Monitoring Principles & z/VSE Monitoring Options

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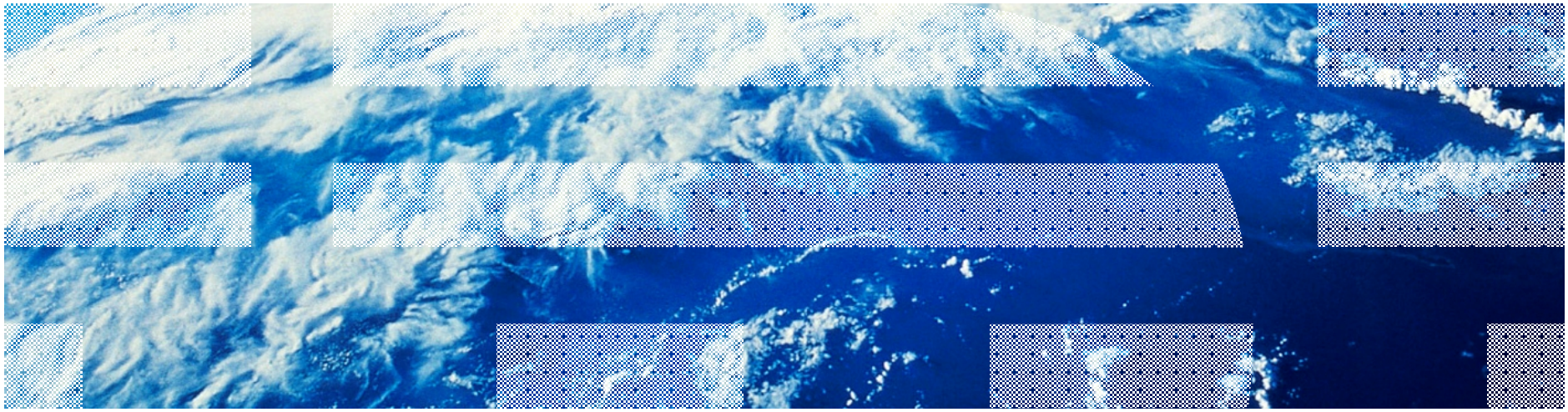


What is and why use monitoring

§ 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

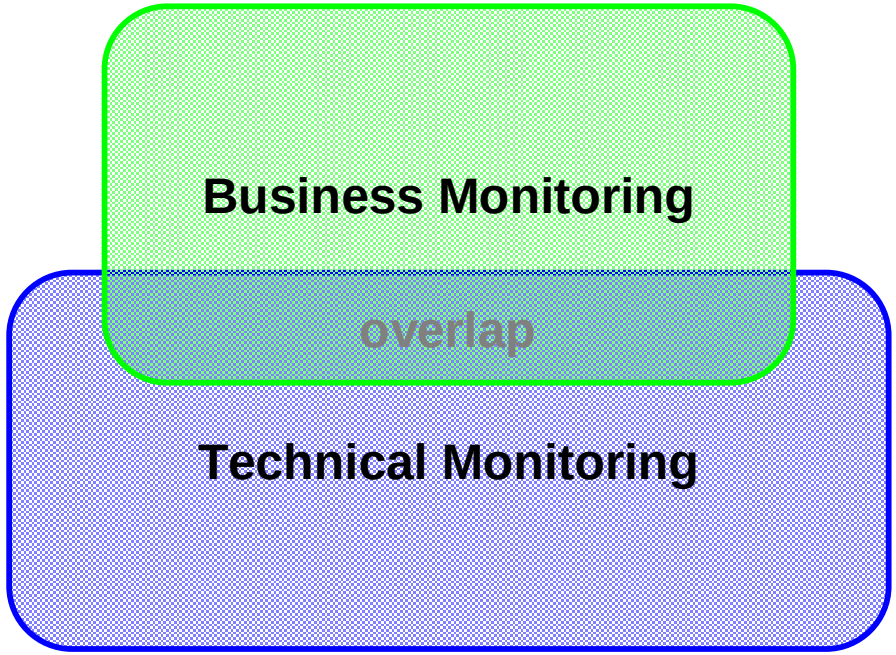
- to be aware of the state of a system
- to observe a situation for any changes which may occur over time
- to react on unpredicted or predicted situations

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

Workloads

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

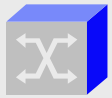
Service Management

- 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

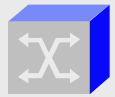
Physical Layer


Non-IBM Servers


IBM System z Power Systems


System x, BladeCenter


IBM & Other Storage


Networking

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.

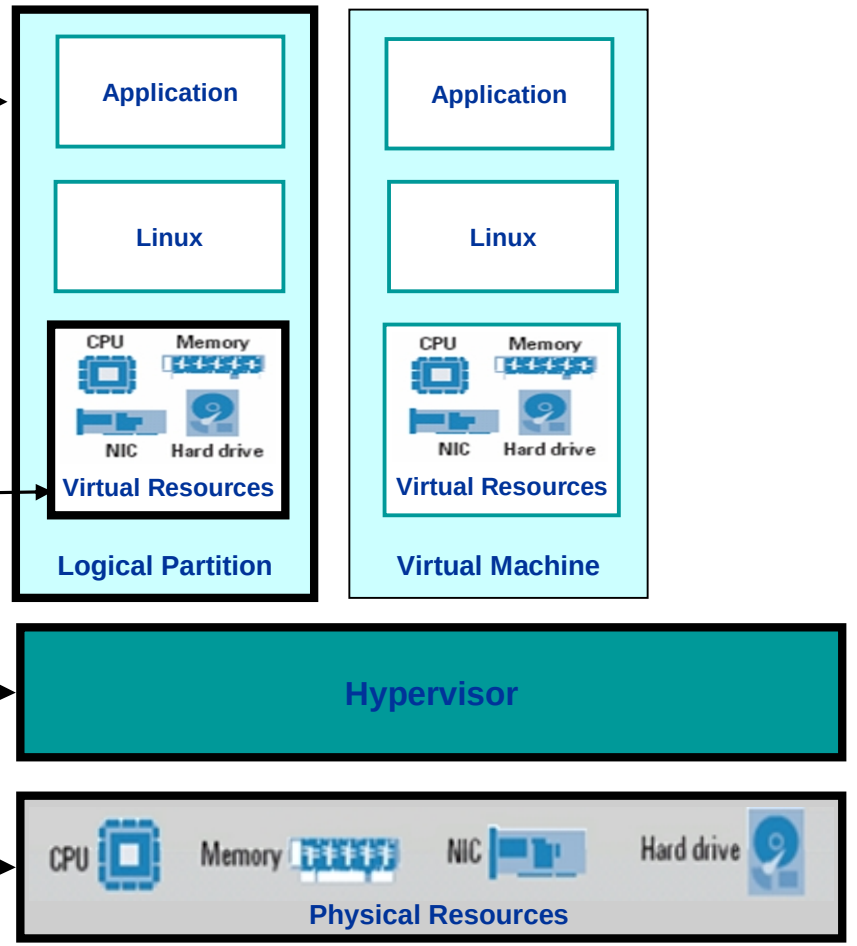
In the Application (bad process) running on the virtual resource?

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

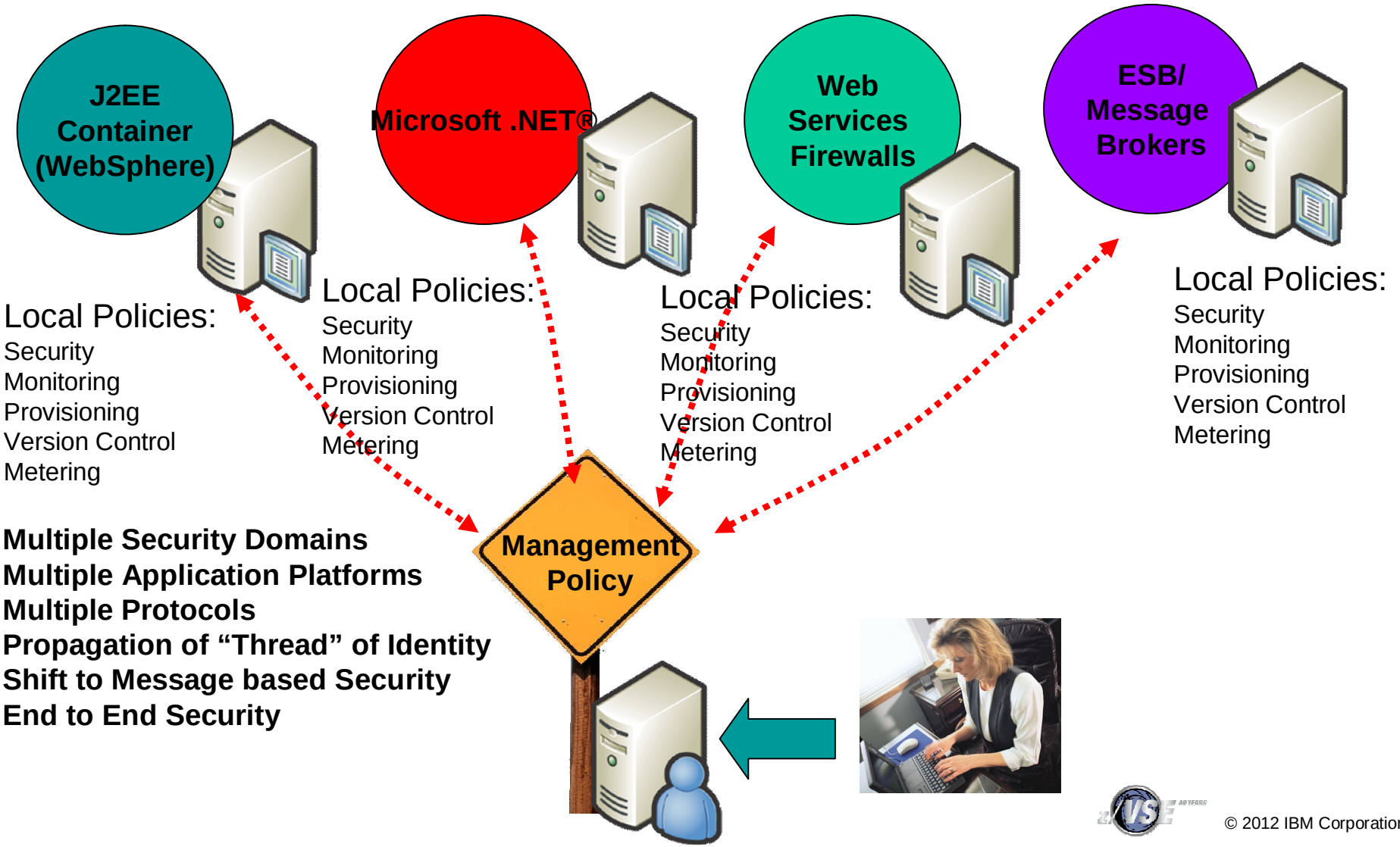
In the VIRTUAL RESOURCE?

In the HYPERVISOR overhead?

Or in the PHYSICAL RESOURCE?



Composite Application Integration Challenges



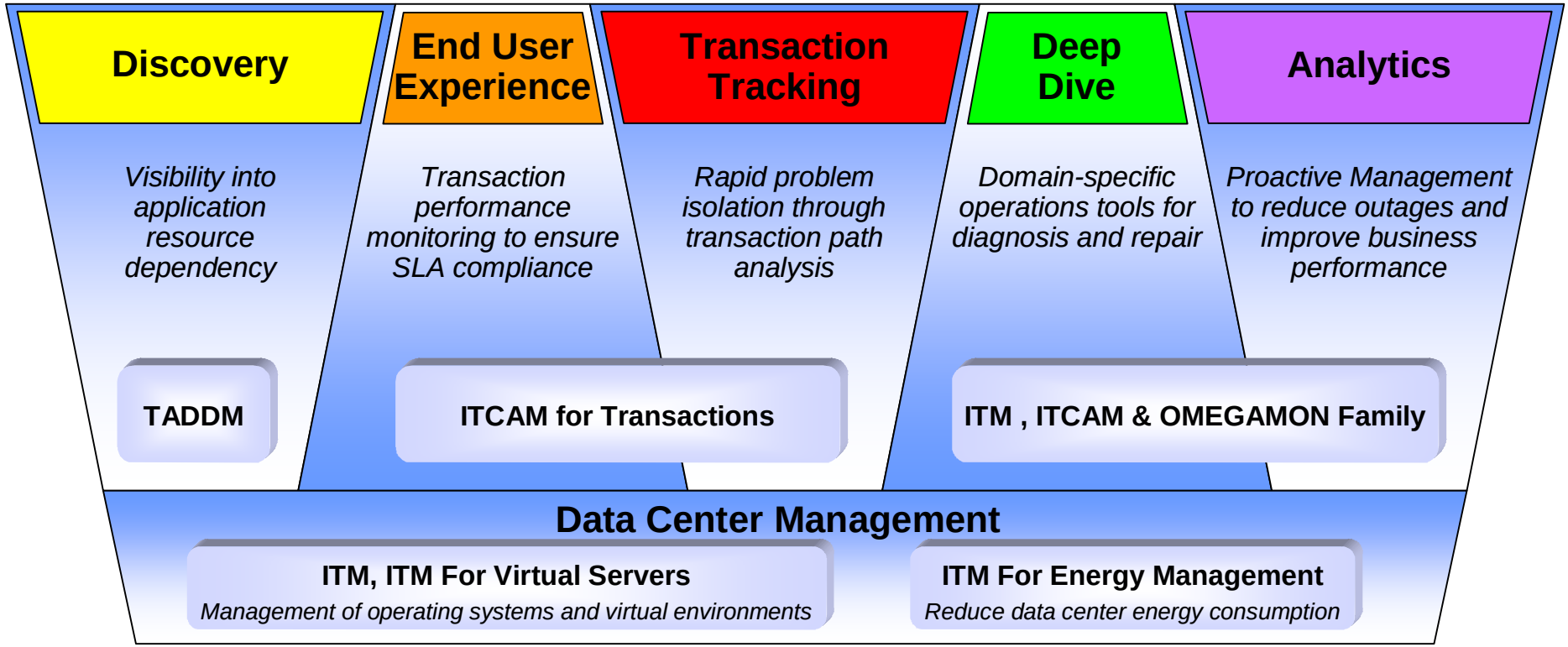
Integrated Monitoring drives Automation Service Interactions with the Platform

Secure User Centric Self-Service Portal, Automation engine and

Automated Provisioning and Image Management

Monitoring, Security and Metering

Tivoli Resource and Availability Monitoring and Management Portfolio



Unified Management

- Central location to view & act on contextualized information
- Reporting Interface to comprehend current appl environment and trends
- Central repository for enterprise-wide performance mgmt data

Broader Coverage

- § OS & Virtual Environment
- § Databases
- § Web Servers and App Servers
- § Packaged Applications
- § Agent Builder supports custom apps

Virtualization

- § Predict physical and virtual resource capacity bottlenecks
- § Ensure maximum resource utilization

Predictive Analytics

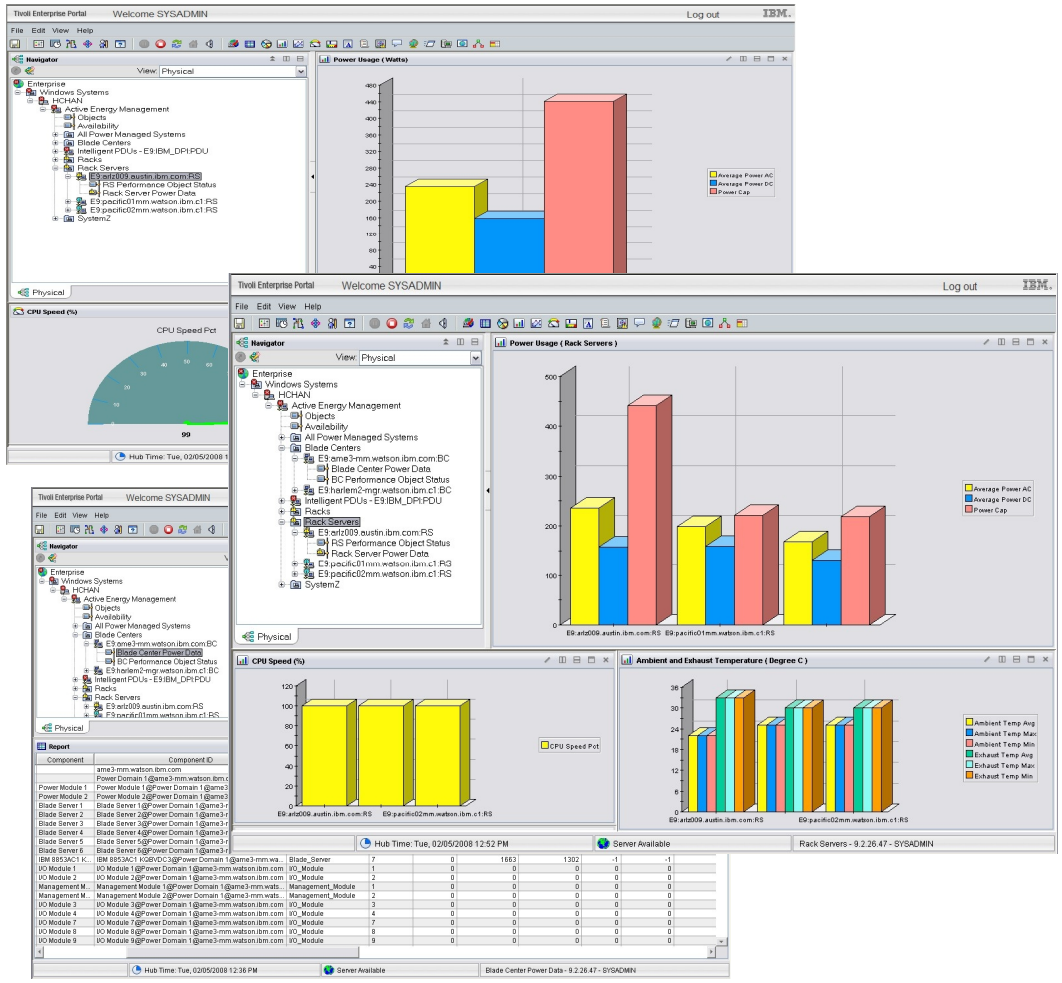
- § Automating Threshold Mgmt
- § Automate Trending to identify emerging Capacity and Performance issues
- § Predictive Learning – uncover anomalies

Monitoring Power and Thermal

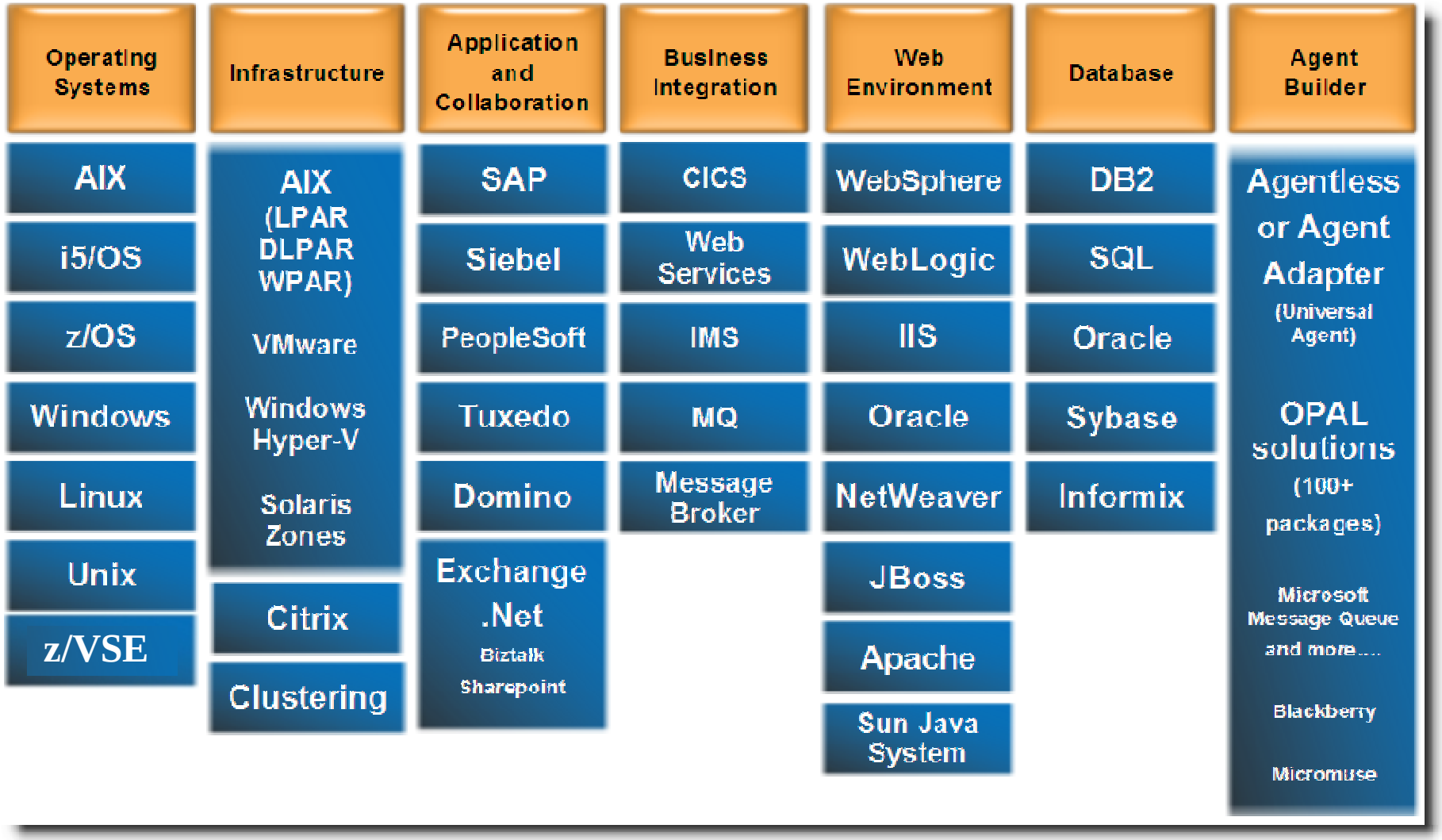
Tivoli Monitoring for Green Energy
Data Center Optimization and Reporting

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

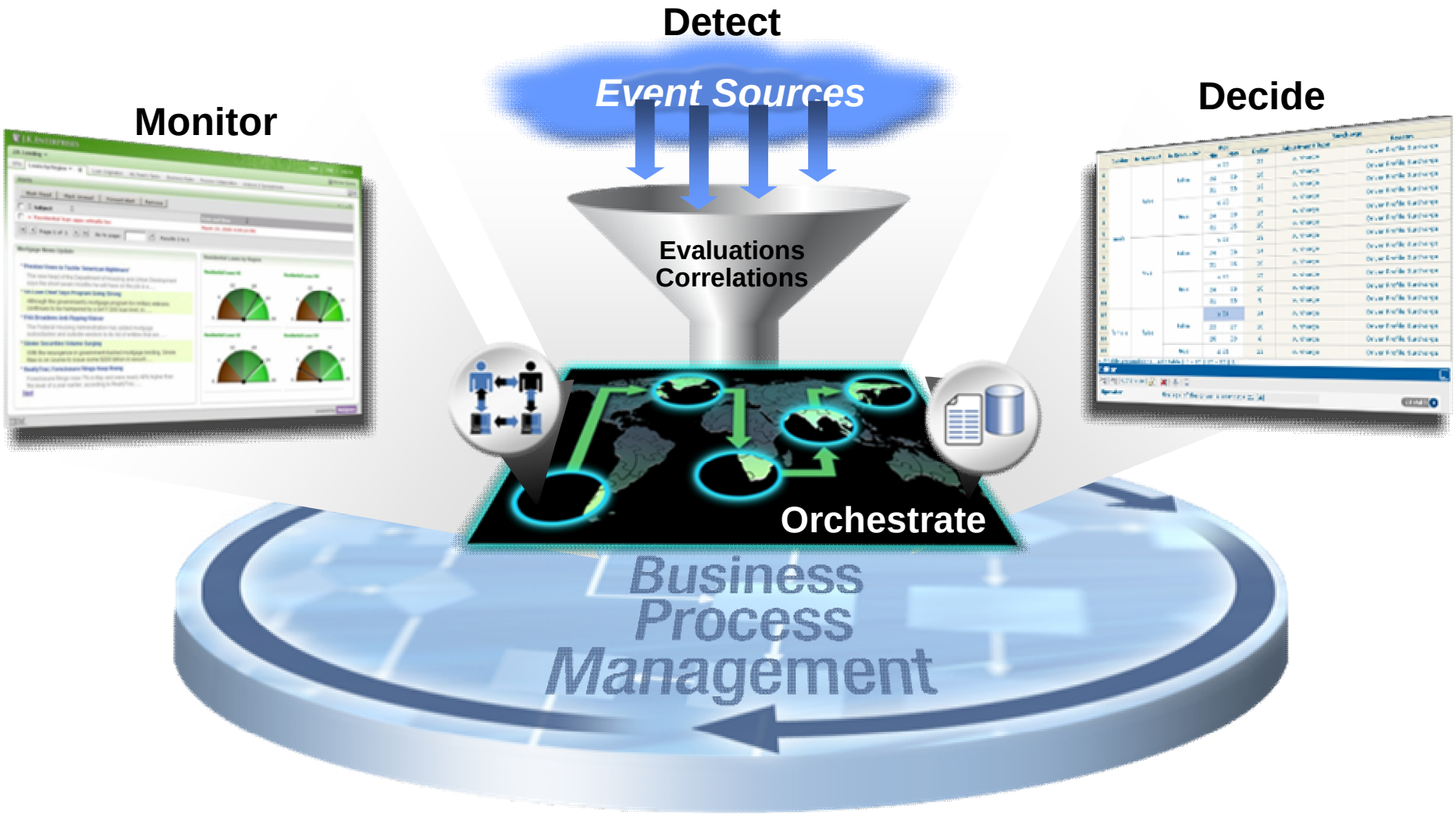


IBM® Tivoli® Monitoring
The Industries' Most Extensive Resource Monitoring



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

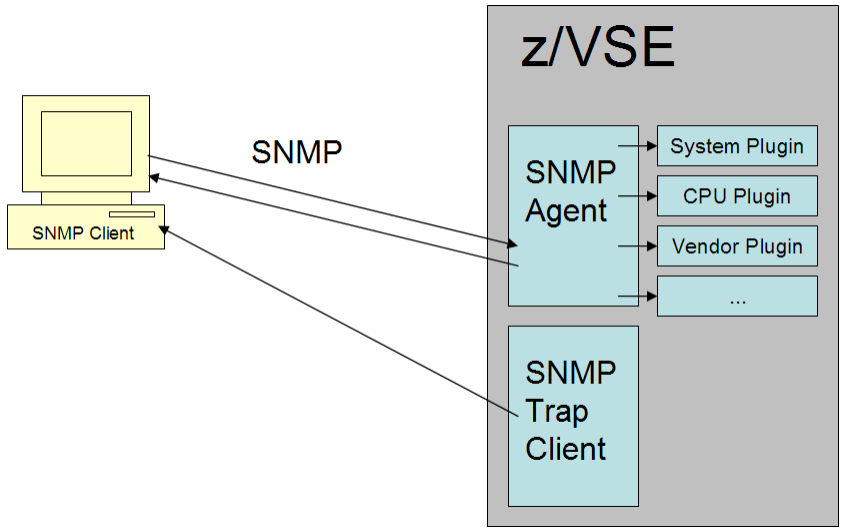
- **Real-Time Monitoring**
  - **displaying** technical information
    - to IT Support/Maintenance/Administration experts

- **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)

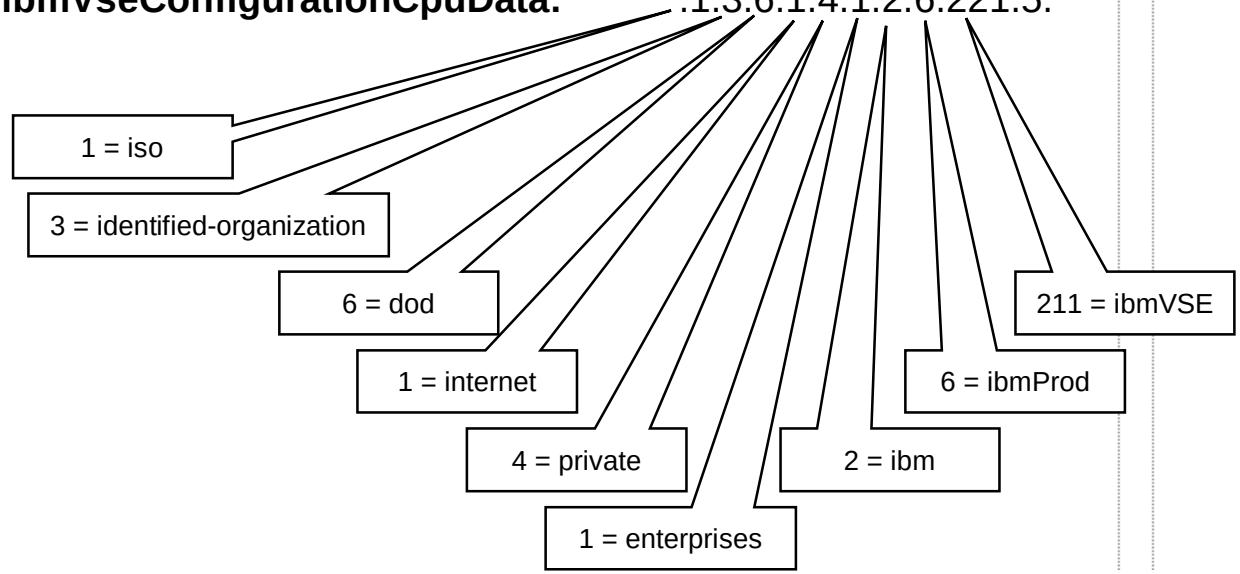
à http://en.wikipedia.org/wiki/Simple_Network_Management_Protocol

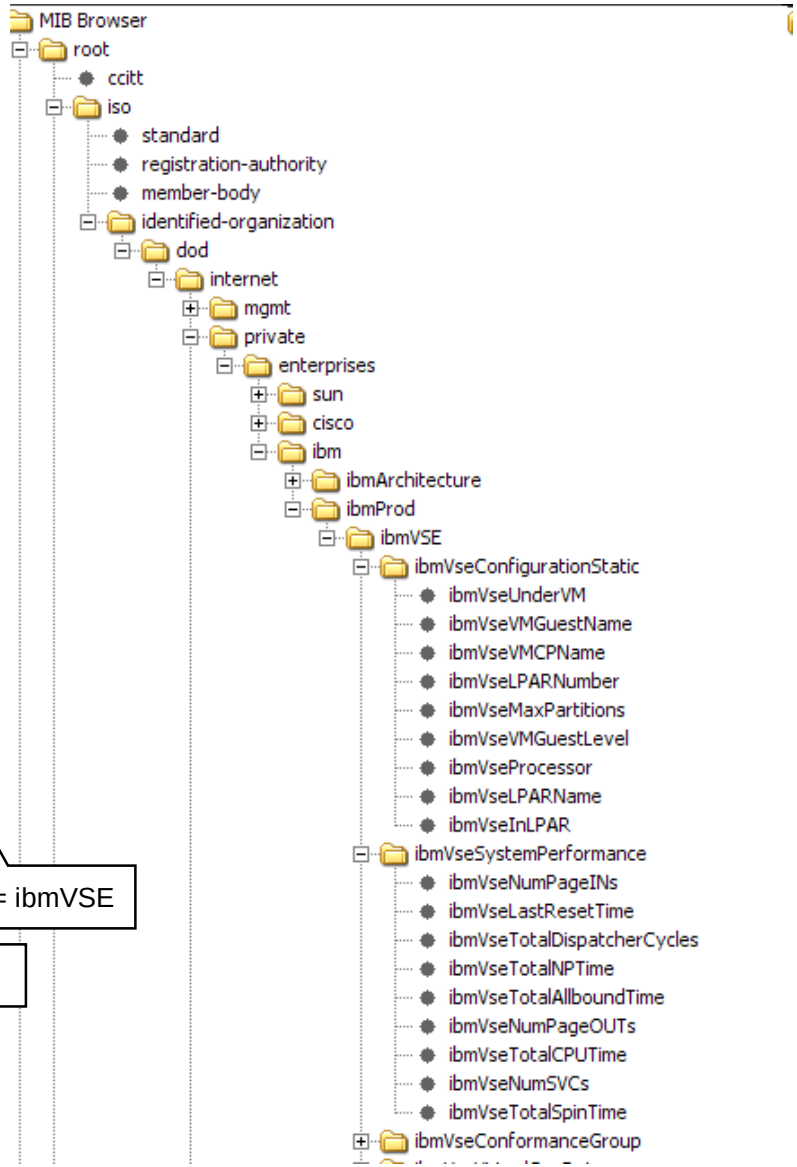
z/VSE SNMP Monitoring Agent support

§ **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.*

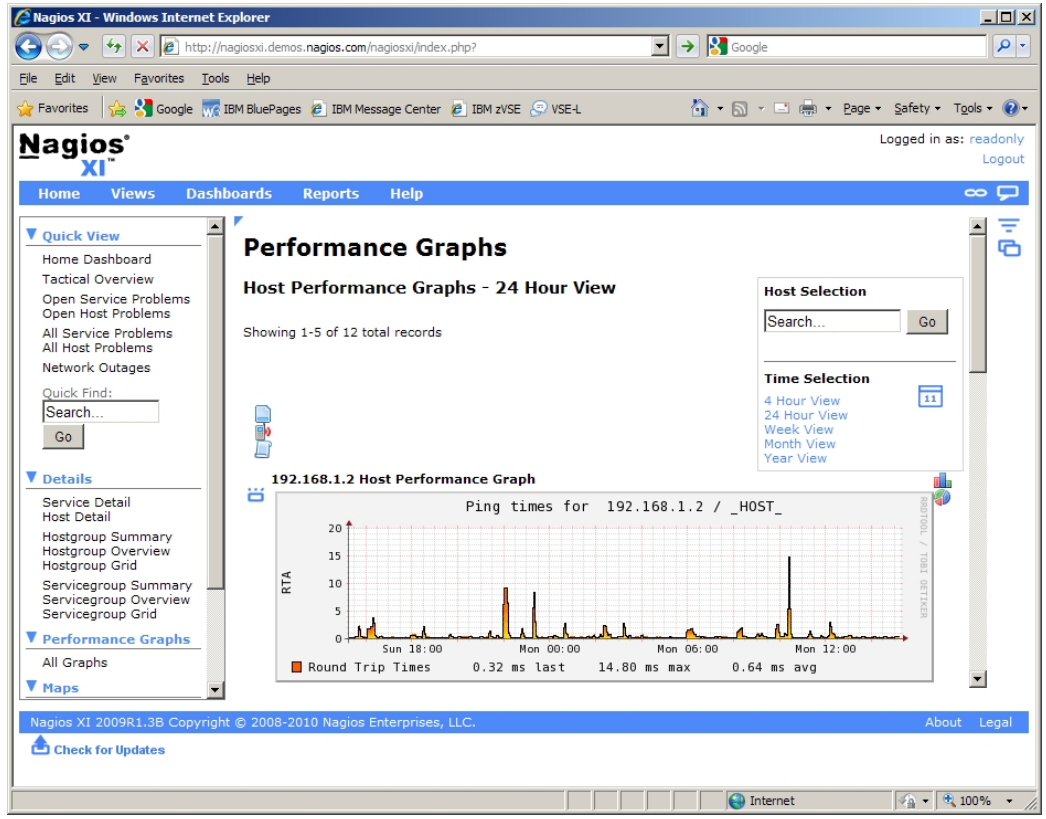




z/VSE SNMP Monitoring Agent support

§ **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)

§ **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

4. **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
```

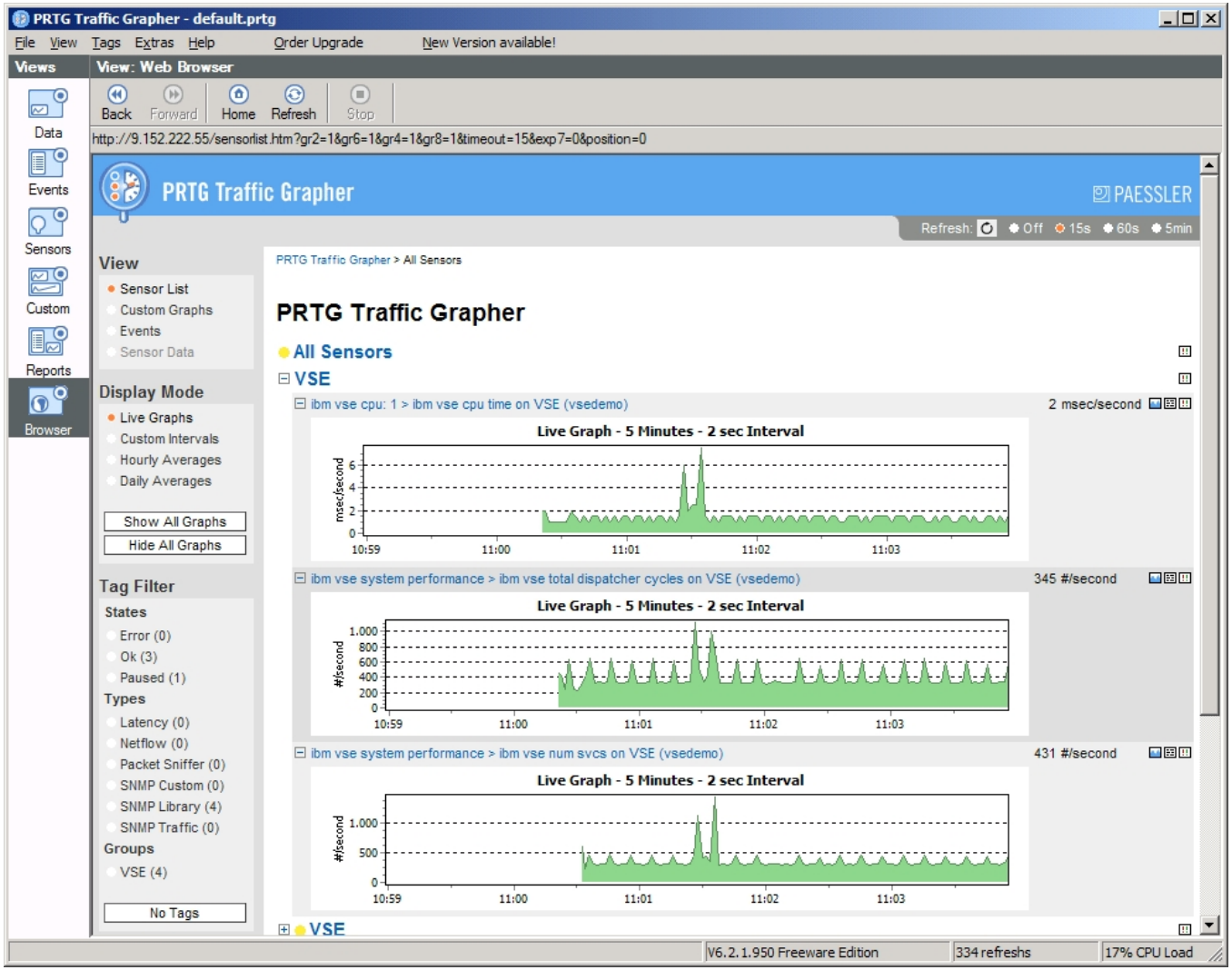
Sample output:

```
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



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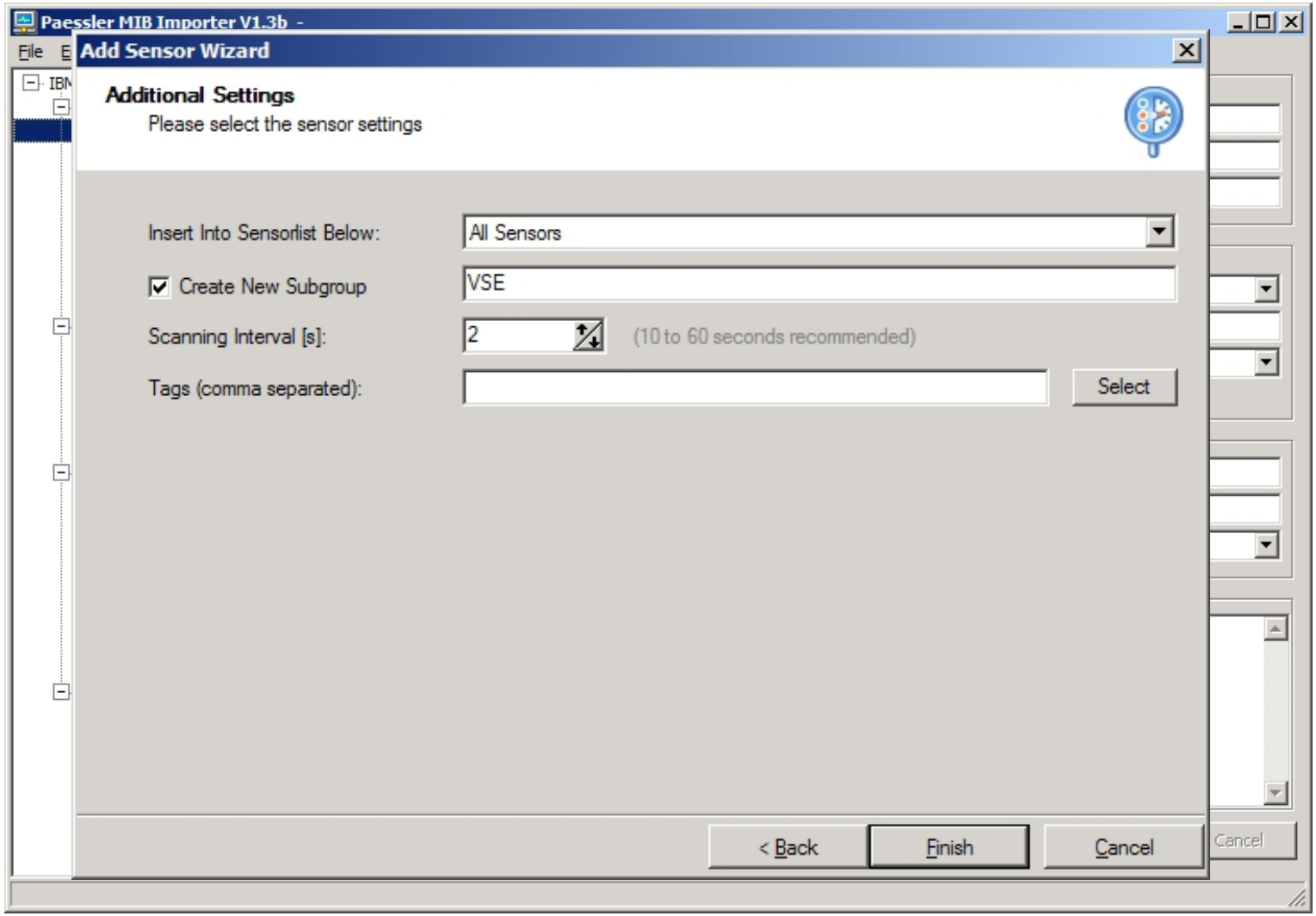
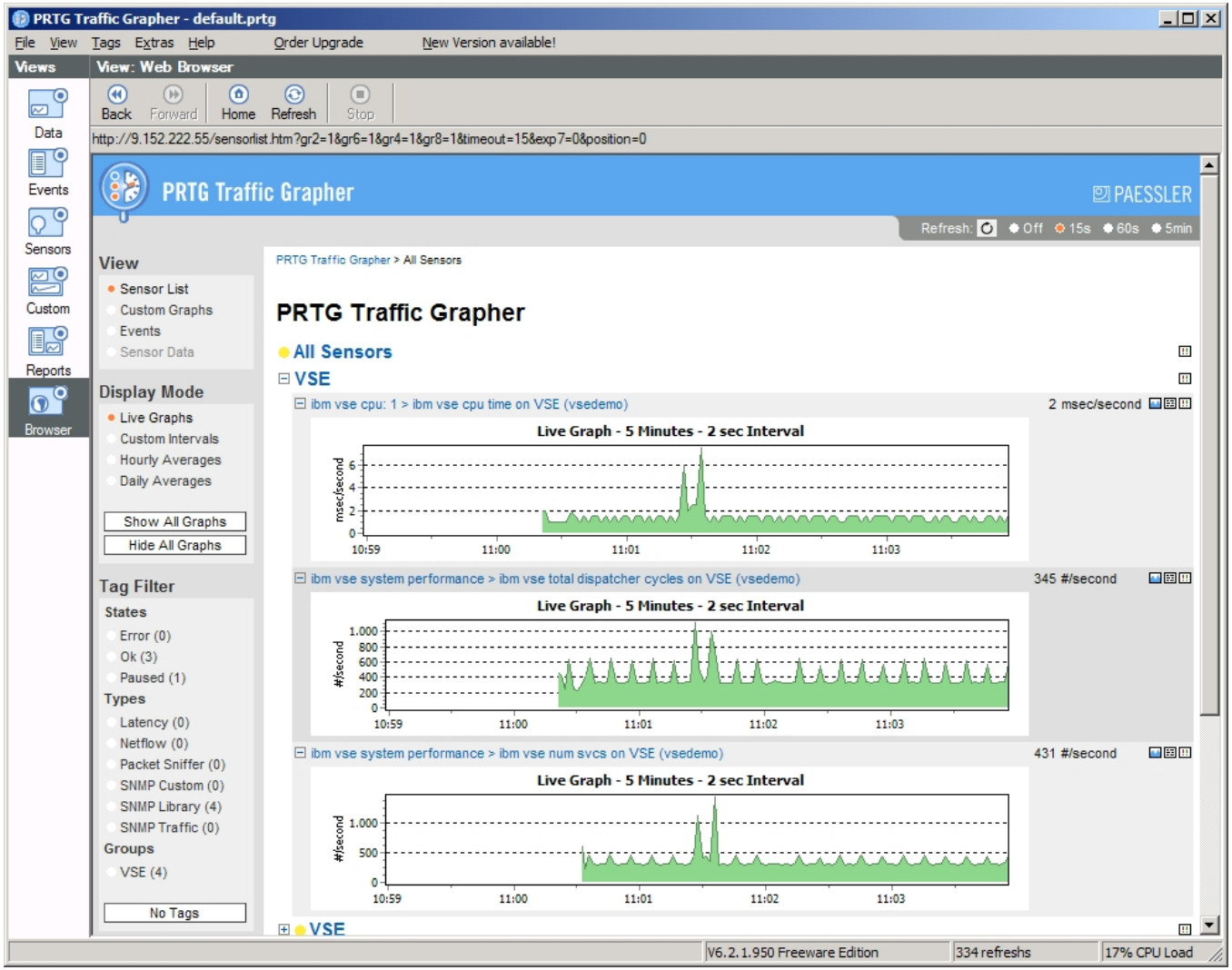


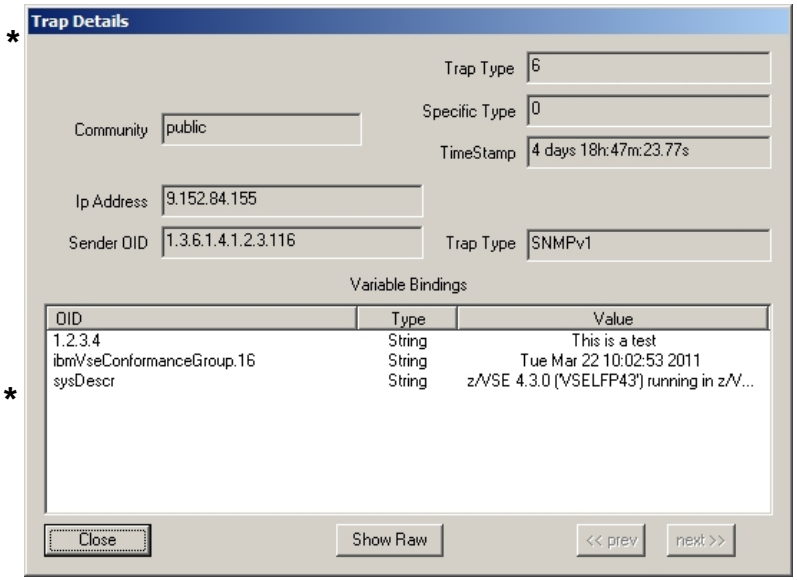
Example: PRTG Traffic Grapher



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
/*
```



Two destinations for the TRAP

Add System Info to the Trap message

This is the trap message

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 ?