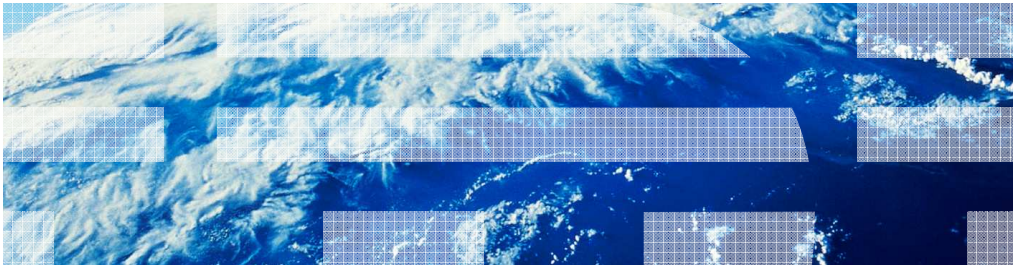


z/OS V1R13

RMF: Integrated ensemble performance monitoring



Session objectives


- RMF™ Integrated Ensemble Performance Monitoring includes support for the following platforms:
 - AIX®
 - Linux® on system x
 - Linux on system z
- Core component: RMF Distributed Data Server (DDS)
- The following GUI's are available for monitoring:
 - RMF Performance Data Portal
 - z/OS®MF Resource Monitoring

Overview (1 of 5)

- Problem Statement / Need Addressed
 - The new IBM zEnterprise™ System integrates the mainframe together with distributed environments
 - Management functions and performance tools for the new platforms are required
- Solution
 - Provide seamless performance monitoring solution for the operating systems running on POWER7® and System x blades
- Benefit / Value
 - Single point of control for performance monitoring
 - Identify performance problems at a glance
 - Common look and feel for all platforms running on zEnterprise Systems

Overview (2 of 5)

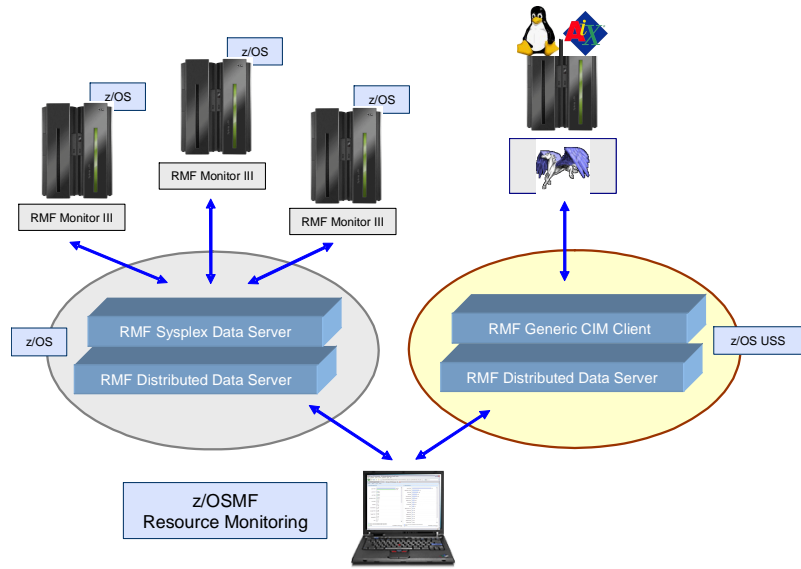
- The Common Information Model (aka CIM) instrumentation is available for almost all operating systems of this planet
- RMF has the infrastructure already in place
 - To combine performance data from multiple systems to a Sysplex wide view
 - To display performance data by means of state-of-the-art graphical frontends

 Isn't it a good idea to bring those powerful things together ?

 We thought it is and we created the RMF Ensemble Monitoring Data Portal

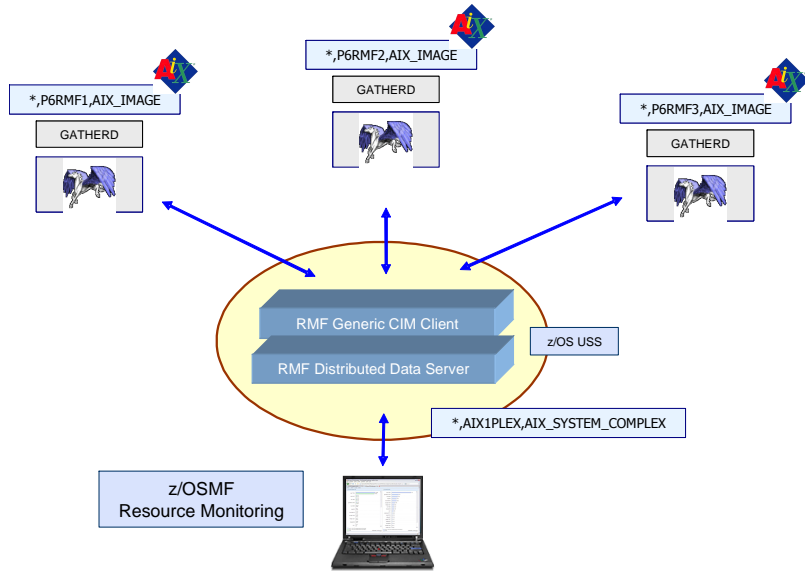
Overview (3 of 5)

Architecture

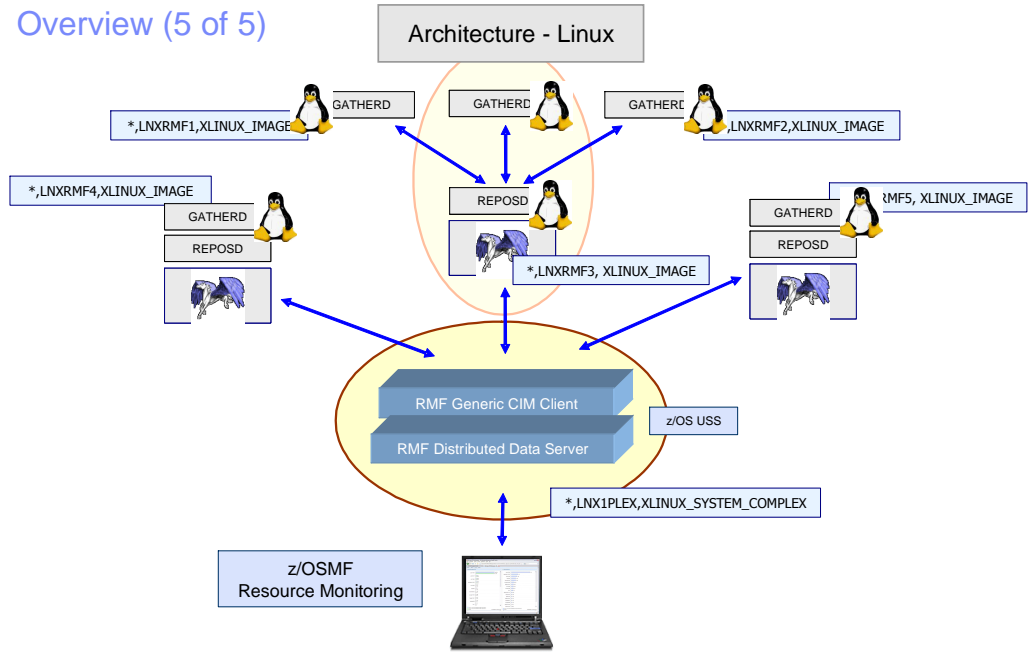


Overview (4 of 5)

Architecture - AIX



Overview (5 of 5)



Usage and invocation (1 of 10)

- Started Task: SYS1.PROCLIB(GPM4CIM)
- Runs in USS Environment via BPXBATCH
- Multiple instances can run in parallel: one STC per platform
 - S GPM4CIM.GPM4A
 - S GPM4CIM.GPM4X
 - S GPM4CIM.GPM4Z

```
//GPM4CIM PROC OS=A
//STEP1 EXEC PGM=BPXBATCH,TIME=NOLIMIT,REGION=0M,
// PARM='PGM /usr/lpp/gpm/bin/gpm4cim cfg=/etc/gpm/gpm4&OS..cfg'
//STDENV DD PATH='/etc/gpm/gpm4cim.env'
//STDOUT DD PATH='/var/gpm/logs/gpm4cim&OS..out',
// PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
// PATHMODE=(SIRUSR,SIWUSR,SIRGRP)
//STDERR DD PATH='/var/gpm/logs/gpm4cim&OS..trc',
// PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
// PATHMODE=(SIRUSR,SIWUSR,SIRGRP)
//SYSPRINT DD SYSOUT=*
//SYSOUT DD SYSOUT=*
// PEND
```


Usage and invocation (2 of 10)

```

//GPM4CIM PROC OS=A
//STEP1 EXEC PGM=BPXBATCH,TIME=NOLIMIT,REGION=0M,
// PARM='PGM /usr/lpp/gpm/bin/gpm4cim cfg=/etc/gp
//STDENV DD PATH='/etc/gpm/gpm4cim.
//STDOUT DD PATH='/var/gpm/logs/gpm4cim&OS..out',
// PATHOPTS=(OWRONLY,OCRE
// PATHMODE=(SIRUSR,S
//STDERR DD PATH='/var/gpm/logs/gpm4cim&OS..trc',
// PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
// PATHMODE=(SIRUSR,SIRGRP)
//SYSPRINT DD SYSOUT=*
//SYSOUT DD SYSOUT=*
// PEND
  
```

```

MAXSESSIONS_HTTP(20) /* Maxno of concurrent HTTP requests */
HTTP_PORT(8805) /* Port number for HTTP requests */
HTTP_ALLOW(*) /* Mask for hosts that are allowed */
HTTP_NOAUTH(*) /* No server can access without auth.*/
ATX_COMPLEX(WEBPLEX) /* Name of system complex */
ATX_IMAGE(p6rmf1.pok.ibm.com) /* Hostname of member */
ATX_IMAGE(p6rmf2.pok.ibm.com)
  
```

```

GPM_HOME=/etc/gpm/
ICLUI_TRACETO=STDERR
_BPX_SHAREAS=NO
_BPXK_AUTOCVT=ON
LIBPATH=/usr/lpp/gpm/bin:/usr/lpp/wbem/lib
  
```

Usage and invocation (3 of 10)

Resource Model - AIX

- ✕ AIX_SYSTEM_COMPLEX
 - 📁 AIX_IMAGE
 - 🔌 ACTIVE_MEMORY_EXPANSION
 - 🔌 ACTIVE_MEMORY_SHARING
 - 🔌 ALL_DISKS
 - 🔌 DISK
 - 🔌 ALL_LOGICAL_PROCESSORS
 - 🔌 LOGICAL_PROCESSOR
 - 🔌 ALL_NETWORK_PORTS
 - 🔌 NETWORK_PORT
 - 🔌 ALL_LOCAL_FILE_SYSTEMS
 - 🔌 LOCAL_FILE_SYSTEM
 - 🔌 ALL_PROCESSES
 - 🔌 PROCESS
 - 🔌 ALL_SHARED_ETHERNET_ADAPTER
 - 🔌 SHARED_ETHERNET_ADAPTER
 - 🔌 ALL_VIRTUAL_TARGET_DEVICES
 - 🔌 VIRTUAL_TARGET_DEVICE
 - 🔌 PARTITION
 - 🔌 MEMORY

Resource Model - xLinux

- ✕ XLINUX_SYSTEM_COMPLEX
 - 📁 XLINUX_IMAGE
 - 🔌 ALL_LOCAL_FILE_SYSTEMS
 - 🔌 LOCAL_FILE_SYSTEM
 - 🔌 ALL_IP_PROTOCOL_ENDPOINTS
 - 🔌 IP_PROTOCOL_ENDPOINT
 - 🔌 ALL_LOGICAL_PROCESSORS
 - 🔌 LOGICAL_PROCESSOR
 - 🔌 ALL_NETWORK_PORTS
 - 🔌 NETWORK_PORT
 - 🔌 ALL_PROCESSES
 - 🔌 PROCESS

Resource Model - zLinux

- ✕ ZLINUX_SYSTEM_COMPLEX
 - 🔌 CEC
 - 🔌 LPAR
 - 📁 ZLINUX_IMAGE
 - 🔌 ALL_LOCAL_FILE_SYSTEMS
 - 🔌 LOCAL_FILE_SYSTEM
 - 🔌 ALL_IP_PROTOCOL_ENDPOINTS
 - 🔌 IP_PROTOCOL_ENDPOINT
 - 🔌 ALL_LOGICAL_PROCESSORS
 - 🔌 LOGICAL_PROCESSOR
 - 🔌 ALL_NETWORK_PORTS
 - 🔌 NETWORK_PORT
 - 🔌 ALL_PROCESSES
 - 🔌 PROCESS
 - 🔌 ALL_CHANNELS
 - 🔌 CHANNEL
 - 🔌 ALL_VOLUMES
 - 🔌 VOLUME

Usage and invocation (4 of 10)

Configuration

The screenshots illustrate the RMF Performance Data Portal interface. The top-left screenshot shows the 'Configuration' box. The middle-left screenshot shows the 'Overview' page with a table of resources for the system complex. The bottom-left screenshot shows the 'Home' page with a table of network ports. The right-side screenshots show the 'Children of' view for a specific resource, displaying a detailed table of system metrics.

Icon	Resource	Metrics	Attributes	Res-Type
	smcc-123-131.AIX_IMAGE	Metrics	N/A	AIX_IMAGE
	smcc-123-133.AIX_IMAGE	Metrics	N/A	AIX_IMAGE
	smcc-123-139.AIX_IMAGE	Metrics	N/A	AIX_IMAGE
	smcc-123-140.AIX_IMAGE	Metrics	N/A	AIX_IMAGE
	smcc-123-141.AIX_IMAGE	Metrics	N/A	AIX_IMAGE

Icon	Resource	Metrics
	tmcc-123-141.en0.NETWORK_PORT	Metrics
	tmcc-123-141.en1.NETWORK_PORT	Metrics
	tmcc-123-141.en0.NETWORK_PORT	Metrics
	tmcc-123-141.en0.NETWORK_PORT	Metrics

Icon	Resource	Metrics	Attributes	Res-Type
	tmcc-123-141.*ACTIVE_MEMORY_EXPANSION	Metrics	N/A	ACTIVE_MEMORY_EXPANSION
	tmcc-123-141.*ACTIVE_MEMORY_SHARING	Metrics	N/A	ACTIVE_MEMORY_SHARING
	tmcc-123-141.*ALL_DISKS	Metrics	N/A	ALL_DISKS
	tmcc-123-141.*ALL_LOGICAL_PROCESSORS	Metrics	N/A	ALL_LOGICAL_PROCESSORS
	tmcc-123-141.*ALL_NETWORK_PORTS	Metrics	N/A	ALL_NETWORK_PORTS
	tmcc-123-141.*ALL_FILE_SYSTEMS	Metrics	N/A	ALL_LOCAL_FILE_SYSTEMS
	tmcc-123-141.*ALL_PROCESSES	Metrics	N/A	ALL_PROCESSES
	tmcc-123-141.*ALL_SHARED_ETHERNET_ADAPTERS	Metrics	N/A	ALL_SHARED_ETHERNET_ADAPTERS
	tmcc-123-141.*ALL_VIRTUAL_TARGET_DEVICES	Metrics	N/A	ALL_VIRTUAL_TARGET_DEVICES
	tmcc-123-141.*PARTITION	Metrics	N/A	PARTITION
	tmcc-123-141.*MEMORY	Metrics	N/A	MEMORY

Usage and invocation (5 of 10)

Metrics

The screenshots illustrate the navigation and data viewing capabilities of the RMF Performance Data Portal. The top screenshot shows the main dashboard with the 'Metrics' button highlighted. The middle screenshot shows the 'Available metrics for: .WEBPLEX,AIX_SYSTEM_COMPLEX' page, which lists various performance metrics such as 'ByteInRate by shared ethernet adapter' and 'AvailableSpace by local file system'. The bottom screenshot shows the 'AvailableSpace by local file system' metric selected, displaying a time-series chart for the resource .WEBPLEX,AIX_SYSTEM_COMPLEX - AvailableSpace by local file system [045010] (megabyte).

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Usage and invocation (6 of 10)

Metric Values

The image displays three screenshots of the RMF Performance Data Portal interface, illustrating different views of system metrics.

Top Left Screenshot: Shows the "Children of: tmcc-123-131,*ALL_LOGICAL_PROCESSORS" view. A table lists resources and their metrics:

Icon	Resource	Metrics	Attrib
	tmcc-123-131.cpu0.LOGICAL_PROCESSOR	Metrics	N/A
	tmcc-123-131.cpu1.LOGICAL_PROCESSOR	Metrics	N/A
	tmcc-123-131.cpu2.LOGICAL_PROCESSOR	Metrics	N/A
	tmcc-123-131.cpu3.LOGICAL_PROCESSOR	Metrics	N/A

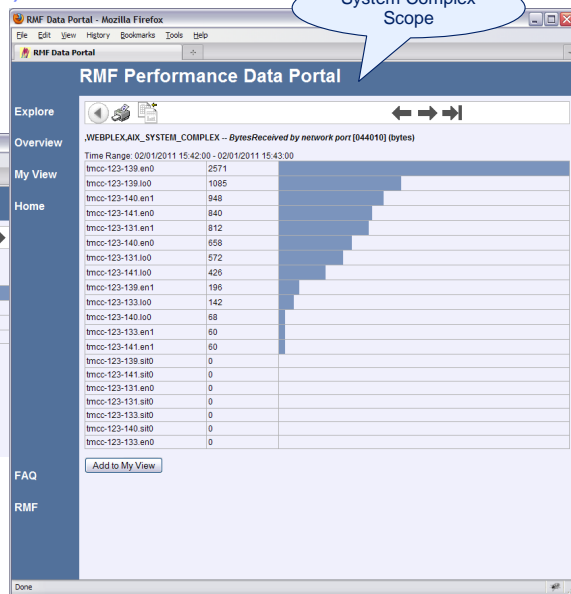
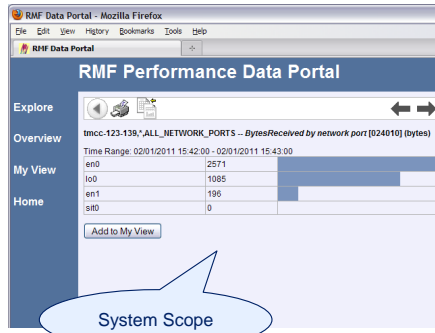
Top Right Screenshot: Shows the "tmcc-123-131.cpu0.LOGICAL_PROCESSOR - TotalCPUTimePercentage [001010] (percent)" view. It displays a time range of 02/01/2011 14:59:00 - 02/01/2011 15:00:00 and a bar chart showing a value of 91.8112. An "Add to My View" button is visible.

Bottom Screenshot: Shows the "Children of: .tmcc-123-131,AIX_IMAGE" view. A table lists resources and their metrics:

Icon	Resource	Metrics	Attributes	Res-Typ
	tmcc-123-131.*.ACTIVE_MEMORY_EXPANSION	Metrics	N/A	ACTIVE
	tmcc-123-131.*.ACTIVE_MEMORY_SHARING	Metrics	N/A	ACTIVE
	tmcc-123-131.*.ALL_DISKS	Metrics	N/A	ALL_DR
	tmcc-123-131.*.ALL_LOGICAL_PROCESSORS	Metrics	N/A	ALL_LO
	tmcc-123-131.*.ALL_NETWORK_PORTS	Metrics	N/A	ALL_NETWORK_PORTS
	tmcc-123-131.*.ALL_LOCAL_FILE_SYSTEMS	Metrics	N/A	ALL_LOCAL_FILE_SYSTEMS
	tmcc-123-131.*.ALL_PROCESSES	Metrics	N/A	ALL_PROCESSES

Usage and invocation (7 of 10)

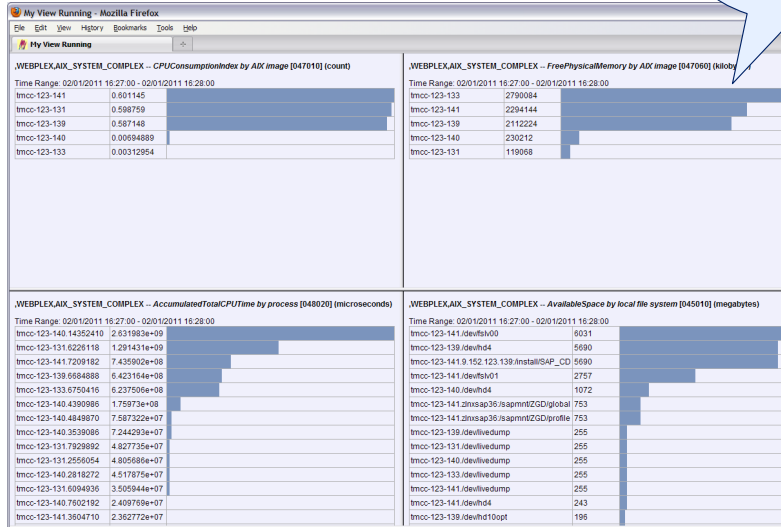
Metric Scope



Usage and invocation (8 of 10)

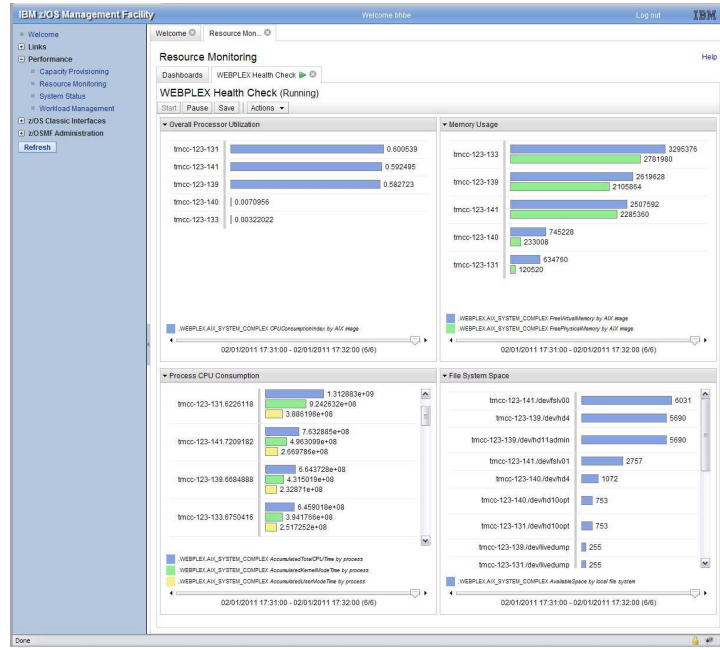
Personal View

Health Check:
 . Processor
 . Memory
 . Filesystem

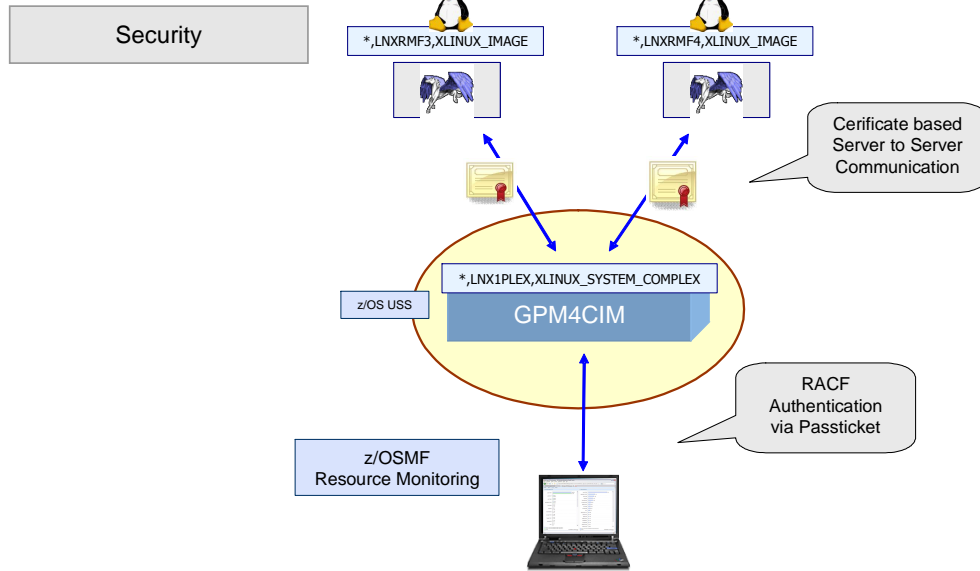


Usage and invocation (9 of 10)

z/OSMF Integration



Usage and invocation (10 of 10)



Interactions and dependencies

- Software Dependencies
 - AIX
 - AIX 5.3+, 6.1+
 - Packages:
 - sysmgt.cimserver.pegasus
 - sysmgt.cim.providers
 - sysmgt.cim.smisproviders
 - Linux
 - RED HAT Linux 5.3, 5.4, 6.0 32 & 64 bit
 - SUSE Linux 10, 11 32 & 64 bit
 - Packages:
 - tog-pegasus or sblim-sfcb
 - sblim-gather-provider
 - (sblim = standard based linux instrumentation for manageability)
- Hardware Dependencies
 - HW running any of the above operating systems

Migration and coexistence considerations

- The GPM4CIM Started Tasks are running independent of the existing RMF Distributed Data Server for z/OS (aka GPMSEVERE).
- GPM4CIM instances and GPMSEVERE can run on the same sysplex or even on the same system. Each instance uses it's dedicated TCP/IP port number.

Installation

- All parts are installed to the HFS directory /usr/lpp/gpm
- /usr/lpp/gpm/bin
 - gpm4cim
 - libgpmccli.so
 - gpm4cim_setup.sh
- /usr/lpp/gpm/etc
 - gpm4cim.env
 - gpm4A.cfg
 - gpm4A.ini
 - gpm4X.cfg
 - gpm4X.ini
 - gpm4Z.cfg
 - gpm4z.ini

Installation

- The post installation script `gpm4cim_setup.sh`
 - copies the environment files and configuration files to the runtime directory. Default: `/var/gpm`
 - Allocates the directory for log and trace files. Default: `/var/gpm/logs`

Session summary

- RMF Integrated Ensemble Performance Monitoring is the powerful solution for the challenges in the hybrid world of the new IBM zEnterprise System with the zBX blade centers.
- The exploitation of DDS technology provides a seamless transition for performance monitoring of z/OS systems and the distributed platforms
- The z/OSMF GUI provides a WEB 2.0 based state-of-the-art frontend
- Alternatively: Instant access to all metrics via web browser
- GPM4CIM is an out-of-the-box solution: the installation takes a couple of minutes, almost no customization is needed

Appendix - References

- RMF homepage: <http://www.ibm.com/systems/z/os/zos/features/rmf>
- Product information, newsletters, presentations, ...
- Downloads
 - Spreadsheet Reporter
 - RMF PM Java™ Edition
- Documentation and news:
 - RMF Report Analysis, SC33-7991
 - RMF Users Guide, SC33-7990
- PDF files can be downloaded from:
<http://www.ibm.com/systems/z/os/zos/bkserv>





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