The IBM Tivoli Monitoring Infrastructure on System z and zEnterprise

Session 11524

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Mike Bonett (bonett@us.ibm.com)

IBM Advanced Technical Skills

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ABSTRACT

Are you a mainframe person who is overwhelmed with understanding the various components of IBM Tivoli Monitoring that run across both mainframe and distributed platforms? Then never fear, this session is here!

This technical tutorial will cover the components and relationships of IBM Tivoli Monitoring, including their applicability to the System z and zEnterprise environment. In addition, information on the key best practices for implementing and using these components will be provided.

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Agenda

- IBM Tivoli Monitoring Architecture Overview
- Components
  - Monitoring Servers
  - Portal Server
  - Clients
  - Agents
- Additional Features
  - Enhanced 3270 Interface
  - Tivoli Data Warehouse
  - Tivoli Common Reporting
  - Performance Analyzer
  - Command Line Interface
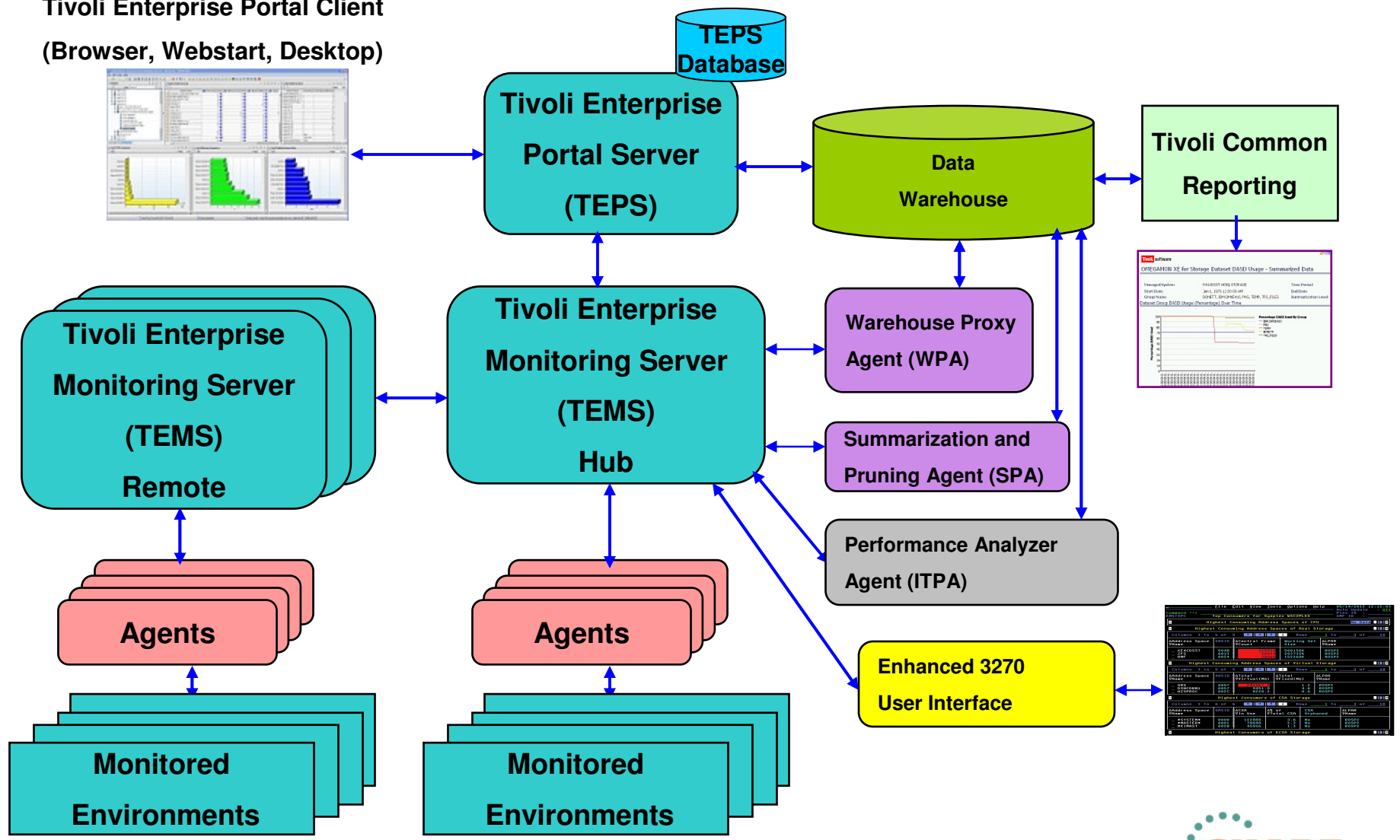- Installation and Customization
- Operational Integration

Overview and Components

What is IBM Tivoli Monitoring (ITM)?

- An infrastructure for supporting end-to-end real time and historical monitoring across both System z and distributed environments

- Provides availability and performance monitoring for a wide range of technologies

- Designed to support small, medium, and large environments

- A focal point for integrating data from OMEGAMON, Composite Application Management (ITCAM), and other IBM and third party products

- Enables building bridges across islands of monitoring

- A key element for supporting IBM IT Service Management at the operational level

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ITM Infrastructure at a Glance

Tivoli Enterprise Portal Client

(Browser, Webstart, Desktop)

TEPS Database

Tivoli Enterprise Portal Server (TEPS)

Data Warehouse

Tivoli Common Reporting

Tivoli Enterprise Monitoring Server (TEMS) Remote

Tivoli Enterprise Monitoring Server (TEMS) Hub

Warehouse Proxy Agent (WPA)

Summarization and Pruning Agent (SPA)

Performance Analyzer Agent (ITPA)

Agents

Agents

Enhanced 3270 User Interface

Monitored Environments

Monitored Environments

Primary Components

Component	Function	Platforms

Tivoli Enterprise Portal Client (TEP)	•User interface
	  •Standalone client
	  •Web browser (IE, Firefox)
	  •**Java Web Start**
		•Windows
		•Linux
		•AIX (browser client)

Tivoli Enterprise Portal Server (TEPS)	•Provides presentation views (workspaces) of metrics, events, and thresholds •Sends commands to Monitoring server or agent to execute •Caches requested short term data •Database can be embedded or DB2/Oracle/SQL Server	•Windows •Linux (Intel, System z) •AIX
Tivoli Enterprise Monitoring Server (TEMS)	•Collects data from agents •Runs threshold situations and report results •Executes commands •**Hub (1)** and **Remote** (0 or more) for scalability and grouping	•Windows •Linux (Intel, System z) •z/OS •UNIX (AIX, HP-UX, Solaris) •i
Agents	•Integrate with monitored component to return metrics and status to TEMS •Execute commands	All

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TEP Client Functions

- **Navigation Tree**
  - Physical placement of agents by default
  - Custom placement as desired can be created
  - Associated workspaces and actions
- **Workspaces**
  - "Container" for various monitoring views from one or more agents
  - User authorization required for access
- **Views**
  - Various agent data representations (table, bar, pie, plot, circular, linear, graphic, topology)
  - Events (TEP, TEC, Netcool/OMNIbus, situation and policy status)
  - External information (web browser, 3270, telnet)
  - Dynamic links between views
- **Situations**
  - Notification and optional reactive automation based on agent data values
- **Workflow Policies**
  - Monitoring "flow" allowing of multiple situations and generating of multiple actions
- **Take Action**
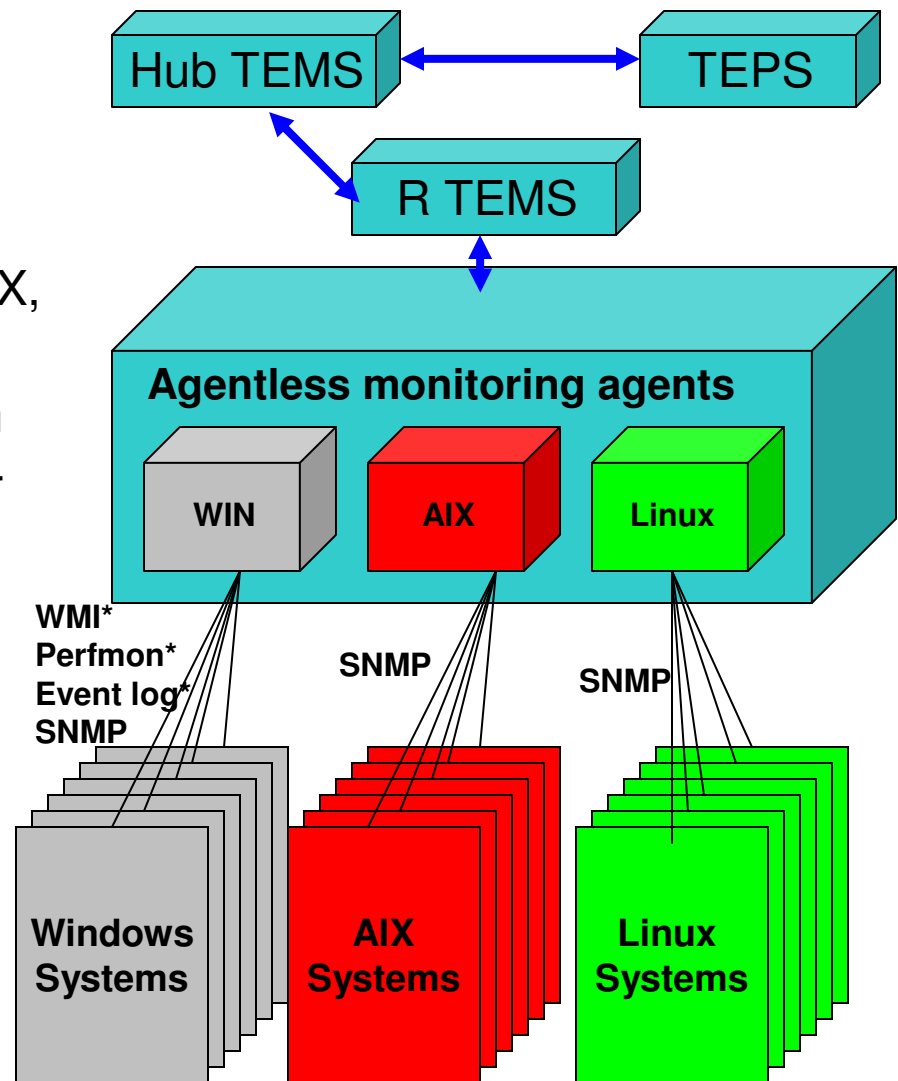 - Issue commands for execution on target resource (manual or automated)

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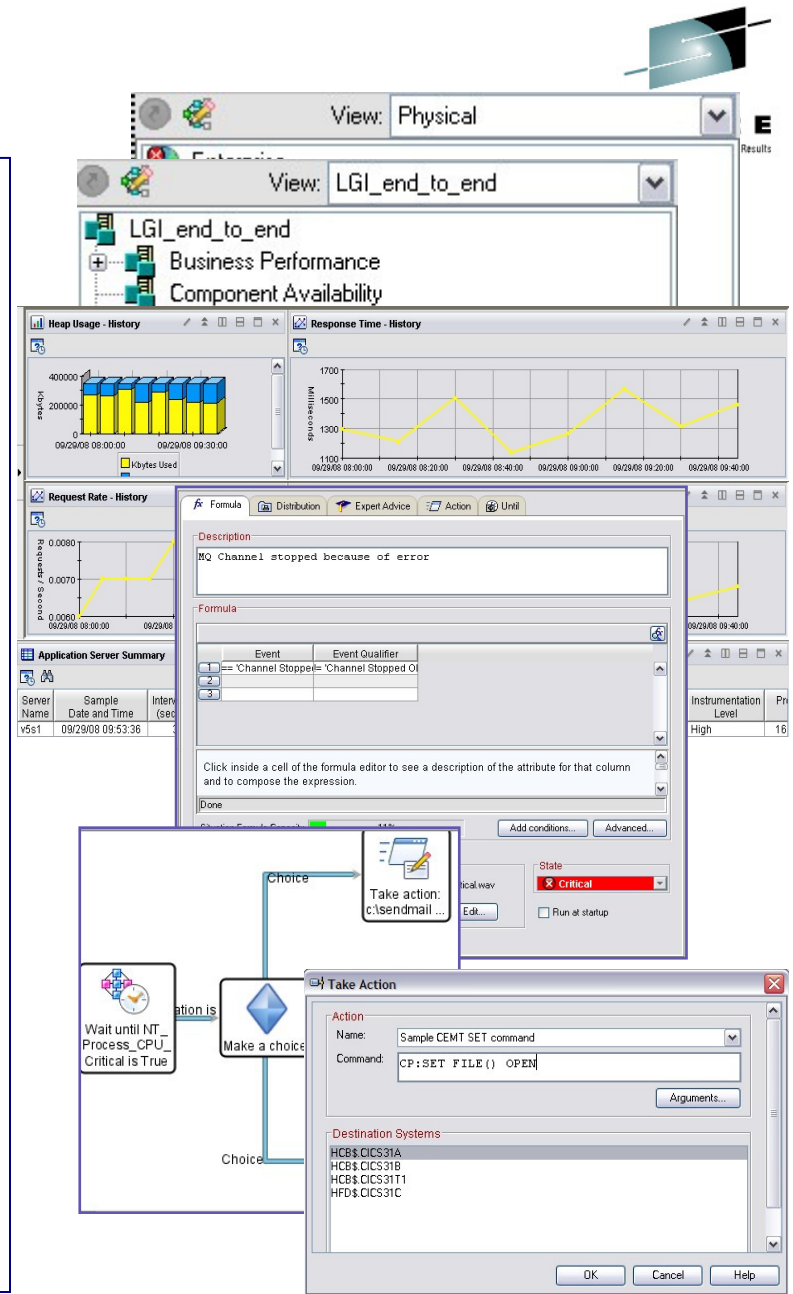
Agents

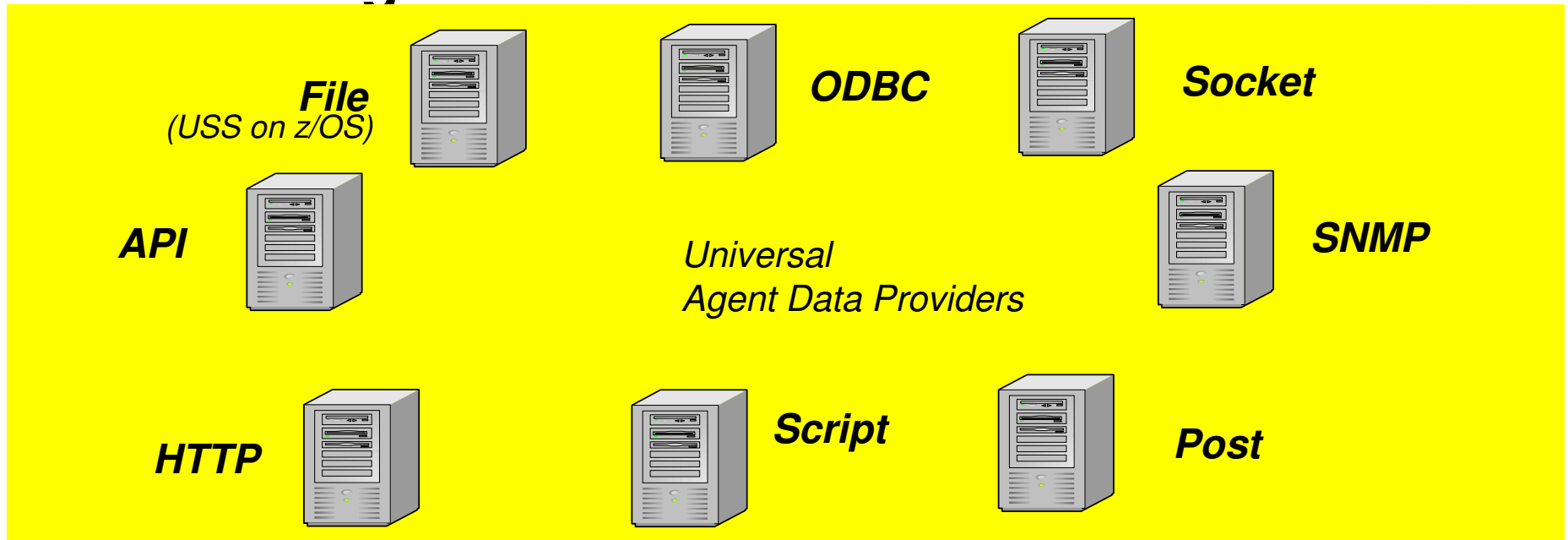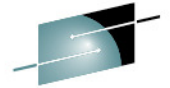| Type	Monitored areas	Examples
IBM Tivoli Monitoring (ITM)	Non-z/OS operating systems and resources, hardware platforms	Windows, Linux, UNIX, I, databases, applications, clusters, virtual, energy, zEnterprise,…
OMEGAMON XE	System z platform and resources	CICS, DB2, IMS, Mainframe Networks, Messaging, Storage, z/OS, z/VM and Linux
Composite Application Management (ITCAM)	Applications, middleware, transactions	Applications, SOA, Application Diagnostics (HTTP/ WebSphere/J2EE),Transaction Response Time/Tracking,...
Other products	Product monitored information for ITM integration	NetView, System Automation/GDPS, TWS, TBSM, Netcool/OMNIbus, third party…

- Each agent has an associated 2 character product code used in the infrastructure
- Most can operate in autonomous mode (function without being connected to a TEMS
  - Forward EIF or SNMP events to event management servers

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Agentless Monitoring

- An agent that remotely monitors one or more target platforms
- Data obtained via remote APIs: SNMP, CIM, or WMI
- Supported target platforms: Windows, AIX, Solaris, HP-UX, Linux
- Up to 10 agentless monitors on a system
- Up to 100 remote monitored systems per agentless monitor
- Key metrics monitored
  - Logical and physical disk utilization.
  - Network utilization
  - Virtual and physical memory
  - System-level information
 - Aggregate processor utilization
  - Process availability

Hub TEMS

TEPS

R TEMS

Agentless monitoring agents

WIN

AIX

Linux

WMI*
Perfmon*
Event log*
SNMP

SNMP

SNMP

Windows Systems

AIX Systems

Linux Systems

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Universal Agent

File
(USS on z/OS)

ODBC

Socket

API

Universal
Agent Data Providers

SNMP

HTTP

Script

Post

- Provides a variety of interfaces ("Data Providers") to capture data
- Used for custom monitoring solutions
  - some available on the Integrated Service Management Library (formerly OPAL) website
- Ability to access/receive data from other platforms via network connectivity
- Runs on Unix/Windows/Linux, but can be used to integrate with and monitor z/OS or z/VM information remotely

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Agent Builder

- Strategic method for building custom monitoring
- A "wizard-driven" solution for creating agents
  - Develop customized agent solutions, including agent installation package
- Data Sources
  - Availability Monitoring:
    - Process Monitoring
    - Windows Service Monitoring
    - Functionality Test
  - WMI, CIM
  - Windows Performance Monitor
  - Windows Event Log
  - SNMP and SNMP events
  - Scripts, Log Files
  - HTTP, SOAP, JMX, ICMP
  - JDBC, Java API

- Created agents execute on Windows/Unix/Linux, but can remotely monitor z/OS or z/VM information

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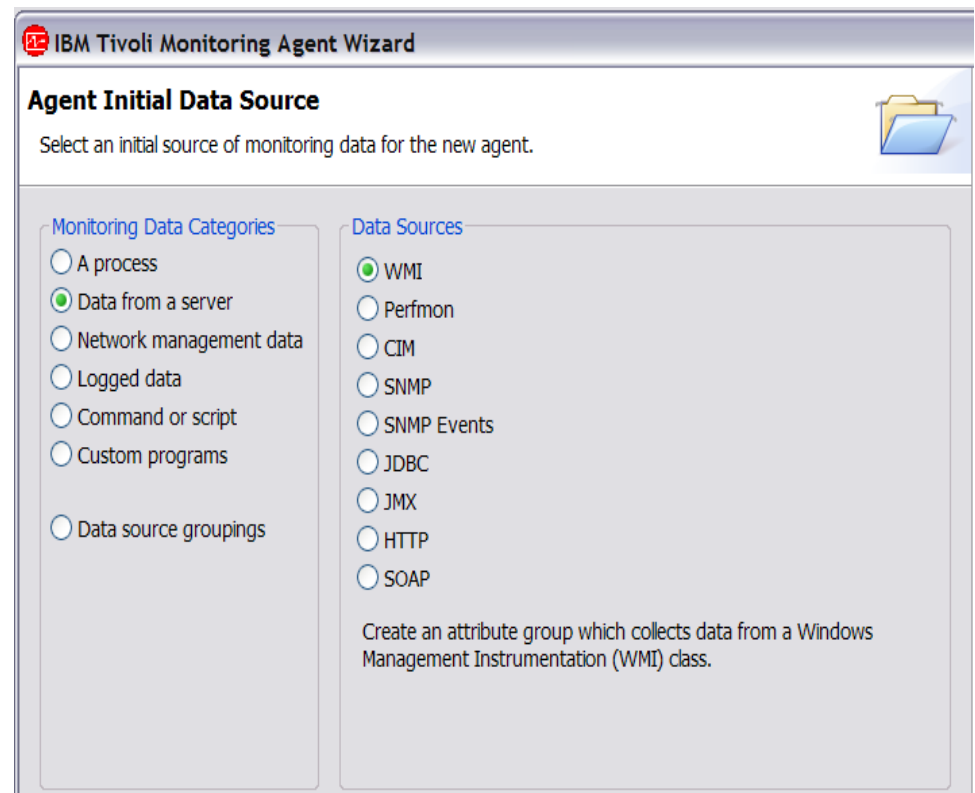
Agent Application Support

- Files that allow agent to participate in infrastructure
  - Catalog and attribute (CAT and ATR) files for presenting workspaces, online help, and expert advice for the agent in Tivoli Enterprise Portal.
  - SQL files for adding product-provided situations, templates, and policies to the Enterprise Information Base (EIB) tables maintained by the hub monitoring server
    - Also called "seed data"
  - ODI files for historical attribute groups
  - Must be synchronized across TEPS/TEMS/Client
    - Missing, empty or Kxx: named workspaces usually a result of missing or mismatched application support files

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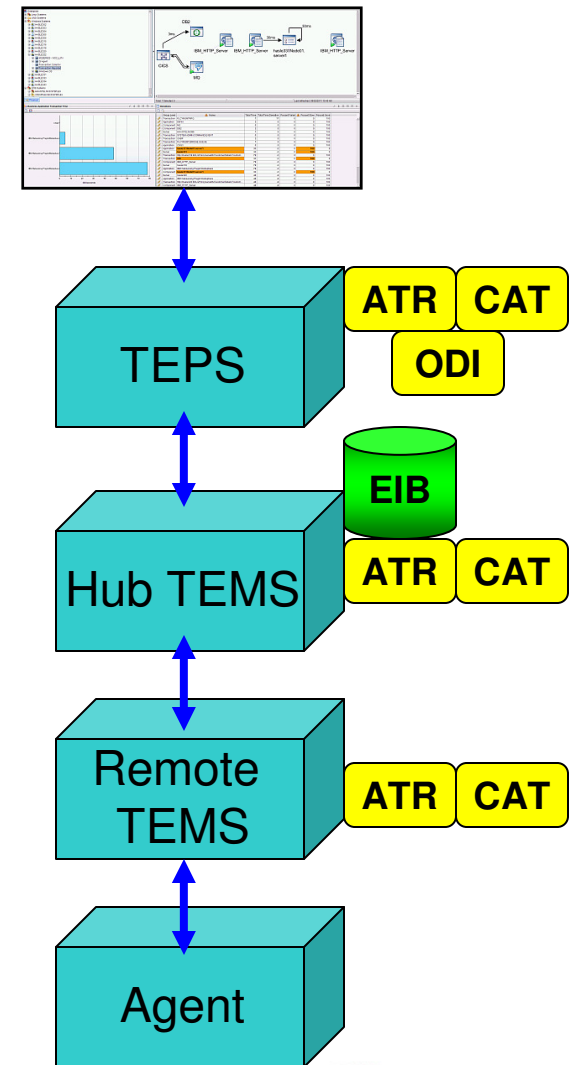
High Availability Options

- Agents
  - Define primary and secondary TEMS for failover
- Remote TEMS
  - Use multiple Remotes TEMS, place to eliminate single points of failure
  - Define primary and standby Hub TEMS for failover
- Hub TEMS
  - Non-z/OS: define hot standby TEMS
    - Synchronizes and monitors Hub TEMS
    - Takes over if Hub TEMS fails
  - z/OS: Define High Availability Hub
    - Requires DVIPA IP address, moveable among Sysplex LPARs
    - No agents defined in its runtime environment (RTE)
- TEPS
  - Manual actions required to switch TEPS to backup Hub TEMS
    - Possible to automate with external automation products
  - Can use multiple TEPS
    - One "Administrative", others read only

System z Infrastructure Placement Example

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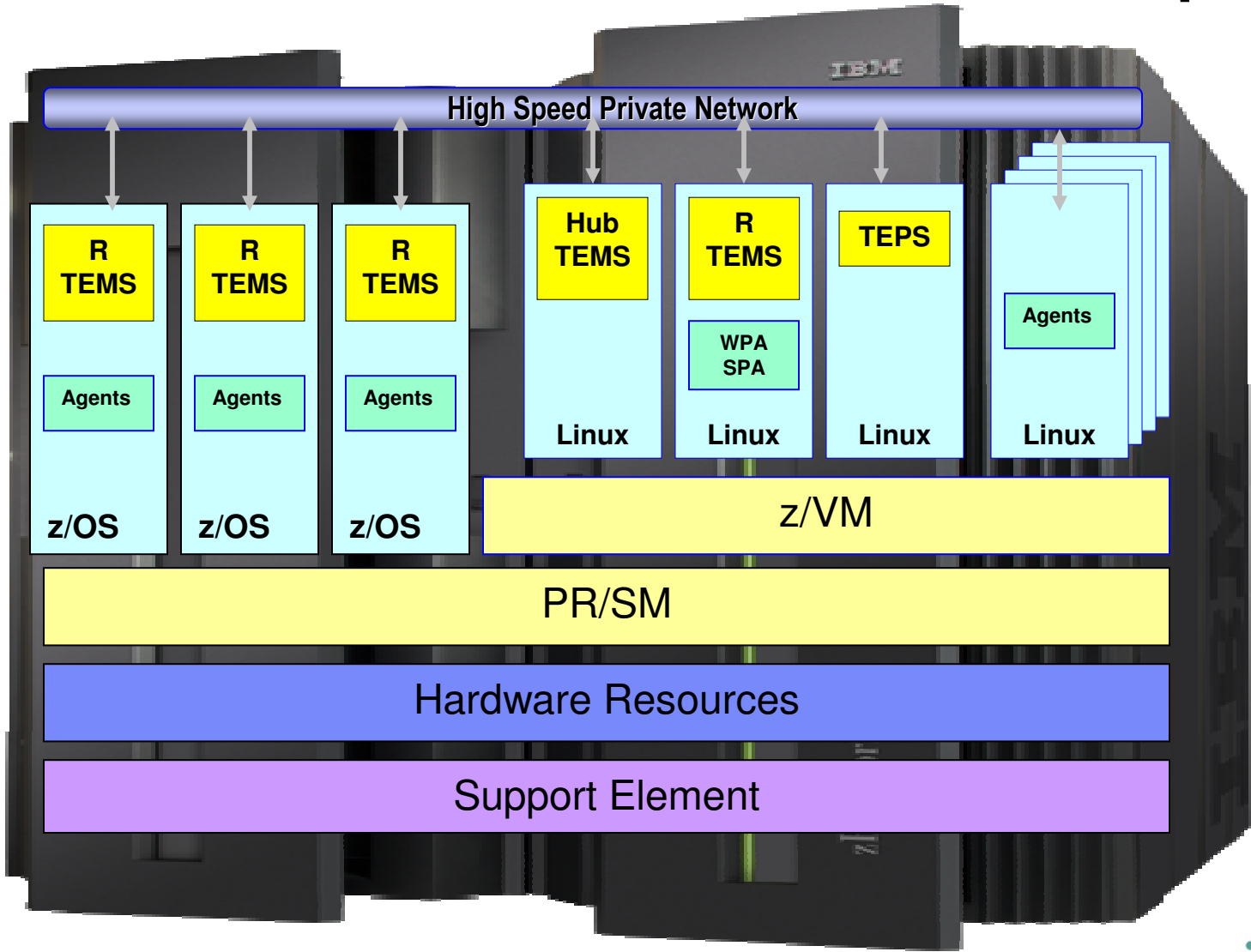
zEnterprise Infrastructure Placement Example
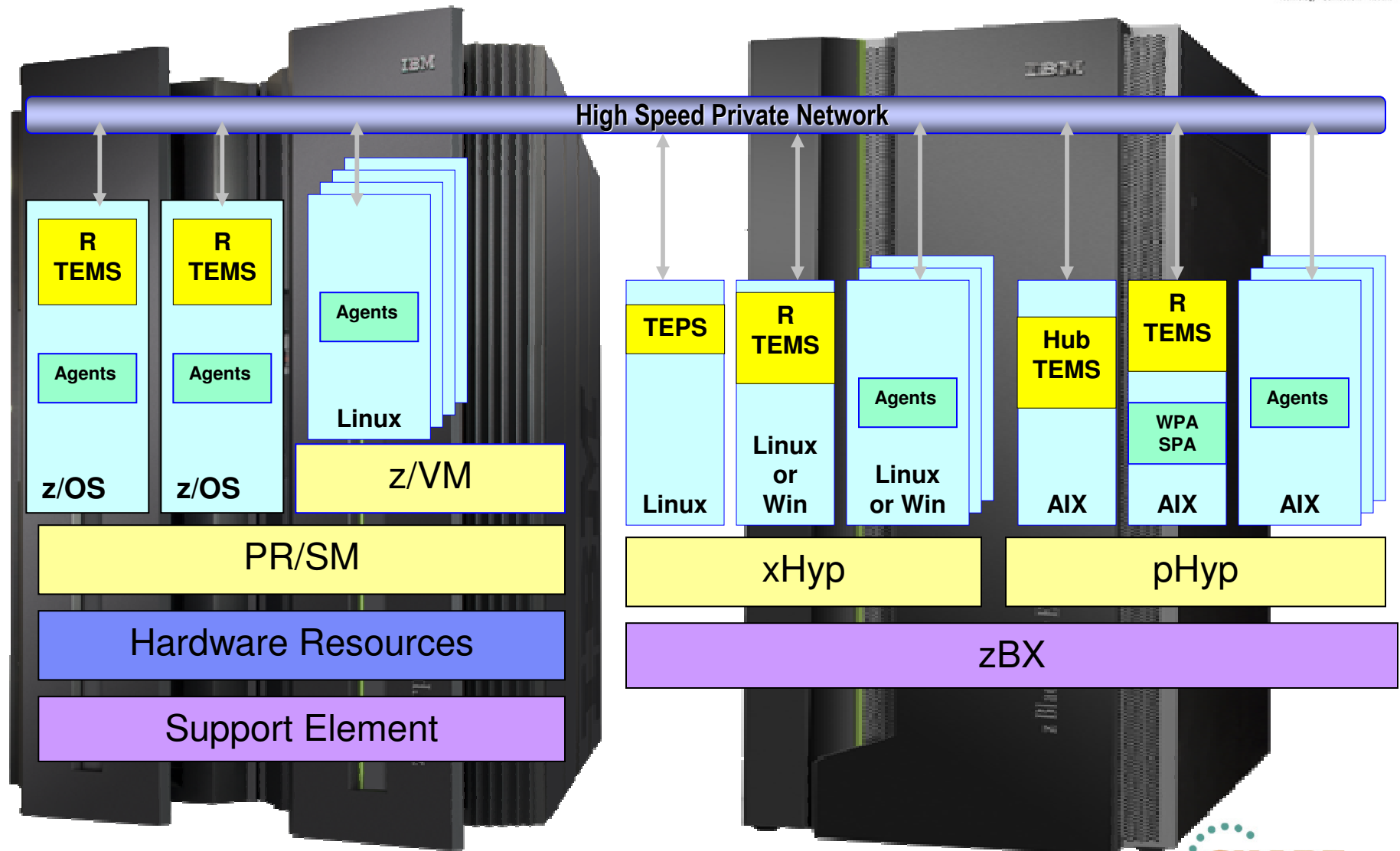
Additional Features

Enhanced 3270 Interface


```
                    File   Edit   View   Tools   Options   Help      05/14/2012 11:17:20
                                                                     Auto Update   : Off
Command ==>                                                          Plex ID  :  _____
KOBSTART                            Enterprise Summary               Sys ID   :  _____
┌─────────────────────────────────────────────────────────────────────────────────────┐
│▽│                        All Active Sysplexes                              ■│▯│⊠│
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│ Columns _2 to _6 of _9    ←│ │→│ │↑│ │↓│     Rows _____1 to _____2 of _____2 │
├─────────────────────────────────────────────────────────────────────────────────────┤
│◇Sysplex   │△Average      │Highest        │△Highest      │△Percent LPAR   │+LPAR Grou│
│ Name      │▽CPU Percent  │LPAR Name      │▽LPAR CPU%    │▽MSU Capacity   │ Name     │
│ _ WSCZPLEX│          1   │ROSP2          │          1   │         0.4    │N/A       │
│ _ HIAVSYSL│          3   │               │          4   │         1.6    │N/A       │
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├─────────────────────────────────────────────────────────────────────────────────────┤
│△CICSplex  │△Number of    │△Transaction   │△CPU          │Any SOS    │SOS       │
│▽Name      │▽Regions      │▽Rate          │▽Utilization  │Regions    │Region    │
│ _  OMEGPLEX│          2   │        6/m    │        0.0%  │No         │n/a       │
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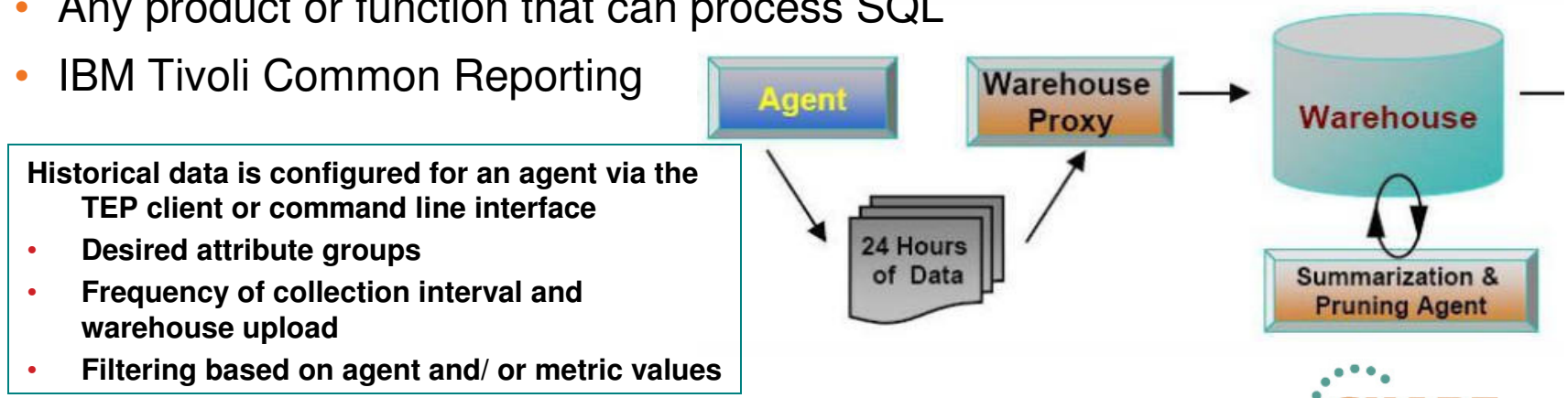
- 3270 view that allows access to data across multiple agents and agent types
  - All sysplexes, all CICS regions, specfic groupings of agents, etc.
  - Drill down to detailed agent data
- Data is retrieved from Hub TEMS
  - Requires Hub TEMS and desired agents to be active and enabled (Runtime Environment customization)
- Enhanced 3270 Address Space provides user interface
  - Only one needed per sysplex
- Define global settings and individual user settings (source Hub, panel views)
- Threshold alerts to highlight information

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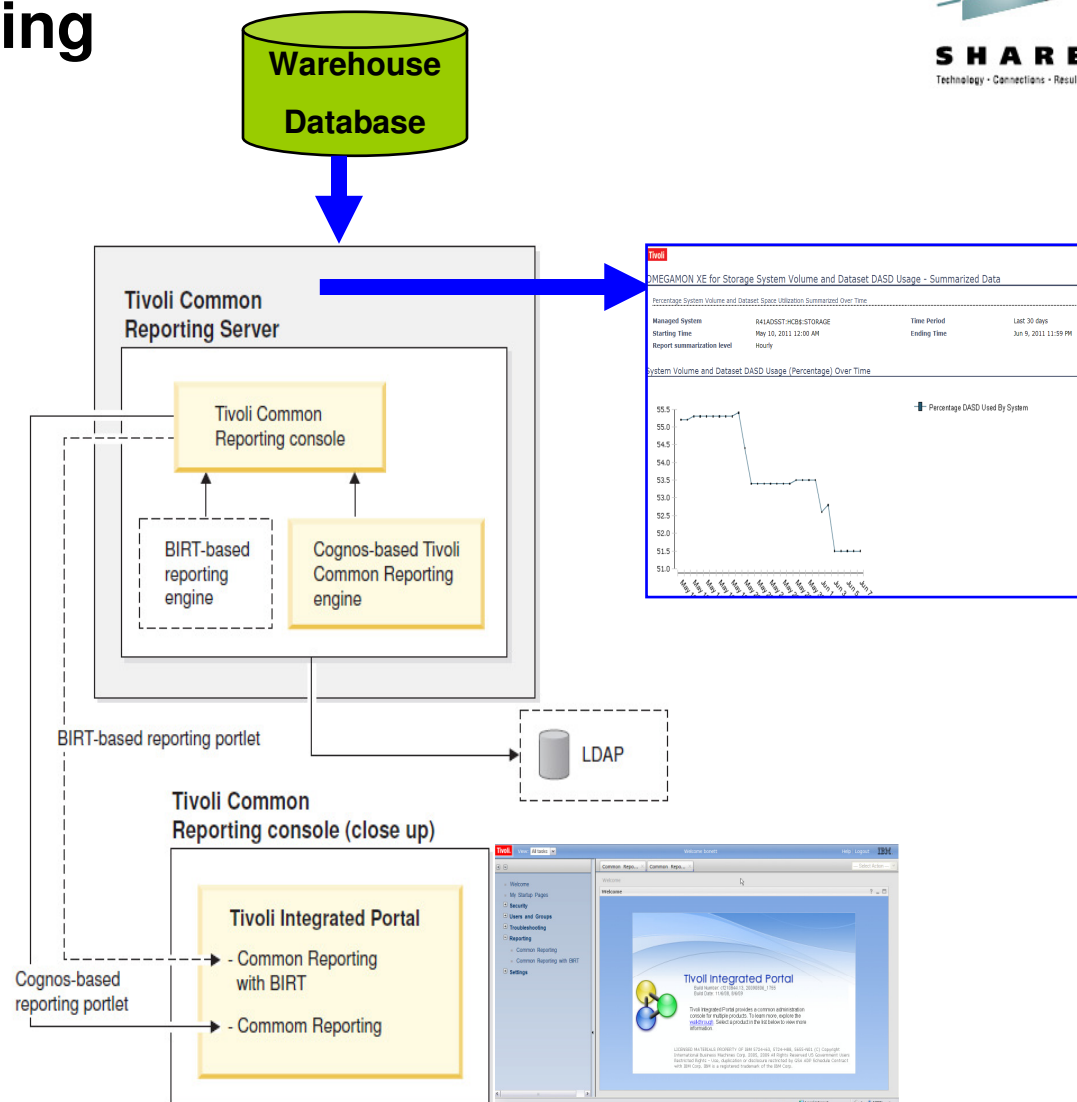
Tivoli Data Warehouse

- Stores any desired agent metrics for long term trending and reporting purposes

- Supports information correlation and trending for incident, capacity and change management purposes

- Components
  - Database: DB2 (z/OS or distributed), Oracle, or SQL Server
  - Warehouse Proxy Agent – offload data from agents and stores in database
  - Summarization and Pruning Agent – summarizes and prunes database

- Data is in relational format and can be reported on by:
  - Any product or function that can process SQL
  - IBM Tivoli Common Reporting

Historical data is configured for an agent via the TEP client or command line interface
- **Desired attribute groups**
- **Frequency of collection interval and warehouse upload**
- **Filtering based on agent and/ or metric values**

Agent → Warehouse Proxy → Warehouse

24 Hours of Data

Summarization & Pruning Agent

Tivoli Common Reporting

- Provided as part of ITM
- A packaged WebSphere application that uses Cognos (TCR 1.3 and later) and BIRT engines to provide reports on data in Warehouse
  - Supported on Linux on System z
- Most agents come with a set of canned reports
- Provided reports can be modified, or new ones developed, to address specific requirements

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Performance Analyzer Agent
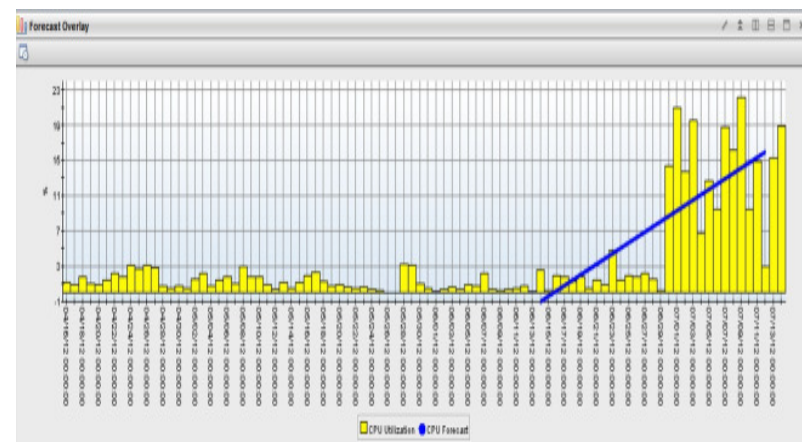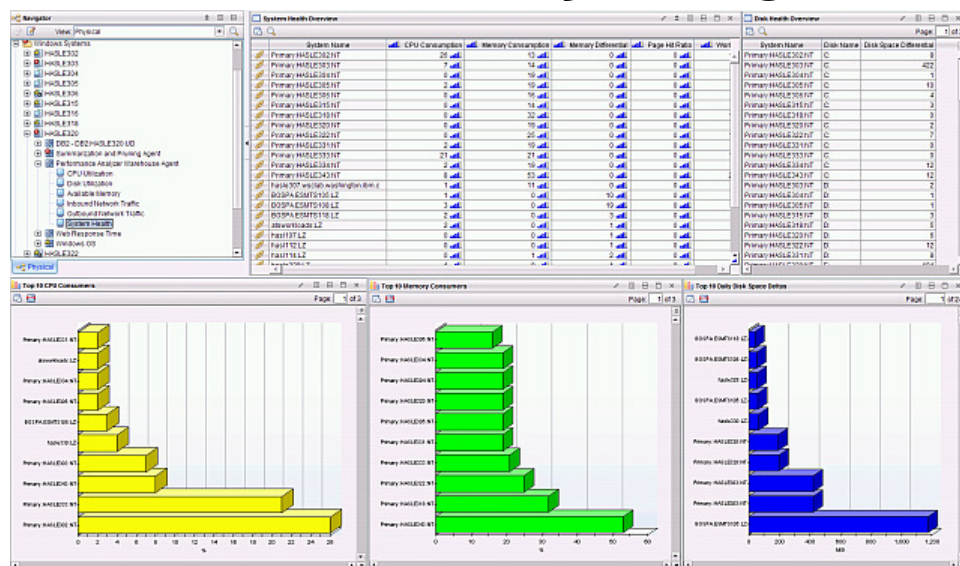
- Provides analytic engine for linear forecasting, basic transformation analysis, and (with SPSS) non-linear forecasting of any metrics collected in the Tivoli Data Warehouse

- Provides medium and long term forecasts within a confidence factor

- Provides predefined workspaces, tasks situations, and TCR reports for Unix, Linux, Windows, DB2 (distributed), Oracle, ITCAM, VMware, System p
  - e.g. can use for forecasting future z/VM or xHyp* Linux guest capacity

- GUI tool in TEP to

  - Create and modify analytical tasks

  - Define trending/forecasting for any warehouse data

Command Line Interface

- **TACMD** function provides a command line driven interface from Windows, Linux, or UNIX to manage and control ITM Functions

- Requires authentication to Hub TEMS

- Supports all actions that can be done from the TEP client and more:
  - Install agent packages into repository
  - Check prerequisites on a target system
  - Deploy new/upgrade existing agents
  - Edit agent configurations
  - Define and control situations and historical data collection
  - Import/export custom navigator views, workspaces, queries, and situation associations
  - Display configured information and execute commands
  - Start and stop agents

- Allows ITM administration to be automated from external products

Installation and Customization

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z/OS Installation

- z/OS components execute within a Runtime Environment (RTE)
  - A set of datasets with TEMS and/or agent code
  - Several RTE configuration options available
    - Full – complete self-contained RTE
    - Base – sharable libraries only, for use with Sharing RTE
    - Sharing – Image-specific libraries, shares with Base RTE, Full RTE, or SMP/E target libraries
- Options for creating/maintaining RTEs and customizing components:
  1. Configuration Tool (ICAT)
     - ISPF menu driven interface
     - Identify agent to be configured
     - Identify RTE to configure agent in
     - Submit jobs to create/update RTE members
     - Batch ICAT option to create new RTEs from existing ones
  2. PARMGEN method
     - Introduced in ITM 6.22
     - Edit a set of PDS members to define RTE and agents to be associated with RTE
     - Execute jobs to create/update RTE members

Non-z/OS Installation

- Standalone Prerequisite Checking
  - Provided to verify platform (Windows, Linux, or UNIX) meets agent installation requirements
  - Currently for Operation System agents only
  - Checking methods
    - Manually executed standalone program run directly on checked platform
    - Remote checking done via **tacmd checkprereq** command
      - *Can be done for individual systems or a group of systems*

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TEPS/TEMS Installation

- Optional: Install on TEPS platform
  - DB2 UDB Version 9.x (provided)
  - SQL Server (option for Windows)
- If using embedded database, DB2 or SQL database client software required if
  - Using DB2 or SQL for TEPS database
  - Accessing TDW from TEPS views
  - "Typical" installation path is fine
  - Take all defaults
  - Upgrade to FPx (or higher level)
- Install TEPS and TEMS
  - Windows: GUI or silent installation process
  - Linux: Command Line or silent installation process

Startup Center

- A graphical user interface tool to guide setup of a new IBM Tivoli Monitoring environment on Windows/Linux/UNIX
  - Not intended for upgrading existing components
- Topology diagrams are used to configure and deploy an initial base IBM Tivoli Monitoring environment
- Runs on both Windows and Linux Intel x86-32 systems
  1. Scan IP range(s) to discover systems, or add systems manually
  2. Assign systems to components (drag and drop)
  3. Provide system access information
  4. Identify installation image repository
  5. Start installation
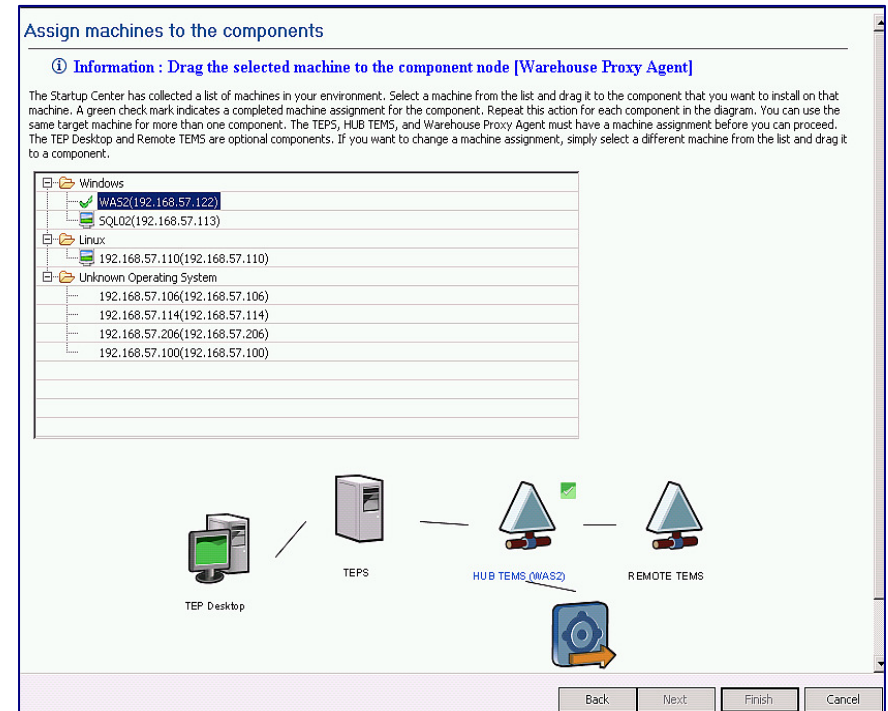
Agent Remote Deployment

- Requires Hub TEMS running on Linux/UNIX/Windows
- Agent packages ('bundles') installed in repositories on any Hub or Remote TEMS
- Commands provided to install/upgrade agents
- Provides for mass and/or automated agent installation
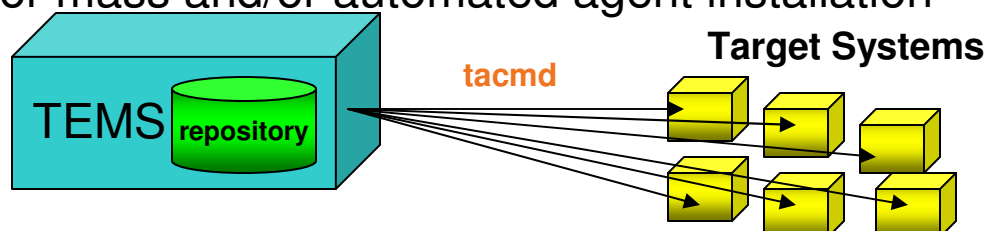
Command	Description
tacmd addBundles	Add one or more deployment bundles to the local agent deployment depot.
tacmd addgroupmember	Add a group member to the specified group.
tacmd addSystem	Deploy a monitoring agent to a computer in your IBM Tivoli Monitoring environment.
tacmd clearDeployStatus	Remove entries from the table that stores the status of the asynchronous agent deployment operations.
tacmd creategroup	Create a new group on the server.
tacmd createNode	Deploy an OS agent to a remote computer.
tacmd getDeployStatus	Display the status of the asynchronous agent deployment operations.
tacmd listBundles	Display the details of one or more deployment bundles that are available for deployment to the local deployment depot.
tacmd login	Log on to a monitoring server and create a security token used by subsequent commands.
tacmd removeSystem	Remove one or more instances of an agent or uninstall an agent from a managed system.
tacmd viewDepot	Display the types of agents you can install from the deployment depot on the server which you are logged on to.

Agent Application Support Installation/Upgrade
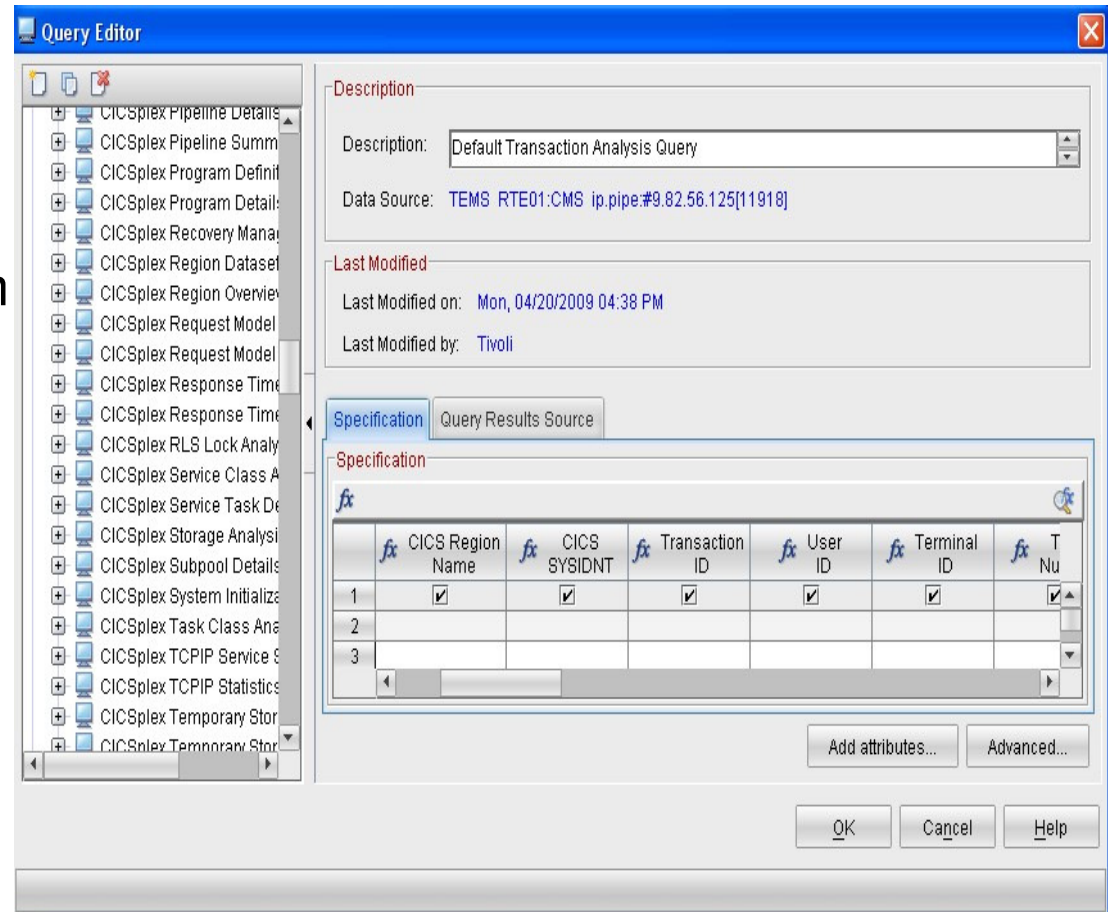
- Prior to ITM 6.23

	TEMS on z/OS	TEMS on non-/zOS and TEPS
Agent on z/OS	Product configuration (ICAT or PARMGEN)	Install from product/fixpack media
Agent on non-z/OS	Remotely install from TEPS platform	Install from product/fixpack media

- ITM 6.23

  - Self-describing agent function added (support being added to agents in new releases)
    - TEPS/TEMS support receiving and updating application support from agents with self-describing function
    - Agents provided with as part of ITM 6.23 contain function
  - Application support can be automatically installed on TEMS and TEPS when agent first connects
    - Function enabled via Hub TEMS parameter

Custom Queries

- Metrics are retrieved for viewing via queries to agent attributes
- Custom queries can be developed to display data from
  - Agents (individual or multiple agents of same type)
  - Hub TEMS Enterprise Information Base
  - Data Warehouse
  - ODBC or JDBC data sources
- Filtering at query time and/or in view to customize actual data being displayed

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Custom View Example

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Custom View Example

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Operational Integration

Situations

- Allow notifications to be generated based on values of one or more metrics in an attribute group
- Done via TEP or tacmd commands
- Notifications can be an alert on the TEP, a message in the ITM message view, EIF event, or reflex automation
- Text documentation or instructions can be associated with a situation
- Selective distribution to individual targets or groups
- Every agent comes with a set of predefined situations
- Existing situations can be modified, or new ones added
- Reflex automation allows a command to be executed at the command interface of the agent or the TEMS it is connected to
  - For z/OS, console command
    - security authentication is provided via NetView for z/OS

Name

DEMO_Queue_Depth_Warn

Description

A WebSphere MQ queue has too many messages

Formula

fx

	Current Depth	Queue Name	Current Depth
1	> 10	abc ... PLCYMGMT	<= 500
2			
3			

Action Selection

◉ System Command   ○ Universal Message

System Command

[   ]

[Attribute Substitution...]

If the condition is true for more than one monitored item:

◉ Only take action on first item
○ Take action on each item

Where should the Action be executed (performed):

◉ Execute the Action at the Managed System (Agent)
○ Execute the Action at the Managing System (TEMS)

If the condition stays true over multiple intervals:

◉ Don't take action twice in a row (wait until situation goes false then true again)
○ Take action in each interval

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Workflow Policies

- Connect multiple situations and actions in a flow
- Allows correlation across multiple agents
  - Situation from one agent can trigger actions in other agents
  - Situations from multiple different agents can be combined to trigger one or more actions

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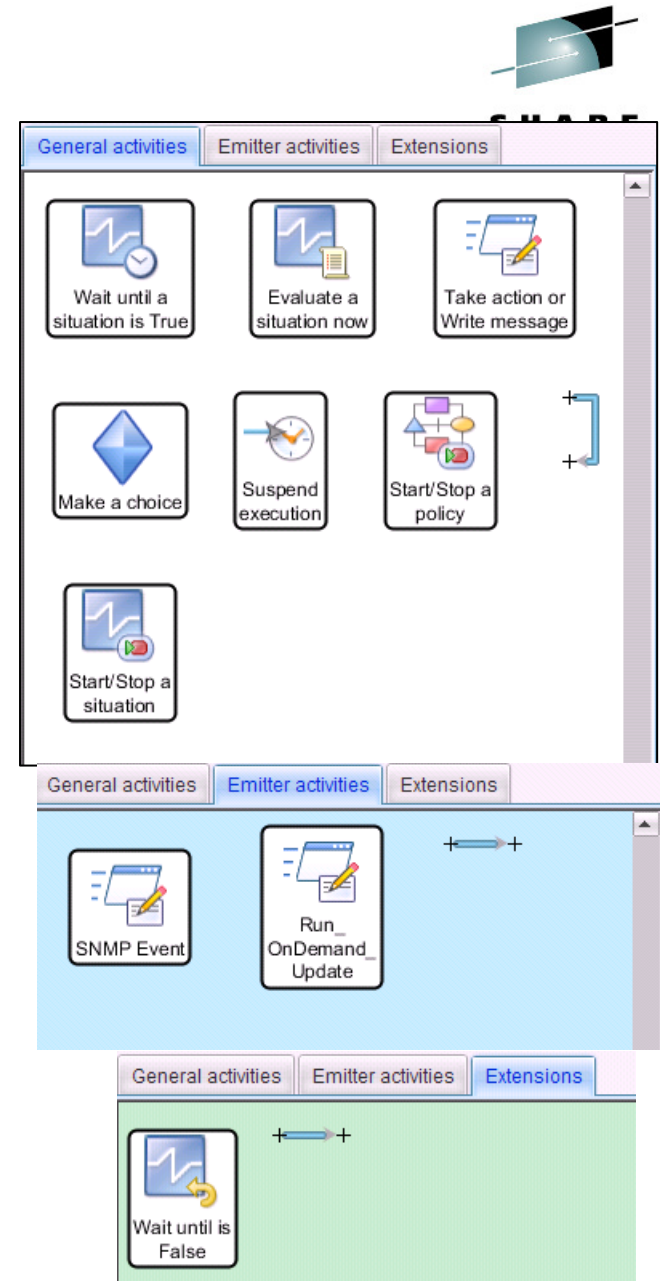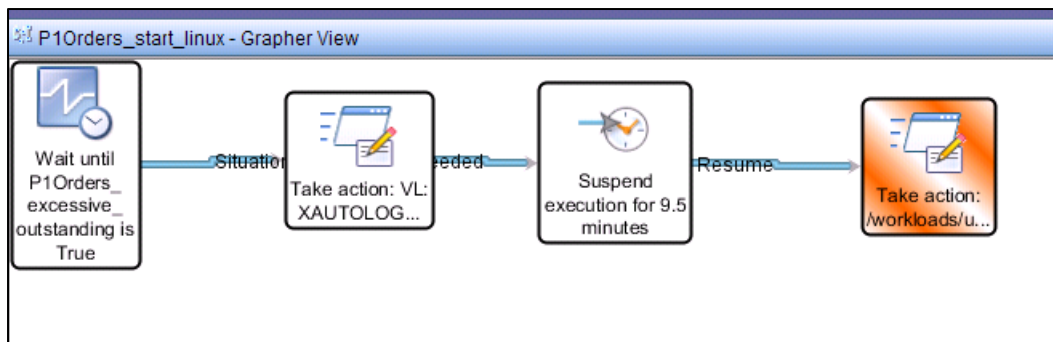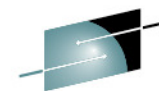
Actions

- z/OS Commands can be issued from the TEP to z/OS
  - Manually (Take Action)
  - Triggered by a Situation
- "One way" (command response is not captured)

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Event Integration

- **Event Integration Facility (EIF)**
  - A Situation can send an EIF event to multiple EIF receivers when triggered
    - Maps situation attributes to EIF event slots
  - Event synchronization between ITM and Netcool/OMNIbus or TEC
    - e.g. close situations when EIF event is closed in those products
  - Agents can be enabled to send EIF events directly to EIF receivers
  - Common Event Console view shows Netcool/OMNIbus and TEC events along with ITM events
- **SNMP**
  - Universal Agent provides a SNMP Emitter, which can be used in workflow policies to send SNMP traps
  - Agents can be enabled to directly send SNMP events
  - Other integration is possible via command execution from situations and take actions
  - Information from situation or view can be passed to executing function

Netcool/ OMNIbus

Tivoli Enterprise Console

NetView for z/OS

3rd Party EIF Receiver

SNMP Manager

Custom

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SOAP Integration

CT_SOAP Generic SOAP Client

*Note: Have the **Access data sources across domains** enabled in IE's security settings. This setting is disabled by default. If disabled, you'll get an **access denied** error when pressing the Call Method button.*

Enter your SOAP Request here:

Enter SOAP request details manually below... or select

Endpoint:
http://hasl125:11920/soap

Interface:
CT_SOAP

Method:
CT_Get

Payload (XML):
```
<CT_Get>
<userid>sysadmin</userid>
<password>secretpw</password>
<object>Address_Space_CPU_Utilization</object>
<attribute>Job_Name</attribute>
<attribute>JESJOBID</attribute>
<attribute>CPU_Percent</attribute>
```

[Make SOAP Request]

SOAP Request Headers

POST http://hasl125:11920/soap HTTP/1.1

MethodName: CT_Get
InterfaceName: CT_SOAP
MessageType: Call
Content-Type: text/xml-SOAP

Your Soap Response Payload:

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/"  SOAP-
ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"> <SOAP-
ENV:Body><SOAP-CHK:Success xmlns:SOAP-CHK
= "http://soaptest1/soaptest/" xmlns="urn:candle-
soap:attributes"><TABLE name="KM5.ASCPUUTIL">
<OBJECT>Address_Space_CPU_Utilization</OBJECT>
<DATA>
<ROW>
<Job_Name>R41ADSST</Job_Name>
<JESJOBID>STC14606</JESJOBID>
<CPU_Percent dt="number">1.3</CPU_Percent>
</ROW>
<ROW>
<Job_Name>WLM</Job_Name>
<JESJOBID></JESJOBID>
<CPU_Percent dt="number">0.4</CPU_Percent>
</ROW>
</DATA>
</TABLE>
</SOAP-CHK:Success></SOAP-ENV:Body></SOAP-ENV:Envelope>
```

SOAP Response Headers

Status: 200 KDH1_STC_OK

Server: KDH/6100.7 (tms_ctbs622mdx:d1130a)
Date: Mon, 12 Sep 2011 03:20:39 GMT
Cache-Control: cache
Content-Type: text/xml
Transfer-Encoding: chunked

- Hub TEMS can be configured as a SOAP Server
  - Can also direct SOAP requests to other Hub TEMS
- Access to ITM data and functions via SOAP calls
- Results returned in XML format

ITM Audit Tools

- Available from the Integrated Service Management Library website
- Retrieves data from TEMS, TEPS, and the Data Warehouse to show current configuration and connectivity
- Highlights areas where problems may exist examples:
  - Topology (e.g. agents offline for long periods)
  - TEMS and Agent connectivity and response time
  - TEMS Servers (e.g. situation statistics)
  - Exceptions Analysis (e.g. situations never fired)
  - Distributions (e.g. situations distributed to agents)
  - Situation and Policy Testing
  - Outages (infrastructure availability)
  - TEPS (e.g. installed application support analysis, user login information)
  - Stressed resources (from analyzing TDW data)
  - Warehouse information (e.g active collections)
- Provides batch tools for additional analysis
- Sessions can be saved

Auditing Tools

ITM Super Tool : ▶ Version 06.01.41

Launch BATCH TOOLS-- >> | ▶ Taudit for Errors | ▶ Taudit for Enterprise | ▶ Taudit for Situation Distributions | ▶ Taudit for History Missing | ▶ Taudit for Warehouse | ▶ TEMS Memory Tracking | ▶ z CPU Analysis | ▶ Agent Contactability

Errors | Topology | Connectivity | TEMS Servers | Exceptions Analysis | Distributions | Situation/Test | Policy/Test | Agents/Response | Outages | TEPS | Stressed/Resources | Warehouse | Tivoli Servers | Save Session

Systems

- ▶ -- 1 Warehouse Systems
- ▶ -- hasle330:Warehouse
- ⊞ -- 5 TEMS Systems
- ⊞ -- 12 Windows Systems
- ⊞ -- 4 UNIX Systems
- ⊞ -- 11 MQM Systems
- ⊞ -- 3 UNIX LOG Systems
- ⊞ -- 5 ZOS-M5 Systems
- ⊞ -- 6 DB2-D5 Systems
- ▶ -- 1 UDB Systems
- ▶ -- DB2:HASLE320:UD
- ⊞ -- 12 Linux Systems
- ⊞ -- 6 Storage-S3 Systems
- ⊞ -- 6 MainframeNetwork-N3 Systems
- ⊞ -- 7 MVS_HLTH Systems
- ⊞ -- 5 MQ_CONFIG Systems
- ▶ -- 1 REMEDY Systems
- ▶ -- hasle302POSTdp:MAS00
- ⊞ -- 4 MQSI Systems
- ⊞ -- 6 ITCAM_WEBSPHERE Systems
- ▶ -- 1 S&P Systems
- ▶ -- HASLE320:SY
- ⊞ -- 6 ITCAM_SOA Systems
- ▶ -- 1 EM_ROBOT Systems
- ▶ -- hasle316:T6
- ⊞ -- 2 EM_WRM Systems
- ⊞ -- 3 VMWARE_VI Systems
- ⊞ -- 5 EM_SERVER Systems
- ▶ -- 1 OMXE_VM Systems
- ▶ --
- HASL113.WSCLAB.WASHINGTON.IBM.C
- ▶ -- 1 PERF_ANALYTICS

Tools Index

Situation Error Statistics HUB at RTE01:CMS

REMOTE_HASLE315, 06.22.05	0.672 Seconds	REMOTE_HASL104, 06.22.05	0.187 Seconds	RTE01:CMS, 06.22.05	0.703 Seconds	RTE02:CMS, 06.22.05	0.641 Seconds	SYSC:CMS, 06.22.05	
Error Situations:	3	**Error Situations:**	12	**Error Situations:**	0	**Error Situations:**	14	**Error Situations:**	
UADVISOR_KYJ_KYJAPSRV	1	UADVISOR_KT4_T4APPCS	1			_Z_HSM_ACTVTY16	1	_Z_HSM_ACTVTY1	1
UADVISOR_KYJ_KYJGCACT	1	UADVISOR_KT4_T4SRVCS	1			_Z_HSM_ACTVTY20	1	_Z_HSM_ACTVTY10	1
UADVISOR_KYJ_KYJREQHIS	1	UADVISOR_KT4_T4SUBTXCS	1			_Z_HSM_ACTVTY3	1	_Z_HSM_ACTVTY14	1
		UADVISOR_KT4_T4TXCS	1			KHL_CF_Paths_Problem	1	UADVISOR_KS3_HSM_ACTVT	
		UADVISOR_KT5_T5APPCS	1			KHL_CF_Policy_Reformat	1	UADVISOR_KT4_T4APPCS	1
		UADVISOR_KT5_T5CLNTCS	1			KHL_CF_Structures_Problem	1	UADVISOR_KT4_T4SRVCS	1
		UADVISOR_KT5_T5SRVCS	1			KHL_CF_Systems_Problem	1	UADVISOR_KT4_T4SUBTXCS	
		UADVISOR_KT5_T5SUBTXCS	1			KHL_XCF_Paths_Problem	1	UADVISOR_KT4_T4TXCS	1

Catalog Comparisons

REMOTE_HASLE315	22.062 Seconds V5	REMOTE_HASL104	4.547 Seconds V5	RTE01:CMS	8.828 Seconds V5	RTE02:CMS	9.984 Seconds V5	SYSC:CMS	2.594 Seconds V5
No of Apps	= 97	No of Apps	= 73	No of Apps	= 100	No of Apps	= 37	No of Apps	= 25
ABA [351]	10/07/05 15:54:26	ABA [351]	10/07/05 15:54:26			DWC00[68]	Missing	DWC00[68]	Missing
						GAR00[39]	Missing	GAR00[39]	Missing
ABH [347]	10/07/05 15:54:26	ABH [347]	10/07/05 15:54:26			IBM00[11]	Missing	IBM00[11]	Missing
						INT00[22]	Missing	INT00[22]	Missing
AMA [56]	10/07/05 15:54:26	AMA [56]	10/07/05 15:54:26			KA4[1027]	Missing	KA4[1027]	Missing
						KHD[94]	Missing	KHD[94]	Missing
AMB [83]	10/07/05 15:54:26	AMB [83]	10/07/05 15:54:26			KHT[136]	Missing	KHT[136]	Missing
						KLZ [870]	10/23/08 HUB=875 15:09:30	KLZ[875]	Missing
AMD [14]	10/07/05 15:54:26	AMD [14]	10/07/05 15:54:26			KNO[225]	Missing	KNO[225]	Missing
						KNT [1773]	10/23/08 HUB=1778 15:14:40	KNT[1778]	Missing
AMN [32]	10/07/05 15:54:26	AMN [32]	10/07/05 15:54:26			KOQ[573]	Missing	KOQ[573]	Missing
						KOR[1179]	Missing	KOR[1179]	Missing
AMS [30]	10/07/05 15:54:26	AMS [30]	10/07/05 15:54:26			KOY[736]	Missing	KOY[736]	Missing
						KP5[144]	Missing	KP5[144]	Missing
AMW [205]	10/07/05 15:54:26	AMW [205]	10/07/05 15:54:26			KPA[268]	Missing	KPA[268]	Missing
								KPH[55]	Missing

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Best Practices Summary

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Hub TEMS Considerations

- Placement based on
  - Security
    - User access controlled via Hub TEMS platform security or LDAP
  - Resource availability
    - processor, memory, storage
  - Data conversion considerations
    - ASCII<->EBCDIC translation between components
  - Network topology
    - Impact of firewalls, NAT, agent locations
  - Failover capabilities
    - Manual restart vs automated
  - Remote deployment for agents
    - Requires HUB on non-z/OS platform
- Minimize number of directly connecting agents

Remote TEMS Considerations

- Define at least 2 for availability and performance
  - Offload work from Hub TEMS
  - Agents can have primary and backup TEMS defined
- One TEMS per z/OS image
  - z/OS and Storage agent must run within TEMS address space
  - Agents can have primary and backup TEMS defined
- Rule of Thumb: 500-1500 agents per remote TEMS
  - Processor speed more a factor than memory or storage
  - Workload depends on event arrival rate, situation processing, workflow policy processing, client, action commands running on the TEMS server,…
  - Start with relatively few agents and measure performance before moving toward a final workload level target
    - Continue to measure performance over time and make adjustments to match goals
- On z/OS TEMS should be at a higher workload priority than agents
- Network topology
  - Locate Remote TEMS as close to connecting agents as possible
    - Acts as a concentrator for NAT/firewall/geographical locations

TEP Client Considerations

- **Java Webstart is recommended client**
  - Automatically keeps synchronized with TEPS when agents are added/upgraded/removed
  - Easier to manager multiple clients going to different TEPS – files are stored separately
- **Browser is next best option**
  - Best for users with limited access or smaller client platforms
  - Conflicts can arise when trying to use with multiple TEPS at different levels, or other Java based browser
  - Not as fast as desktop or webstart clients
- **Desktop client issue: staying in sync with TEPS**
  - Must manually install updated application support files
  - Difficult having multiple desktops going to different TEPS

Agent Considerations

- For agents on z/OS:
  - Run agents in separate address space (except z/OS and Storage)
  - TEMS agent reports to should be on z/OS
- Collect historical data at agent to reduce performance impact on TEMS
- Define primary and backup TEMS for availability
  - Agent will connect to backup if primary is not available
- Keep agent application support synchronized on TEP and TEMS
  - Otherwise will have missing data
  - Requires installing application support on TEPS and TEMS whenever agent upgrade/fixpack provides new application support
  - Use Monitoring Server workspaces and ITM Audit Tools to validate
  - **ITM 6.23 adds self-describing agent function**
- Determine how much of the "default" monitoring is really needed
- Agent autonomous operation
  - Agent monitors and send events when not connected to a TEMS

Historical Data Collection Considerations

- Collect data at agent where possible
    - For z/OS TEMS and Agents, persistent datastore datasets must be defined
- Only collect data that will be used
- Use the Warehouse Load Projections Spreadsheet or agent users guides to estimate warehouse database size
    - Manage size via pruning
- Use multiple WPAs based on number of agents
    - Assign a WPA to each TEMS to collect from connected agents
- Data compression can be enabled between agents and WPA to reduce network traffic
    - Tradeoff is increased processor use at agent and WPA
- Only summarize on intervals needed for reporting or capacity planning
- Use standard database policies/procedures for tuning and archiving beyond ITM capabilities
- Apply documented WPA and SPA performance and tuning options

Summary

- IBM Tivoli Monitoring provides a platform for consolidated end-to-end monitoring across System z and distributed environments

- Fully supports monitoring of z/OS, z/VM and Linux on System z, and application operating system platforms and components running across a zEnterprise

- System z and zEnterprise can act as a "manage from" platform to manage itself and other operating system platforms and networks

- Data, event, automation, and historical analysis can be integrated with other products

- Be sure to plan and guidelines and best practices experiences to get the most out of IBM Tivoli Monitoring

For Further Information

- IBM Tivoli Monitoring and OMEGAMON XE Information Center
  - http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?toc=/com.ibm.itm.doc/toc.xml
- IBM Tivoli Monitoring: Implementation and Performance Optimization for Large Scale Environments
  - http://www.redbooks.ibm.com/abstracts/sg247443.html
- IBM Tivoli Monitoring Wiki
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/Tivoli%20Monitoring
- Tivoli System z Monitoring and Application Management Wiki
  - https://www.ibm.com/developerworks/wikis/display/tivoliomegamon/Home
- Flashes, Technotes, and White Papers on IBM Techdocs
  - http://www.ibm.com/support/techdocs (search on "IBM TIvoli Monitoring", "ITM",or "OMEGAMON")
- YouTube videos (search "IBM Tivoli Monitoring" and/or "OMEGAMON")
- IBM Integrated Service Management Library
  - https://www.ibm.com/software/brandcatalog/ismlibrary/

System z Social Media

- System z official Twitter handle:
  - **@ibm_system_z**

- Top Facebook pages related to System z:
  - **Systemz Mainframe**
  - **IBM System z on Campus**
  - **IBM Mainframe Professionals**
  - **Millennial Mainframer**

- Top LinkedIn Groups related to System z:
  - **Mainframe Experts Network**
  - **Mainframe**
  - **IBM Mainframe**
  - **System z Advocates**
  - **Cloud Mainframe Computing**

- YouTube
  - **IBM System z**

- Leading Blogs related to System z:
  - **Evangelizing Mainframe (Destination z blog)**
  - **Mainframe Performance Topics**
  - **Common Sense**
  - **Enterprise Class Innovation: System z perspectives**
  - **Mainframe**
  - **MainframeZone**
  - **Smarter Computing Blog**
  - **Millennial Mainframer**

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Tivoli System z Session at SHARE

Monday
- 11:00   11207: Automating your IMSplex with System Automation for z/OS   Platinum 7
- 1:30   11832: What's New with Tivoli System Automation for z/OS   Elite 1
- 3:00   11886: Improve Service Levels with Enhanced Data Analysis   Elite 1

Tuesday
- 9:30   11792: What's New with System z Monitoring with OMEGAMON   Elite 1
- 11:00   11791: Tuning Tips To Lower Costs with OMEGAMON Monitoring   Platinum 8
- 1:30   11900: Understanding Impact of Network on z/OS Performance   Grand Salon A

Wednesday
- 9:30   11835: Automated Shutdowns using either SA for z/OS or GDPS   Elite 1
- 1:30   11479: Predictive Analytics and IT Service Management   Grand Salon E/F
- 1:30   11899: Top 10 Tips for Network Perf. Monitoring w/ OMEGAMON   Platinum 9
- 4:30   11836: Save z/OS Software License Costs with TADz   Elite 1

Thursday
- 9:30   11905: Using NetView for z/OS for Enterprise-Wide Mgmt and Auto   Grand Salon A
- 11:00   11909: Get up and running with NetView IP Management   Grand Salon A
- 11:00   11887: Learn How To Implement Cloud on System z   Grand Salon E/F

Friday
- 9:30   11630: Getting Started with URM APIs for Monitoring & Discovery   Elite 1

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