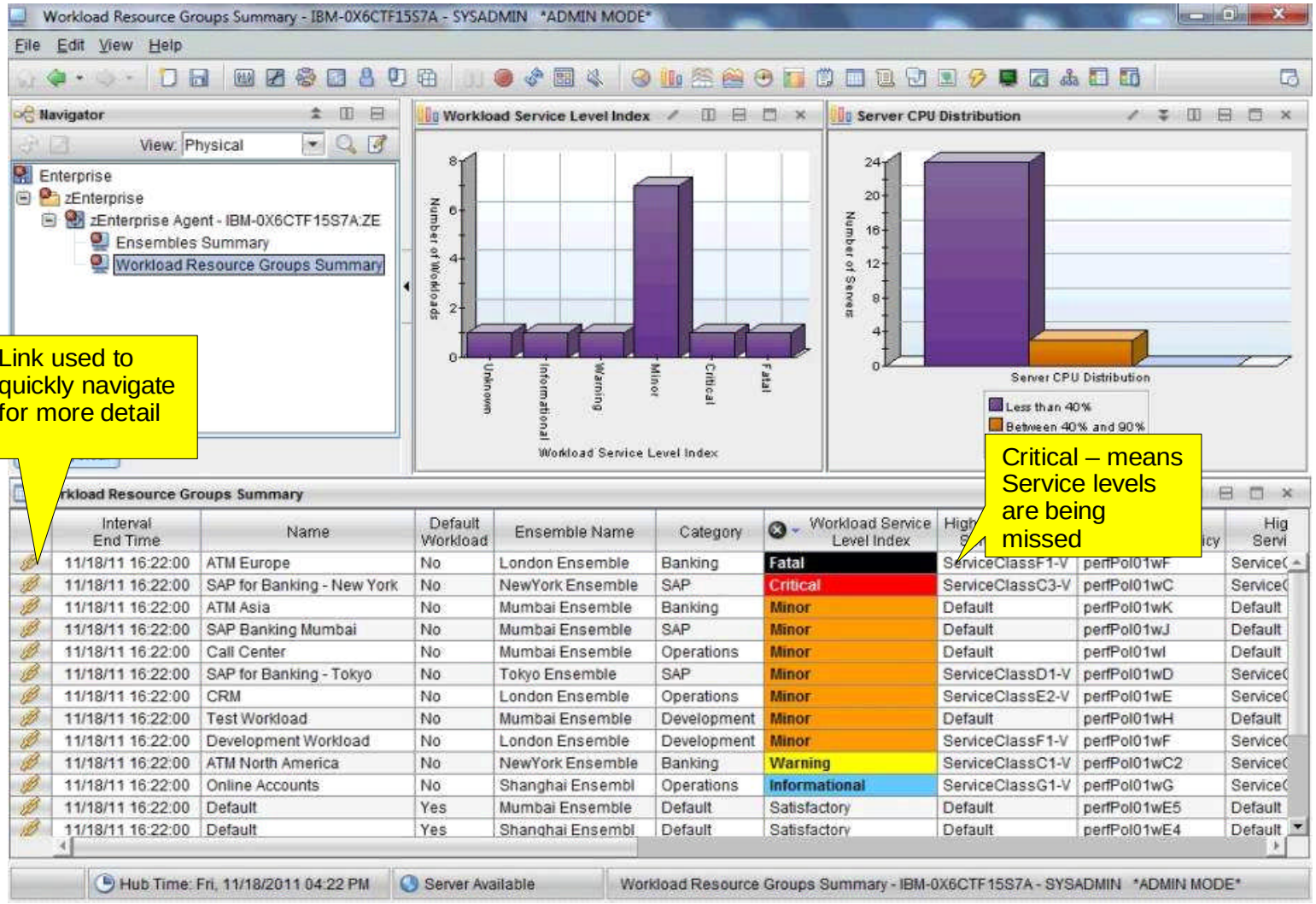
#	DSNA-MVST - Version: 0	DB1S-MVST - Version: 0	DSNB-MVST - Version: 0
Database Maximum Altered Time Stamp	12/2/09 08:41 CDT	12/9/09 15:37 CDT	12/2/09 09:05 CDT
Config Contents			
Tablespaces			
Source Token	DSNA-MVST-DB2Subsystem-Tablespaces-AppConfig	DB1S-MVST-DB2Subsystem-Tablespaces-AppConfig	DSNB-MVST-DB2Subsystem-Tablespaces-AppConfig
Content			
Source Token	DSNA-MVST-DB2Subsystem-Tablespaces-ZReportFile	DB1S-MVST-DB2Subsystem-Tablespaces-ZReportFile	DSNB-MVST-DB2Subsystem-Tablespaces-ZReportFile
Checksum	867999802	738890175	840676648
Label	DSNA-MVST-DB2Subsystem-Tablespaces	DB1S-MVST-DB2Subsystem-Tablespaces	DSNB-MVST-DB2Subsystem-Tablespaces
Databases			
Source Token	DSNA-MVST-DB2Subsystem-Databases-AppConfig	DB1S-MVST-DB2Subsystem-Databases-AppConfig	DSNB-MVST-DB2Subsystem-Databases-AppConfig
Content			

Monitoring

- **Free with ITM!**
- Install/Configure ONE zEnterprise Monitoring Agent per enterprise
- Runs on Linux for z and x, AIX, Windows
- zEnterprise Monitoring Agent uses common collector API for initial discovery of resources and to collect performance metrics per collection interval
- HMC notifications keep the collector's inventory up to date, enabling automatic monitoring and update capability in TADDM/CMDB
- Monitored zEnterprise resources (ensembles, workloads, virtual servers, network, storage, policy) visualized on Dashboards and workspaces.
- Situation processing generates events when SLAs are not being met
- Historical reports available for capacity planning, trend analysis and problem determination (Cognos)
- Event management (OMNIbus) with correlation to applications (Smart Cloud APM)

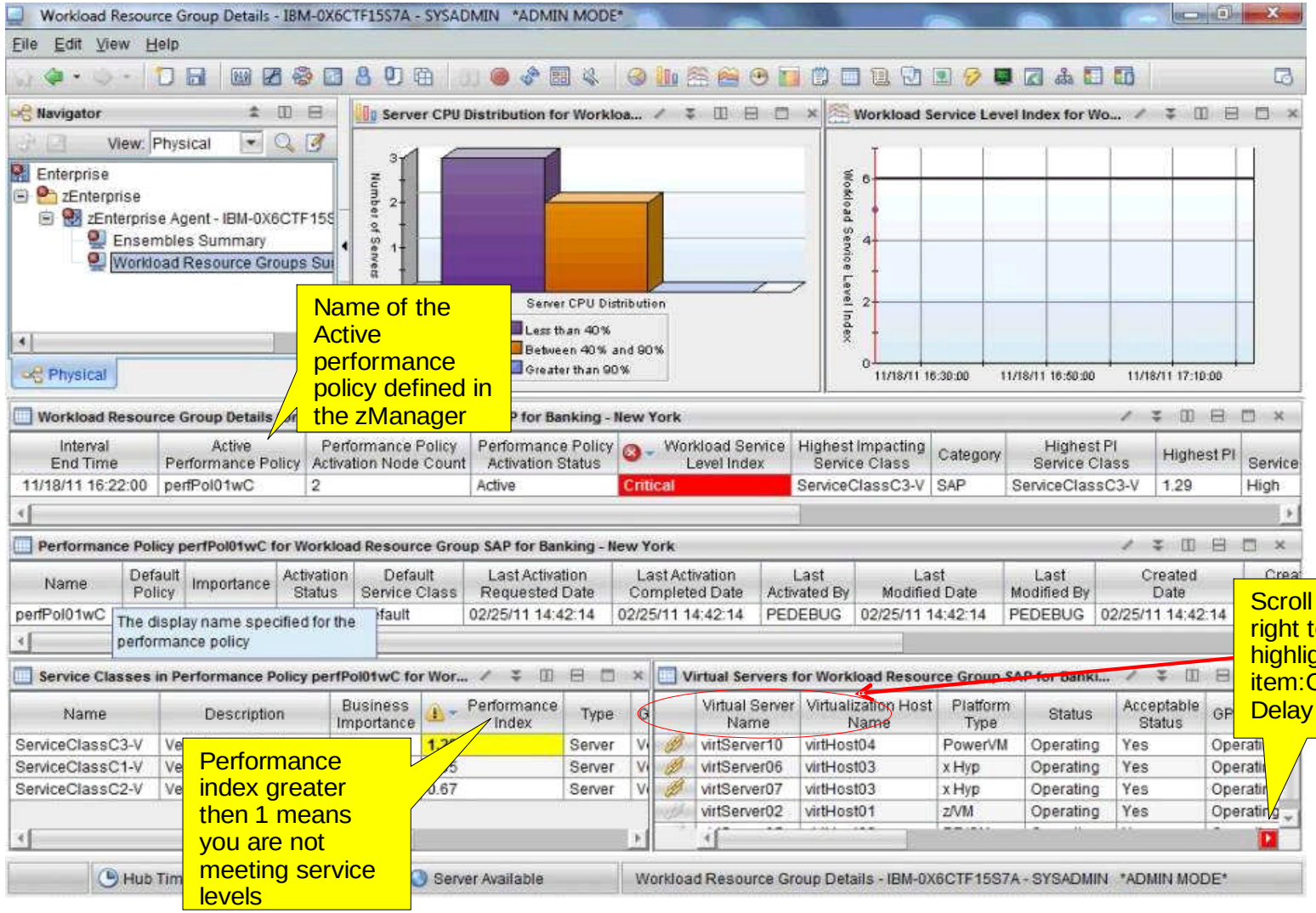


Example Flow: Workload Resource Groups Summary (1/3)

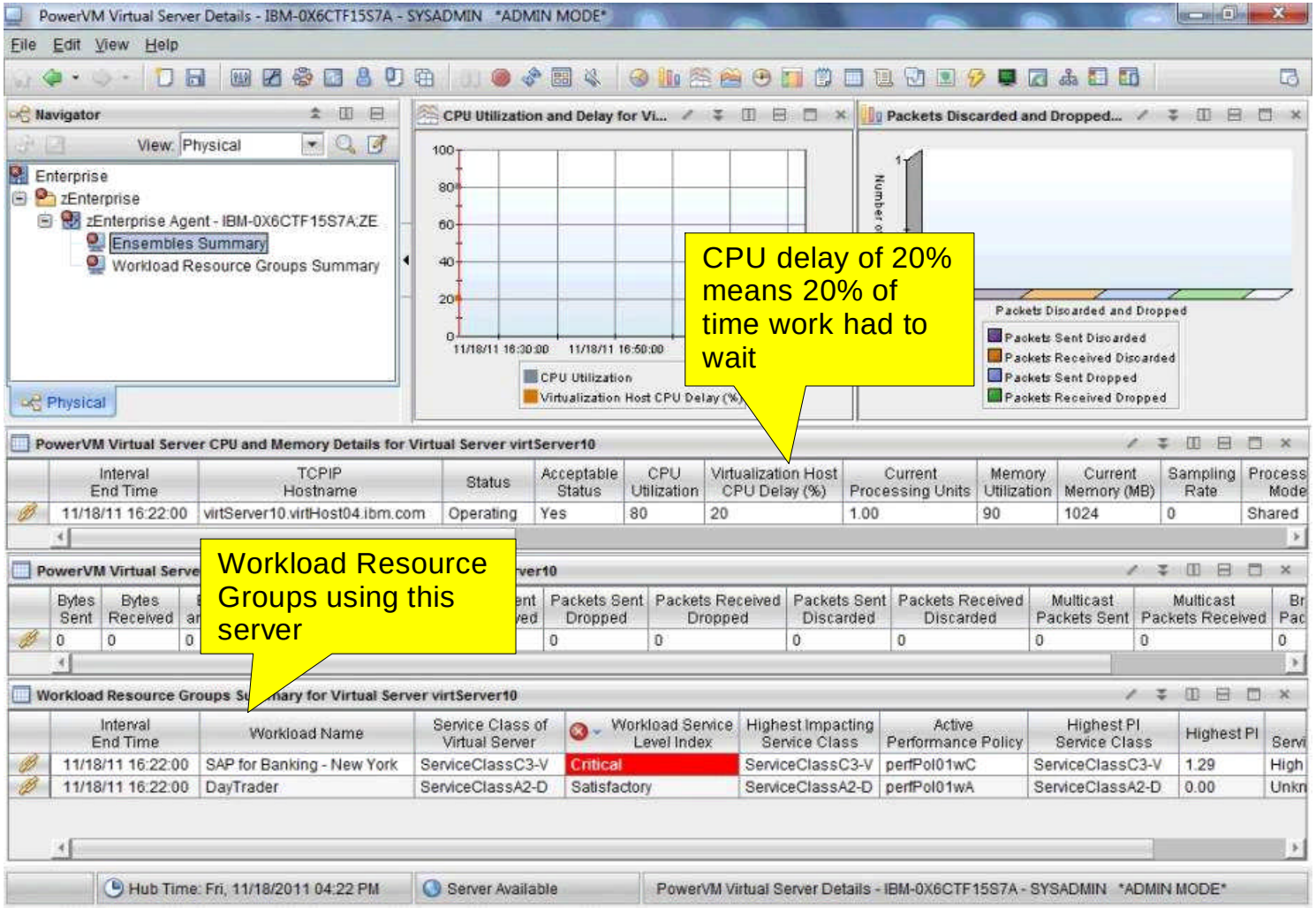


Interval End Time	Name	Default Workload	Ensemble Name	Category	Workload Service Level Index	High	Hig Servi
11/18/11 16:22:00	ATM Europe	No	London Ensemble	Banking	Fatal	ServiceClassF1-V	perfPol01wF
11/18/11 16:22:00	SAP for Banking - New York	No	NewYork Ensemble	SAP	Critical	ServiceClassC3-V	perfPol01wC
11/18/11 16:22:00	ATM Asia	No	Mumbai Ensemble	Banking	Minor	Default	perfPol01wK
11/18/11 16:22:00	SAP Banking Mumbai	No	Mumbai Ensemble	SAP	Minor	Default	perfPol01wJ
11/18/11 16:22:00	Call Center	No	Mumbai Ensemble	Operations	Minor	Default	perfPol01wI
11/18/11 16:22:00	SAP for Banking - Tokyo	No	Tokyo Ensemble	SAP	Minor	ServiceClassD1-V	perfPol01wD
11/18/11 16:22:00	CRM	No	London Ensemble	Operations	Minor	ServiceClassE2-V	perfPol01wE
11/18/11 16:22:00	Test Workload	No	Mumbai Ensemble	Development	Minor	Default	perfPol01wH
11/18/11 16:22:00	Development Workload	No	London Ensemble	Development	Minor	ServiceClassF1-V	perfPol01wF
11/18/11 16:22:00	ATM North America	No	NewYork Ensemble	Banking	Warning	ServiceClassC1-V	perfPol01wC2
11/18/11 16:22:00	Online Accounts	No	Shanghai Ensembl	Operations	Informational	ServiceClassG1-V	perfPol01wG
11/18/11 16:22:00	Default	Yes	Mumbai Ensemble	Default	Satisfactory	Default	perfPol01wE5
11/18/11 16:22:00	Default	Yes	Shanghai Ensembl	Default	Satisfactory	Default	perfPol01wE4

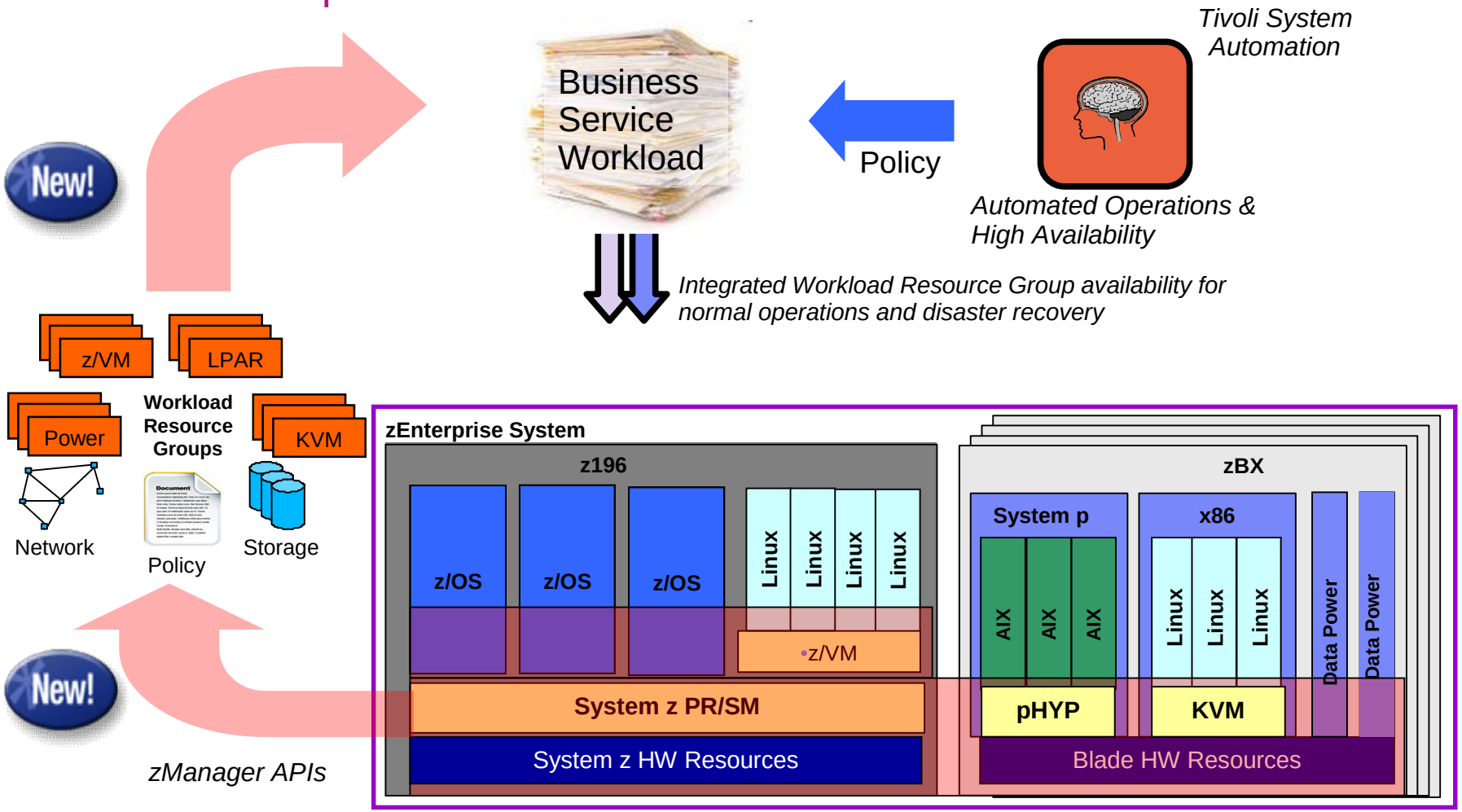
Example Flow: Workload Resource Group details (2/3)



Example Flow: Virtual Server details (3/3)



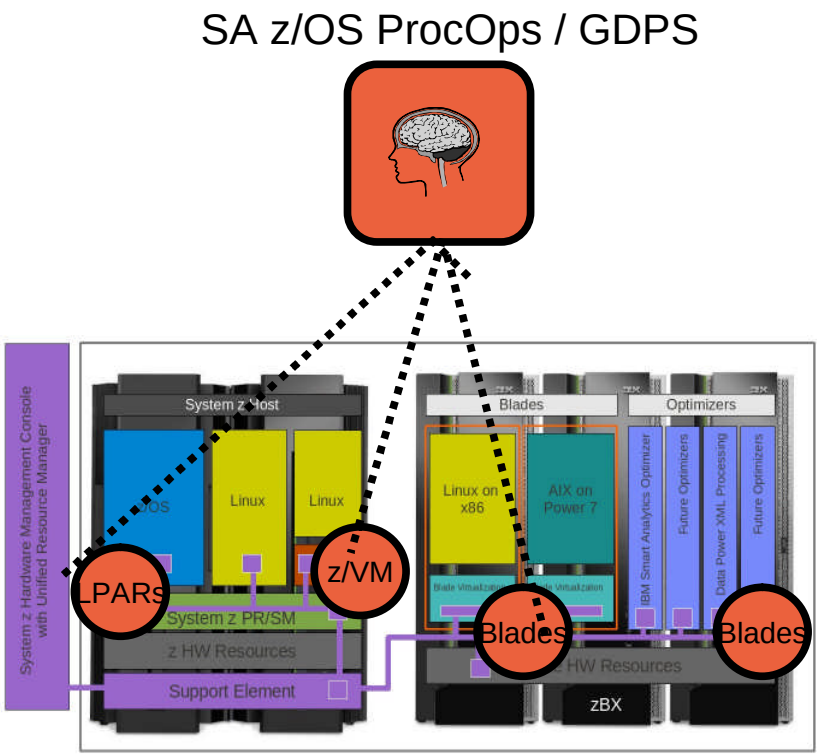
Tivoli System Automation can ensure availability of Workload Resource Groups and Business Services



Basic Availability and DR with System Automation 3.4

Enhanced hardware automation capabilities

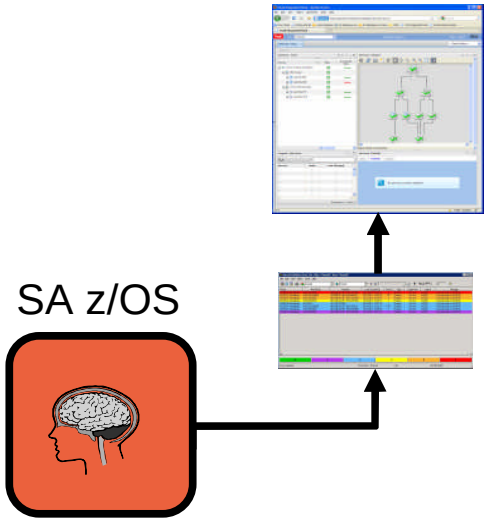
- SA z/OS Processor Operations is used already today to automate hardware operations in System z environments
- SA is enhanced to
  - be aware of zBX, blades, virtual servers and their workload context
  - be informed about inventory and status changes
  - include new elements in policy
  - permitting similar commands as possible for CPC today also for zBX elements
- Value
  - Reduced operations costs due to SPOC for zEnterprise automated HW operations
  - Simplified site management for planned and unplanned outages
  - Immediate alerting based on policy in case of failures
  - Foundation for GDPS Application CA/DR solution



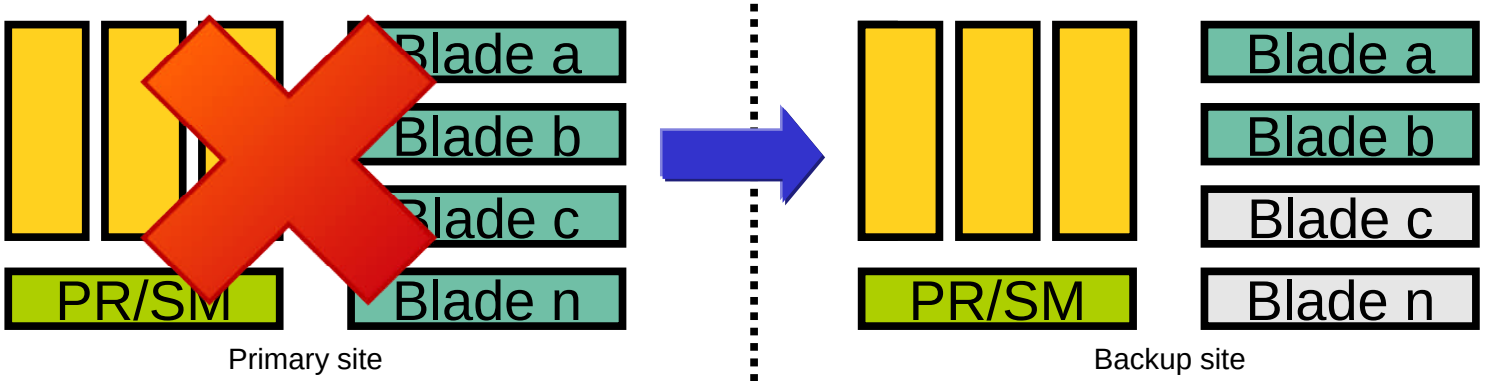
Enhanced hardware automation capabilities - sample scenarios

- **Blade reports hardware message**
  - SA z/OS ProcOps is informed and alert is sent to OMNIbus
- Alert will be rendered on TBSMs business service dashboard
  - ✓ LOB is immediately informed about potential failure

- **Shutdown of complete node due to maintenance**
  - SA z/OS ProcOps deactivates all blades
  - SA z/OS ProcOps deactivates all LPARs
  - SA z/OS ProcOps powers off CPC and zBX
  - ✓ Fully automated hardware operations enables quick shutdown and startup and reduces overall maintenance window



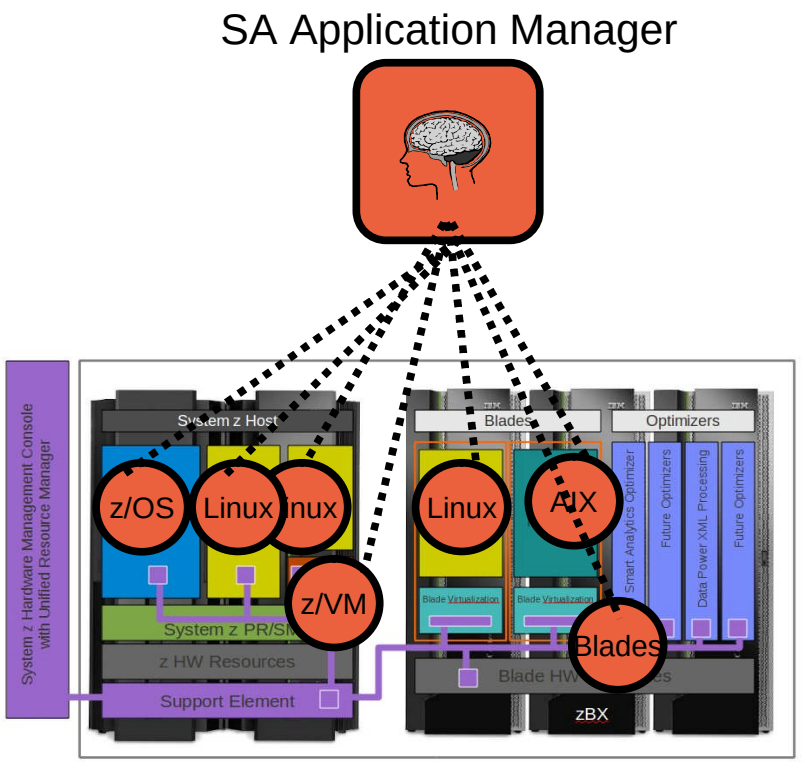
- **Site takeover directed by GDPS**
  - SA z/OS ProcOps activates idle resources on backup server



Basic Availability and DR with SA Application Manager 3.4 GA

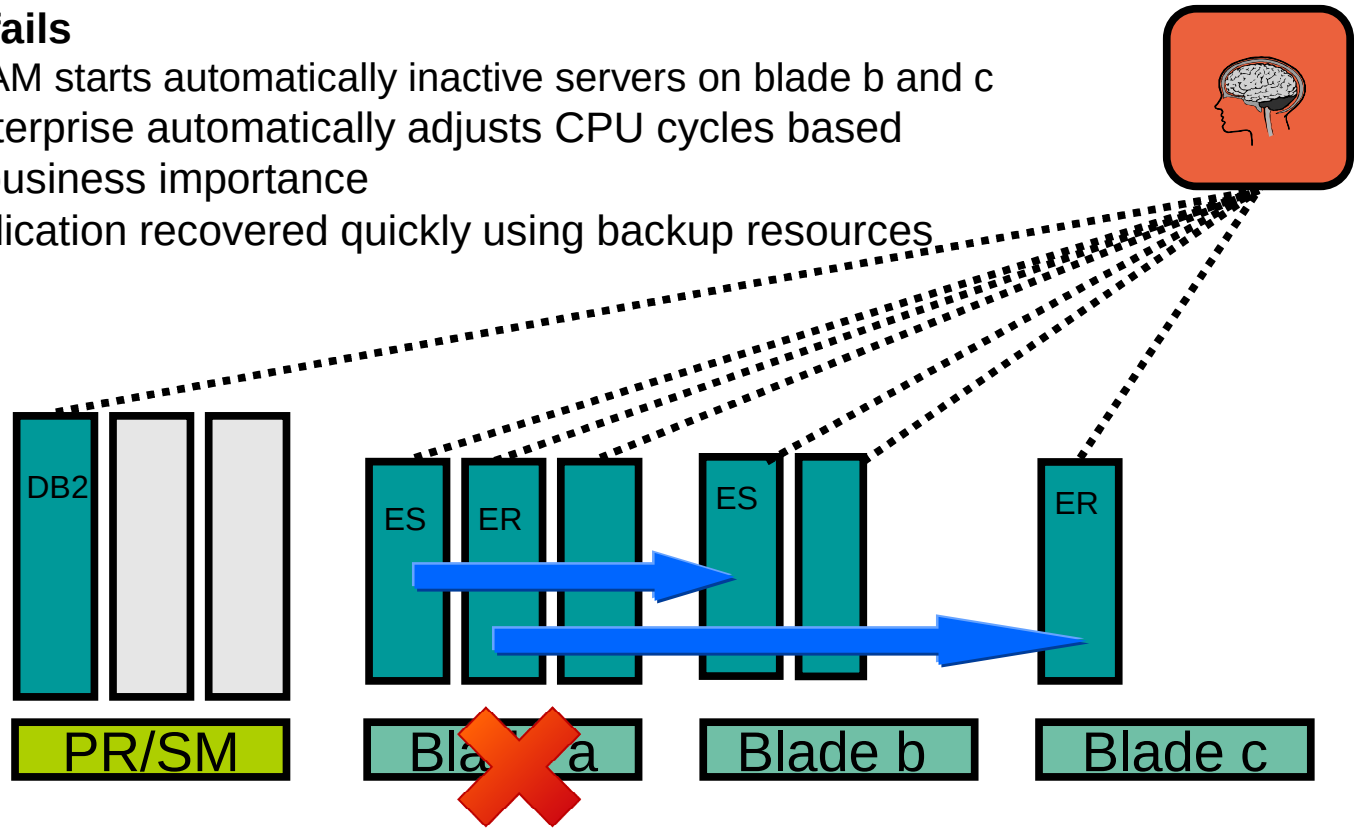
Virtualization capabilities

- SA Application Manager manages multi-tier applications across platforms and is IBM's implementation for GDPS Distributed Cluster Management (DCM)
- It is enhanced to
  - be aware of zBX virtualization infrastructure, the virtual servers and their workload context
  - be informed about virtual server inventory and status changes
  - permitting virtual server operations (start/stop)
  - permitting toggle from primary site to backup site as directed by GDPS
    - Metro distance
    - Unlimited distance
- Value
  - Reduced operations cost due to SPOC for operating business applications on virtualized infrastructure
  - Avoids or reduces MTTR in case of application or infrastructure outages
  - Unique zEnterprise DR solution that completes GDPS Application CA/DR solution for zEnterprise



Virtualization capabilities - sample scenarios

- **SAP Enqueue Replication Server (ER) fails**
  - SA MP moves ER server to active backup server
  - SA AM restarts failed server to become new backup
  - ✓ No application outage, redundancy quickly re-established
- **Blade a fails**
  - SA AM starts automatically inactive servers on blade b and c
  - zEnterprise automatically adjusts CPU cycles based on business importance
  - ✓ Application recovered quickly using backup resources



Summary

Tivoli provides Visibility, Control and Automation for zEnterprise environments:

- Availability and performance monitoring
- Capacity and performance planning
- End-to-end automated operations and high availability across platforms
- Enablement for configuration management, service delivery and impact analysis
- Time to Value and reduced Total Cost of Ownership

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