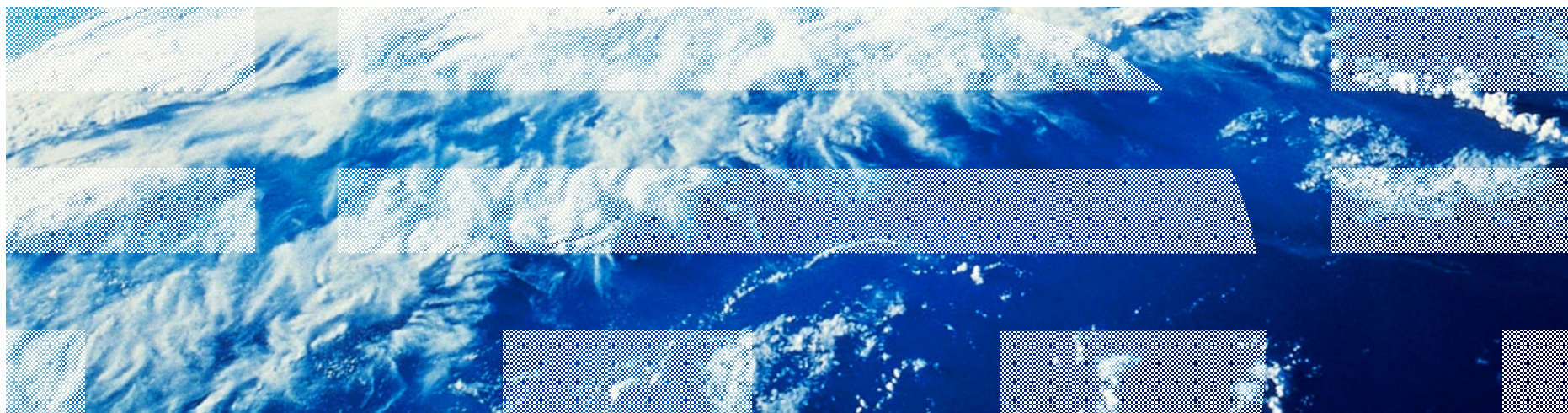


# Monitoring Principles & z/VSE Monitoring Options

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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

## Business Monitoring and Technical Monitoring

### § Business monitoring

- Monitoring and aggregation of data, like data input values, data changes, paths in application depending of data, or human centric data.

### § Business activity monitoring (BAM)

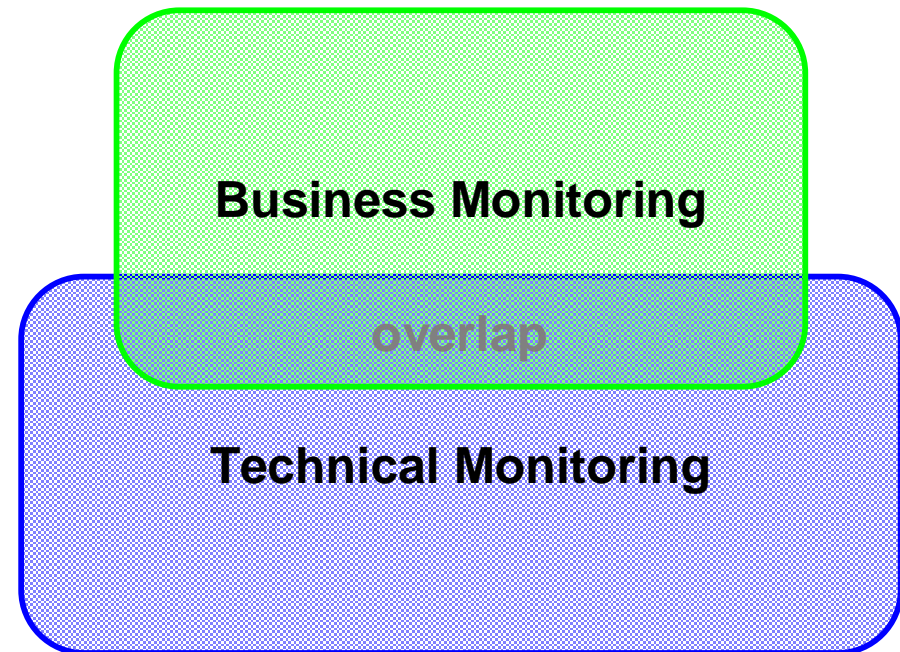
- Business Monitoring of data from business processes.

### § Technical monitoring

- Monitoring for supporting and controlling any system, application, or service to ensure that they run as designed and as expected.

## Business Monitoring and Technical Monitoring

- § Borders between both monitoring intentions are smooth
- § Technical Monitoring and Business Monitoring may overlap in some cases
- § In most cases doing business monitoring, dealing with sensitive or critical data, technical monitoring may be applied as well



## Monitoring types

### Business Monitoring and Technical Monitoring

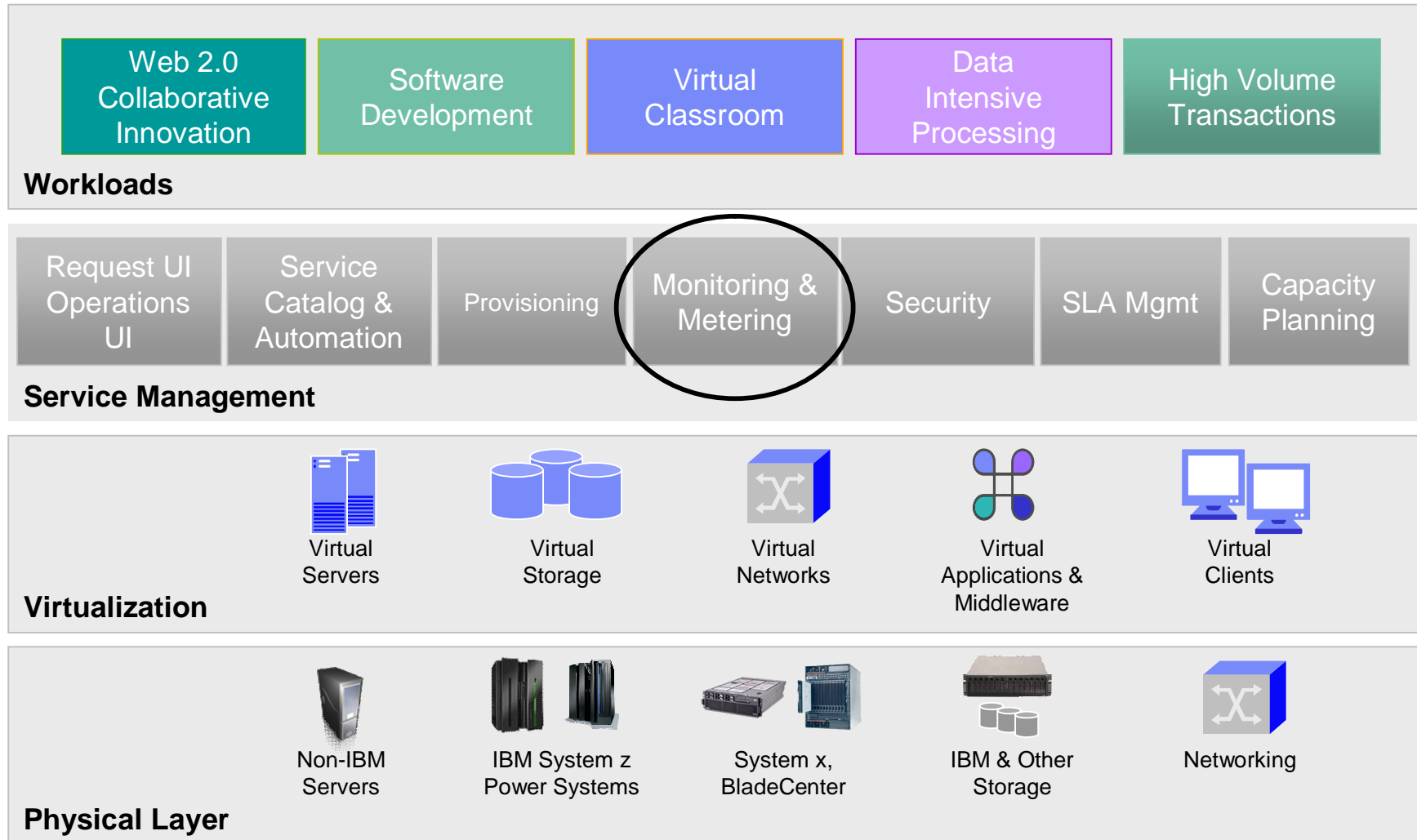
#### § **Business Monitoring - *Near-time Monitoring***

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

#### § **Technical Monitoring - *Real-Time Monitoring***

- **displaying real-time** technical information
  - to IT Support / Maintenance / Administration experts
- **acting on specific events** or situation changes
  - Event driven monitoring

# Commonly accepted architectural overview of IT layers



# 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.

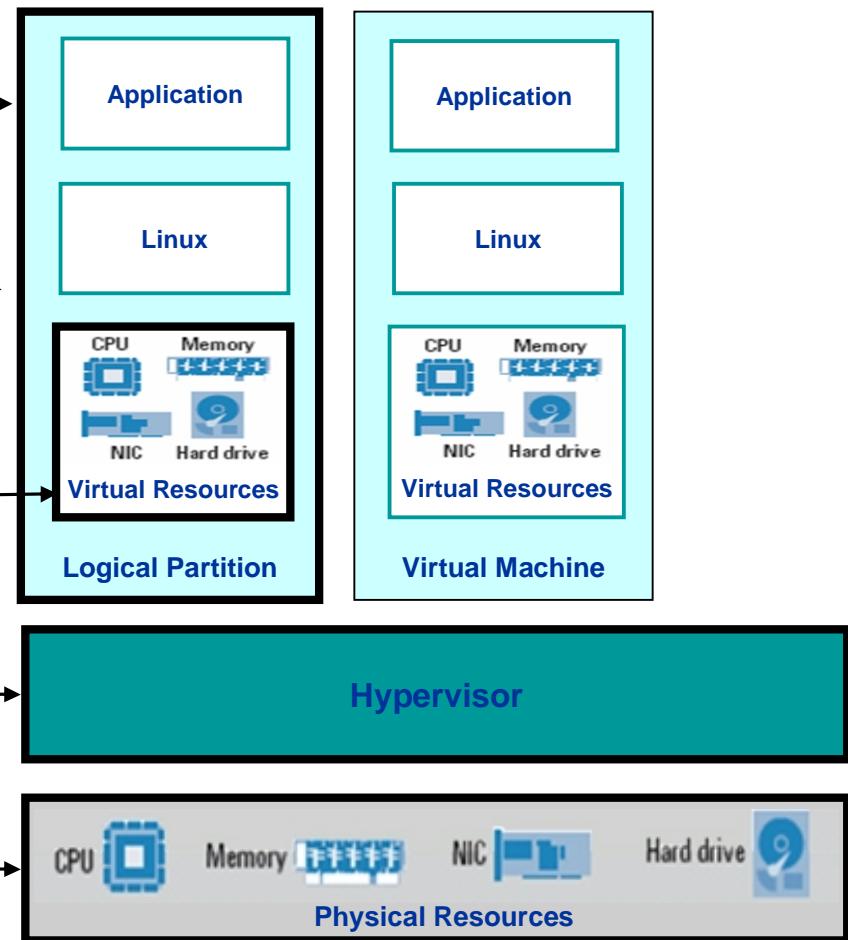
In the **Application (bad process)** running on the virtual resource?

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

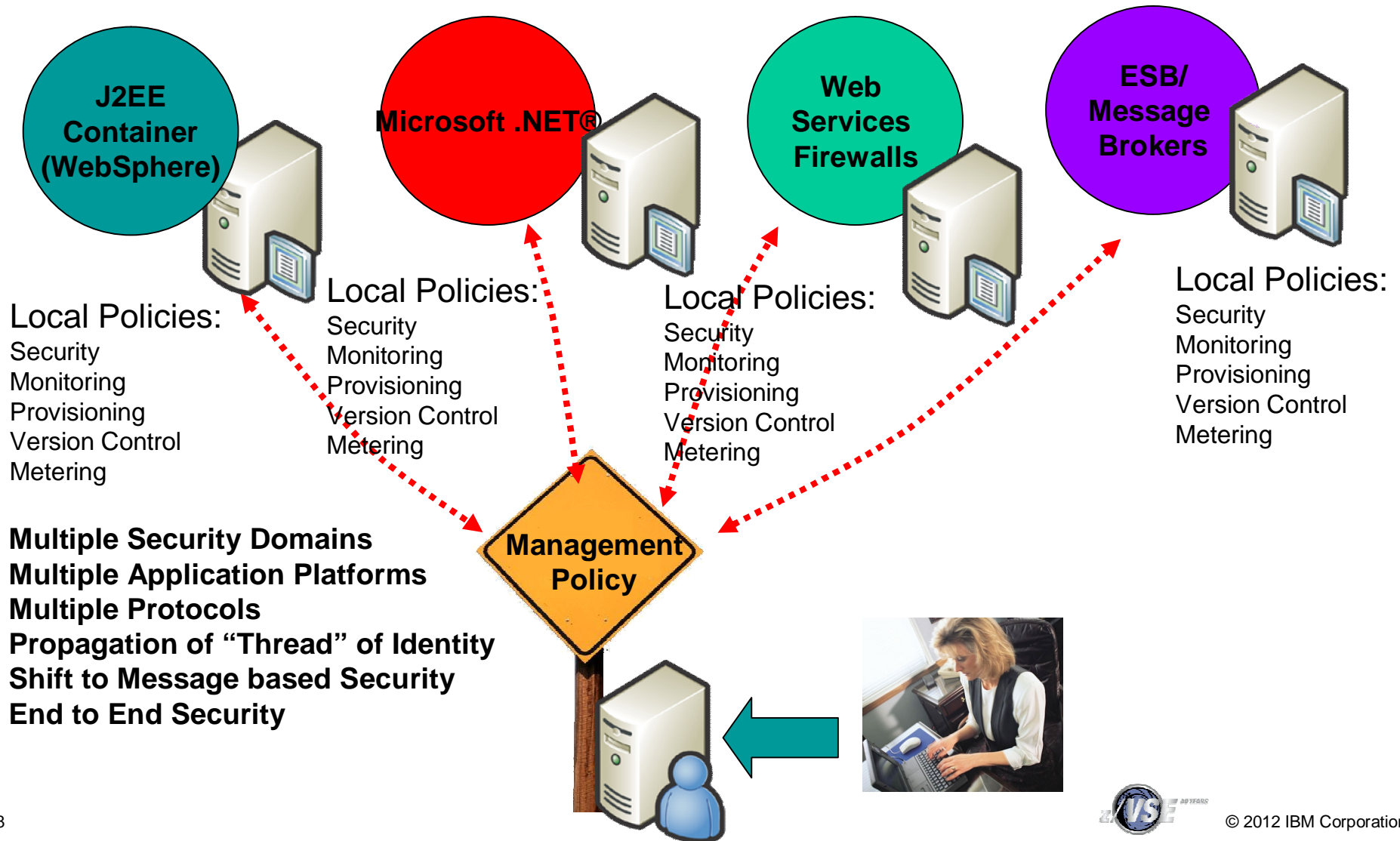
In the **VIRTUAL RESOURCE?**

In the **HYPERVISOR** overhead?

Or in the **PHYSICAL RESOURCE?**

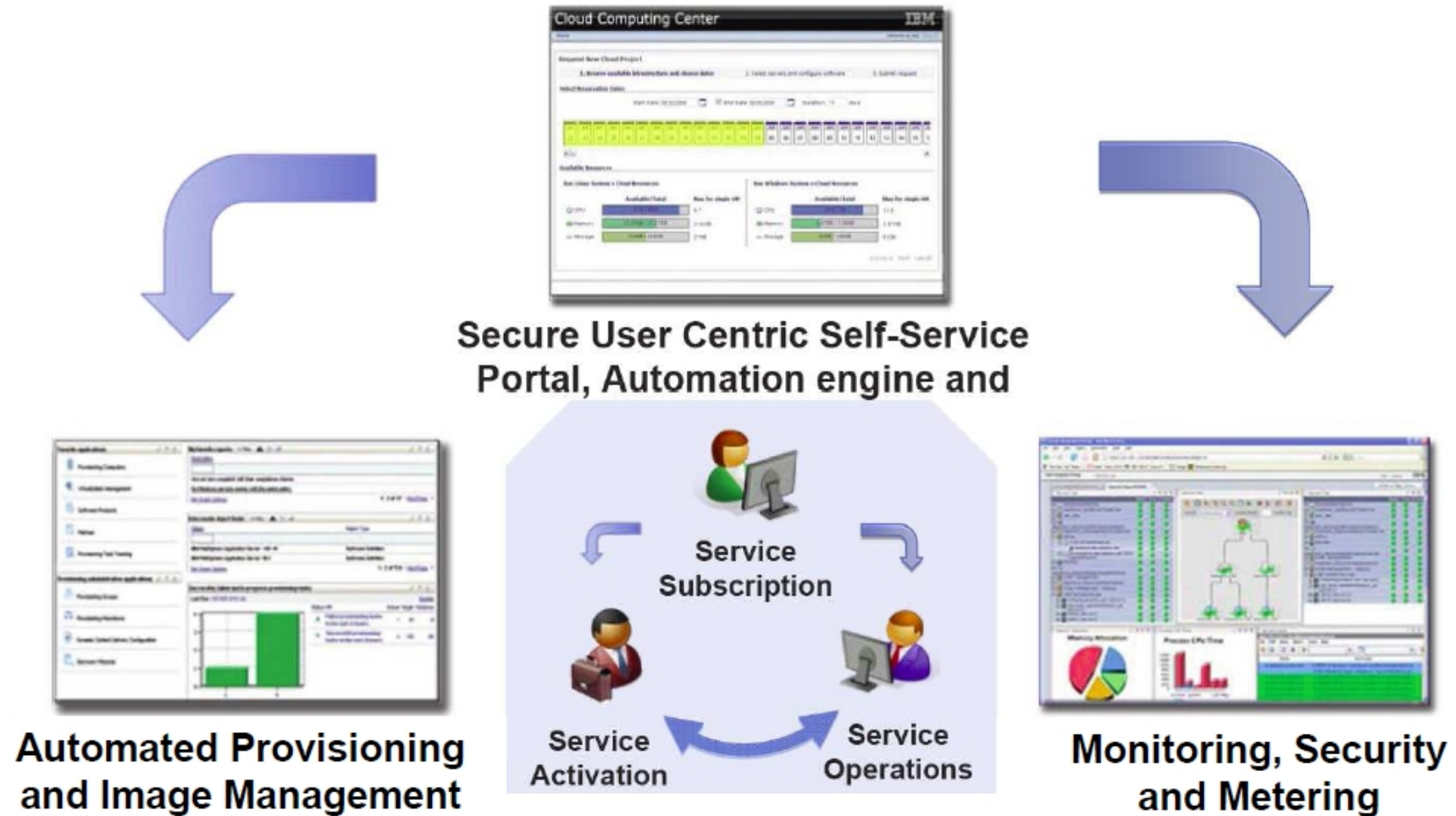


# Composite Application Integration Challenges

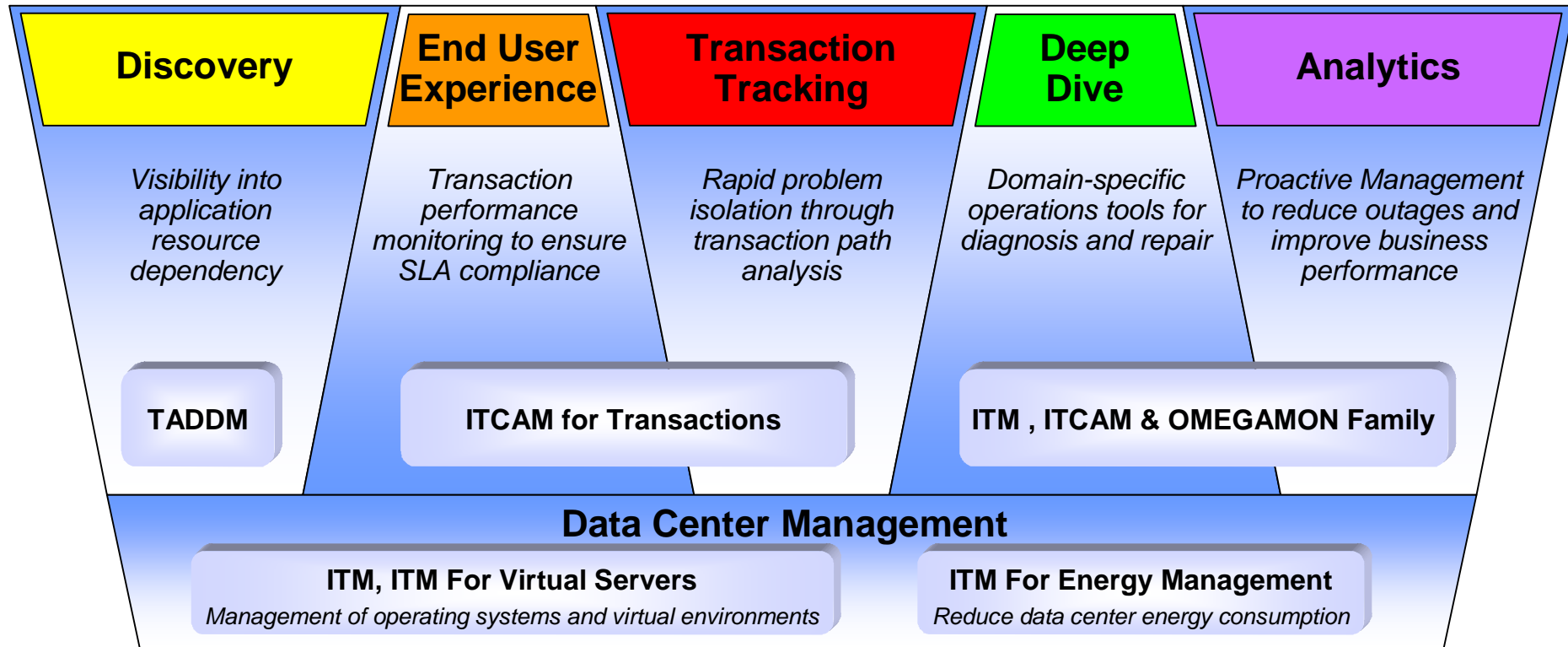




# Integrated Monitoring drives Automation Service Interactions with the Platform



## Tivoli Resource and Availability Monitoring and Management Portfolio



Unified Management	Broader Coverage	Virtualization	Predictive Analytics
<ul style="list-style-type: none"> <li>• Central location to view &amp; act on contextualized information</li> <li>• Reporting Interface to comprehend current appl environment and trends</li> <li>• Central repository for enterprise-wide performance mgmt data</li> </ul>	<ul style="list-style-type: none"> <li>§ OS &amp; Virtual Environment</li> <li>§ Databases</li> <li>§ Web Servers and App Servers</li> <li>§ Packaged Applications</li> <li>§ Agent Builder supports custom apps</li> </ul>	<ul style="list-style-type: none"> <li>§ Predict physical and virtual resource capacity bottlenecks</li> <li>§ Ensure maximum resource utilization</li> </ul>	<ul style="list-style-type: none"> <li>§ Automating Threshold Mgmt</li> <li>§ Automate Trending to identify emerging Capacity and Performance issues</li> <li>§ Predictive Learning – uncover anomalies</li> </ul>

# Monitoring Power and Thermal

## Tivoli Monitoring for Green Energy Data Center Optimization and Reporting

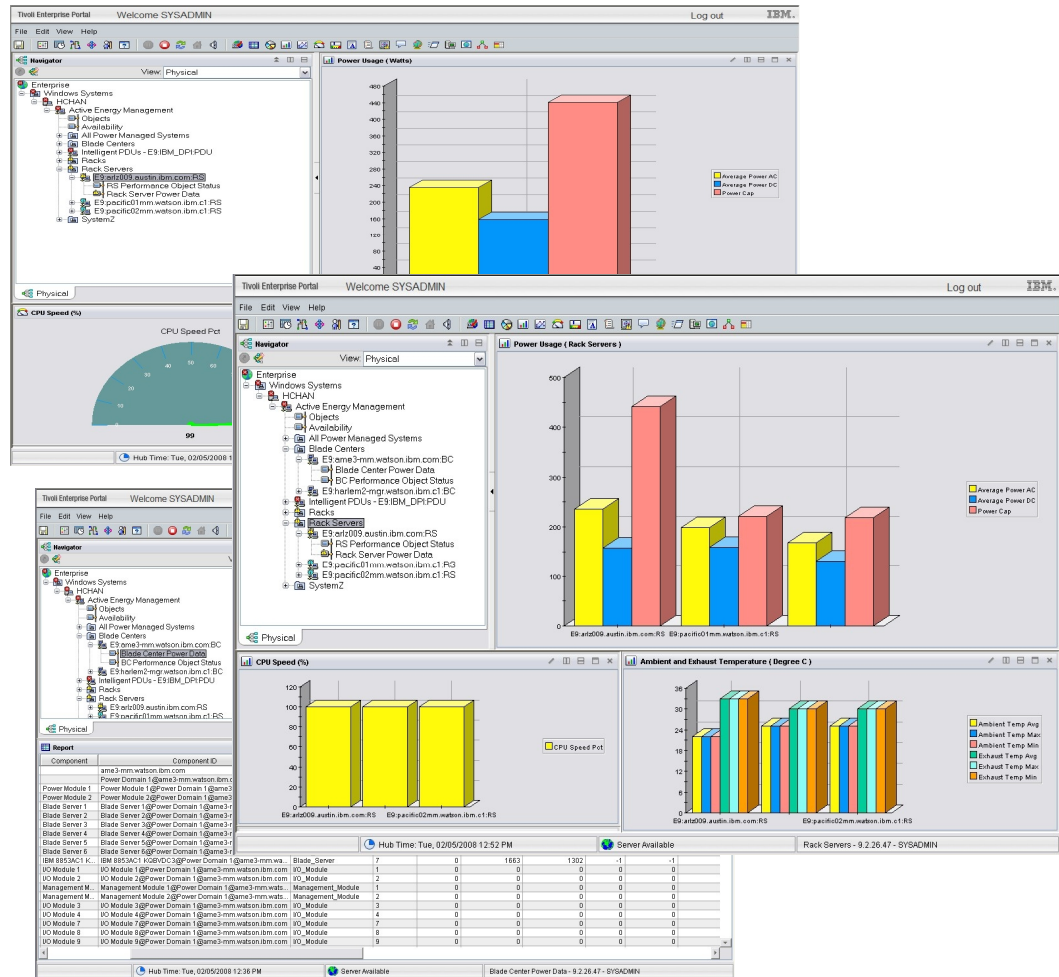
Metric Collection, Analytics,  
Thresholding and Eventing

§ 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

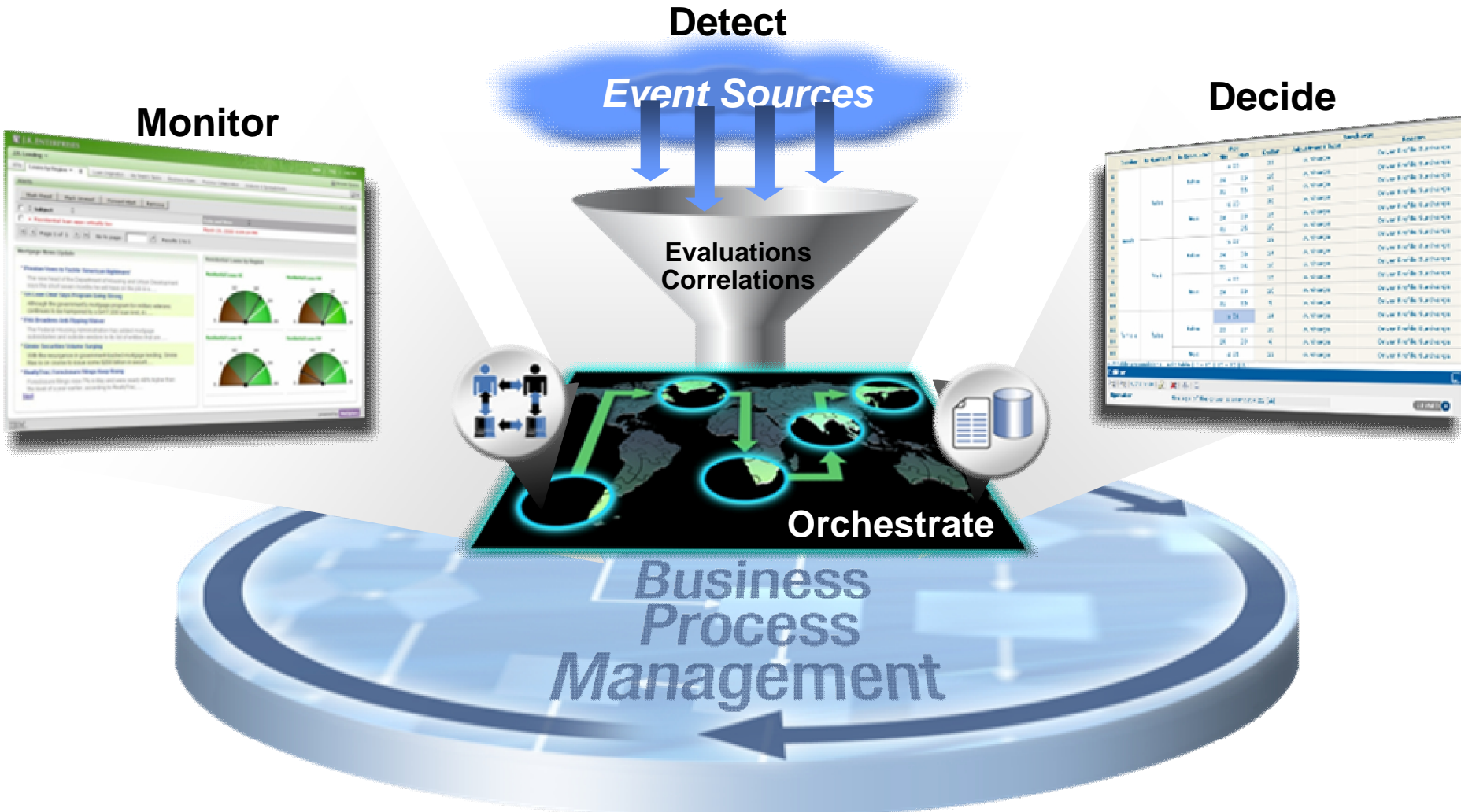


# IBM® Tivoli® Monitoring The Industries' Most Extensive Resource Monitoring

Operating Systems	Infrastructure	Application and Collaboration	Business Integration	Web Environment	Database	Agent Builder
AIX	AIX (LPAR DLPAR WPAR) VMware Windows Hyper-V Solaris Zones Citrix Clustering	SAP	CICS	WebSphere	DB2	Agentless or Agent Adapter (Universal Agent) OPAL solutions (100+ packages) Microsoft Message Queue and more.... Blackberry Micromuse
i5/OS		Siebel	Web Services	WebLogic	SQL	
z/OS		PeopleSoft	IMS	IIS	Oracle	
Windows		Tuxedo	MQ	Oracle	Sybase	
Linux		Domino	Message Broker	NetWeaver	Informix	
Unix		Exchange .Net Biztalk Sharepoint		JBoss		
z/VSE				Apache		
			Sun Java System			

# Insight for Action - with Tivoli Monitoring and OMNibus

*Leveraging Real time monitoring and event driven agility*



***Know What's Happening, When to Act and What to Do***

## z/VSE Monitoring – Technical Monitoring

### § Real-Time Monitoring

- **displaying** technical information
  - to IT Support/Maintenance/Administration experts

### § Event driven Monitoring

- **acting on specific events** or situation changes
  - Event driven monitoring

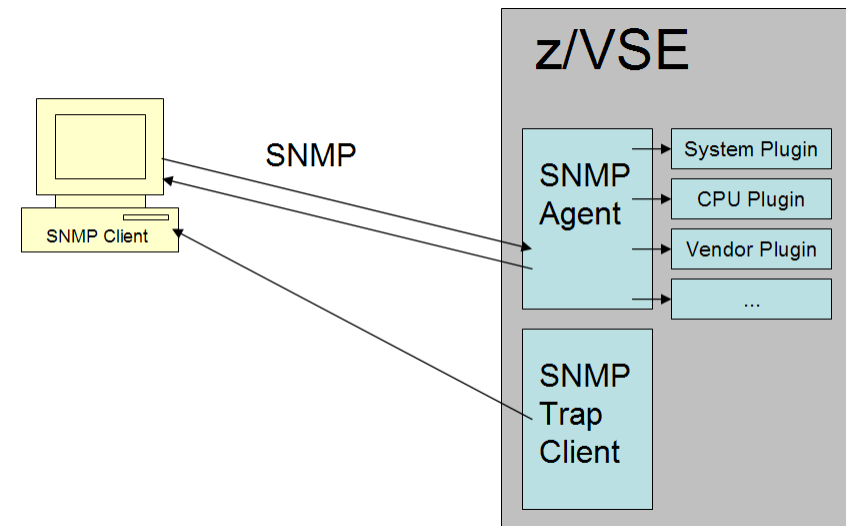
## z/VSE SNMP Monitoring Agent support

### § z/VSE Monitoring Agent enables customers to monitor z/VSE systems using standard monitoring interfaces (SNMP V1)

- Available since z/VSE V4.3
- 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



## z/VSE SNMP Monitoring Agent support

### § Management Information Base (MIB)

- SNMP itself does not define which information (which variables/counters) 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)

à [http://en.wikipedia.org/wiki/Simple\\_Network\\_Management\\_Protocol](http://en.wikipedia.org/wiki/Simple_Network_Management_Protocol)

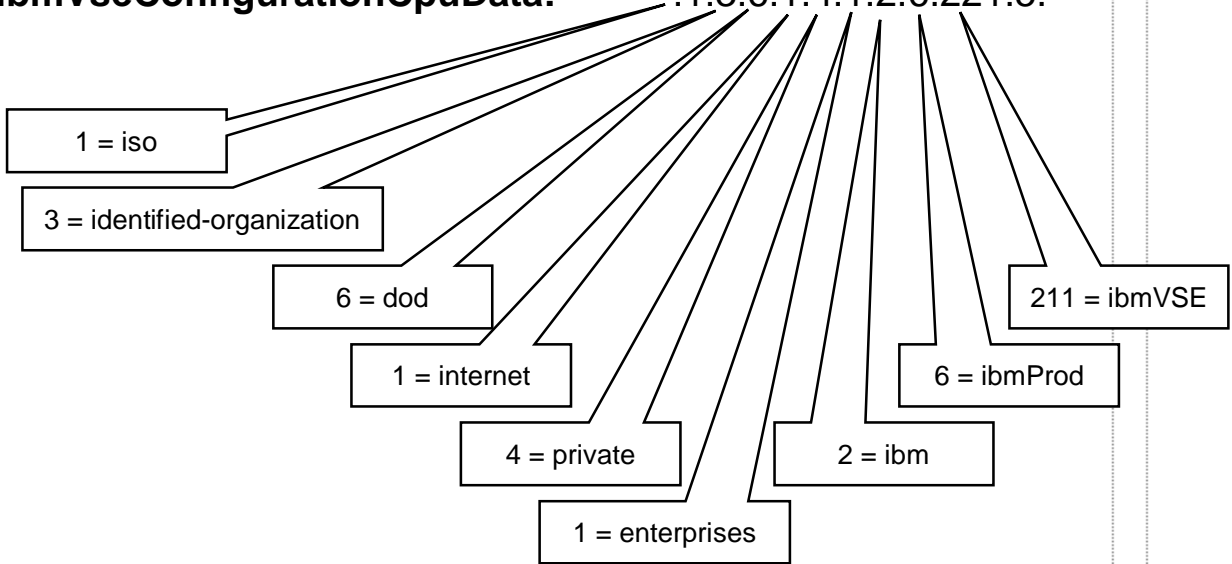


# z/VSE SNMP Monitoring Agent support

§ A **MIB** (Measurement Information Base) is provided describing the data collected

à 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.\*



MIB Browser tree structure:

- root
  - ccitt
  - iso
    - standard
    - registration-authority
    - member-body
    - identified-organization
      - dod
        - internet
          - mgmt
          - private
            - enterprises
              - sun
              - cisco
              - ibm
                - ibmArchitecture
                - ibmProd
                  - ibmVSE
                    - ibmVseConfigurationStatic
                      - ibmVseUnderVM
                      - ibmVseVMGuestName
                      - ibmVseVMCPName
                      - ibmVseLPARNumber
                      - ibmVseMaxPartitions
                      - ibmVseVMGuestLevel
                      - ibmVseProcessor
                      - ibmVseLPARName
                      - ibmVseInLPAR
                    - ibmVseSystemPerformance
                      - ibmVseNumPageINs
                      - ibmVseLastResetTime
                      - ibmVseTotalDispatcherCycles
                      - ibmVseTotalNPTTime
                      - ibmVseTotalAllboundTime
                      - ibmVseNumPageOUTs
                      - ibmVseTotalCPUTime
                      - ibmVseNumSVCs
                      - ibmVseTotalSpinTime

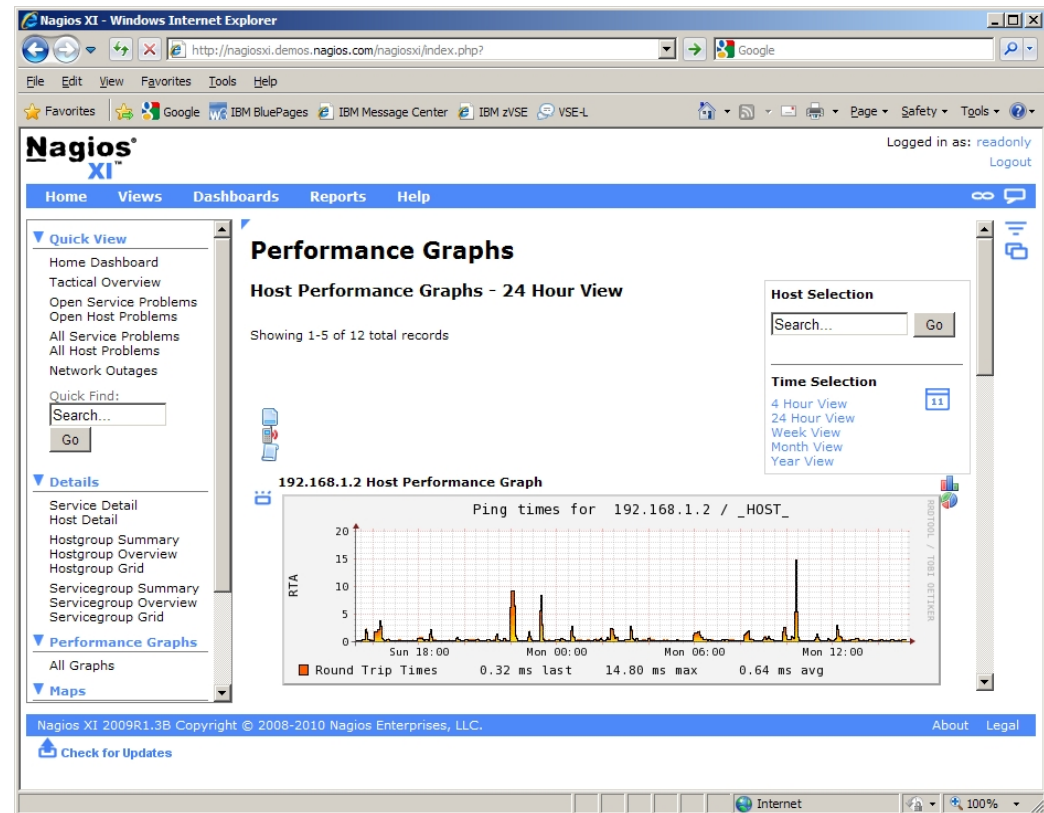
## z/VSE SNMP Monitoring Agent support

### § 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 ([www.nagios.org](http://www.nagios.org))

### § 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



## z/VSE 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**

## z/VSE 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                  |

# Example: PRTG Traffic Grapher

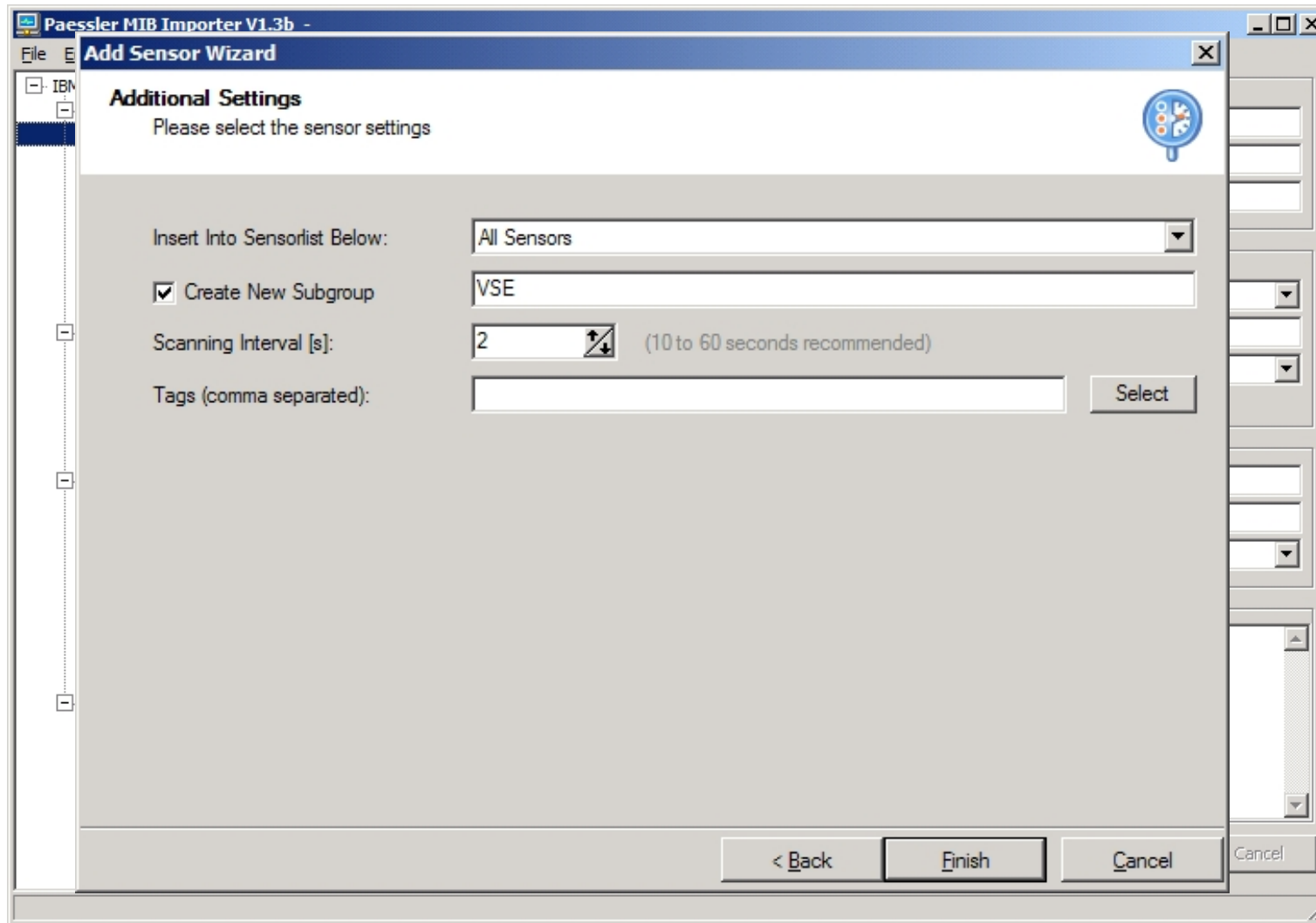
The screenshot displays the PRTG Traffic Grapher web interface. The browser address bar shows the URL: `http://9.152.222.55/sensorlist.htm?gr2=1&gr6=1&gr4=1&gr0=1&timeout=15&exp7=0&position=0`. The interface includes a navigation sidebar on the left with sections for Data, Events, Sensors, Custom, Reports, and Browser. The main content area is titled "PRTG Traffic Grapher > All Sensors" and features three live graphs for the "VSE" sensor group. Each graph is titled "Live Graph - 5 Minutes - 2 sec Interval".

- The first graph, "ibm vse cpu: 1 > ibm vse cpu time on VSE (vsedemo)", shows CPU time in msec/second, with a current value of 2 msec/second.
- The second graph, "ibm vse system performance > ibm vse total dispatcher cycles on VSE (vsedemo)", shows dispatcher cycles in #/second, with a current value of 345 #/second.
- The third graph, "ibm vse system performance > ibm vse num svcs on VSE (vsedemo)", shows the number of services in #/second, with a current value of 431 #/second.

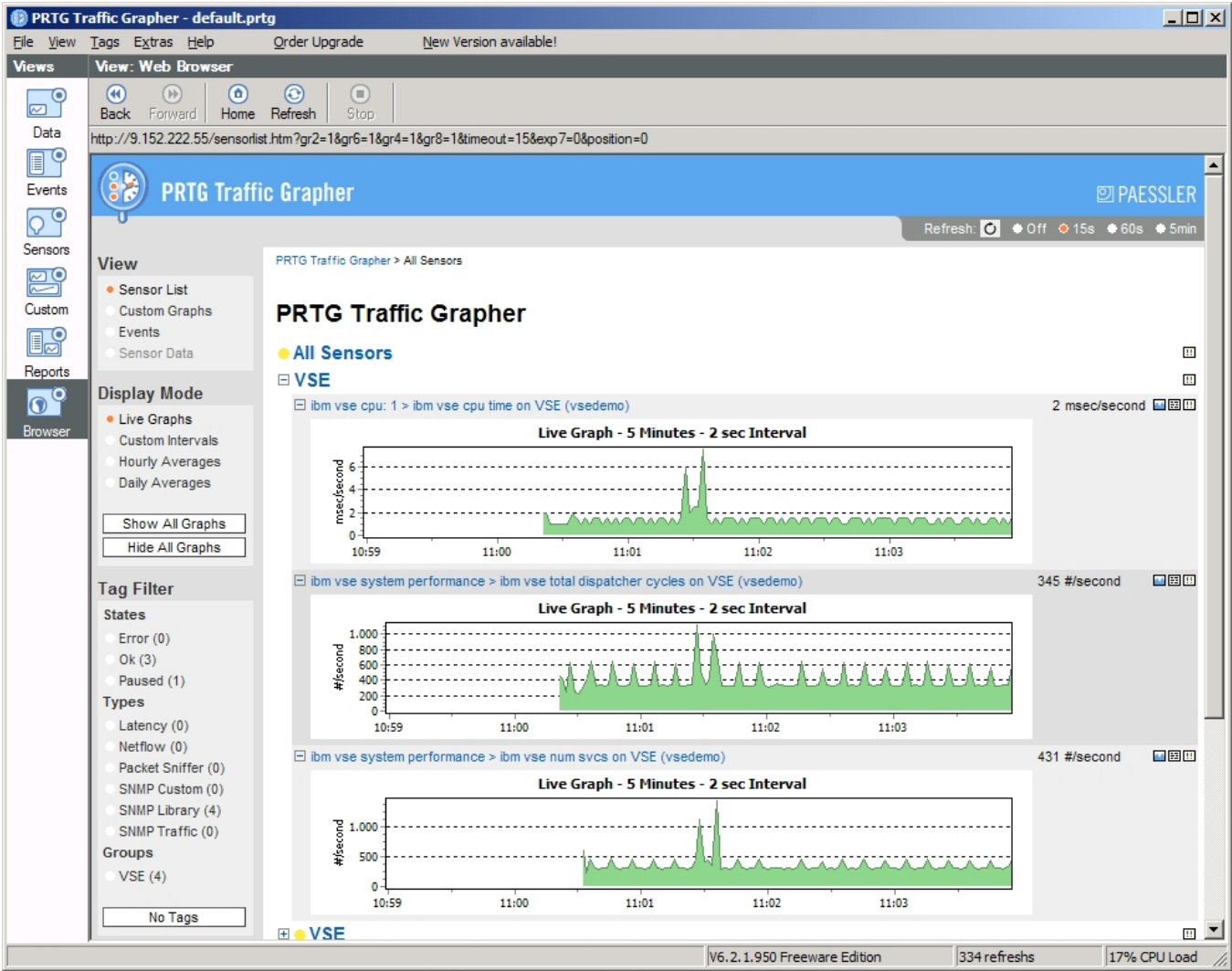
The status bar at the bottom of the interface indicates "V6.2.1.950 Freeware Edition", "334 refreshes", and "17% CPU Load".



## Example: PRTG Traffic Grapher



# Example: PRTG Traffic Grapher



# z/VSE 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
/*
    
```

**Trap Details**

Community: public

Trap Type: 6

Specific Type: 0

TimeStamp: 4 days 18h:47m:23.77s

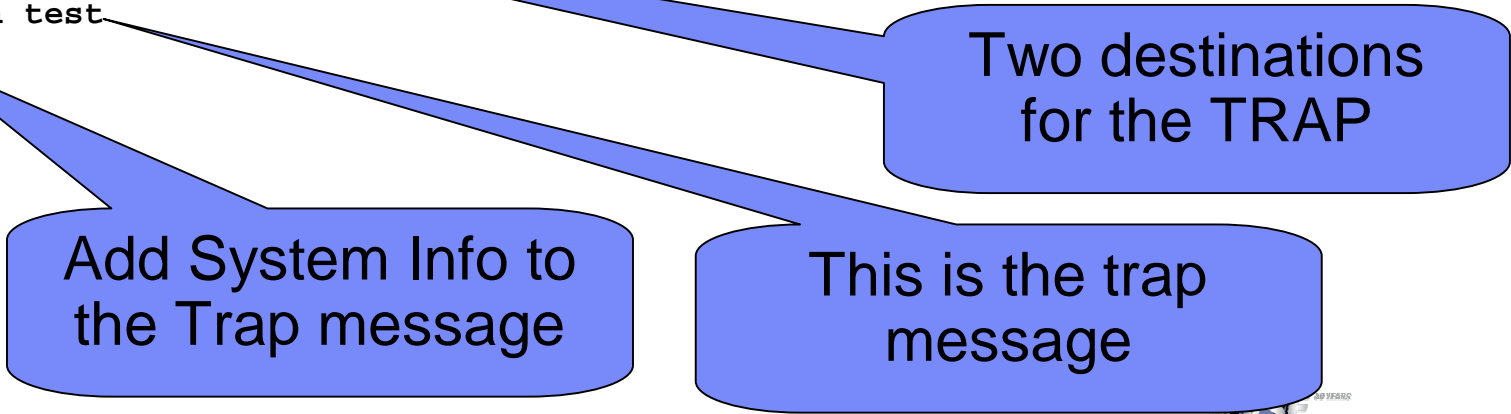
Ip Address: 9.152.84.155

Sender OID: 1.3.6.1.4.1.2.3.116

Trap Type: SNMPv1

| OID                       | Type   | Value                                   |
|---------------------------|--------|---|
| 1.2.3.4                   | String | This is a test                          |
| ibmVseConformanceGroup.16 | String | Tue Mar 22 10:02:53 2011                |
| sysDescr                  | String | z/VSE 4.3.0 (VSELP43) running in z/V... |

Buttons: Close, Show Raw, << prev, next >>





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

### § z/VSE 4.3: SNMP traps (events) can be sent from batch jobs only

- via // EXEC IESMTRAP in a batch job

### § z/VSE 5.1 adds the possibility to send SNMP traps from within customer programs

- Using the new SNMP Trap API
- Send traps from within batch programs (LE enabled, i.e. COBOL, PL/1, C)
- Send traps from within a CICS application (EXEC CICS LINK interface)

```
01 IESMTRPB          PIC X(8) VALUE 'IESMTRPB'.
Procedure Division.
  Move Length Of MTRA-AREA to AREA-LENGTH.
  Move '9.152.224.43' to DEST.
  Move 0 to RET-CODE.
  Move 'PUBLIC' to COMMUNITY.
  Move '1.2.3.4' to OID.
  Move 0 to DEBUG.
  Move 1 to ADDSYSINF.
  Move 6 to TRAPTYPE.
  Move 1 to MSGTYPE.
  Move 'HELLO VSE WORLD' to MSGSTR.
  DISPLAY "CALLING TRAP INTERFACE ...".
  CALL IESMTRPB USING BY REFERENCE MTRA-AREA.
  DISPLAY "RC:".
  Display RET-CODE.
```



## Questions ?



## Mark your calendar:

### **WAVV 2012**

Covington, KY, USA  
April 13-17, 2012



### **IBM System z Technical Conference**

Berlin, Germany  
May 21-25, 2012

### **IBM System z Technical University**

Las Vegas, NV, USA  
October 1-5, 2012

### **European GSE/IBM**

**Technical University for  
z/VSE, z/VM and Linux on System z**  
Mainz, Germany  
October 22-24, 2012

<http://ibm.com/vse/events/>