



| RMF Development Edition

z/OS Resource Measurement Facility

RMF Monitor III Data Portal



September, 18th 2008

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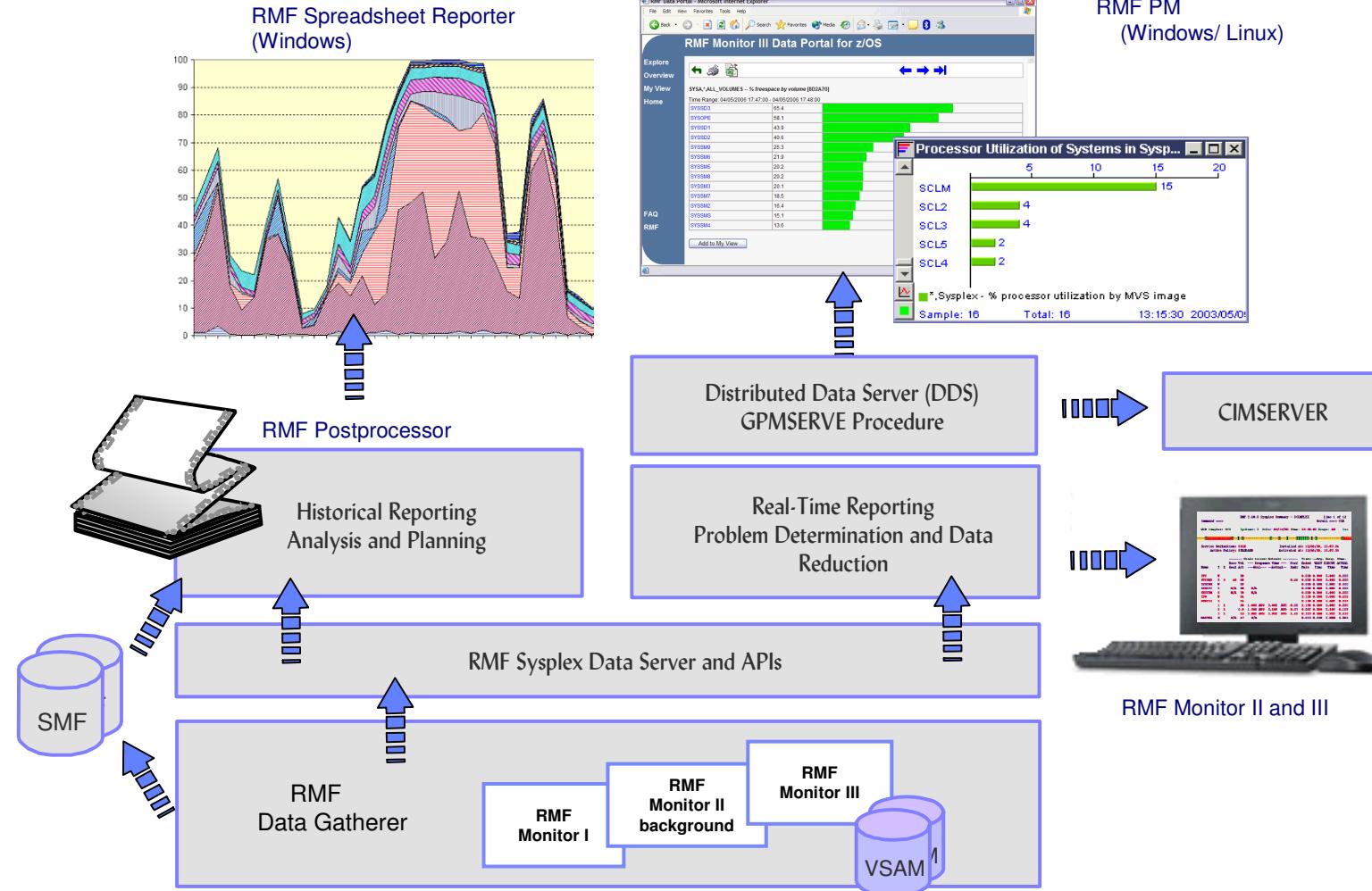
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The New Face of RMF

- ▶ RMF Overview
- ▶ RMF Data Portal
 - ▶ Distributed Data Server (DDS)
 - ▶ How to use
 - ▶ DDS HTTP request

RMF Product Overview



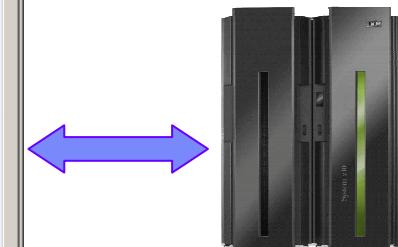
RMF Monitor III Data Portal

- ▶ direct connection to the RMF Distributed Data Server
- ▶ just specify <http://<hostname>:8803>
- ▶ Subset of RMF Monitor III Reports and metrics available
- ▶ Also available for Linux on zSeries and x86 Linux (check RMF Homepage)

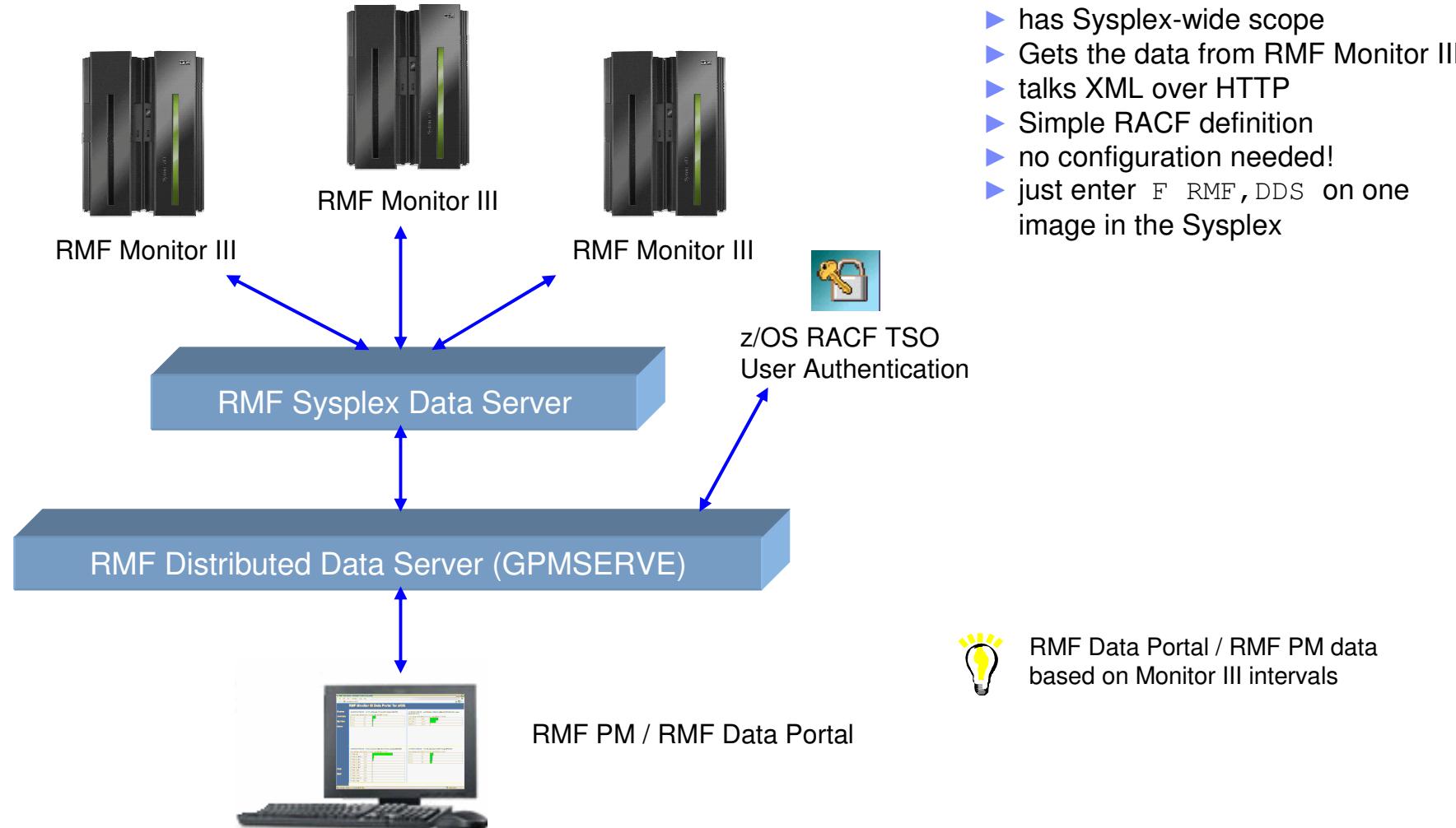


Important notes:

- When using this application you will be prompted to login to the Sysplex with a valid userid and password.
- This application requires Javascript to be enabled
- For some functions (such as "My View") you must allow your browser to store cookies.
- This application has been successfully tested with:
 - Microsoft Internet Explorer Version 6.0 or higher for Windows (Recommended: 7.0 or higher)
 - The Mozilla Suite or Firefox Browser Version 1.0 or higher from www.mozilla.org for various platforms. (Recommended: 2.0 or higher)
 - Netscape Browser Version 7.0 or higher for various platforms (Recommended: 8.0 or higher)



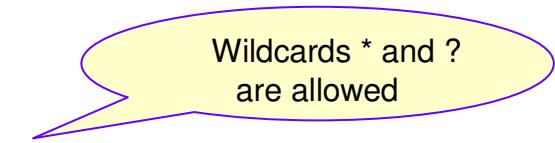
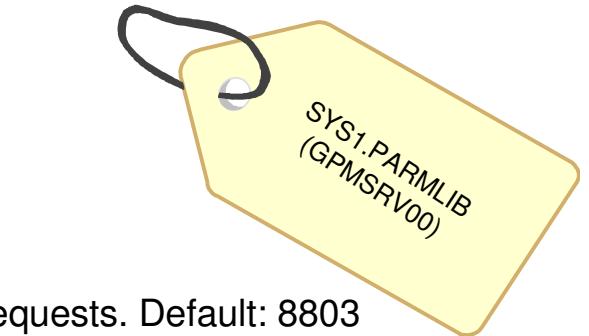
RMF Distributed Data Server



DDS Setup

- Parmlib member SYS1.PARMLIB(GPMSRV00)
 - ▶ **HTTP_PORT:**
is the port number where the server is listening for incoming HTTP requests. Default: 8803
 - ▶ **HTTP_ALLOW:**
specifies the host names that can use the HTTP interface Default: HTTP_ALLOW(*)

Examples: HTTP_ALLOW(*.ibm.com)
 HTTP_ALLOW(9.164.*.*)
 HTTP_ALLOW(bhbe.de.ibm.com)
 - ▶ **HTTP_NOAUTH:**
specifies the host names that can use the HTTP interface without authentication (userid/password). Wildcards * and ? are allowed. Default: HTTP_NOAUTH
- Start DDS via *MODIFY RMF,DDS* Command

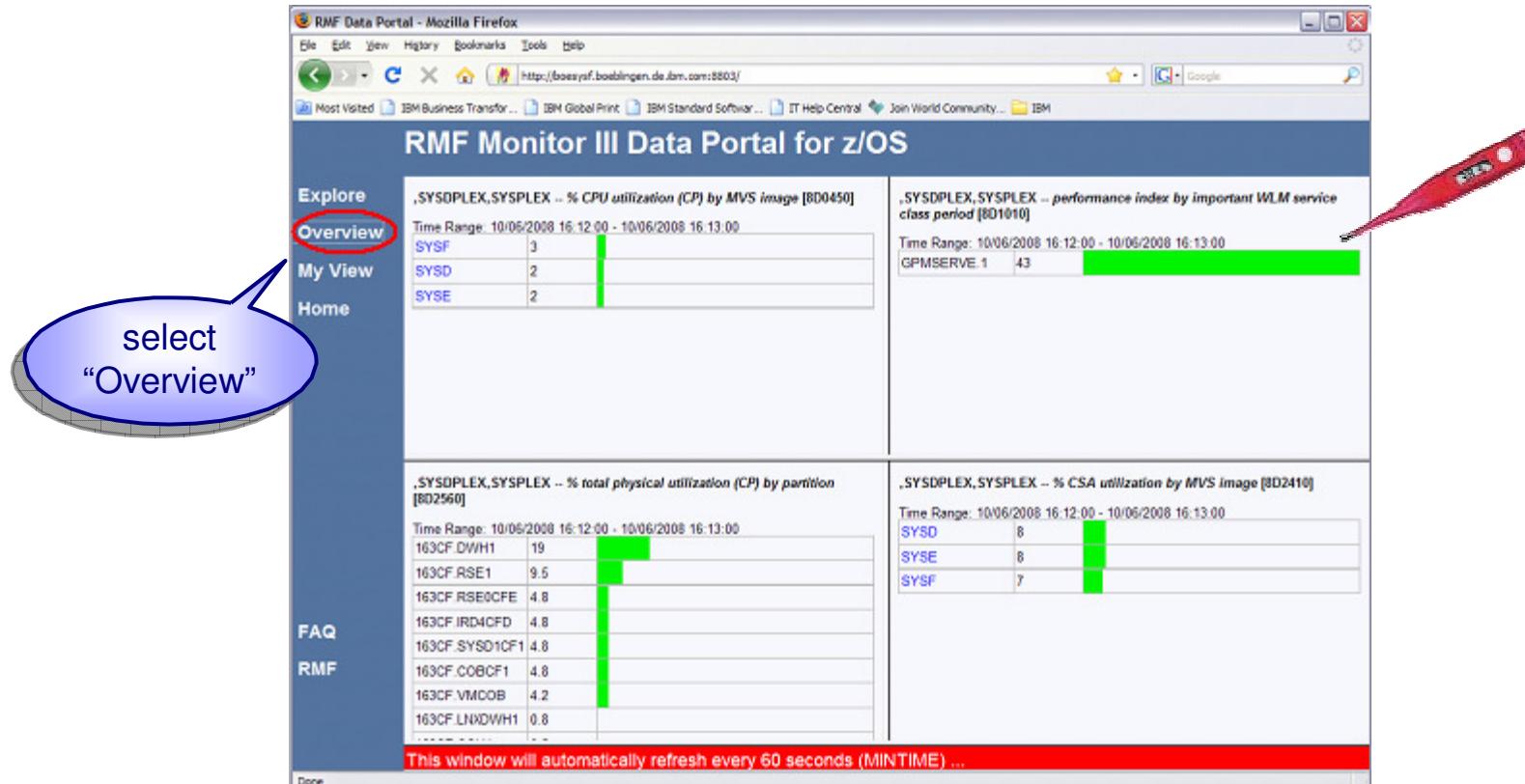


```
F RMF,DDS
ERB140I RMF: DDS OPTION ACCEPTED
S GPMERVE.RMFDDS01
ERB141I RMF: STARTING DISTRIBUTED DATA SERVER
$HASP100 GPMERVE ON STCINRDR
$HASP373 GPMERVE STARTED
IEF403I GPMERVE - STARTED - TIME=13.45.45
IEE252I MEMBER GPMSRV00 FOUND IN SYS4.PARMLIB
GPM060I RMF DISTRIBUTED DATA SERVER READY FOR COMMANDS
```

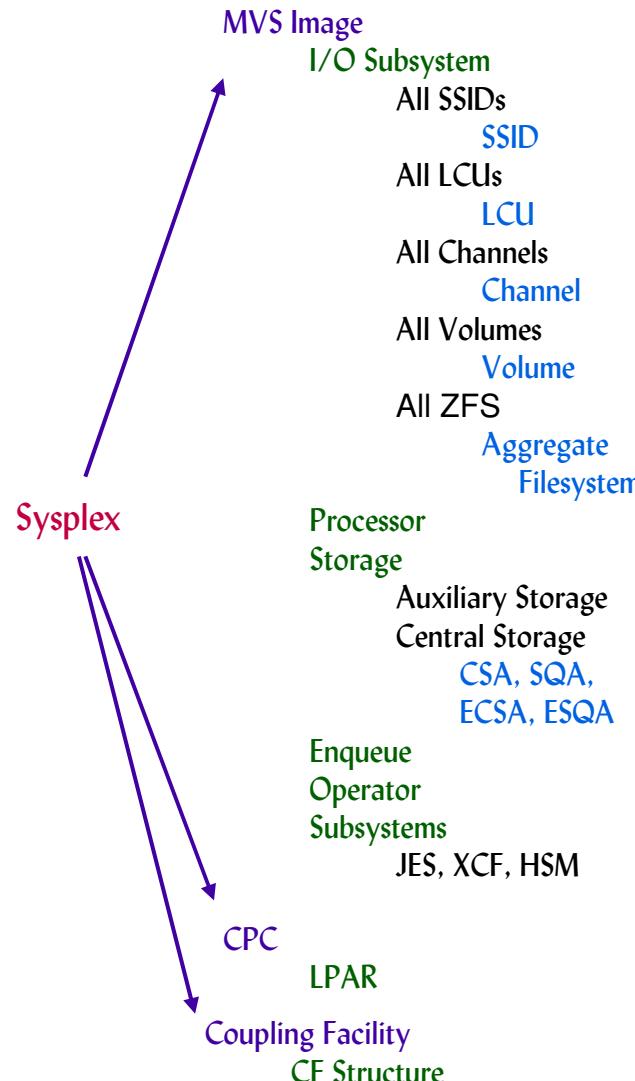
The Overview PerfDesk

✓ High level health-check

- ▶ Processor % CPU utilization (CP) by MVS image
- ▶ CEC % total physical utilization (CP) by partition
- ▶ Storage % CSA utilization by MVS image
- ▶ WLM performance index by WLM service class period



The Resource Model



→ The Sysplex is the top-level resource

Icon	Resource	Metrics	Attributes	Res-Type
Flag	SYSAPLEX,SYSPLEX	Metrics	Show	SYSPLEX

Icon	Resource	Metrics	Attributes	Res-Type
Blue square	.SYSA,MVS_IMAGE	Metrics	Show	MVS_IMAGE
Blue square	.SYSB,MVS_IMAGE	Metrics	Show	MVS_IMAGE
Blue square	.SYSC,MVS_IMAGE	Metrics	Show	MVS_IMAGE
Red triangle	.CF01,COUPLINGFacility	Metrics	Show	COUPLINGFacility
Red triangle	.CF02,COUPLINGFacility	Metrics	Show	COUPLINGFacility
Black square	.16F7A,CPC	Metrics	Show	CPC

The Resource Model...

Resource specific actions:

- ▶ List metrics
- ▶ Show attributes

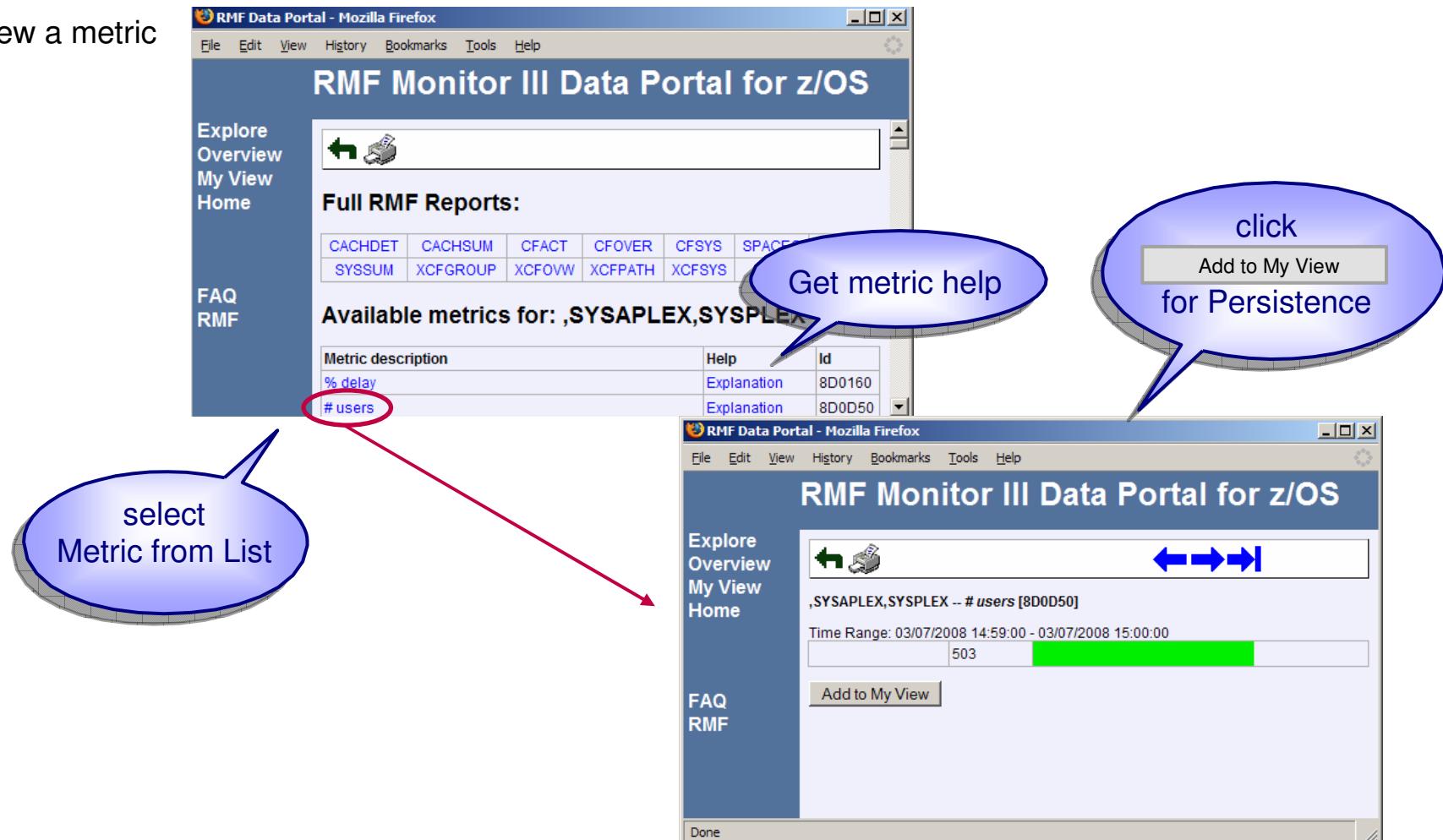
The figure consists of three screenshots of the RMF Monitor III Data Portal for z/OS, illustrating resource-specific actions:

- Screenshot 1 (Top):** Shows the main portal interface. A table lists resources, with the "Metrics" column containing a link labeled "Metrics Show". This link is circled in red, and two red arrows point from it to the "Available metrics for" section and the "Attributes of" section in the other two screenshots.
- Screenshot 2 (Bottom Left):** Shows the "Available metrics for" section for the resource ,SYSAPLEX,SYSPLEX. It displays a table of metrics like CACHDET, CACHSUM, etc., and a detailed view of two metrics: "% delay" and "% delay for enqueue".
- Screenshot 3 (Bottom Right):** Shows the "Attributes of" section for the resource ,SYSAPLEX,SYSPLEX. It displays a table of attributes with values such as Service Definition name (systest), Service Definition installation time (03/02/07, 15.05.12), and Sysplex Name (SYSPLEX).

The Resource Model...

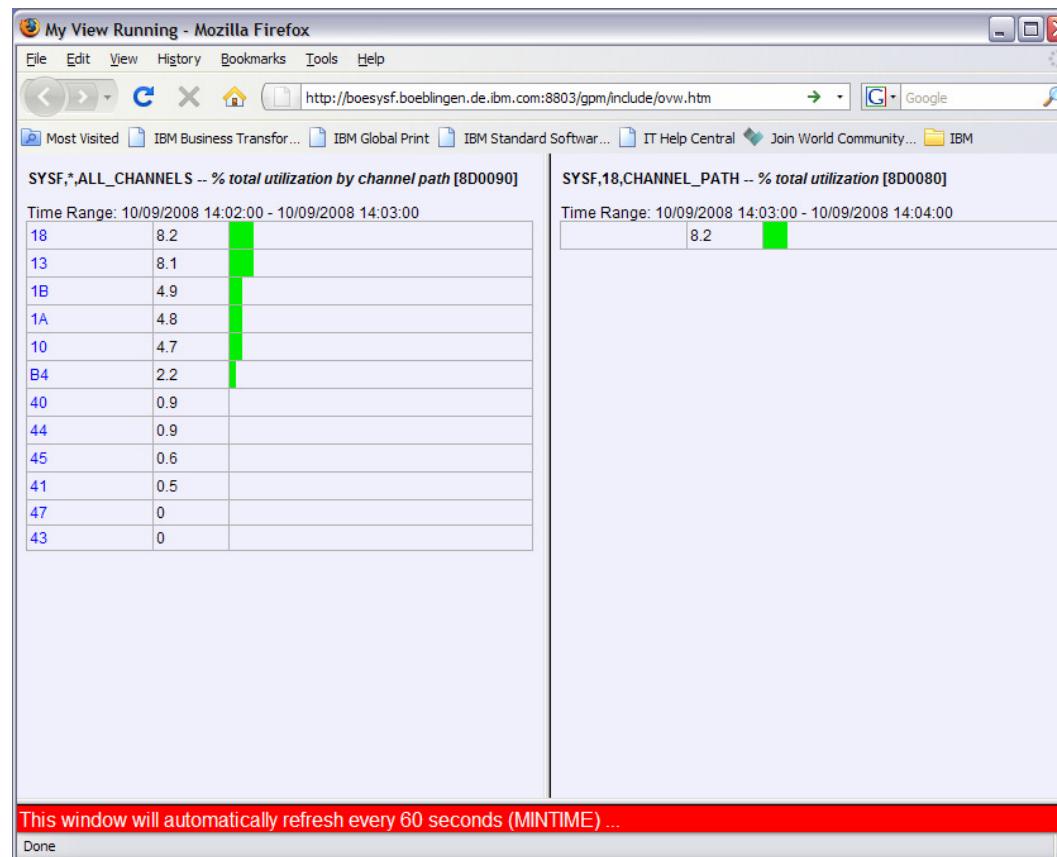
Resource specific actions:

- ▶ View a metric



Resources and Metrics

- Each resource is associated with various metrics
- Two basic metric types:
 - ▶ Single valued metrics - consists of exactly one value
 - ▶ List valued metrics - is represented by a list of name/value pairs



Resources and Metrics...

- A subset of metrics are available for more than one resource type (e.g. volume statistics on Sysplex or single system scope)
- Resources can appear with identical names, but with different high level qualifier (e.g. shared volumes)



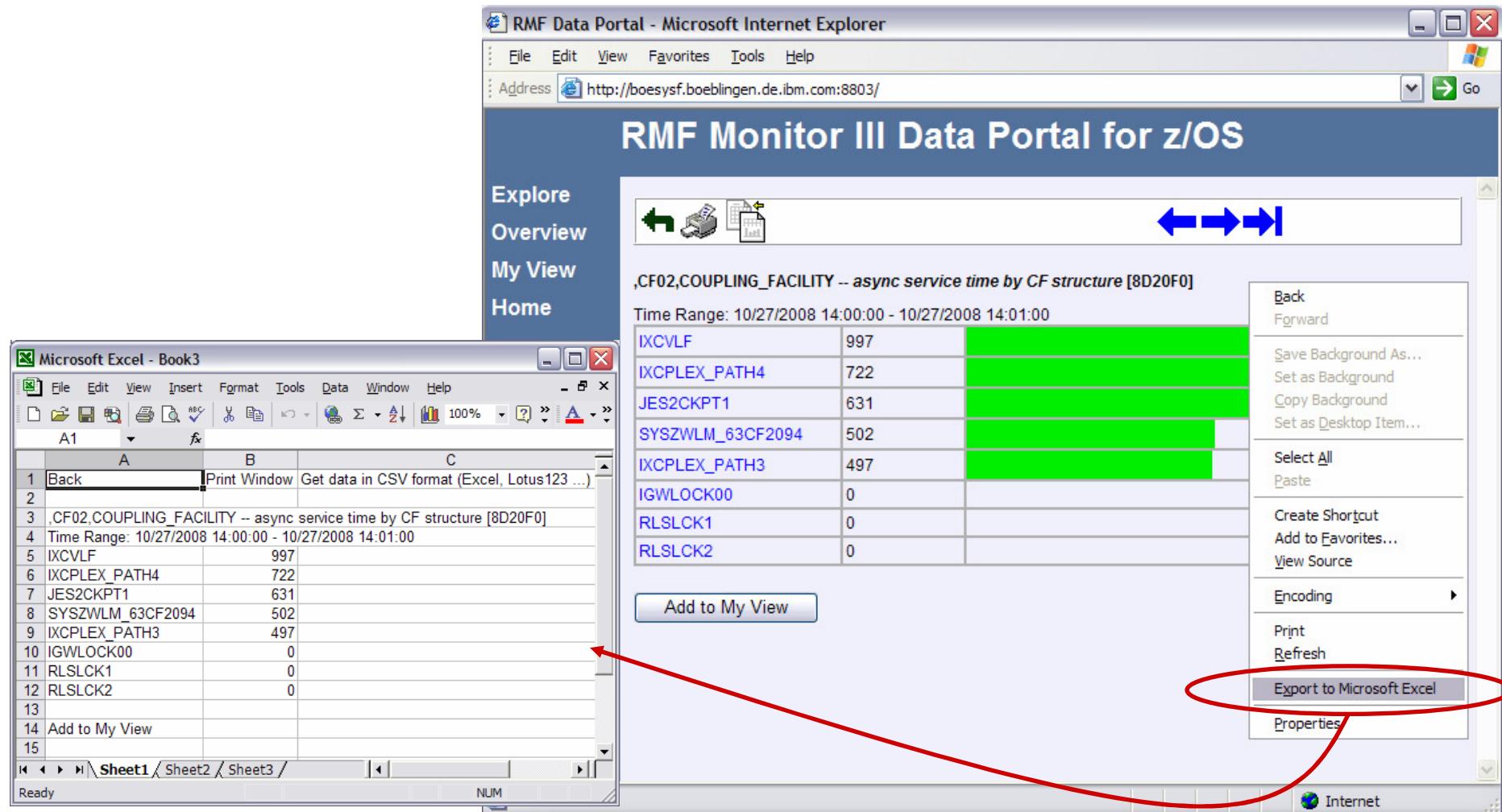
Customizing Views

The figure consists of three screenshots of the RMF Data Portal interface:

- Screenshot 1:** Shows the main RMF Monitor III Data Portal for z/OS page. A blue oval labeled "select favorite Metric from List" points to the "Add to My View" button, which is highlighted with a red oval.
- Screenshot 2:** Shows the "Manage Metrics in My View" dialog box. It lists metrics selected for the user's view, with one entry ("Added (New)") highlighted in green. A blue oval labeled "Manage My View" points to this dialog.
- Screenshot 3:** Shows the RMF Data Portal with the "My View" option selected in the navigation menu. A blue oval labeled "My View definitions are stored persistently" points to the "My View" link.

Spreadsheet Export

Export action on Microsoft Internet Explorer initiates **Web Query** of Microsoft Excel



Monitor III Reports

- ✓ Sysplex-wide reports and single system reports available via *Metrics* selection
- ✓ View full RMF Monitor III Reports (also hidden fields) with state-of-the-art frontend

The figure consists of four screenshots of the RMF Data Portal interface:

- Screenshot 1:** Shows the main dashboard for a sysplex. A red circle highlights the "Metrics" column in a table under "Available metrics for: ,SYSPLEX,SYSPLEX".
- Screenshot 2:** Shows a detailed view of resources under "Children of: ,SYSPLEX,SYSPLEX". A red circle highlights the "Metrics" column in a table for the ,SYSE,MVS_IMAGE resource.
- Screenshot 3:** Shows a detailed report for the ,SYSE,MVS_IMAGE resource. A blue speech bubble above it says "Scorable and resizable!".
- Screenshot 4:** Shows a detailed report for the ,SYSF,MVS_IMAGE resource.

Monitor III Reports...

The screenshot illustrates the RMF Monitor III Data Portal for z/OS. It consists of two overlapping browser windows:

- Left Window (Foreground):** Titled "RMF Monitor III Data Portal for z/OS". It displays a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a sidebar with links for Explore, Overview, My View, Home, FAQ, and RMF. A main content area titled "Full RMF Reports:" lists metrics: CHANNEL, CPC, DELAY, DEV, DEVR, DSND, EN, PROC, PROCU, STOR, STOPC, STORCR, STORF, S. The "PROC" and "PROCU" entries are circled in red. Below this is a message: "Available metrics for: ,SYSF,MVS_IMAGE". A blue speech bubble points to the "Select MIII Report" button at the bottom.
- Right Window (Background):** Titled "RMF Monitor III Data Portal for z/OS". It also has a menu bar and sidebar. The main content area is titled "RMF Report [,SYSF,MVS_IMAGE] : STOR (Storage Delays)". It shows a table with the following data:

Jobname	ASID (dec)	Type	Service Class	Active Frames	Fixed Frames	Idle	Working Set	Working Set Expanded
MASTER	0001	S	SYSTEM	3904	2382	0	3904	
PCAUTH	0002	S	SYSTEM	124	69	0	124	
RASP	0003	S	SYSTEM	317	305	0	317	
TRACE	0004	S	SYSTEM	1132	1096	0	1132	
DUMPSRV	0005	S	SYSTEM	360	124	0	360	
XCFAS	0006	S	SYSTEM	9214	2142	0	9214	
GRS	0007	S	SYSTEM	8169	503	0	8169	
SMSPDSE	0008	S	SYSTEM	3156	1398	0	3156	
SMSVSAM	0009	S	SYSTEM	11529	502	0	11529	
CONSOLE	0010	S	SYSTEM	3458	138	0	3458	
WLM	0011	S	SYSTEM	2506	187	0	2506	
ANTMAIN	0012	S	SYSTEM	1358	149	0	1358	
ANTAS000	0013	S	STCDEF	1267	131	0	1267	
DEVMAN	0014	S	SYSTEM	164	55	0	164	

Monitor III Reports...

Timing adjustments:

- step backward, forward
- jump to current time
- key in a time stamp
- use GO mode

Sort: Ascending or Descending

Fly over help!

Jobname	ASID	ASID	Live Frames	Fixed Frames	Idle	Working Set	Working Set Expanded
MASTER	0001	The address space id of a Job, TSO Userid, started task or USS address space. Unless otherwise indicated RMF displays the ASID number in decimal and not in hexadecimal notation.	1	2249	0	3861	
XCFAS	0006		1	2147	0		
SMPDSE	0008		2	1401	0		
TRACE	0004		4	1101	0		
GRS	0007		7	499	0	8307	
SMSVSAM	0009		11324	489	0	11324	
ALLOCAS	0010		4188	389	0	4188	
JES2	0043		3598	364	0	3598	
TN3270	0032	SYSSTC	2028	345	0	2028	
APPC	0044	SYSSTC	1600	343	0	1600	
OMVS	0015	SYSTEM	15916	337	0	15916	
RASP	0003	SYSTEM	335	323	0	335	

Monitor III Reports...

✓ Flip to vertical view to focus on one single row

RMF Report [,SYSDPLEX,SYSPLEX] : CFACT (Coupling Facility Activity)

Time Range: 10/13/2008 16:23:00 - 10/13/2008 16:24:00

Structure Name	Structure Type	Structure Status	Extended Structure Status	System Name	CF Utilization %	Structure Execution %
IGWLOCK00	LOCK	AP	ActiveDuplexPrimary	*ALL	51.8	0.1
	LOCK			SYS		
	LOCK			SYSE		
	LOCK			SYSF		
	LOCK	AS	ActiveDuplexAlternate	*ALL	29.2	0.1
	LOCK			SYSD		
	LOCK			SYSE		
	LOCK			SYSF		
ISGLOCK	LOCK	A	ActiveInUse	*ALL	8.1	0.0
	LOCK			SYSD		
	LOCK			SYSE		
	LOCK			SYSF		
ISTGENERIC	LIST	A	ActiveInUse	*ALL	0.0	0.0
	LIST			SYSD		
	LIST			SYSE		
	LIST			SYSF		

RMF Report - One Row [,SYSDPLEX,SYSPLEX] : CFACT (Coupling Facility Activity)

Time Range: 10/13/2008 16:23:00 - 10/13/2008 16:24:00

Structure Name	IGWLOCK00
Structure Type	LOCK
Structure Status	AP
Extended Structure Status	ActiveDuplexPrimary
System Name	*ALL
CF Utilization %	51.8
Structure Execution %	0.1
Sync Rate	0.0
Sync Avg Service Time	0
Sync Request Count	0
Async Rate	0.0
Async Avg Service Time	0
Async Request Count	0
Async Changed %	0.0
Async Delay %	0.0
Avg Queued Request Time	0
Converted Request Count	0
Operation Count Delayed for Dump Serialization	0
Queued Operation Count	0
Maximum Number of Users	16
Total Number of Users	3
Number of Problem Users	0
Rebuild %	0

Monitor III Reports...

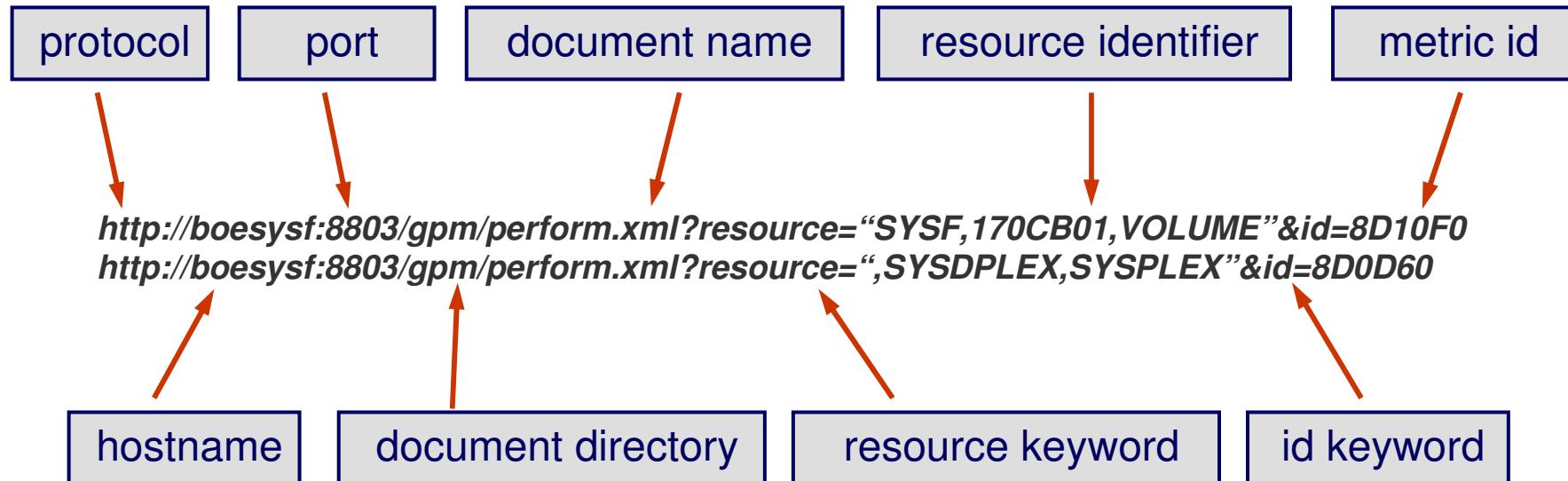
- ✓ Persistence: print reports or export data to your Spreadsheet Application (CSV Format)

The screenshot illustrates the persistence feature of the RMF Monitor III Data Portal. On the left, the RMF Data Portal interface is shown in Mozilla Firefox. A red arrow points from the URL bar (http://boesye.boeblingen.de.ibm.com:8803/) to the Microsoft Excel window on the right. Another red arrow points from the 'Print' icon in the RMF portal's toolbar to the 'Print' dialog box, which is also highlighted with a red circle. A third red arrow points from the 'Report' icon in the RMF portal's toolbar to the 'Report' dialog box, also highlighted with a red circle. The Microsoft Excel window shows a CSV file titled 'CPC[1].csv' containing data from the RMF portal. The data includes various system parameters and performance metrics for CPCs and LPARs.

	A	B	C	D	E	F	G	H
2	*CP							11.1
3	CFE	0	0	YES	1	0.8	0.9	0
4	CFF	0	2	YES	2	2.3	2.5	0.1
5	CIM4	0	2	NO	3	2.1	2.5	0.2
6	KEY3	0	4	NO	5	2.2	2.5	0.2
7	KEY4	0	8	NO	4	5.5	5.9	0.2
8	SYSA	0	8	NO	5	5	5.3	0.2
9	SYSB	0	6	NO	5	3.7	4	0.2
10	SYSC	0	6	NO	5	3.2	3.5	0.2
11	SYSD	100	5	NO	4	3.9	4.2	0.2
12	SYSE	0	6	NO	4	4.1	4.5	0.2
13	SYSF	100	7	NO	3	6.5	6.9	0.2
14	VMA	0	108	NO	7	47.1	47.8	0.8
15	PHYSICAL							8.5

DDS - Request Format (metrics)

- RMF Distributed Dataserver responds to standard HTTP requests
- Example: request the single metric response time for volume *170CB01* located in the i/o subsystem of system *SYSF*
request the list metric number of users MVS Image of sysplex *SYSDPLEX*



- ▶ contained.xml returns the contained resources
- ▶ listmetrics.xml returns the list of associated metrics
- ▶ details.xml returns the properties of the resource
- ▶ perform.xml returns the metric specified by the id parameter

DDS - XML Response Format (single metric)

- ▶ RMF Distributed Dataserver returns XML documents
- ▶ The requested metric can be extracted from the col tag
- ▶ Example: XML document for *response time for volume 170CB01 of SYSF*

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="/gpm/include/perform.xsl"?>
<ddsml xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:noNamespaceSchemaLocation="/gpm/include/ddsml.xsd">
  <server>
    <name>RMF-DDS-Server</name>
    <version>ZOSV1R9</version>
    <functionality>2344</functionality>
  </server>
  <report>
    <metric id="8D10F0">
      <description>response time</description>
      <format>single</format>
      <numcols>2</numcols>
    </metric>
    <resource>
      <reslabel>SYSF,170CB01,VOLUME</reslabel>
      <restype>VOLUME</restype>
      <reslabelurl>SYSF,170CB01,VOLUME</reslabelurl>
    </resource>
    <time-data>
      <local-start>20070321084500</local-start>
      <local-end>20070321084600</local-end>
      <gatherer-interval unit="seconds">60</gatherer-interval>
    </time-data>
    <row refno="1" percent="66.6667">
      <col></col><col>1.5</col>
    </row>
  </report>
</ddsml>
```

DDS - XML Response Format (list metric)

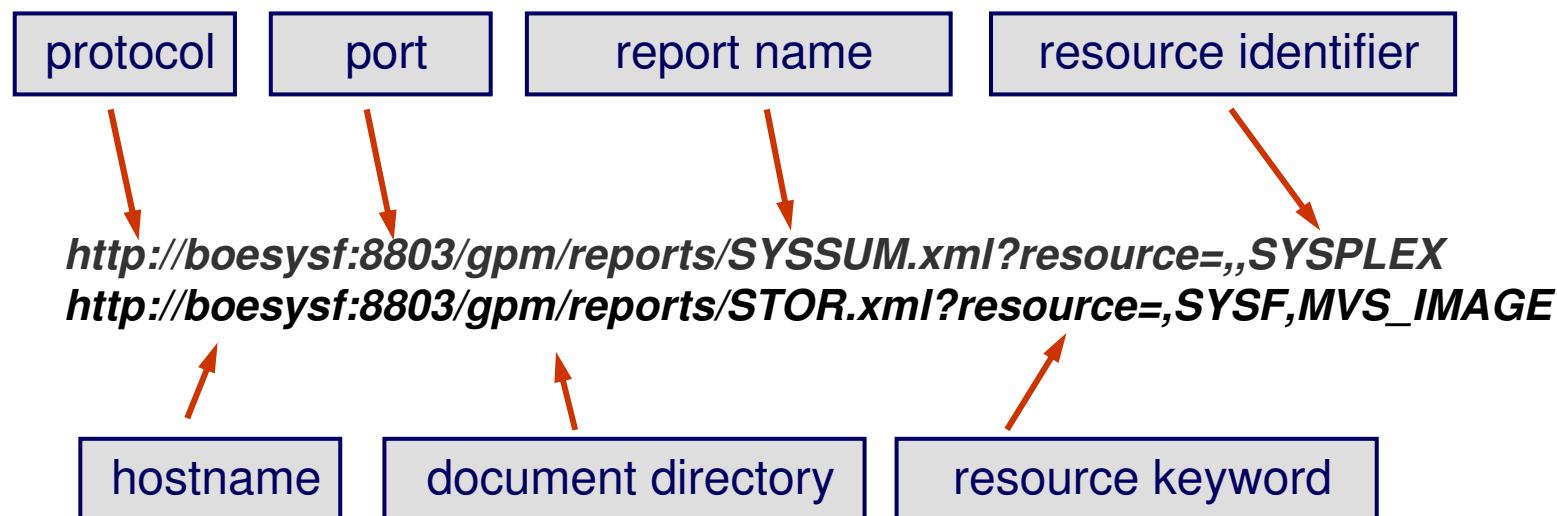
- ▶ Example: XML document for *# users by MVS Image of sysplex SYSDPLEX*:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xmlstylesheet type="text/xsl"
  href="/gpm/include/perform.xsl"?>
<ddsml xmlns:xsi=
  "http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation=
  "/gpm/include/ddsml.xsd">
<server>
<name>RMF-DDS-Server</name>
<version>ZOSV1R10</version>
<functionality>2376</functionality>
<platform>z/OS</platform>
</server>
<report>
<metric id="8D0D60">
<description># users by MVS image</description>
<format>list</format>
<numcols>2</numcols>
<listtype>M</listtype>
<workscope>,G</workscope>
<filter>HI=20</filter>
<unit>count</unit>
</metric>
<resource>
<reslabel>,SYSDPLEX,SYSPELX</reslabel>
<restype>SYSPELX</restype>
```

```
<reslabelurl>,SYSDPLEX,SYSPELX</reslabelurl>
</resource>
<time-data>
<local-start>20081027175000</local-start>
<local-end>20081027175100</local-end>
<utc-start>20081027165000</utc-start>
<utc-end>20081027165100</utc-end>
<local-prev>20081027174930</local-prev>
<local-next>20081027175130</local-next>
<display-start locale="en-us">10/27/2008 17:50:00</display-start>
<display-end locale="en-us">10/27/2008 17:51:00</display-end>
<gatherer-interval unit="seconds">60</gatherer-interval>
<data-range unit="seconds">60</data-range>
</time-data>
<row refno="1" attributes="YES" percent="100">
<col>SYSE</col><col>162</col>
</row>
<row refno="2" attributes="YES" percent="97.5309">
<col>SYSD</col><col>158</col>
</row>
<row refno="3" attributes="YES" percent="68.5185">
<col>SYSF</col><col>111</col>
</row>
</report>
</ddsml>
```

DDS - Request Format (reports)

- ▶ Can be also used to get Sysplex and single system reports
- ▶ Example:
 - request the System Summary report of the resource **SYSPLEX**
 - request the Storage Delay report of the resource **MVS_IMAGE SYSF**



- ▶ Reports assigned to SYSPLEX resource:
CACHDET, CACHSUM, CFACT, CFOVER, CFSYS, SPACEG, SPACED, SYSSUM, XCFGROUP, XCFOVW, XCFPATH, XCFSYS
- ▶ Reports assigned to MVS_IMAGE resource:
CHANNEL, CPC, DELAY, DEV, DEVR, DSND, ENCLAVE, IOQ, OPD, LOCKSP, LOCKSU, OPD, PROC, PROCU, STOR, STORC, STORCR, STORF, STORM, STORS, SYSINFO, ZFSACT, ZFSSUM

DDS - XML Response Format (reports)

- ▶ Example: XML document for *Storage Delay Report for MVS_IMAGE SYSF*

```
<?xml version="1.0" encoding="UTF-8"?>
<?xmlstylesheet type="text/xsl"
  href="/gpm/include/reports.xsl"?>
<ddsml xsi:noNamespaceSchemaLocation=
  "/gpm/include/ddsml.xsd">
  <server>
    <name>RMF-DDS-Server</name>
    <version>ZOSV1R10</version>
    <functionality>2376</functionality>
    <platform>z/OS</platform>
  </server>
  <report>
    <metric id="STOR">
      <description>STOR (Storage Delays)</description>
      <format>report</format>
      <numcols>9</numcols>
    </metric>
    <resource>
      <reslabel>,SYSF,MVS_IMAGE</reslabel>
      <restype>MVS_IMAGE</restype>
      <reslabelurl>,SYSF,MVS_IMAGE</reslabelurl>
    </resource>
    <time-data>
      <local-start>20081027165800</local-start>
      <local-end>20081027165900</local-end>
      <utc-start>20081027155800</utc-start>
      <utc-end>20081027155900</utc-end>
```

```
  <local-prev>20081027165730</local-prev>
  <local-next>20081027165930</local-next>
  <display-start locale="en-us">10/27/2008 16:58:00</display-start>
  <display-end locale="en-us">10/27/2008 16:59:00</display-end>
  <gatherer-interval unit="seconds">60</gatherer-interval>
  <data-range unit="seconds">60</data-range>
  </time-data>
  <row refno="1">
    <col>*MASTER*</col>
    <col>0001</col>
    <col>S</col>
    <col>SYSTEM</col>
    <col>4056</col>
    <col/>
  </row>
  ....
  <column-headers>
    <col type="T">STRPJOB</col>
    <col type="N">STRPASI</col>
    <col type="T">STRPCLA</col>
    <col type="T">STRPSVCL</col>
    <col type="N">STRPACTV</col>
    <col type="N">STRPFIXD</col>
  </column-headers>
  </report>
</ddsml>
```

DDS - Optional Parameters

- &filter** reduces the amount of data by specifying thresholds and name patterns
&workscope focuses on individual workscopes (e.g service classes)
&range specifies an individual interval

&filter="PAT=CICS* IMS*"	only instances with the name patterns CICS* and IMS* are returned
&filter="LB=10"	specifies a lower bound threshold value
&filter="UB=10"	specifies an upper bound threshold value
&filter="HI=5"	specifies the number of list elements (containing highest values)
&filter="LO=5"	specifies the number of list elements (containing lowest values)
&filter="ORD=NA" (NA/ND/VA/VD)	specifies the order (ascending/descending names or values)
&workscope="STCHIGH,1,P"	focus on Period 1 of Service Class STCHIGH
&workscope=",STCHIGH,S"	focus on Service Class STCHIGH
&workscope=",BATCH,W"	focus on Workload BATCH
&workscope=",CATALOG,J"	focus on Job Catalog
&range=20070128161000,20070128161140	return data from 16:10:00 to 16:11.40 at 01/28/2007

Information and Tools

RMF homepage: www.ibm.com/servers/eserver/zseries/zos/rmf/

- Product information, newsletters, presentations, ...
- Downloads
 - ▶ Spreadsheet Reporter
 - ▶ RMF PM Java Edition
 - ▶ RMF data collector for Linux

RMF email address: rmf@de.ibm.com

Documentation and news:

- RMF Performance Management Guide, SC33-7992
- RMF Report Analysis, SC33-7991
- RMF User's Guide, SC33-7990
- Latest version of PDF files can be downloaded from:
<http://www.ibm.com/systems/z/os/zos/bkserv/r10pdf/>
- RMF Redbook: Effective zSeries Performance Monitoring Using Resource Measurement Facility, SG24-6645-00
<http://www.redbooks.ibm.com>



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