z/VSE Automation Options and Monitoring Enhancements

zDO01

Wilhelm Mild
mildw@de.ibm.com

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Agenda

- Process Automation
- z/VSE Monitoring

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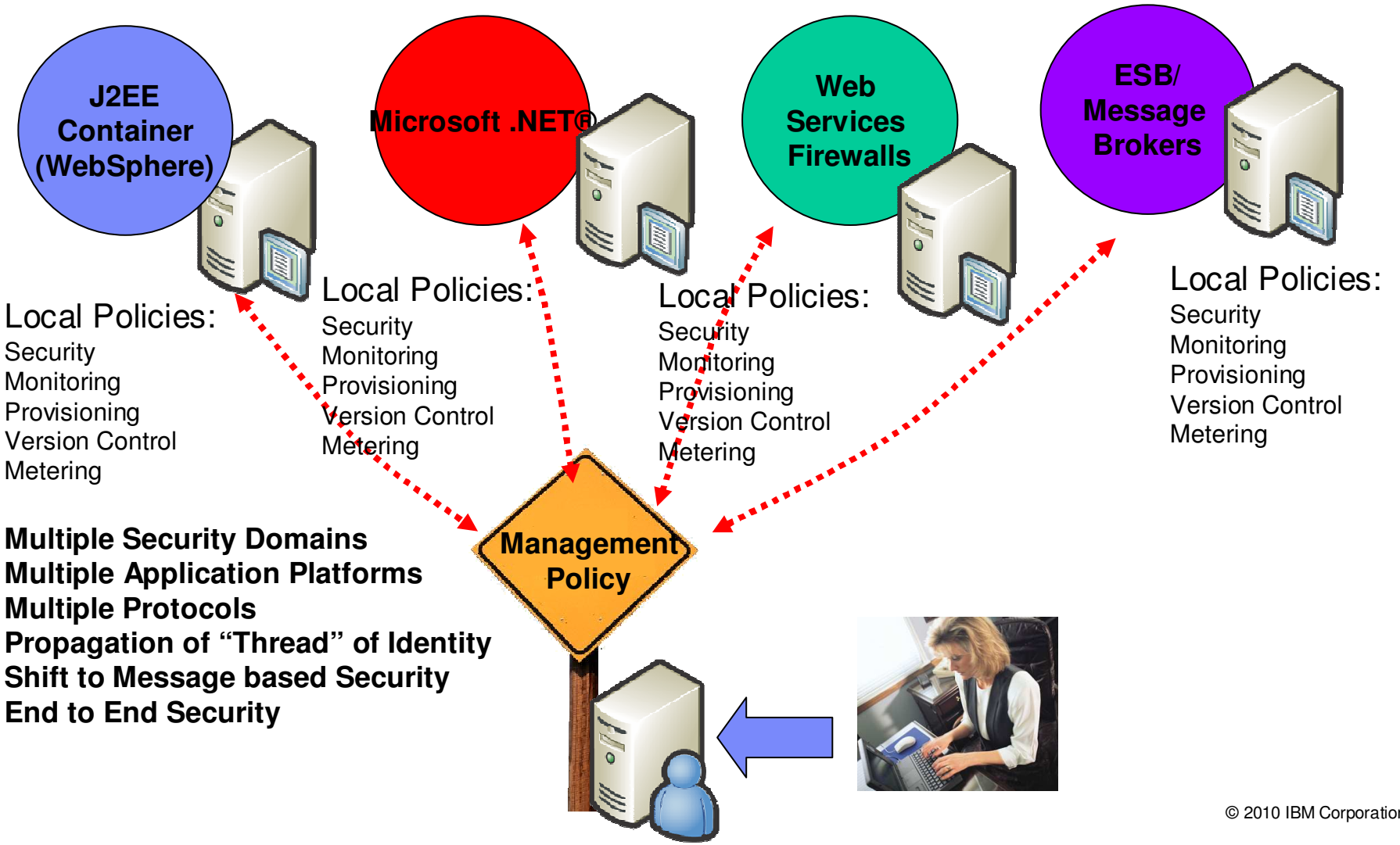
Composite Application Integration Challenges



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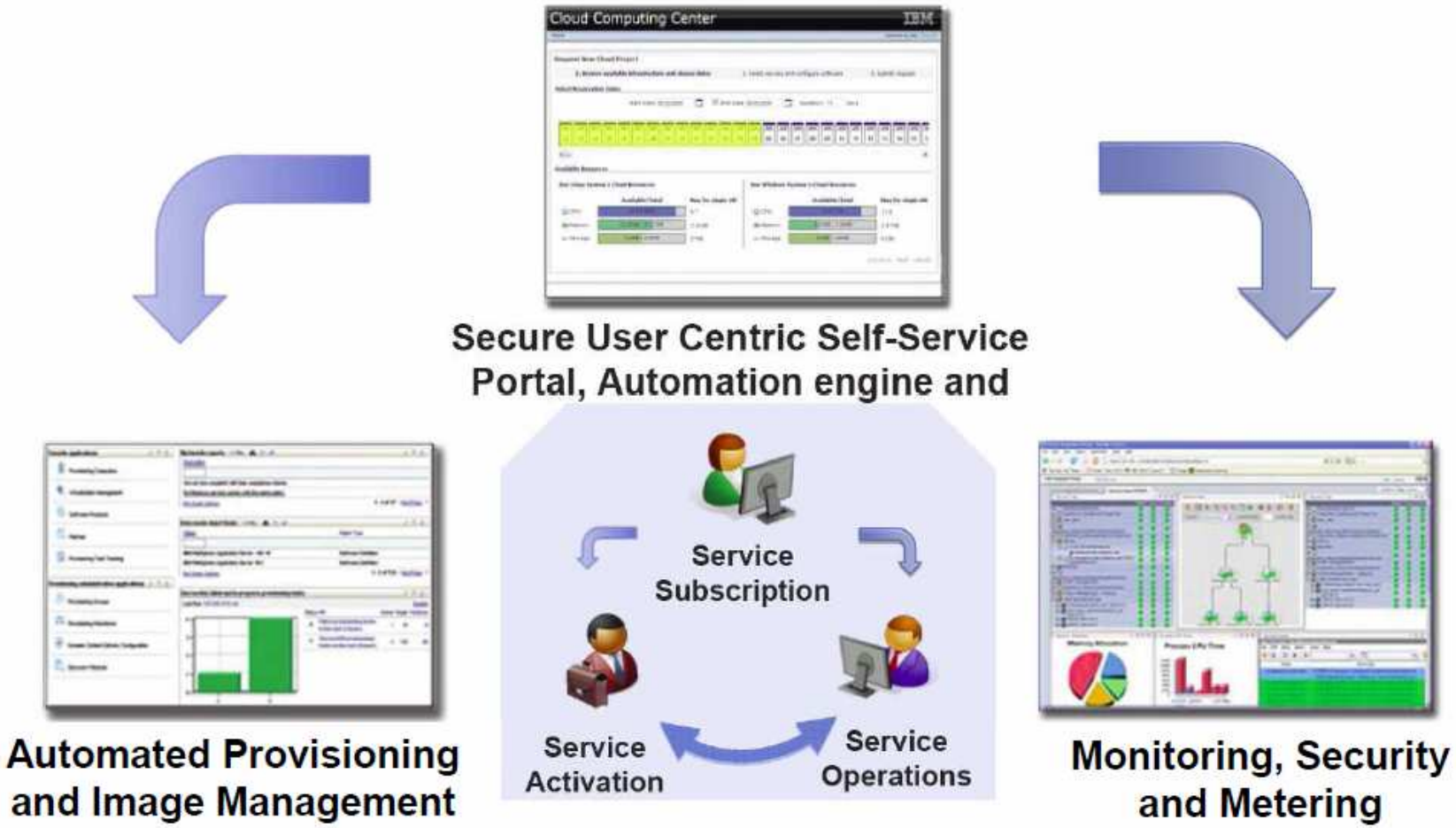
Integrated Service Management Drives Client Interaction with the Platform



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Commonly accepted architectural overview of IT layers

Workloads

- Web 2.0 Collaborative Innovation
- Software Development
- Virtual Classroom
- Data Intensive Processing
- High Volume Transactions

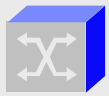
Service Management

- Request UI Operations UI
- Service Catalog & Automation
- Provisioning
- Monitoring & Metering
- Security
- SLA Mgmt
- Capacity Planning

Virtualization


Virtual Servers


Virtual Storage


Virtual Networks

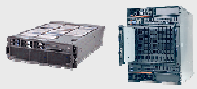

Virtual Applications & Middleware


Virtual Clients

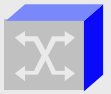
Physical Layer


Non-IBM Servers


IBM System z Power Systems


System x, BladeCenter


IBM & Other Storage


Networking

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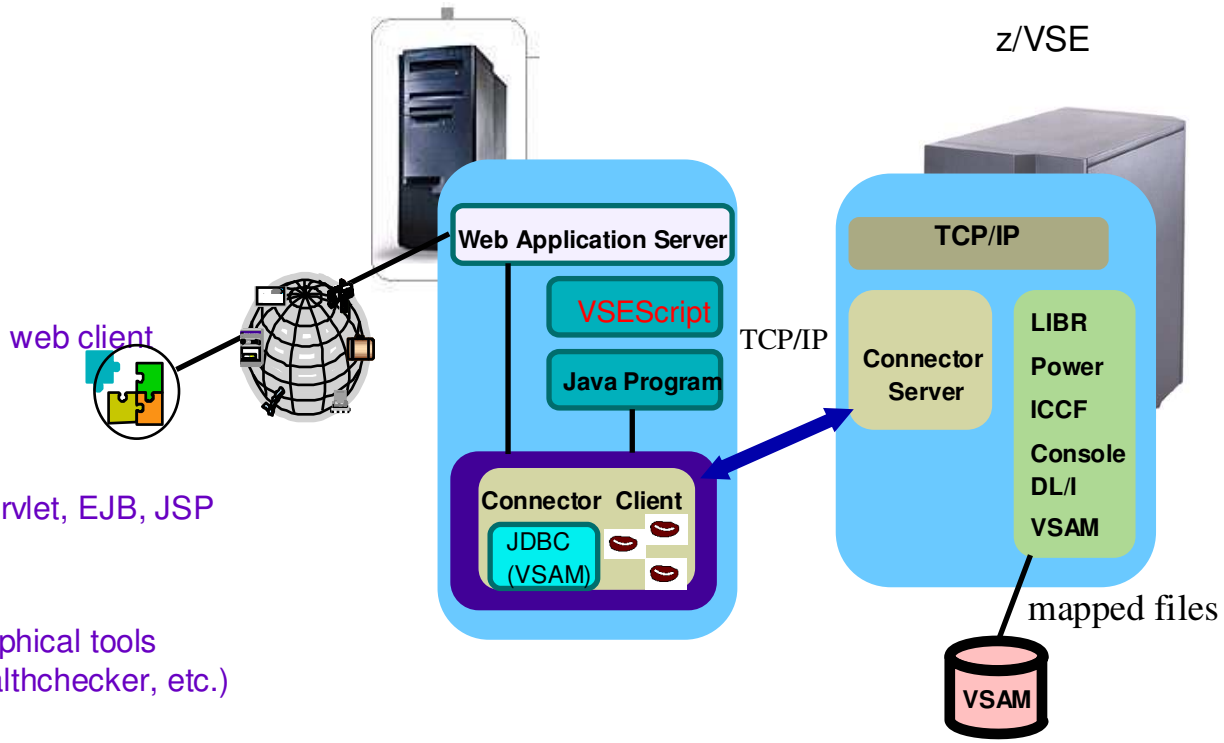
Automation through - Real time access to z/VSE Resources with the Java–Based Connector



- HTML
- Java applet, servlet, EJB, JSP
- JDBC
- VSEScript
- specialized graphical tools (Navigator, Healthchecker, etc.)

- real time access to VSE resources from remote systems ,
  - real time access to VSAM data, Librarian
  - monitoring and analyzing possibilities using console or statistic values

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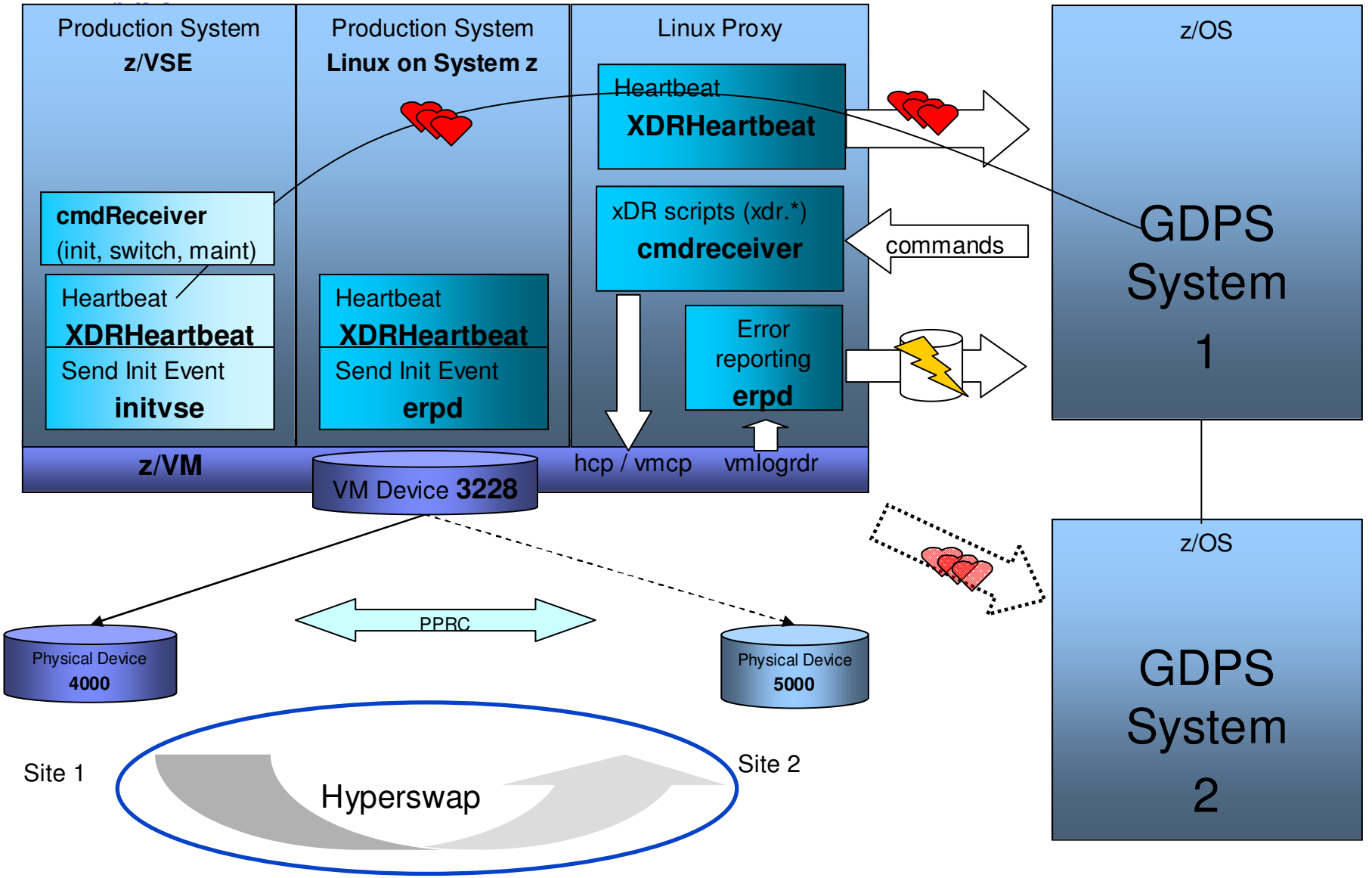
Automated DASD site switch: xDR Support for z/VSE as active guest under



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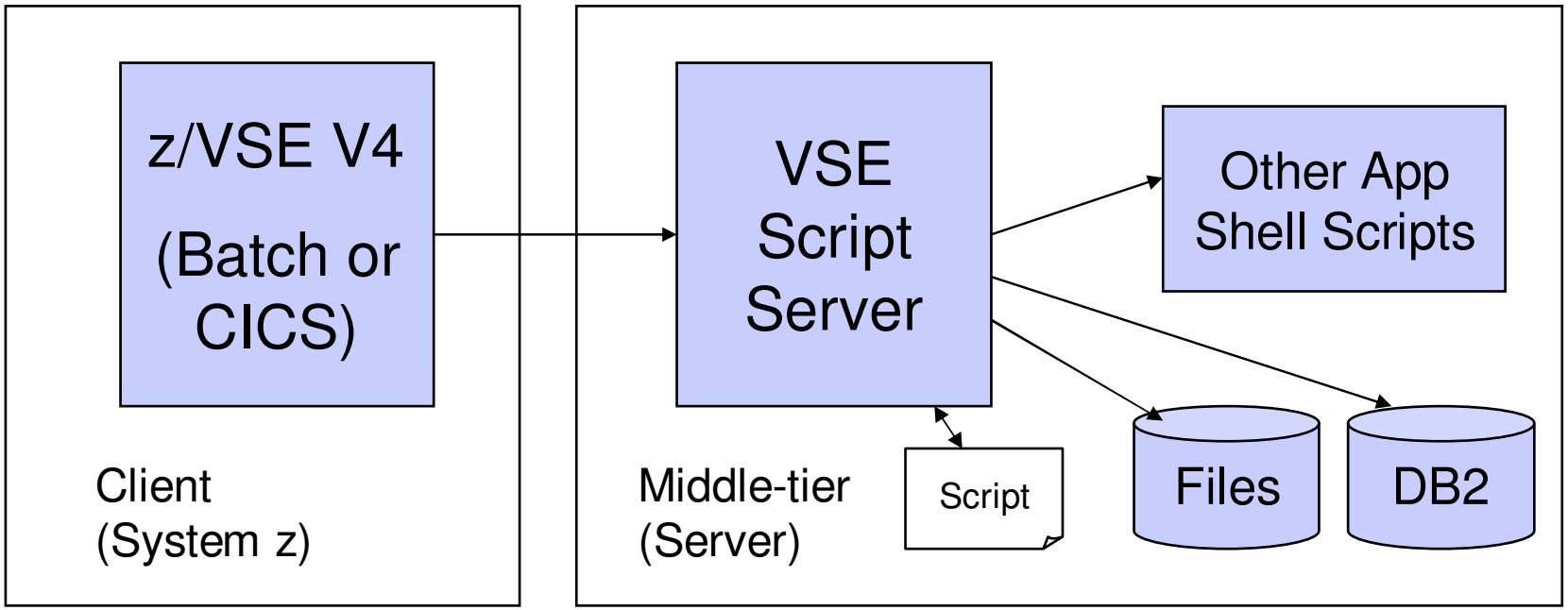
Process Automation – remote invocation from VSE

- With z/VSE V4 we provide a Script client that runs on VSE
  - Allows to start scripts on remote systems and return resultsets and return codes



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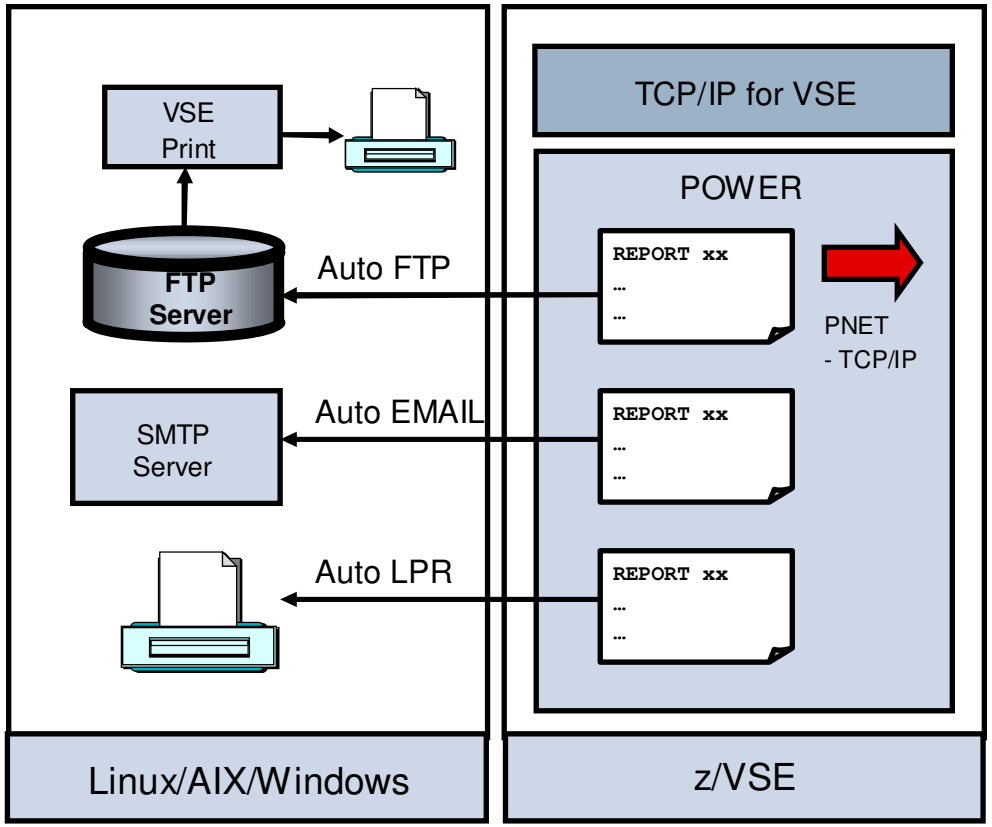
Automation of z/VSE Power Output
-Functions integrated in TCP/IP for VSE

- The POWER entry will automatically be processed by a predefined script.
- An Event class defines which script will be used.



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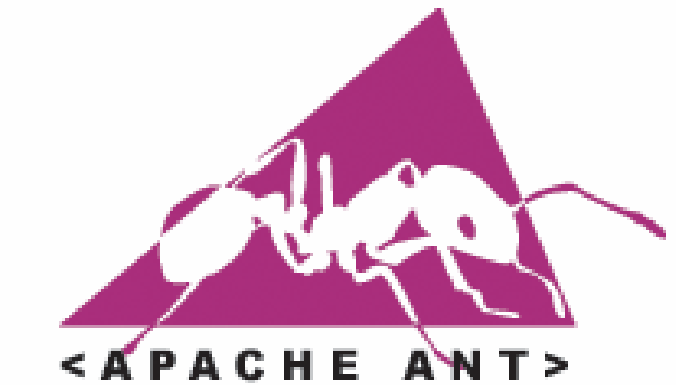
VSE ANT Tasks

- Apache ANT is an Java-based Open-Source Build-Tool, similar to Make.
  - Originally intended for automated build (compile) of Java code
  - ANT provides Java-Classes (Tasks) for automating different things
  - Build-Scripts are formulated in XML
  - Web Page: http://ant.apache.org/
- z/VSE provides a set of ANT-Tasks to automate VSE specific operations
  - Submit VSE Jobs
  - Upload & Download members and files
  - Issue console commands and retrieve messages
  - Access VSAM data
- Allows to automate VSE processes from a central place




```
<submit jobfile="c:\vsejobs\define_vtape.job"
            waitforoutput="true"
            outfile="c:\vsejobs\output\definetape.txt"
            propertyprefix="definetape.job"
            vsesystem="TESTVSE1"/>

<condition property="definetape.failed">
   <not>
     <equals arg1="${definetape.job.maxrc}"
             arg2="0000"/>
   </not>
 </condition>

 <fail if="definetape.failed"
       message="Define VTAPE failed with
                MAXRC=${definetape.job.maxrc}."/>
```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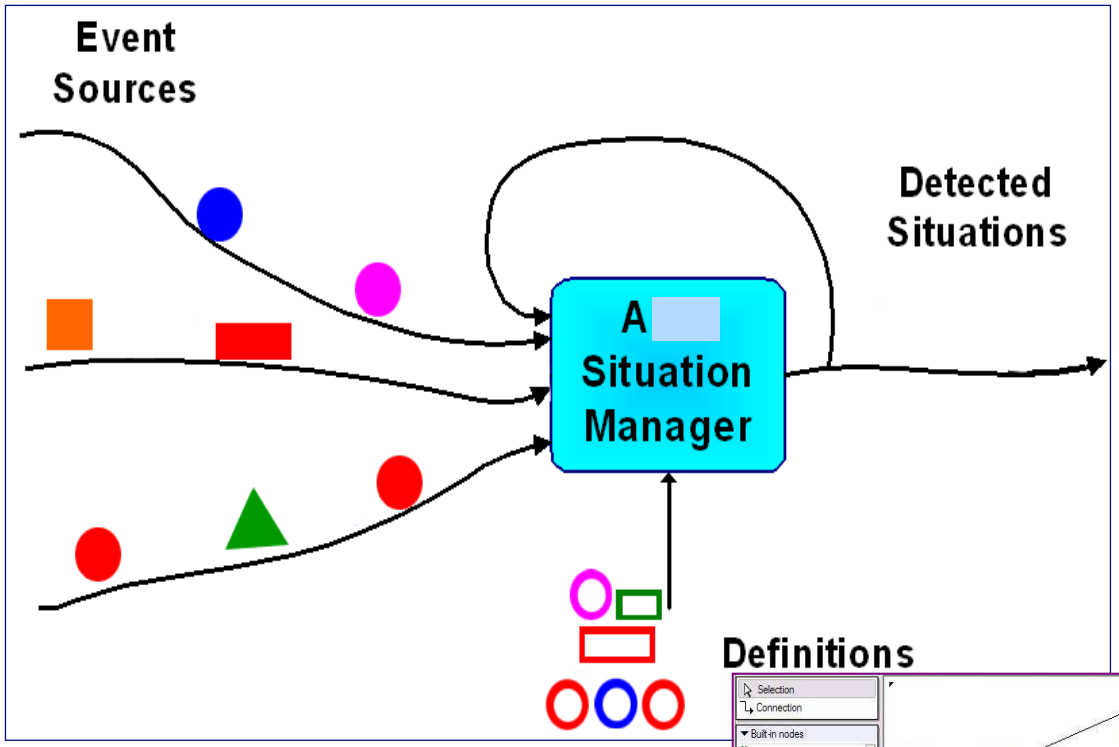
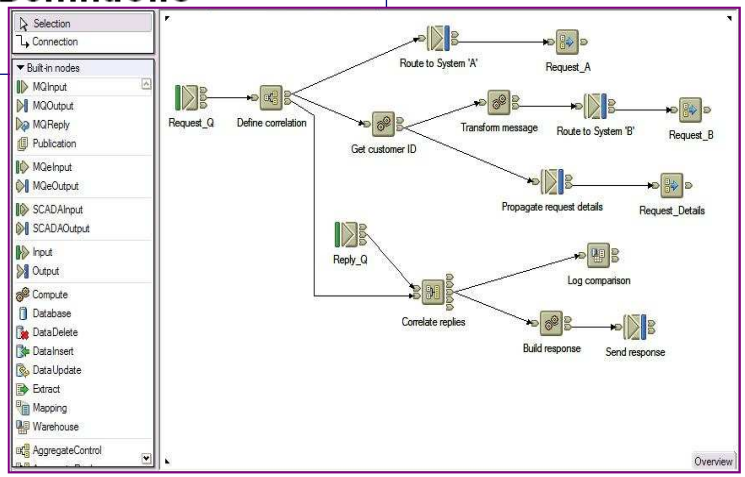
WebSphere Message Broker – intelligent routing





1. **A framework for processing MQ messages**
2. **A robust hosting environment for:**
   - ✓ Transforming data
   - ✓ Enriching data
   - ✓ Interacting with databases
   - ✓ Routing messages based on content
   - ✓ Detecting complex combinations of messages
   - ✓ Interacting existing applications with Web Services

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Agenda

- Process Automation

- z/VSE Monitoring

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Anticipating Virtualization Challenges

When a virtual environment has a problem, where did it originate?

The are no "virtual performance problems", only very real performance problems manifested in a very complex consolidated, virtual environment.

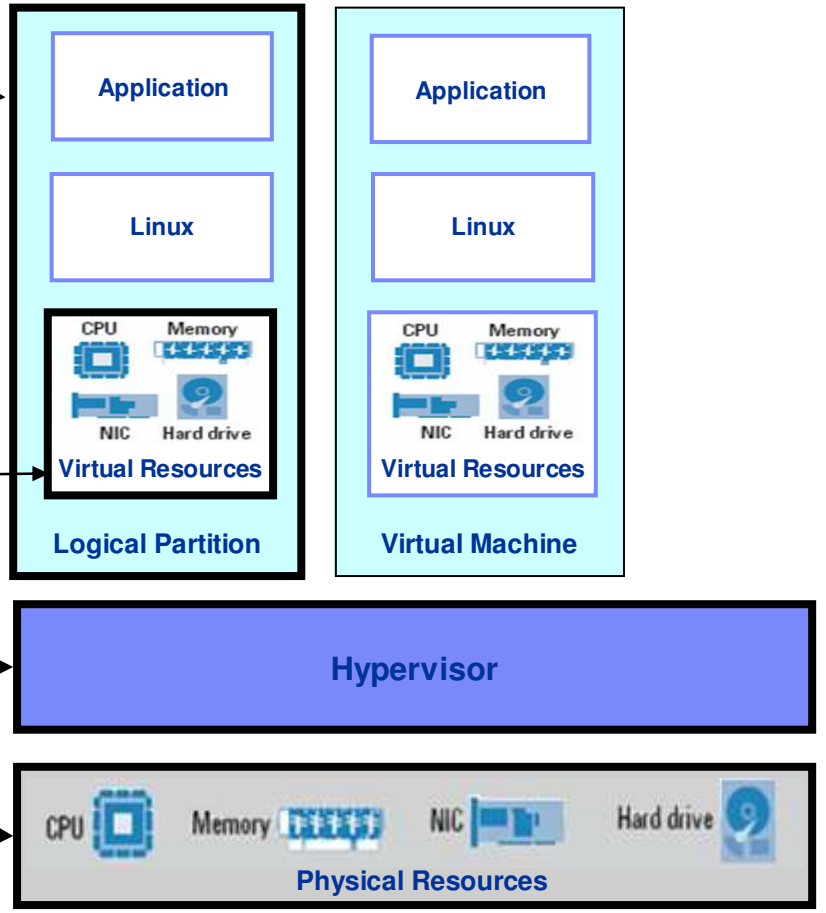
In the Application (bad process) running on the virtual resource?

In the Logical Partition/Machine sharing the same physical resource?

In the VIRTUAL RESOURCE?

In the HYPERVISOR overhead?

Or in the PHYSICAL RESOURCE?



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What is and why use monitoring

- **Monitoring definition**
  - Monitoring is a continuous process to keep eye on systems or scheduled activities.
  - Its aim is to obtain real-time information to ease the overview or action in certain cases.
  - Monitoring varies from to time, project to project and activity to activity.
  - Can be Real-time or Event driven

- **Why use monitoring**
  - to be aware of the state of a system
  - to observe a situation for any changes which may occur over time
  - to react on unpredicted or predicted situations

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Monitoring types

Business Monitoring vs. Technical Monitoring

- Business Monitoring (Near-time Monitoring)
  - displaying **measurements** or **KPIs** (Key Performance Indicators) to a business process **controller/management**
    - applying a range or SLA
    - measurements with a Target Near-time Monitoring

- Technical Monitoring - **Real-Time Monitoring**
  - **displaying** technical information
    - to IT Support/Maintenance/Administration experts
  - **acting on specific events** or situation changes
    - Event driven monitoring

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z/VSE V4.3 – SNMP Monitoring Agent support (2)

- **Management Information Base (MIB)**
  - SNMP itself does not define which information (which variables) a managed system should offer
  - Rather, SNMP uses an extensible design, where the available information is defined by management information bases (MIBs).
  - MIBs describe the structure of the management data of a device subsystem
    - They use a hierarchical namespace containing object identifiers (**OID**).
    - Each OID identifies a variable (e.g. a performance counter) that can be read or set via SNMP.

- **SNMP V1 Protocol**
  - Get — Get the value of an object identified by its OID
  - GetNext — Get the value of the next object identified by an OID
  - Set — Set the value of an object identified by its OID (not used by z/VSE)
  - Trap — Asynchronous notification about something (an event)

→ **http://en.wikipedia.org/wiki/Simple_Network_Management_Protocol**

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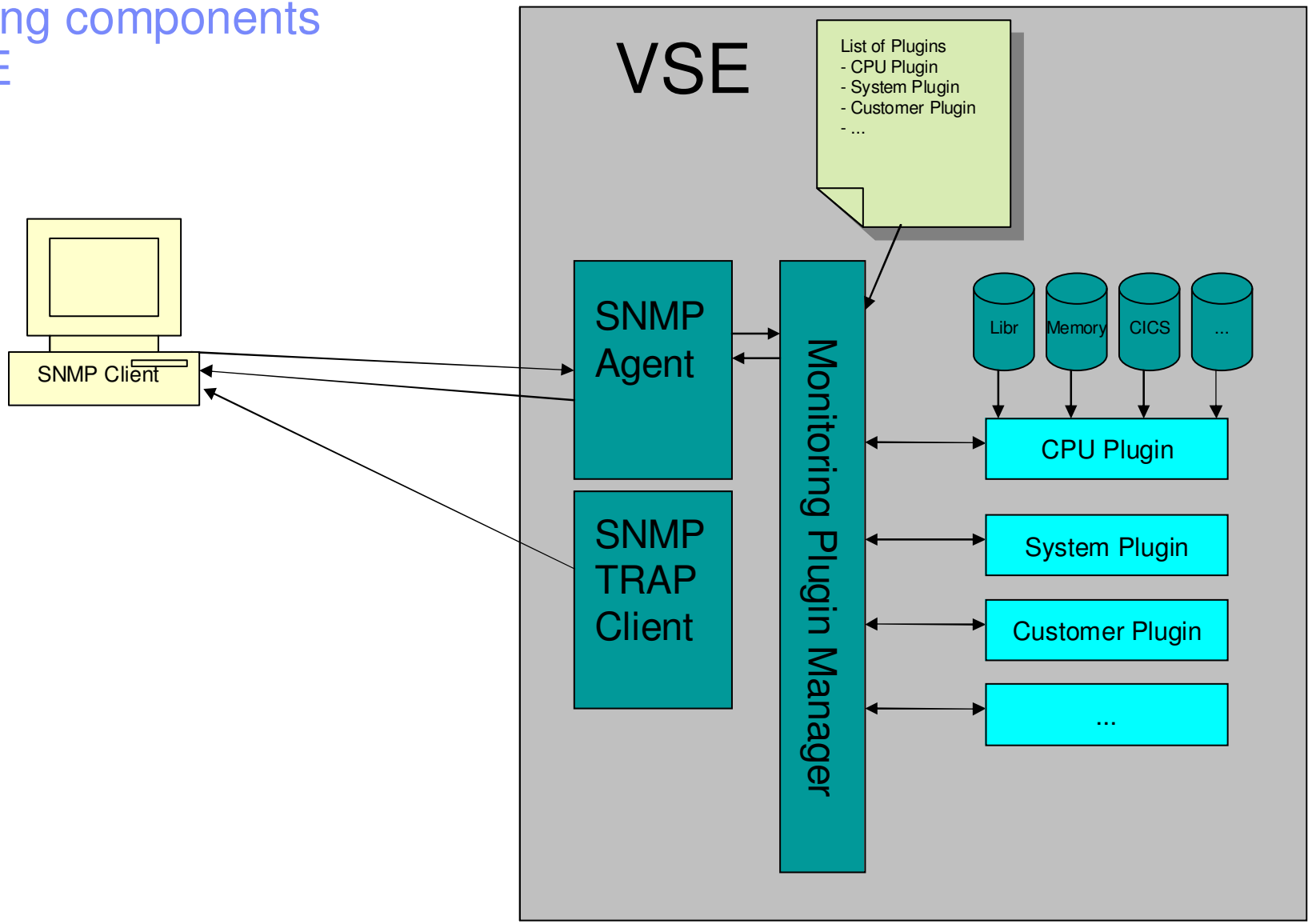
Monitoring components in z/VSE



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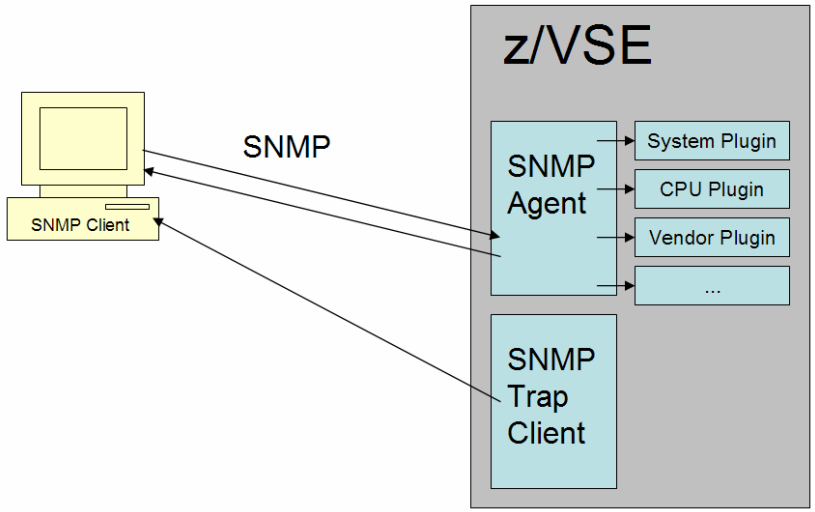
z/VSE V4.3 – SNMP Monitoring Agent support

- **z/VSE Monitoring Agent enables customers to monitor z/VSE systems using standard monitoring interfaces (SNMP V1)**
  - It also includes an open interface, which enables customers or vendors to use own programs (plugins) to collect additional data

- **Data collected by the IBM provided plugins contains**
  - Information about the environment (e.g. Processor, LPAR and z/VM information)
  - Number of partitions (static, dynamic, total, maximum)
  - Partition priorities
  - Number of CPUs (active, stopped, quiced)
  - Paging (page ins, page outs)
  - Performance counters overall and per CPU
  - CPU address and status
  - CPU time, NP time, spin time, allbound time
  - Number of SVCs and dispatcher cycles



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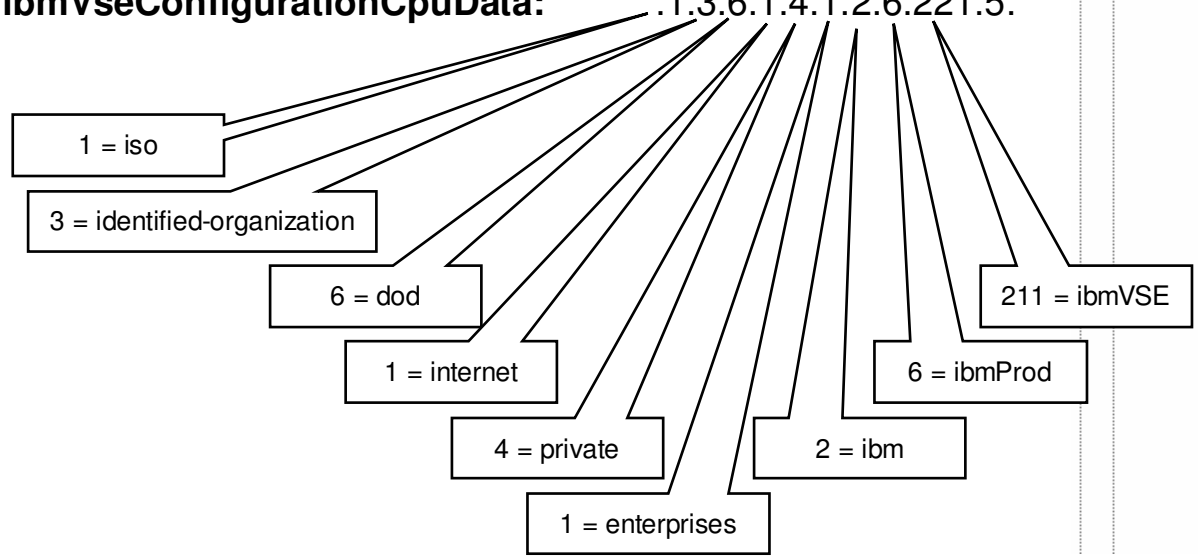
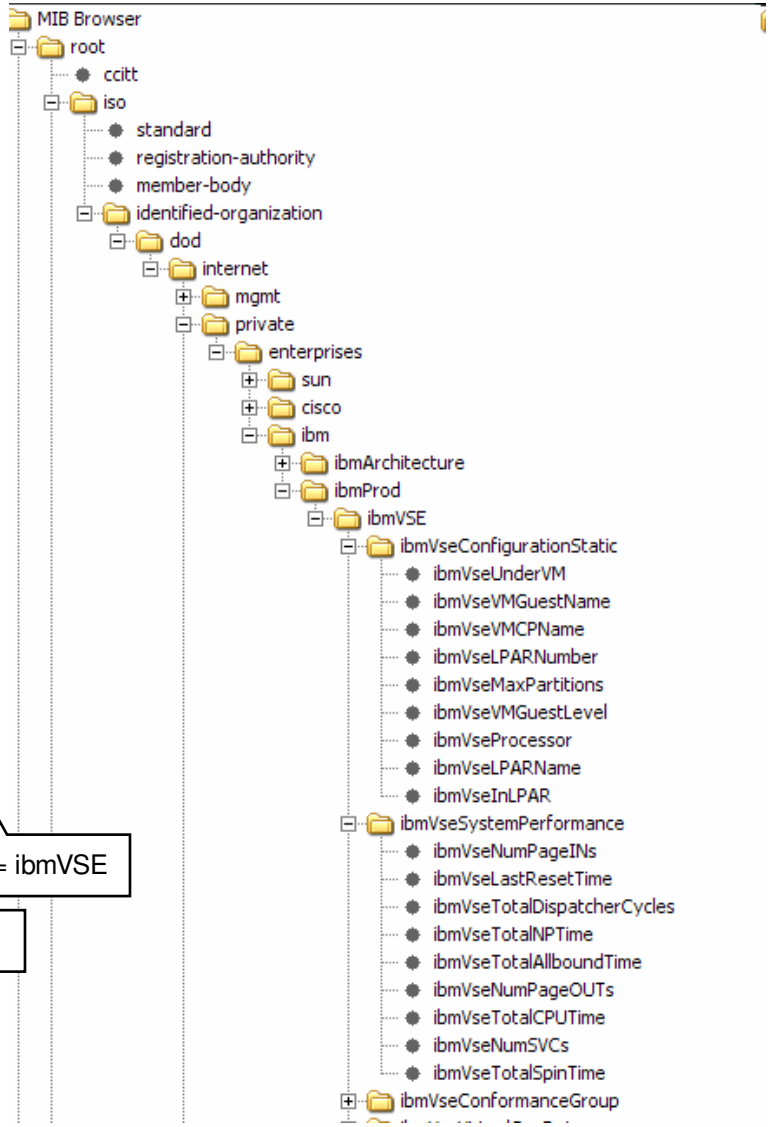
z/VSE V4.3 – SNMP Monitoring Agent support

- **A MIB (Measurement Information Base) is provided describing the data collected**
  → IESMPMIB.Z in PRD1.BASE (plain text member)

ibmVSE: .1.3.6.1.4.1.2.6.221
ibmVseConformanceGroup: .1.3.6.1.4.1.2.6.221.1.*
ibmVseConfigurationStatic: .1.3.6.1.4.1.2.6.221.2.*
ibmVseConfigurationDynamic: .1.3.6.1.4.1.2.6.221.3.*
ibmVseConfigurationPerformance: .1.3.6.1.4.1.2.6.221.4.*
ibmVseConfigurationCpuData: .1.3.6.1.4.1.2.6.221.5.*





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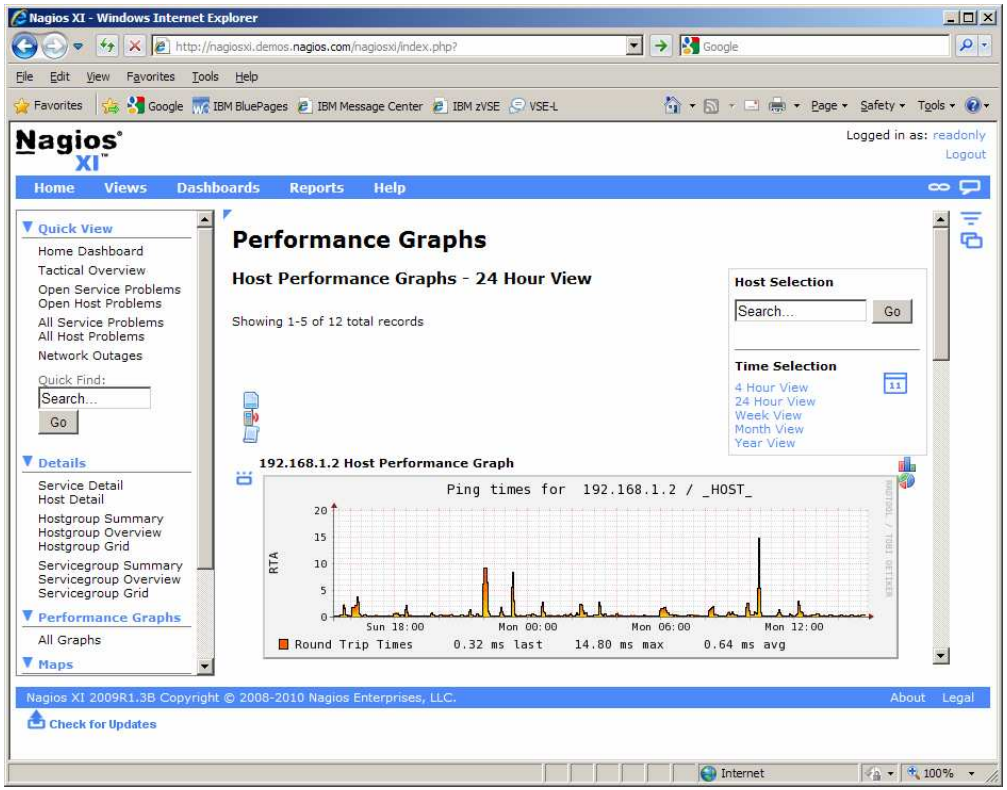
z/VSE V4.3 – SNMP Monitoring Agent support

- **Standard SNMP based monitoring tools can be used to collect, display and analyze z/VSE performance monitoring data**
  - e.g. ITM (IBM Tivoli Monitoring), Velocity monitoring, Nagios

- **z/VSE SNMP Trap client**
  - Sends SNMP V1 traps to inform one or more monitoring stations or servers about important events
  - For example:
    - The end of a job stream is reached.
    - An error has occurred during a job stream



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z/VSE V4.3 – SNMP Monitoring Agent support - Setup

To setup the z/VSE Monitoring Agent you have to do the following steps:

1. **Create the configuration files**
   - Use skeletons IESMASCF and SKMASCFG (ICCF library 59) to create the z/VSE Monitoring Agent configuration file
   - If you want to use the System Plugin, use the skeletons IESMPSCF and SKMPSCFG (ICCF library 59) to create the System Plugin configuration file

2. **Create the startup job**
   - Use skeletons SKSTMAS (ICCF library 59) to create a z/VSE Monitoring Agent startup job

3. **Download the MIB** (IESMPMIB.Z in PRD1.BASE) from your z/VSE system to be able to use it with your SNMP client

1. **Start the z/VSE Monitoring Agent** (using the startup job), e.g. R RDR,STARTMAS

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z/VSE V4.3 – SNMP Monitoring Agent support – Setup

Monitoring Agent configuration file:

```
* ********************************************** *
* CONFIG FILE FOR z/VSE SNMP MONITORING AGENT    *
* ********************************************** *
* SNMP COMMUNITY NAME:
COMMUNITYNAME = 'public'
* PORT (default SNMP Port 161):
PORT = '161'
* SYSTEM PLUGIN
PLUGIN = 'IESMPSYS'
PARM = 'DD:PRD2.CONFIG(IESMPSCF.Z)'
* CPU PLUGIN
PLUGIN = 'IESMPCPU'
* SAMPLE PLUGIN
* THE SAMPLE PLUGIN IS SHIPED AS SOURCE CODE, YOU
* HAVE TO COMPILE IT, IF YOU WANT TO USE IT
* PLUGIN = 'IESMPSMP'
```

COMMUNITYNAME must match on client and server

Location of the System Plugin config file

„*“ is used for comments

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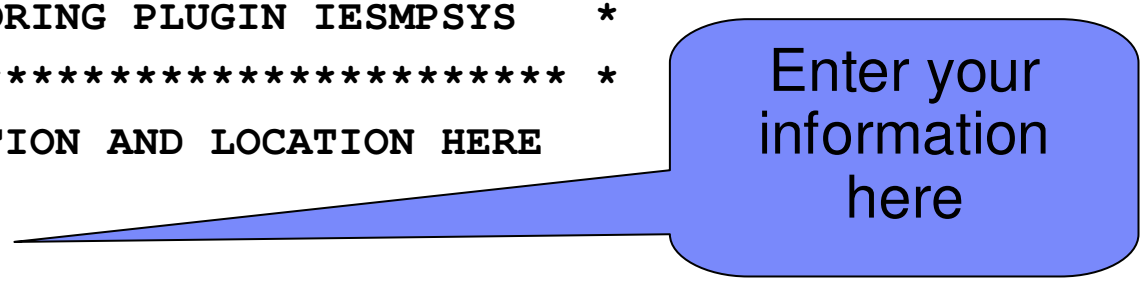
z/VSE V4.3 – SNMP Monitoring Agent support – Setup

System Plugin configuration file:

```
* ******************************************** *
* CONFIG FILE FOR MONITORING PLUGIN IESMPSYS   *
* ******************************************** *
* ENTER CONTACT INFORMATION AND LOCATION HERE
CONTACT = `Joe Tester'
LOCATION = `Colorado'
* THE SYSTEM NAME AND DESCRIPTION ARE OPTIONAL
*DESC = 'z/VSE TEST SYSTEM'
*SYSNAME = 'VSETestSystem'
```



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z/VSE V4.3 – SNMP Monitoring Agent support – Setup

Startup job for the Monitoring Agent:

```
* $$ JOB JNM=STARTMAS,DISP=L,CLASS=R
// JOB STARTMAS STARTS THE SNMP MONITORING AGENT
* ********************************************** *
* This Job starts the SNMP MONITORING AGENT.     *
* Please change the ID and the SYSPARM card if necessary *
* ********************************************** *
// ID USER=VCSRV,PWD=VCSRV
// LIBDEF *,SEARCH=(PRD2.CONFIG,PRD1.BASE,PRD2.SCEEBASE)
// OPTION SYSPARM='00'
// EXEC IESMASNM,PARM='DD:PRD2.CONFIG(IESMASCF.Z)'
/*
/&
* $$ EOJ
```

Location of the z/VSE Monitoring Agent Config File

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z/VSE V4.3 – SNMP Monitoring Agent support – Usage

Operating Monitoring Agent:

To get status information from the z/VSE Monitoring Agent, enter at the z/VSE console

```
msg <jobname>,data=status
```

Sample output:

```
AR 0015 1I40I READY
R1 0045 IESMA118I AGENT STATUS:
R1 0045 AGENT VERSION:           0004.3000
R1 0045 CONFIG MEMBER:           DD:PRD2.CONFIG(IESMASCF.Z)
R1 0045 PORT:                    161
R1 0045 COMMUNITY STRING:        public
R1 0045 RECEIVED REQUESTS:       5869313
R1 0045 WRONG COMMUNITY STRING: 0
R1 0045 WRONG SNMP VERSION:      0
R1 0045 ANSWERED REQUESTS:       5869313
R1 0045 IESMM002I MONITORING PLUGIN MANAGER STATUS:
R1 0045 MANAGER VERSION:         0004.3000
R1 0045 INSTALLED PLUGINS:       2
R1 0045 HANDLED OIDS:            34
R1 0045 HANDLED OID GROUPS:      1
```

Supported Commands:

HELP	Displays help information
STATUS	Displays the server status
RESETSTAT	Reset statistics
LISTOIDS	List all handled OIDs
LISTOIDSDET	List all handled OIDs (detailed)
LISTPLUGINS	List all active plugins
SHUT	Ends the server
SHUTDOWN	Ends the server

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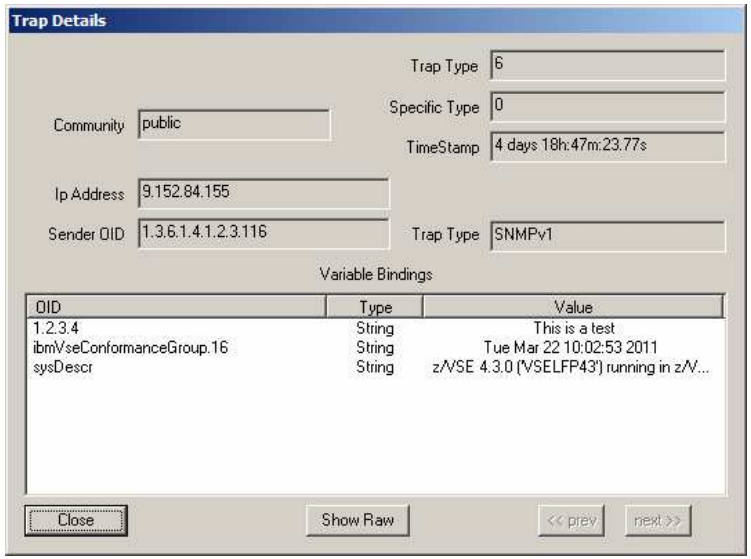
z/VSE V4.3 – SNMP Monitoring Agent support – Trap Client

Send a Trap (see SKSTTRAP in ICCF library 59):

```
* ********************************************************
* SNMP TRAP CLIENT sample
* You can add one or more destinations.
* The ADDSYSINF parameter adds system information to
* trap packet.
* If you specify the HELP parameter you will find a
* detailed help and a list of all supported parameters
* in the job listing.
* A '*' marks lines as comments
* ********************************************************
// OPTION SYSPARM='00'
// EXEC IESMTRAP
DEST=192.168.1.55
DEST=myserver1:162
OID=1.2.3.4
MSG=This is a test
ADDSYSINF
/*
```



Two destinations for the TRAP

Add System Info to the Trap message

This is the trap message

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z/VSE Event Monitoring – Trap Client Enhancements z/VSE 5.1

- z/VSE 4.3 Event SNMP traps can be sent by customers only in batch jobs
  - via executing the IESMTRAP.PHASE
- z/VSE 5.1 enables the possibility for customer programs to dynamically link the SNMP trap client (the so called SNMP Trap API)
  - to send traps within their programs
  - To send traps from within a cics transaction
- A new interface/API will be provided

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Omnibus

- **IBM Tivoli Netcool/OMNIbus Probe for SNMP**
- The IBM Tivoli Netcool/OMNIbus Probe for SNMP monitors SNMP traps and informs on both UDP and TCP sockets concurrently.

This probe has the following features that allow it to handle generic traps:

- It can handle a high volume and high rate of traps.
- It receives traps independently of trap processing, using an internal queue mechanism.
- It handles high trap rates and high burst rates using two buffers:
  - one buffer is for all of the sockets that the probe monitors,
  - the other buffer is an internal queue between the reader and writer sides of the probe
- It supports SNMP V1, V2c, and V3 traps
- It supports SNMP V2c and V3 traps and informs

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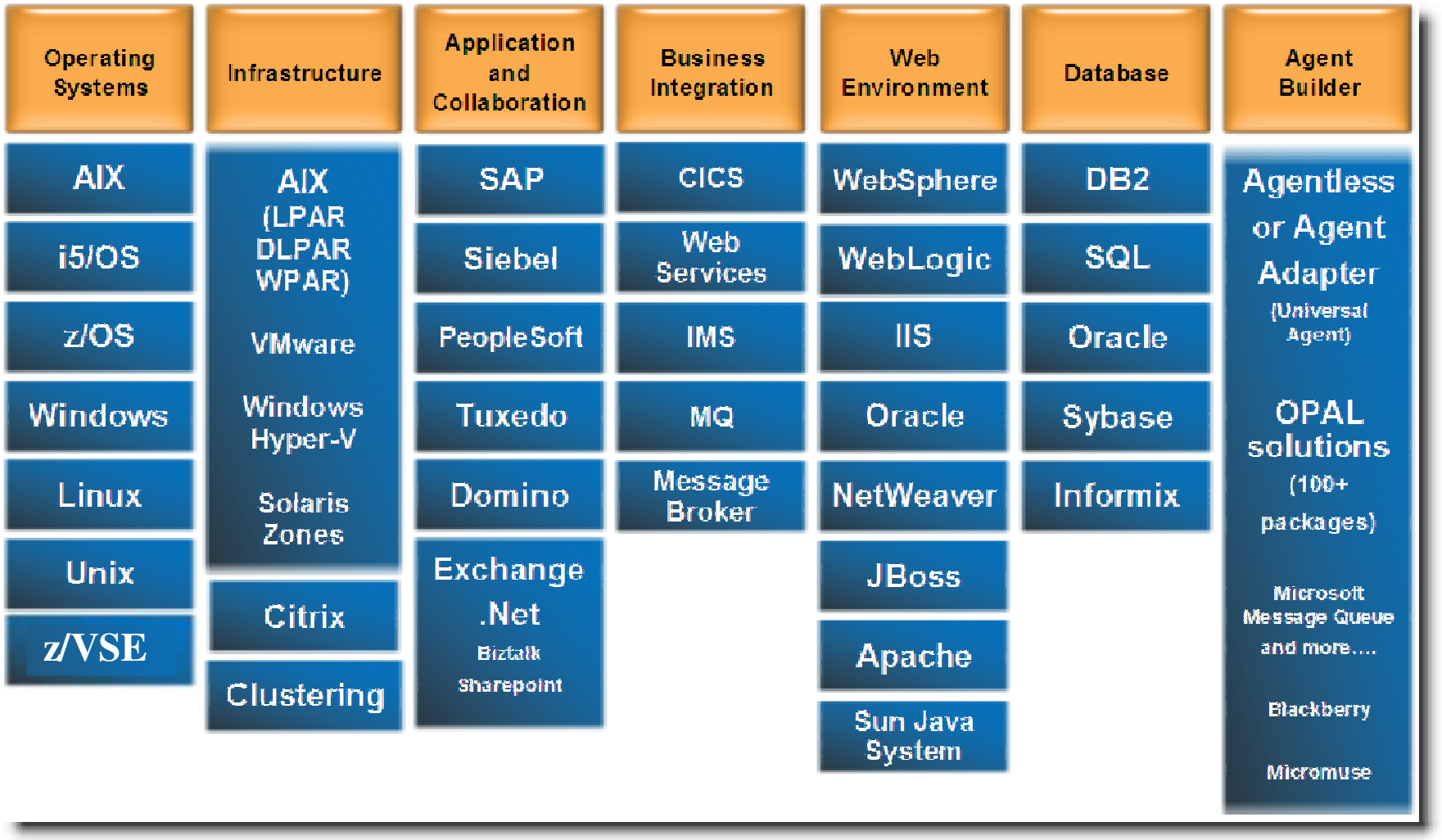

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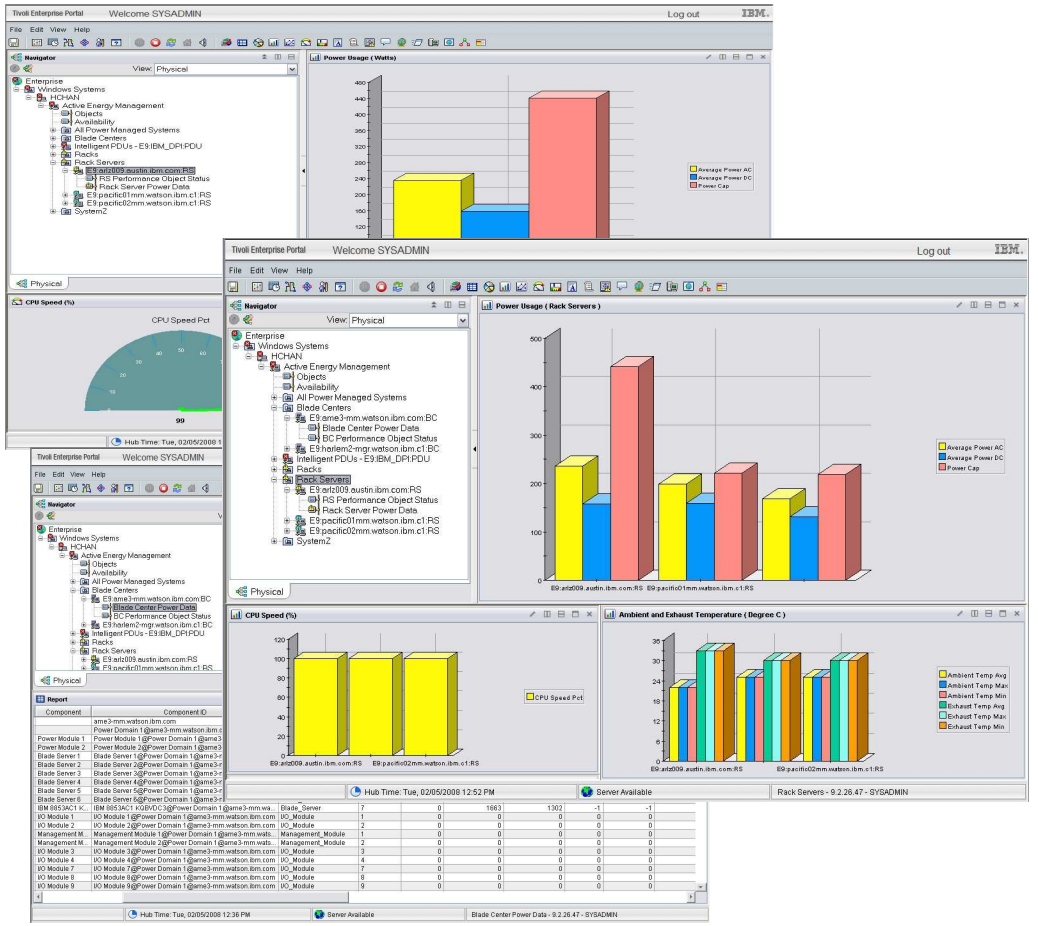
Monitoring Power and Thermal

Tivoli Monitoring for Green Energy

Data Center Optimization and Reporting

Metric Collection, Analytics, Thresholding and Eventing

- Monitor power usage and thermal data from IT resources through embedded sensors or via remote sensors
- Operations dashboard integrates traditional IT measurements and emerging environmental measurements onto common dashboard
- Aggregation of IT and environmental metrics with ability to take manual or automated actions when needed
- Intelligent thresh-holding and event generation



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Tivoli Workload Automation Integration Points

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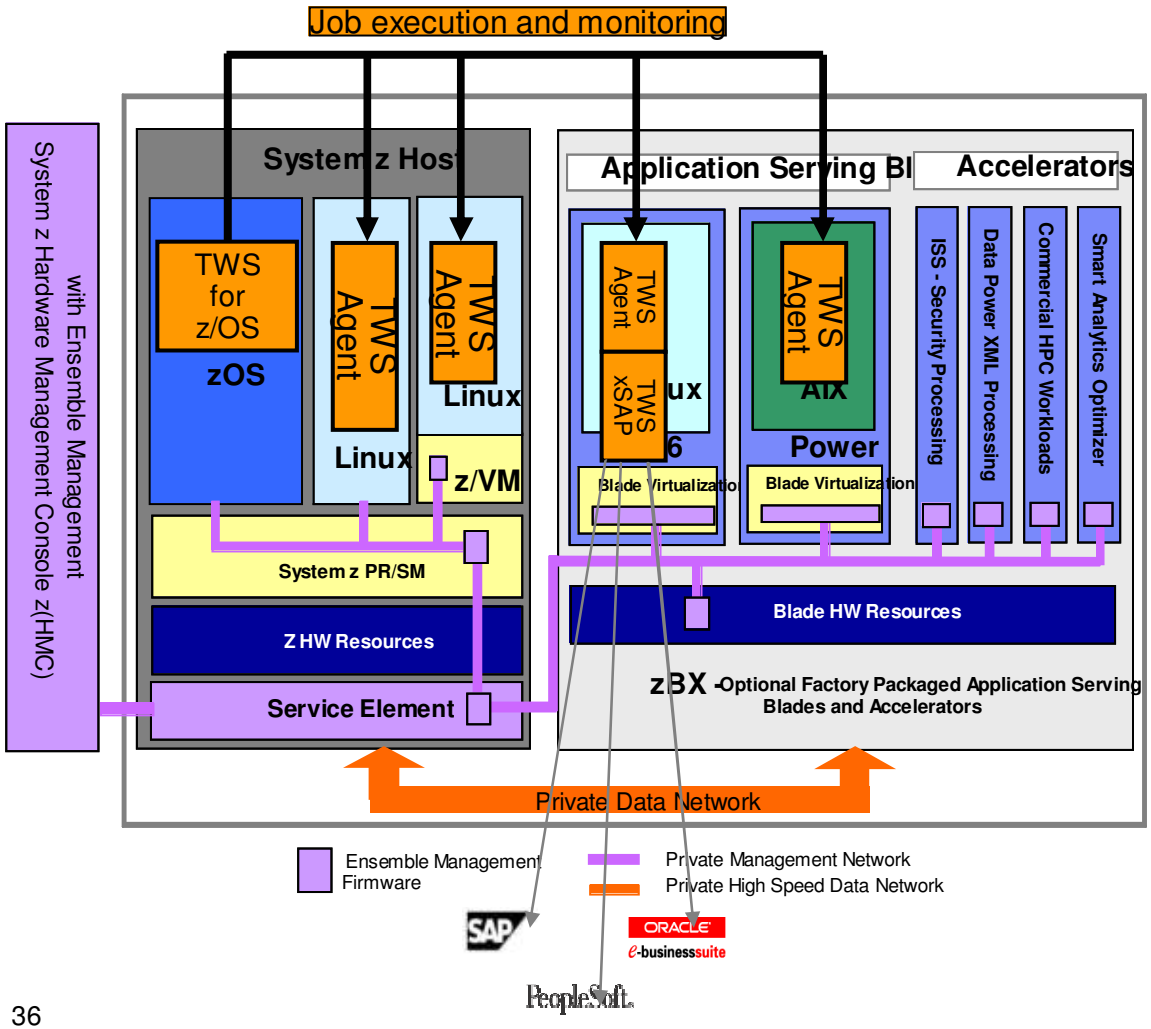
Workload Automation on zEnterprise

Fit for purpose workload deployment



- zCentric end-to-end solution ideal to manage heterogeneous workloads across System z and Blade extensions, under a single point of control and management
- Future option to exploit Unified Resource Management interfaces would provide unprecedented workload moving and optimization capabilities

Business benefits

★ ***Reduce costs with fit-for-purpose platform, and implement a virtualized and green data center***

★ ***Realize data-proximity processing with high bandwidth for distributed applications***

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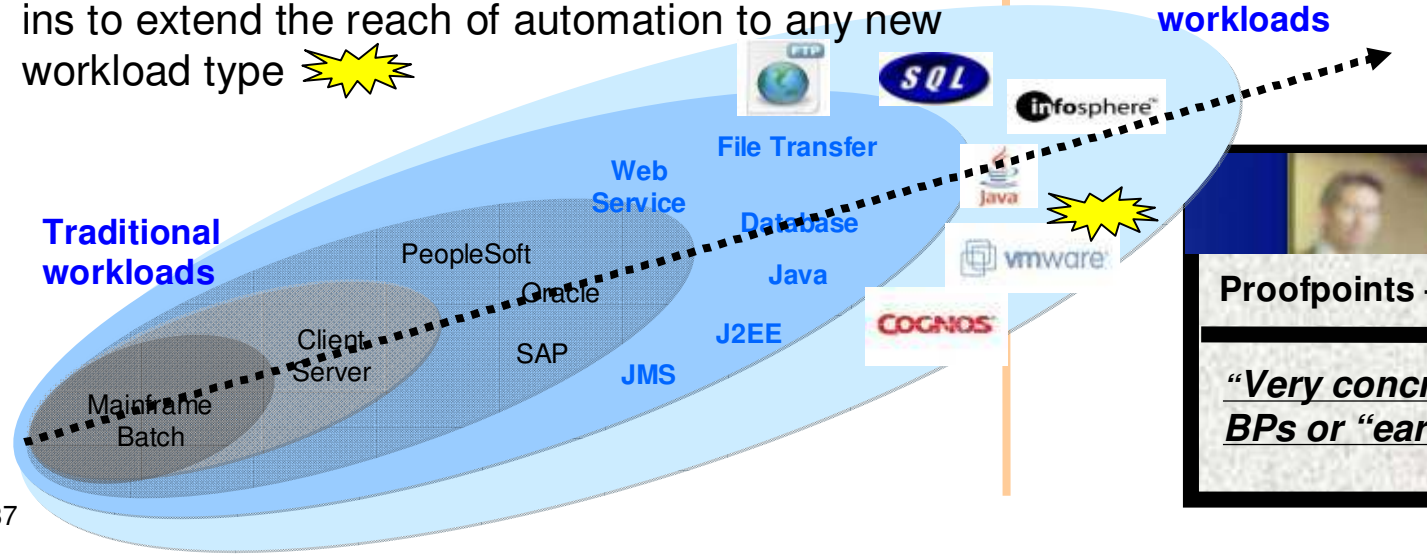
Application Extensions allow business users to take advantage of processes in a managed approach

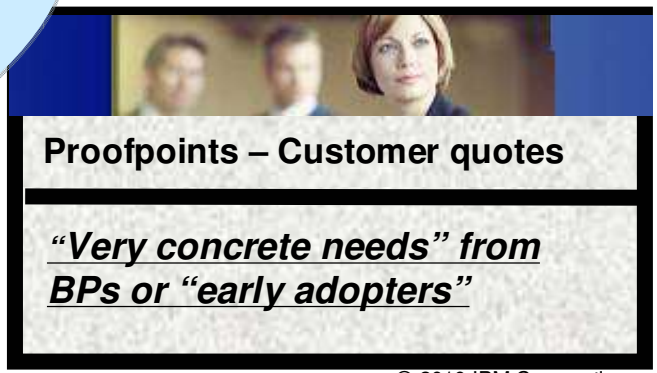
New Tivoli Workload Automation application extensible framework

- Customers shifting from traditional backend transaction focused systems to modern systems running web applications and heterogeneous applications
- Workload Automation role is maintaining a single point of control over workloads
- TWS 8.6 easily build and deploy application plug ins to extend the reach of automation to any new workload type



Business benefits

- ★ ***Share infrastructure among applications***
- ★ ***Reduces labor costs, enabling to automate new workloads with the same staff of people***
- ★ ***No request for new skill: re-using of workload automation processes and procedures already in place***



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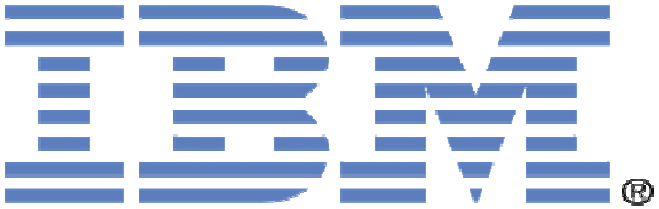

Thank you!

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