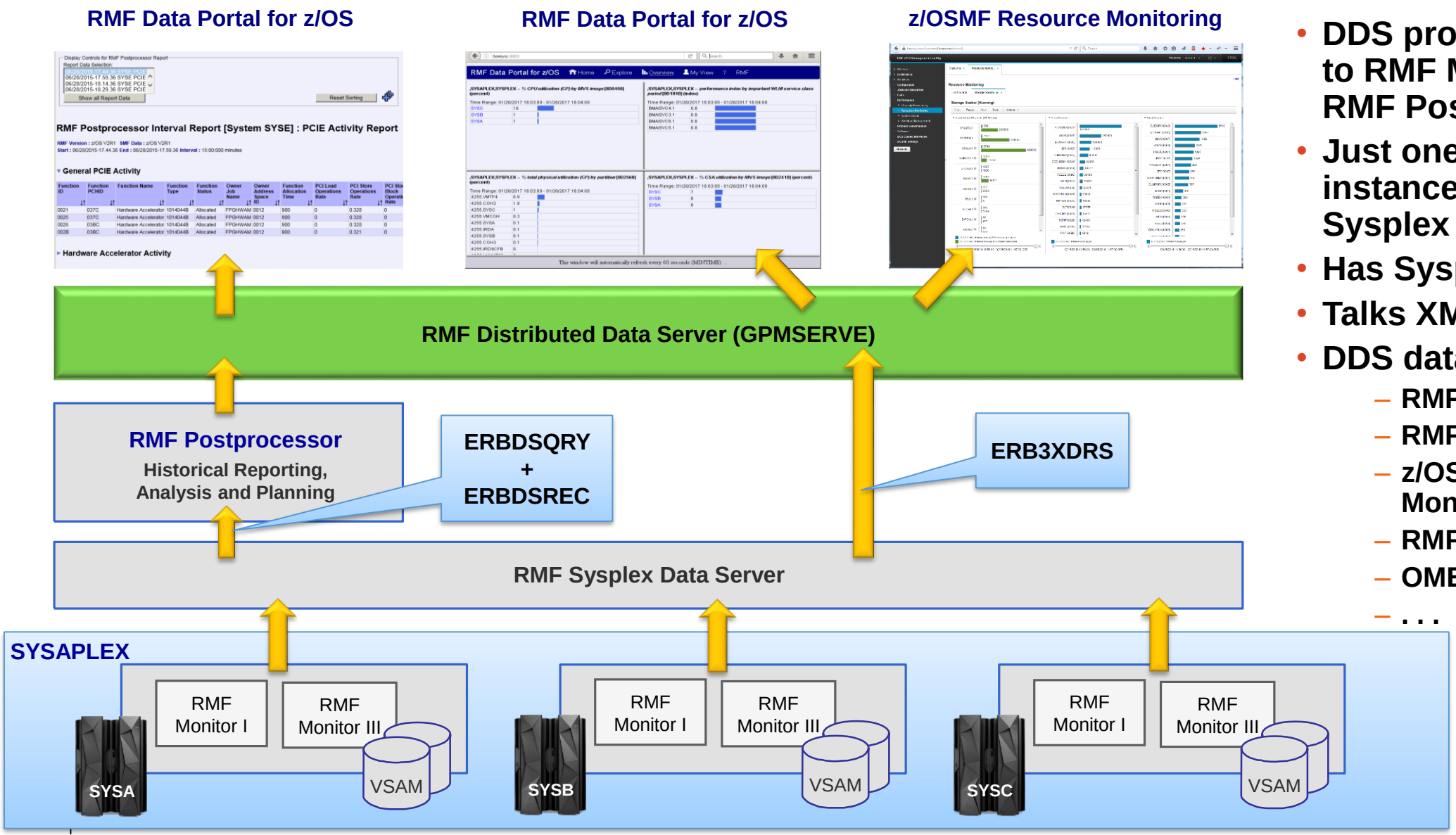
z/OS
Resource Measurement Facility

RMF Treasure Island – Exploring the RMF Distributed Data Server

Session Objectives

- RMF Distributed Data Server Overview
- DDS Setup, Configuration and Operation
  - Exploring DDS Parmlib Options
  - DDS Operation
- Advanced DDS Configuration Topics
  - Dynamic VIPA
  - Configuring PassTicket Support
  - AT-TLS
- Exploiting RMF Monitor III Data
  - Understanding z/OS RMF Monitor III DDS Resource Model
  - Resources and Metrics
  - The DDS HTTP API
  - Monitor III XML Batch Facility
- Exploiting Historical Data from RMF Postprocessor

RMF Distributed Data Server Overview



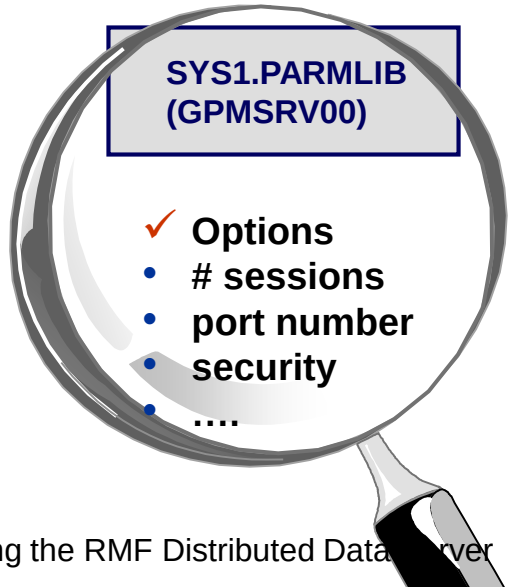
- DDS provides the interface to RMF Monitor III and RMF Postprocessor data
- Just one single DDS instance is needed per Sysplex
- Has Sysplex-wide scope
- Talks XML over HTTP
- DDS data exploiter:
  - RMF Data Portal for z/OS
  - RMF PM
  - z/OSMF Resource Monitoring
  - RMF CIM Provider
  - OMEGAMON XE
  - . . .

DDS Invocation

```
//GPMSERVE PROC MEMBER=00
//STEP1    EXEC PGM=GPMDDSRV,REGION=128M,TIME=1440,
//          PARM='TRAP(ON)/&MEMBER'
//*
//GPMINI   DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMINI)
//GPMHTC   DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMHTC)
//GPMPPJCL DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMPPJCL)
//CEEDUMP  DD   DUMMY
//SYSPRINT DD   DUMMY
//SYSOUT   DD   DUMMY
//         PEND
```

GPMSERVE procedure in SYS1.PROCLIB

Change to SYSOUT=* or dataset if DDS trace is active



SYS1.PARMLIB (GPMSRV00)

- ✓ Options
  - # sessions
  - port number
  - security
  - ….

SYS1.SERBPWSV (GPMINI)

- ✓ Resource definitions
- ✓ Metric definitions

SYS1.SERBPWSV (GPMHTC)

- ✓ HTML pages
- ✓ Help descriptions
- ✓ XSL stylesheets
- ✓ Icons
- ✓ …..

SYS1.SERBPWSV (GPMPPJCL)

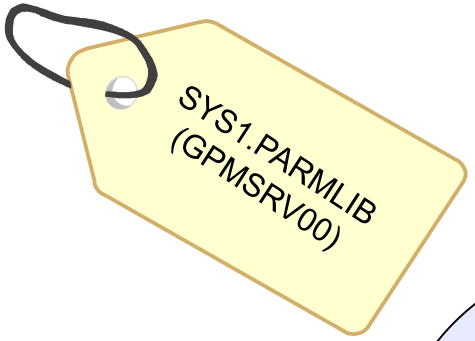
- ✓ JCL template for Postprocessor JOB

DDS Parmlib Options: HTTP Interface

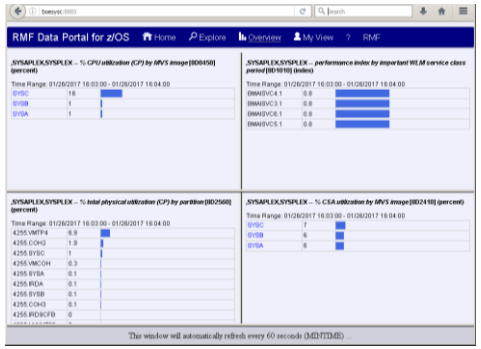
- MAXSESSIONS_HTTP
  - Specifies the maximum number of concurrent HTTP requests. Default: 20
- HTTP_PORT
  - Specifies the TCPIP port number where DDS is listening for incoming HTTP requests. Default: 8803
- HTTP_ALLOW
  - Specifies the host names that can use the HTTP interface.

    Default: HTTP_ALLOW(*)

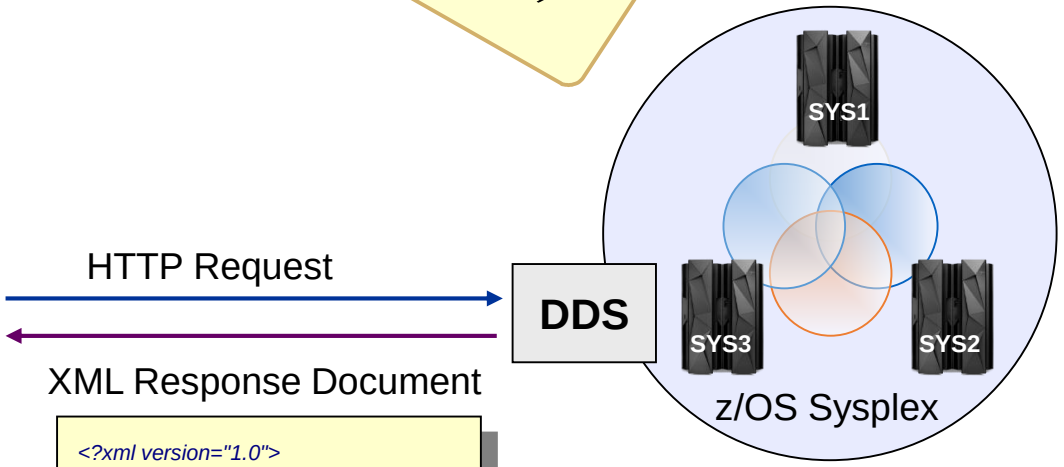
    Examples: HTTP_ALLOW(*.ibm.com)
    HTTP_ALLOW(9.164.*.*)
    HTTP_ALLOW(sys?.boeblingen.de.ibm.com)
- HTTP_NOAUTH
  - Specifies the host names that can use the HTTP interface without authentication (userid/password). Wildcards * and ? are allowed Default: HTTP_NOAUTH()



RMF Data Port for z/OS



Wildcards * and ? are allowed

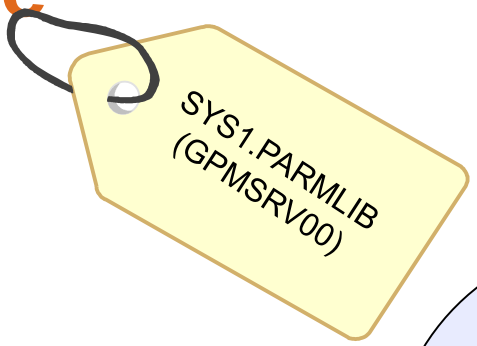



```
<?xml version="1.0">
<ddsml>
  <report>
    <metric id="CPC">
    </metric>
    <caption>
      <var>
        <name>CPCHPNAM</name>
        <value>SYS3</value>
      </var>
      <var
        <name>CPCHMOD</name>
        <value>2097</value>
      </var>
    </caption>
  </report>
</ddsml>
```

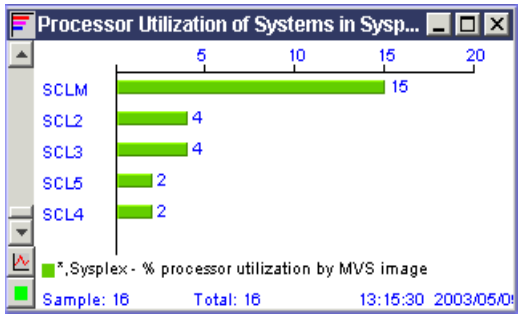
DDS Parmlib Options: RMF PM Interface

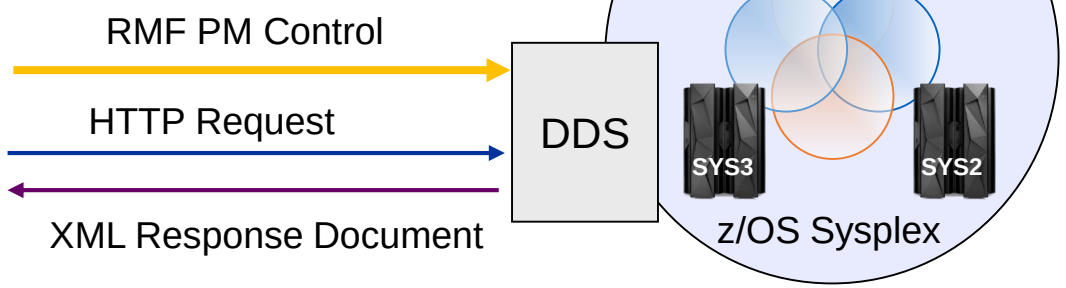
- MAXSESSIONS_INET
  - Specifies the number of concurrent RMF PM clients that are allowed.
    Additional clients will be rejected.
    Default: 5 Maximum: 100
- SESSION_PORT
  - Specifies the TCPIP port number for RMF PM clients.
    It must correspond to the port number that the clients specify in their SYSPLEX settings.

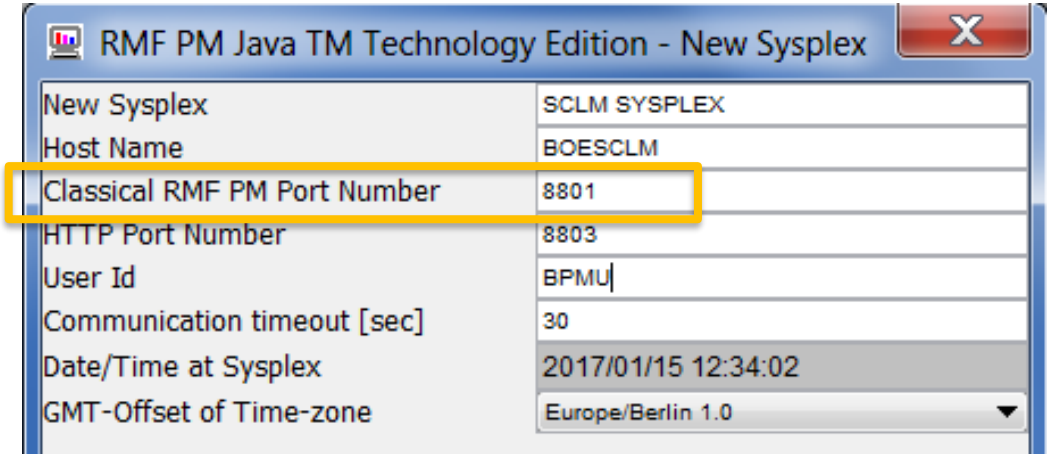
    Default: 8801
- TIMEOUT
  - Specifies the number of seconds of inactivity before DDS assumes a timeout condition on the TCPIP connections for RMF PM clients
    Default: 0 → No Timeout



RMF PM





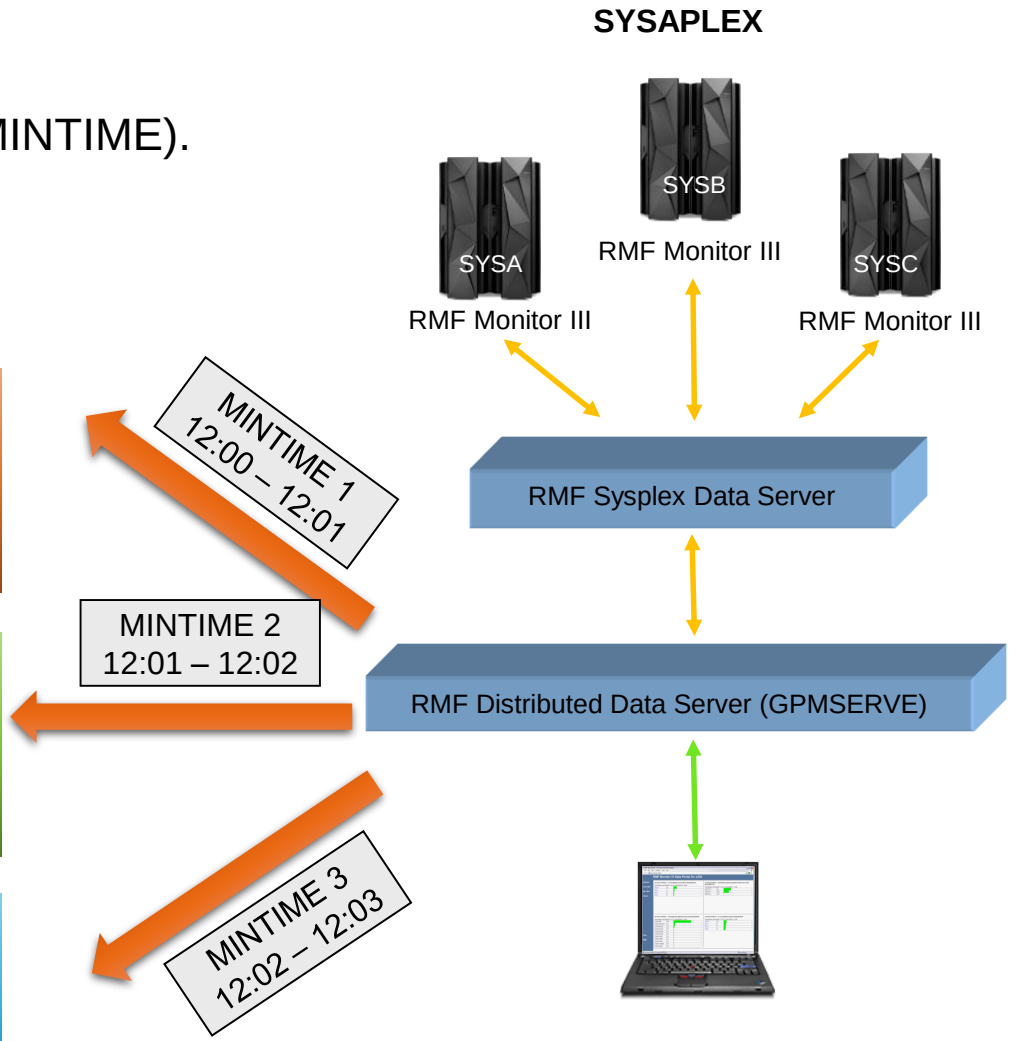


DDS Parmlib Options: CACHESLOTS

- CACHESLOTS
  - Specifies the number of DDS CACHE slots (one for each MINTIME).
    Default: 4 Maximum: 32

    Example: CACHESLOTS(3) Monitor III MINTIME(60)

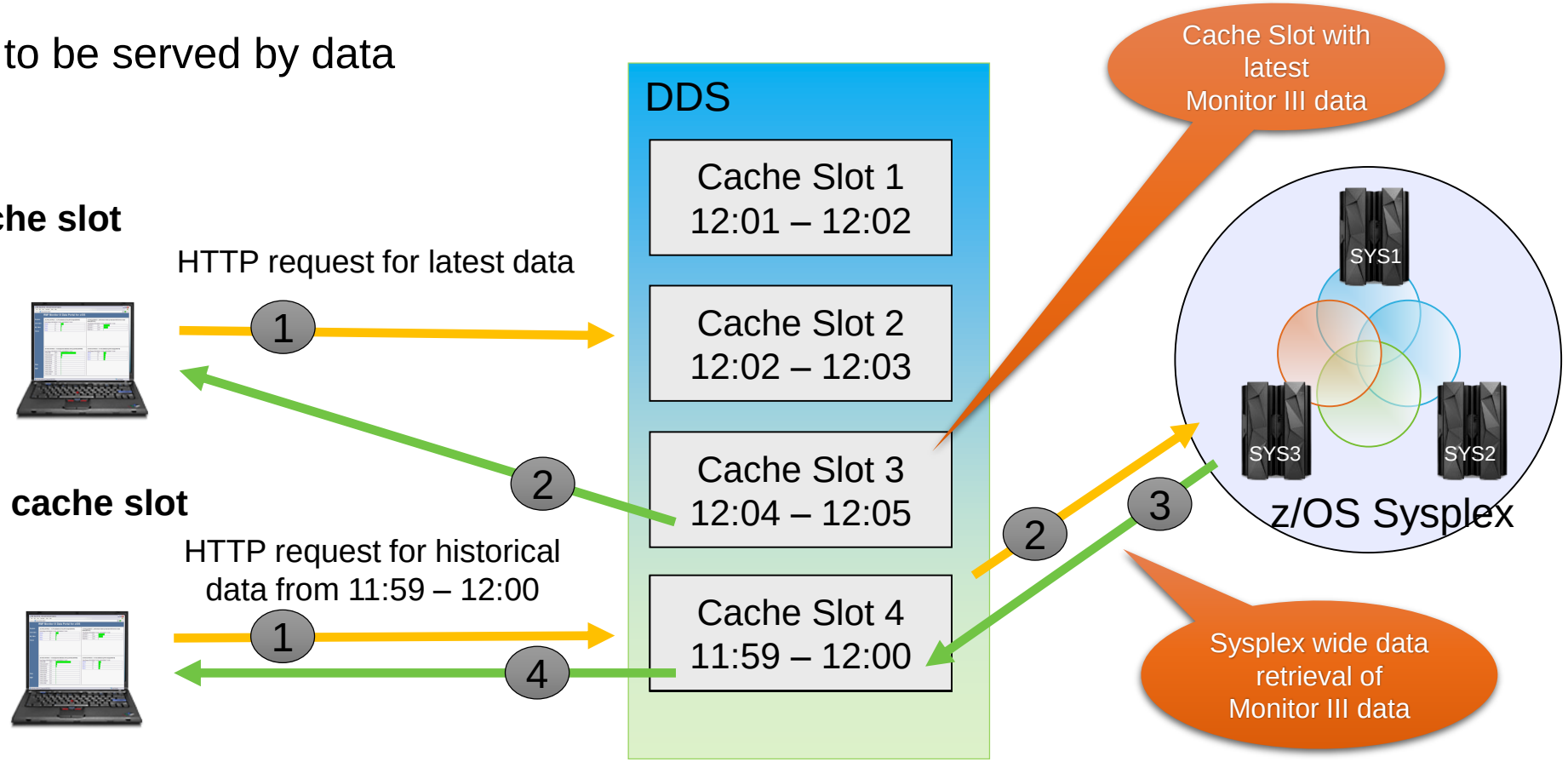
Cache Slot 1 12:00 – 12:01	SYSAPLEX Sysplex Reports	SYSA Single System Reports	SYSB Single System Reports	SYSC Single System Reports
Cache Slot 2 12:01 – 12:02	SYSAPLEX Sysplex Reports	SYSA Single System Reports	SYSB Single System Reports	SYSC Single System Reports
Cache Slot 3 12:02 – 12:03	SYSAPLEX Sysplex Reports	SYSA Single System Reports	SYSB Single System Reports	SYSC Single System Reports



DDS CACHE SLOT Considerations

- All HTTP requests need to be served by data in the DDS cache slots:

Cache Hit:
Requested data in DDS cache slot

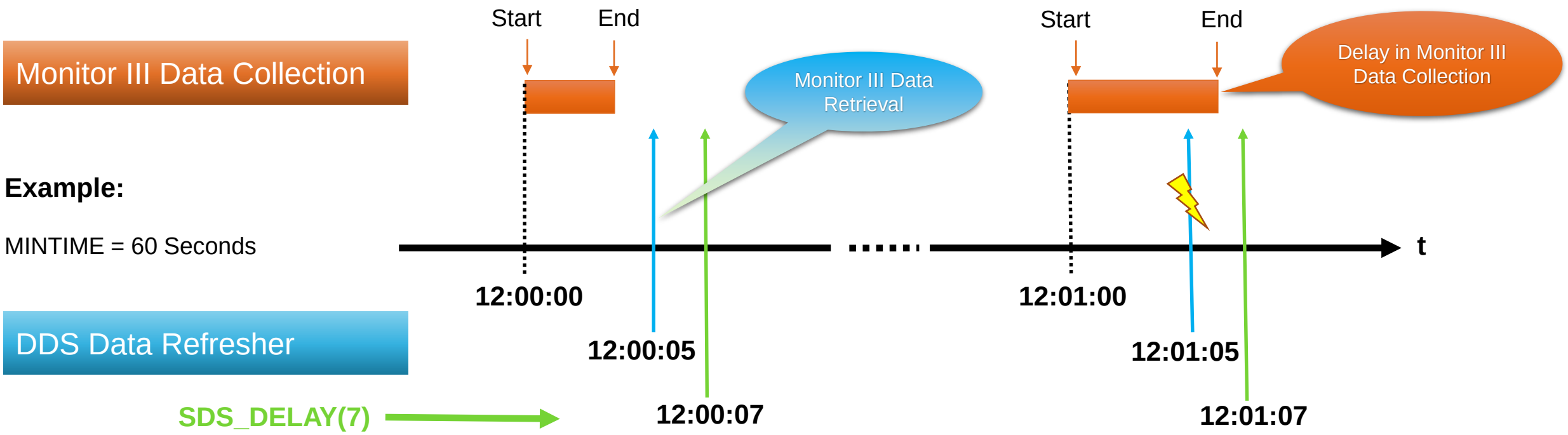


Cache Miss:
Requested data not in DDS cache slot

Take care when using RANGE parm in HTTP request:

HTTP request for data from multiple MINTIMES will trigger DDS Monitor III data retrieval from all sysplex systems.

DDS Parmlib Options: SDS_DELAY



- SDS_DELAY
  - Specifies the time in seconds the DDS data retrieval is delayed after the Monitor III MINTIME has ended.
    Default: 5 Maximum: 20

SDS_DELAY option can address missing data error situations indicated by messages GPM0507I or GPM0718I in RMF PM Client or HTTP Request response.

Do not use SDS_DELAY by default

DDS Parmlib Options: EXCLUDE_REPORTS

- The metric source for the DDS Monitor III metrics are the Monitor III report data tables
- DDS retrieves Monitor III report data from all RMF instances in the Sysplex:
  - All Monitor III Sysplex reports from local system running DDS
  - All Monitor III Single system reports from all systems in Sysplex
- EXCLUDE_REPORTS DDS option allows to exclude specific Monitor III reports from DDS data retrieval
  - Users can exclude reports which are not required by any monitoring clients in their environment

EXCLUDE_REPORTS option can help to decrease the DDS data gathering overhead.
But excluded reports needs to be selected carefully since list of available metrics will be reduced.

  - In case of abnormal termination of reporter modules, operation of the DDS is affected. With this function, those reporters can be excluded temporarily. This allows continued operation of the DDS until a fix for the problem is provided by IBM

DDS Parmlib Options: EXCLUDE_REPORTS ...

- EXCLUDE_REPORTS option is not mandatory
- If not specified, all Monitor III reports supported by the DDS are available
- If specified, the option contains a comma-separated list of report names which should be excluded from DDS processing
- Specify multiple options if list of reports does not fit on one line
- When a client requests a report from the DDS that has been deactivated by EXCLUDE_REPORTS the following message is generated:

  GPM0737I The requested report <reportname> is deactivated
- When a client requests a metric from the DDS that is based on a deactivated report the following message is generated:

  GPM0738I The requested metric is based on the deactivated report <reportname>

```
/*************************************************************/
/*                                                           */
/* NAME:        GPMSRV00                                     */
/*                                                           */
/* DESCRIPTION: PARMLIB MEMBER FOR THE RMF DISTRIBUTED       */
/*              DATA SERVER HOST ADDRESS SPACE (GPMSERVE)    */
/*                                                           */
/* COPYRIGHT:   LICENSED MATERIALS - PROPERTY OF IBM         */
/*              "RESTRICTED MATERIALS OF IBM"                */
/*              5694-A01                                     */
/*              (C) COPYRIGHT IBM CORP. 1998, 2009           */
/*                                                           */
/*              STATUS=HRM7760                               */
/*************************************

...

/*************************************
/*
/* List of reports to be excluded                            */
/*                                                           */
/*************************************************************/
EXCLUDE_REPORTS(CACHDET,CACHSUM)
EXCLUDE_REPORTS(STORCR)
```

Cache Detail, Cache Summary, Common Storage Remaining reports are excluded

⚠ Caution:

- ⇨ z/OS Capacity Provisioning requires RMF DDS and CIM server to obtain performance data from the CPC, SYSINFO and SYSSUM report.
- ⇨ OMEGAMON XE on z/OS can be optionally configured to require RMF DDS to obtain performance data from following reports: CFACT, CFOVER, CFSYS, XCFOVW, XCFGROUP, XCFPATH, XCFSYS, LOCKSP, LOCKSU

Never deactivate report types needed by other components !!

DDS Operation

- Just one single DDS instance is needed per Sysplex
- The system running DDS has to be determined according to following rules:
  - Monitor III Gatherer active
  - Highest RMF Release
  - SMF Buffer active
  - Monitor III MASTER option specified
- DDS console commands:
  - START GPMSERVE[,MEMBER=XX]

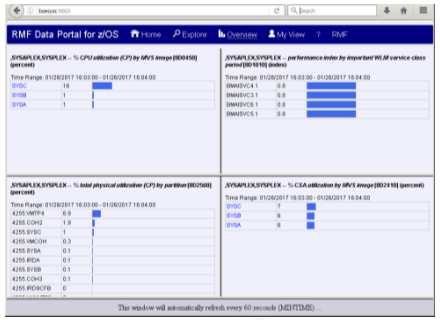
    Example: S GPMSERVE,MEMBER=01

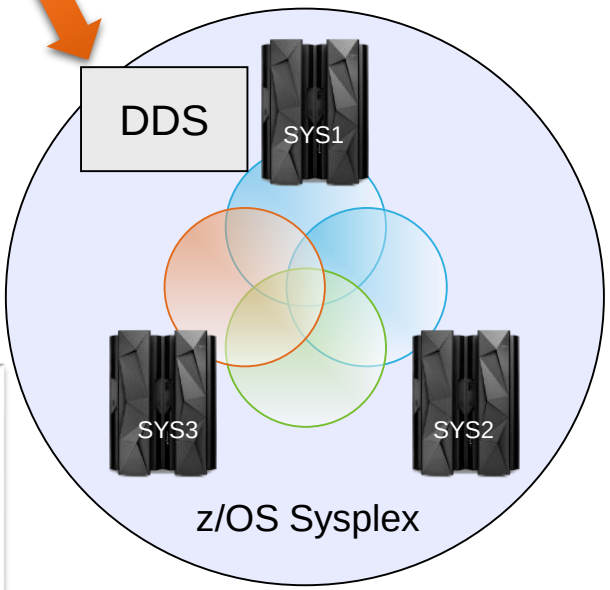
  - STOP GPMSERVE
  - MODIFY GPMSERVE,OPTIONS
  - MODIFY GPMSERVE,DISPLAY

Start DDS with DDS options in GPMSRV01 parmlib member

Displays active DDS options

RMF Data Port for z/OS





DDS Data Refresher

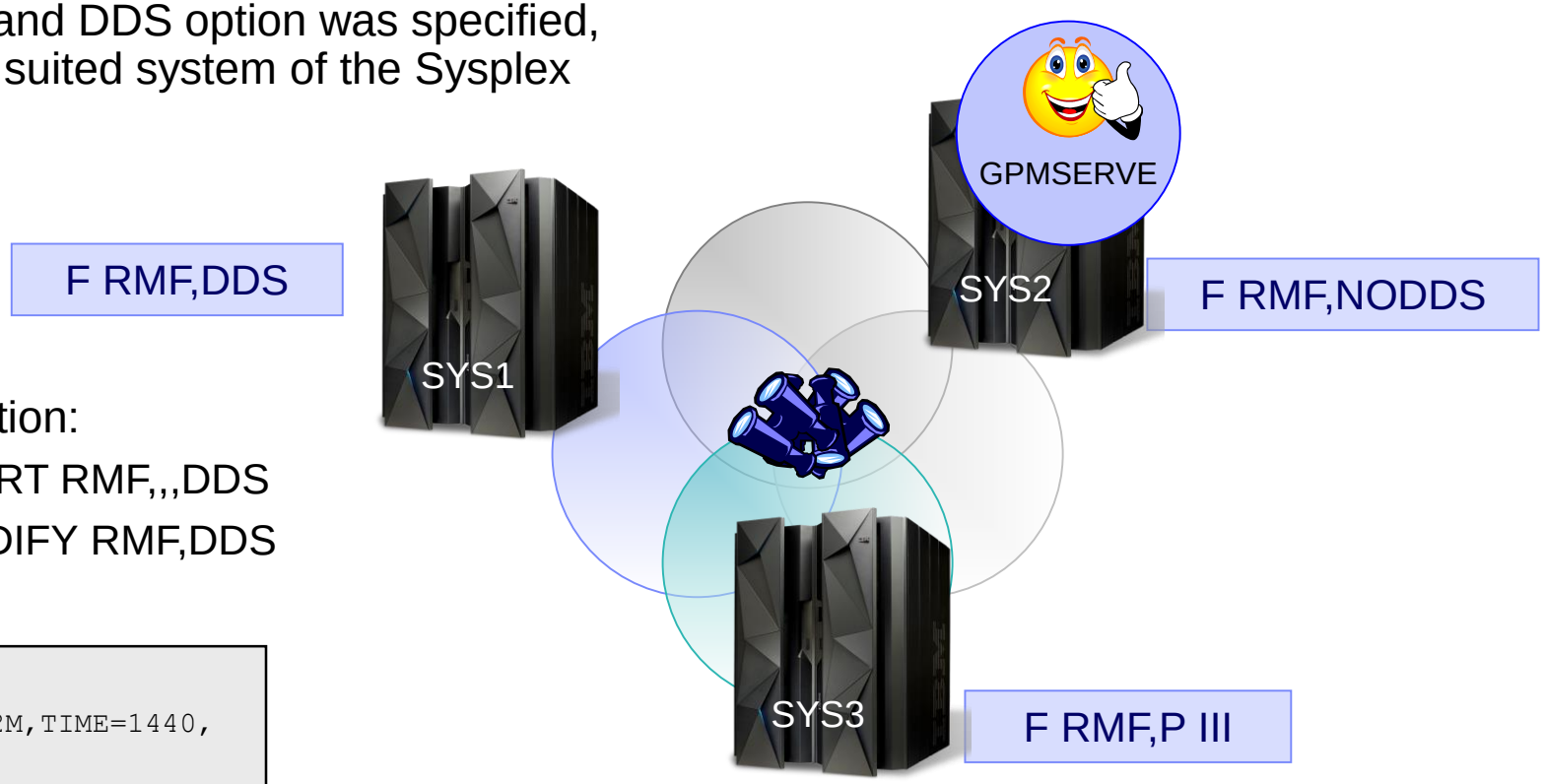
```
GPM062I DDS-REFR 01/15 154005 CYCLE=11. WAITING 60 SEC
GPM062I DM--SERV 01/15 153052 000.000.000.000 N=0 S=0 R=0
GPM062I INET-LIS 01/15 154057 MAX=5 ACTIVE=1
GPM062I UNIX-LIS 01/15 154052 MAX=1 ACTIVE=0 SUSPEND=0
GPM062I HTTP-LIS 01/15 154058 MAX=20 ACTIVE=1 SUSPEND=2
GPM062I INET-CLI 01/15 153429 ::FFFF:9.83.229.33 N=5 S=7140 R=4608
GPM062I HTTP-CLI 01/15 154038 ::FFFF:9.83.229.33 TERMINATED. SUSPENDED.
GPM062I HTTP-CLI 01/15 153512 ::FFFF:9.83.229.33 TERMINATED. SUSPENDED.
GPM062I HTTP-CLI 01/15 154022 ::FFFF:9.83.229.33 N=29 S=4845695 R=10727
```

RMF PM session status

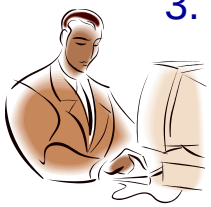
HTTP session status

DDS High Availability

- RMF DDS option allows a sysplex-wide DDS management
- When the RMF initialization is complete and DDS option was specified, DDS is started automatically on the best suited system of the Sysplex



- Following possibilities to specify DDS option:
  1. Start command: START RMF,,,DDS
  2. Modify command: MODIFY RMF,DDS
  3. Procedure parm:

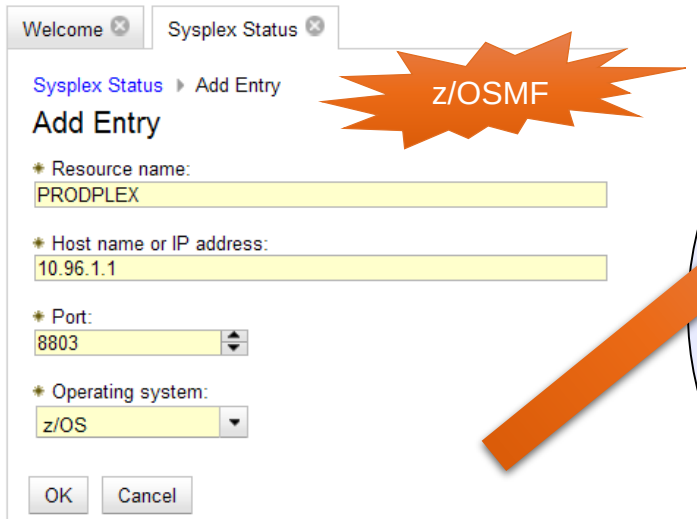


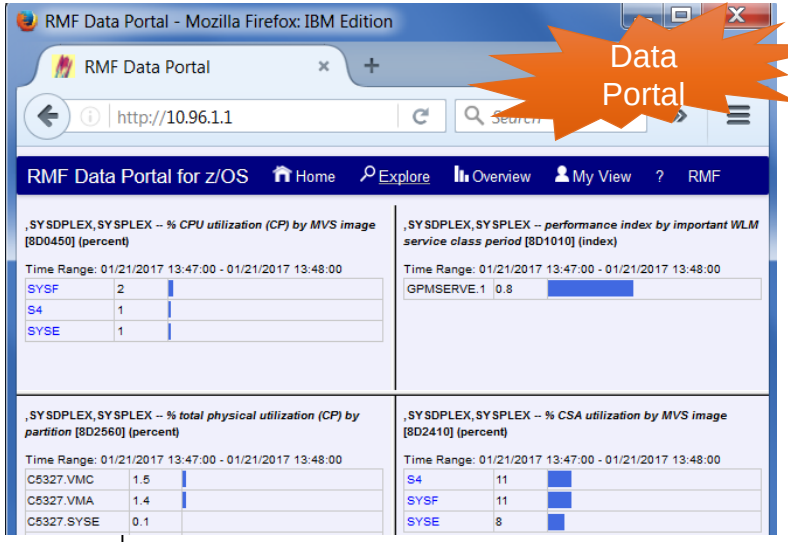
```
//RMF       PROC
//IEFPROC   EXEC PGM=ERBMFMFC,REGION=32M,TIME=1440,
//           PARM='DDS'
```

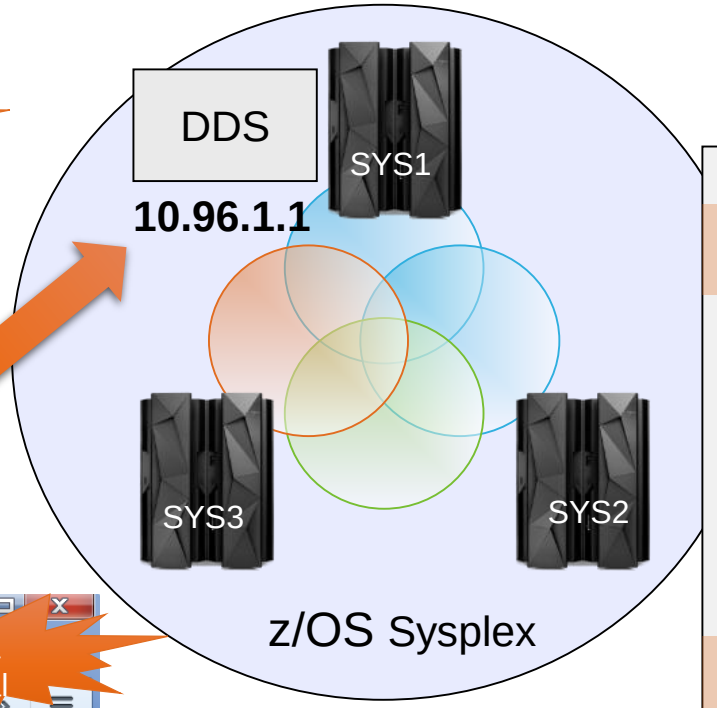
✓ The DDS option can be specified on any system of the Sysplex

✓ It is recognized on all images where RMF is active

DDS High Availability ...







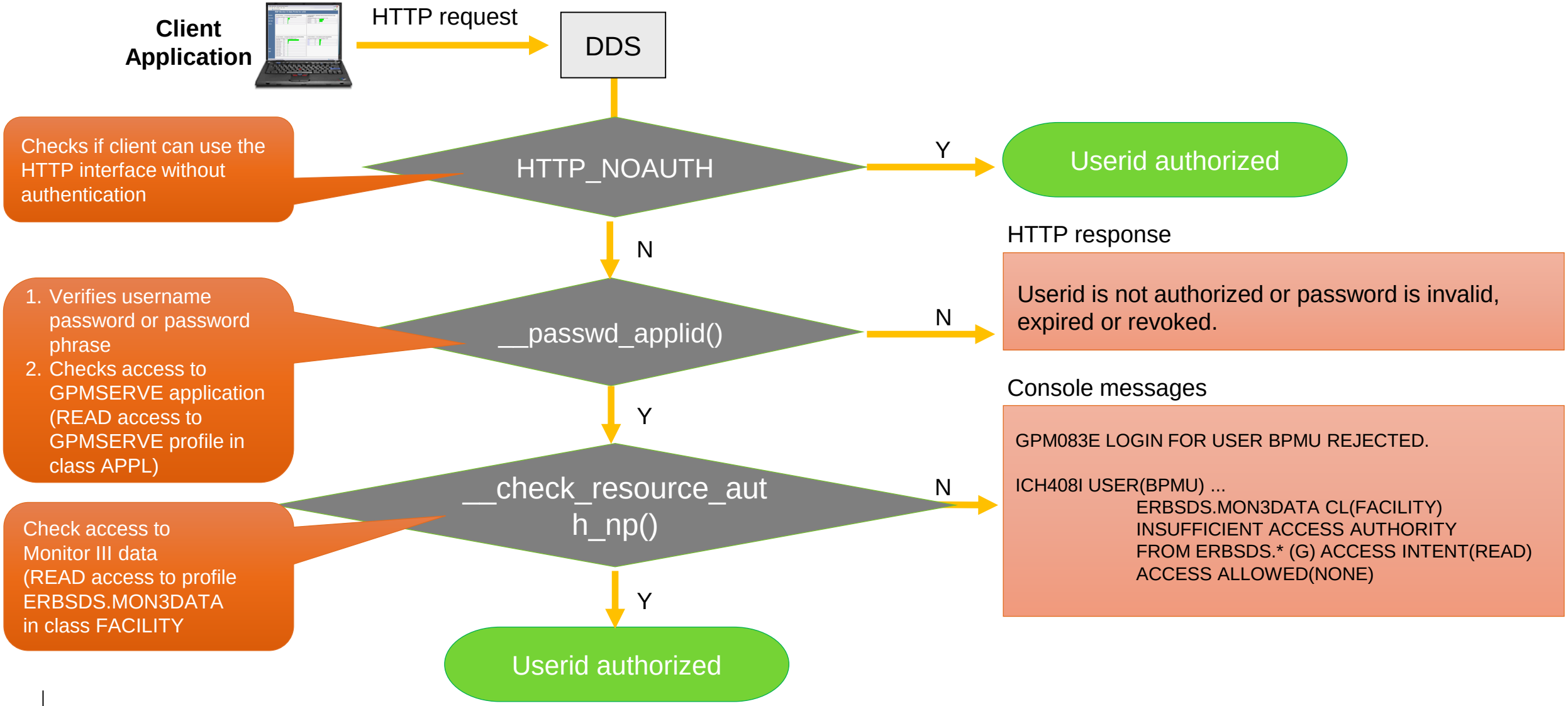

```
//GPMSERVE PROC MEMBER=00,VIPA='10.96.1.1'
//TCPDVP   EXEC PGM=MODDVIPA,
//         PARM='/-p TCPIP -c &VIPA'
//STEP1    EXEC PGM=GPMDDSRV,REGION=128M,TIME=1440,
//         PARM='TRAP(ON)/&MEMBER'
//*
//GPMINI   DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMINI)
//GPMHTC   DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMHTC)
//GPMPPJCL DD   DISP=SHR,DSN=SYS1.SERBPWSV(GPMPPJCL)
//CEEDUMP  DD   DUMMY
//SYSPRINT DD   DUMMY
//SYSOUT   DD   DUMMY
//TCPDVP   EXEC PGM=MODDVIPA,
//         PARM='/-p TCPIP -d &VIPA'
//         PEND
```

Create Dynamic VIPA

Delete Dynamic VIPA

- ✓ Applications can use Dynamic Virtual IP Address (dynamic VIPA) to contact a DDS running on any sysplex system

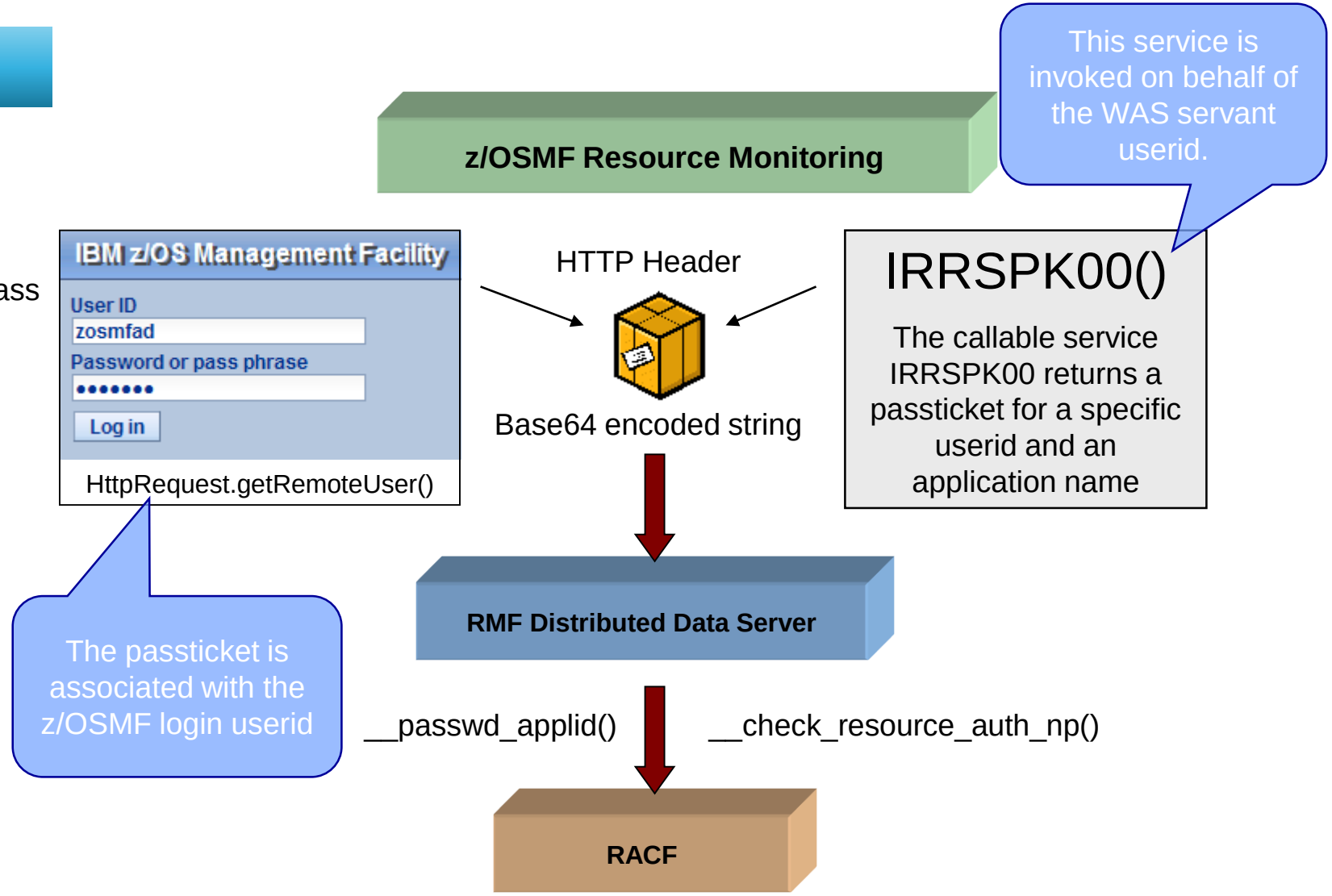
DDS Authentication



DDS Authentication: Passtickets

Example: Passticket Setup for z/OSMF

1. Activate the security class PTKTDATA
   - SETROPTS CLASSACT(PTKTDATA)
   - SETROPTS RACLIST(PTKTDATA)
2. Define a profile for the DDS in the PTKTDATA class and associate a secret secured signon key with the profile
   - RDEFINE PTKTDATA GPMSERVE SIGNON(KEYMASKED(*key*))
3. Define a profile for GPMSERVE PassTicket creation
   - RDEFINE PTKTDATA IRRPTAUTH.GPMSERVE.* UACC(NONE)
4. Grant the z/OSMF product permission to generate passtickets for GPMSERVE
   - PERMIT IRRPTAUTH.GPMSERVE.* CLASS(PTKTDATA) ID(*passticket_creator_userid*) ACCESS(UPDATE)
5. Activate the changes
   - SETROPTS RACLIST(PTKTDATA) REFRESH



DDS and HTTPS

Enable AT-TLS in TCP/IP profile data set

```
TCPCONFIG TTLS
```

Client Application

HTTPS

Port 8803

TCP/IP Stack

AT-TLS

PAGENT

Policy

GPMSERVE

HTTP

Keyring

RACF

Keyring with certificates

```
# RMF DISTRIBUTED DATA SERVER RULE
TTLSRule                              DDS
{
  LocalPortRange                      8803
  Jobname                             GPMSRERVE
  Direction                           Inbound
  TTLSGroupActionRef                  DDSGRP
  TTLSEnvironmentActionRef            DDSENV
}
TTLSGroupAction                       DDSGRP
{
  TTLSEnabled                         On
  Trace                               255
}
TTLSEnvironmentAction                 DDSENV
{
  HandshakeRole                       Server
  TTLSKeyringParms
  {
    Keyring                           BOERMF
  }
}
```

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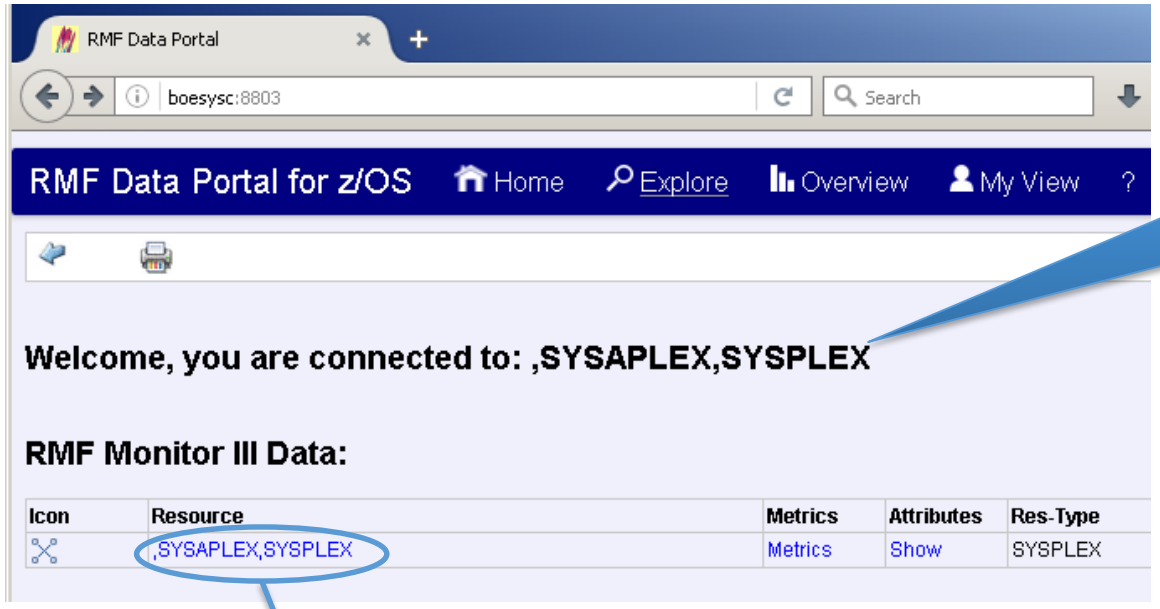
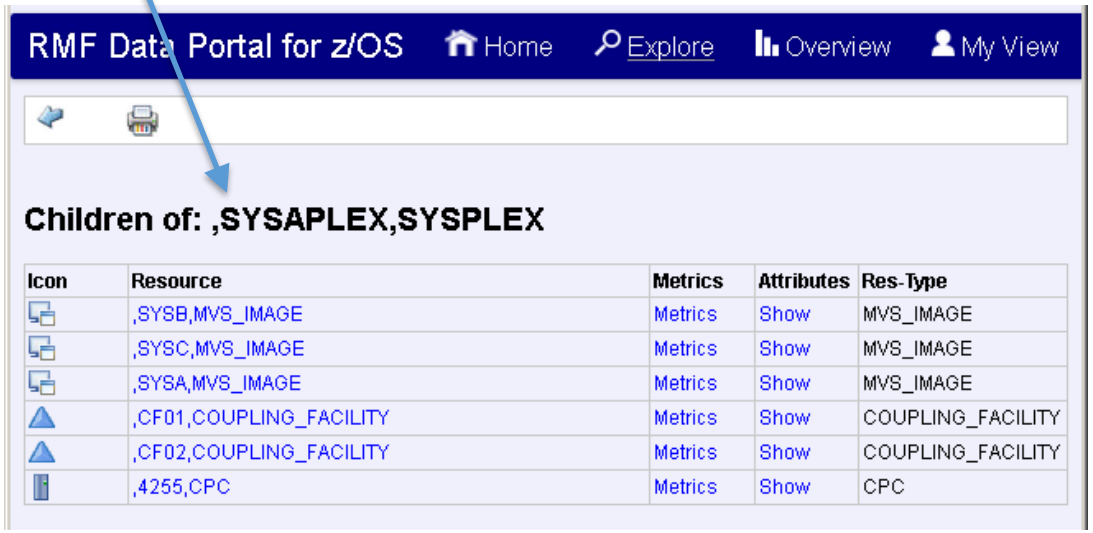
RMF Monitor III DDS Resource Model

- **MVS Image**
  - I/O Subsystem
    - All SSIDs
      - SSID
    - All LCUs
      - LCU
    - All Channels
      - Channel
    - All Volumes
      - Volume
    - PCIE
      - PCIE Function
    - SCM
      - SCM Card
    - ZFS
      - Aggregate
  - Processor
  - Storage
    - Auxiliary Storage
    - Central Storage
      - CSA, SQA,ECSA, SQA
  - Enqueue
  - Operator
  - Subsystems
    - JES, XCF, HSM
- **CPC**
  - **LPAR**
- **Coupling Facility**
  - **CF Structure**

Sysplex

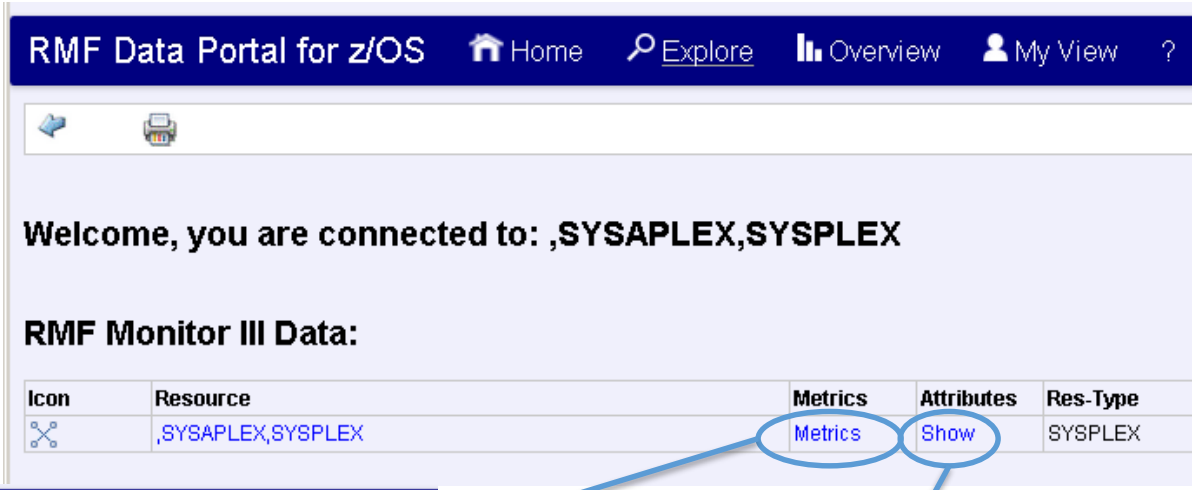


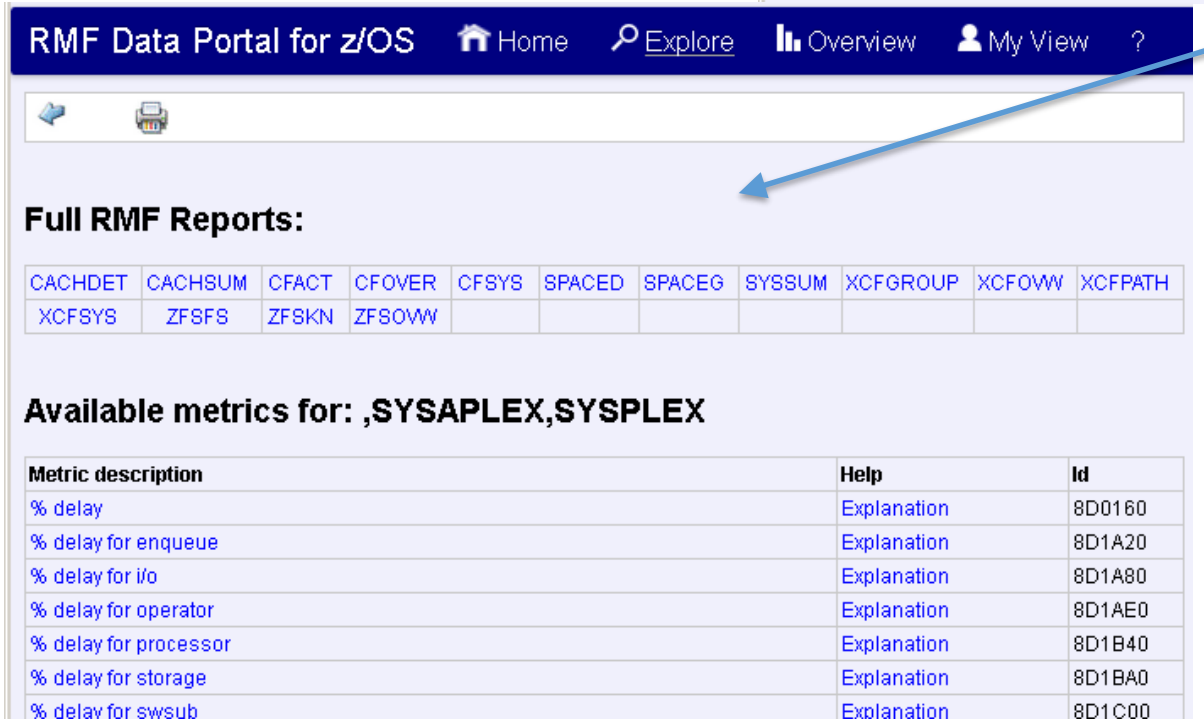
The Sysplex is the top-level resource

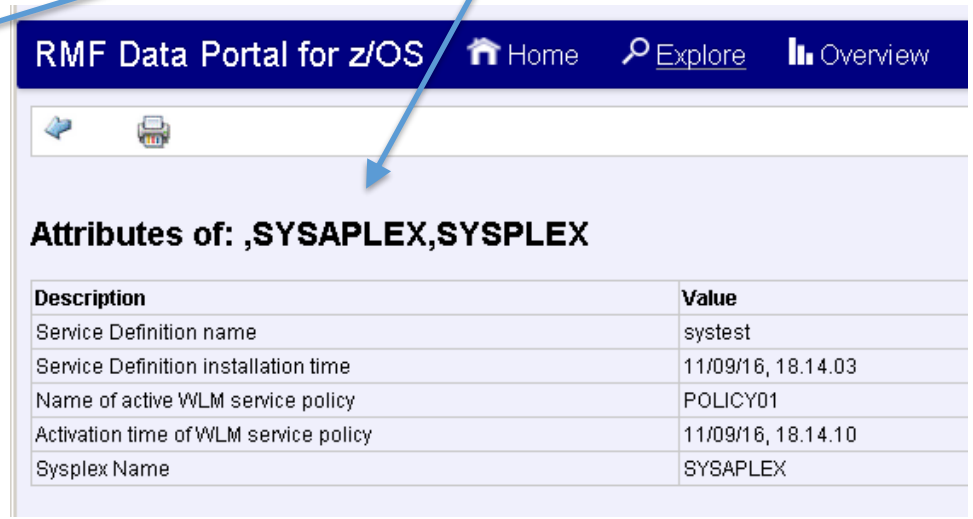


Resources and Metrics

- Resource specific actions:
  - List metrics
  - Show attributes

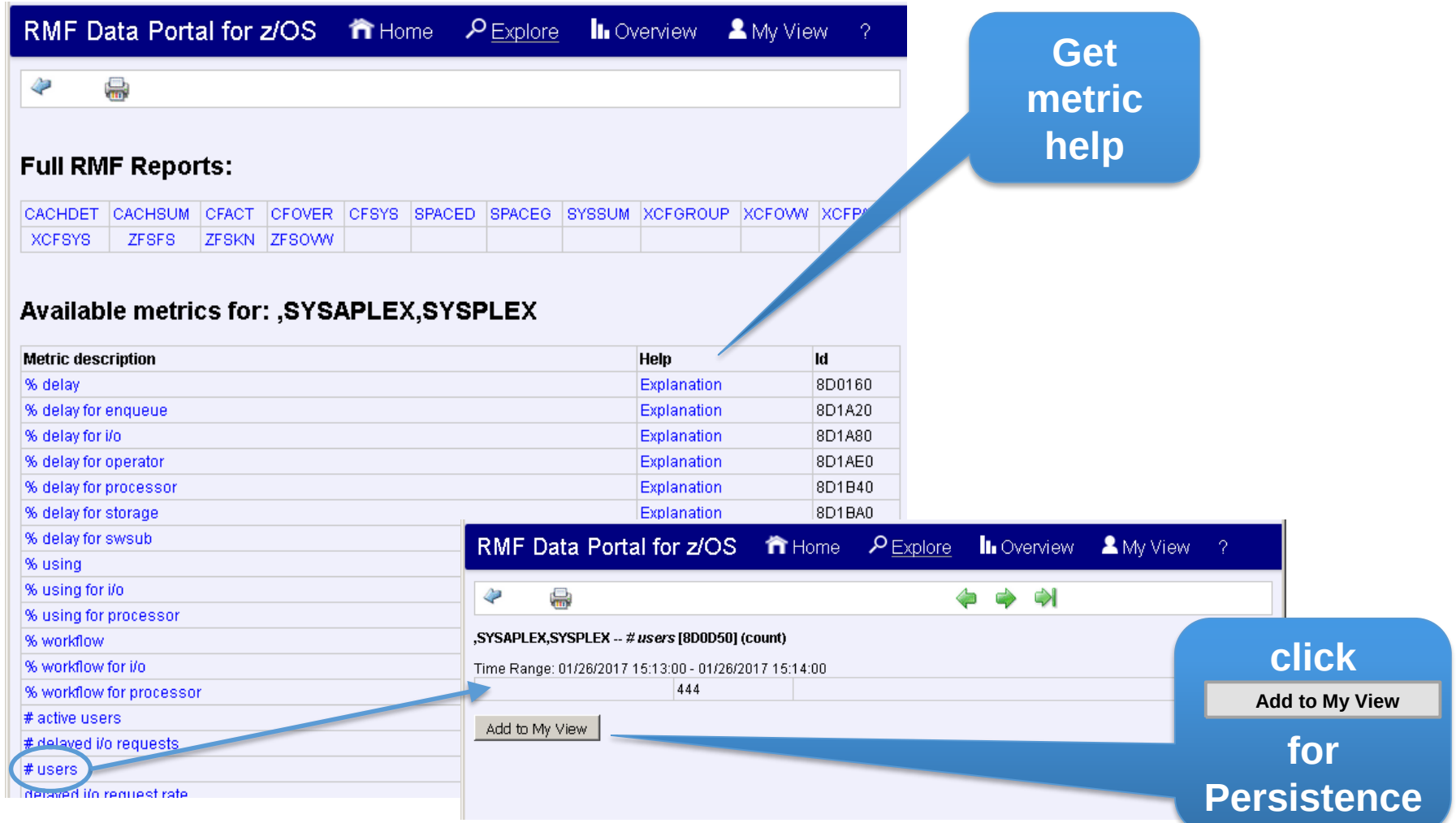






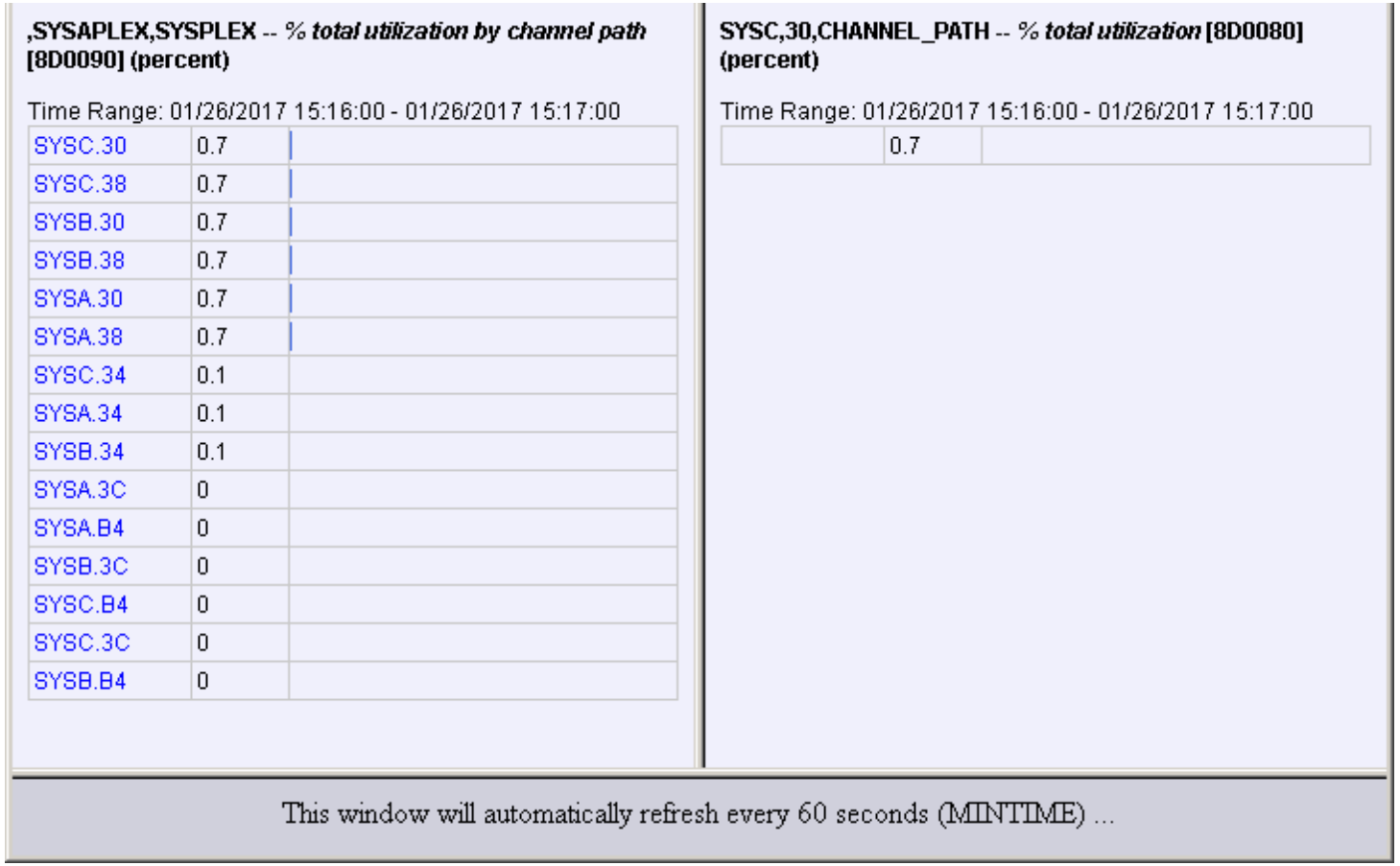
Resources and Metrics ...

- Resource specific actions:
  - View a metric



Basic Metric Types

- 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



,SYSAPLEX,SYSPLEX -- % *total utilization by channel path* [8D0090] (percent)

Time Range: 01/26/2017 15:16:00 - 01/26/2017 15:17:00

SYSC.30	0.7	
SYSC.38	0.7	
SYSB.30	0.7	
SYSB.38	0.7	
SYSA.30	0.7	
SYSA.38	0.7	
SYSC.34	0.1	
SYSA.34	0.1	
SYSB.34	0.1	
SYSA.3C	0	
SYSA.B4	0	
SYSB.3C	0	
SYSC.B4	0	
SYSC.3C	0	
SYSB.B4	0	

SYSC,30,CHANNEL_PATH -- % *total utilization* [8D0080] (percent)

Time Range: 01/26/2017 15:16:00 - 01/26/2017 15:17:00

	0.7	

This window will automatically refresh every 60 seconds (MINTIME) ...

Identifying Metrics

What is the Metric
I can use and
where do I find it ??

SYS1.SERBPWSV(GPMINI)

Counter Description for resource SYSPLEX

Metric ID

```
CD SYSPLEX  RMF#1249 0x8D1180 -------- ???  G
  response time by WLM service class period
  TLWXR AP      SYSSUM  SUMGRP   SUMARTT
```

Metric Description

Report Name

RMF Data Portal for z/OS | Home | Explore | Overview | My View | ?

Full RMF Reports:

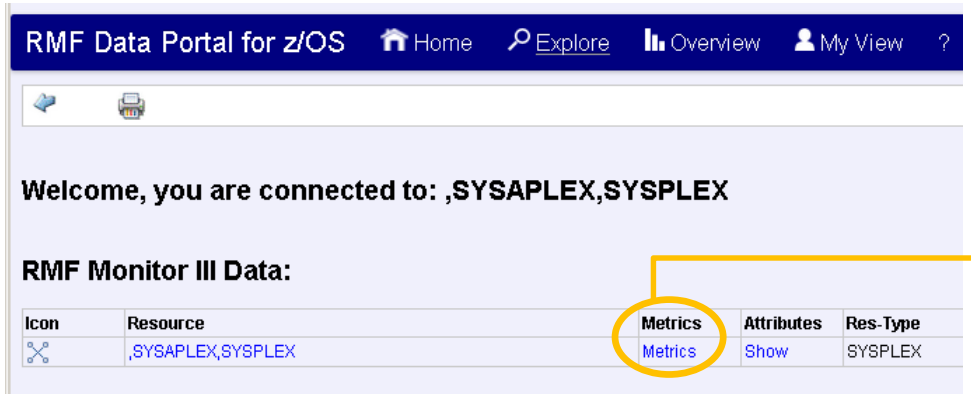
CACHDET	CACHSUM	CFACT	CFOVER	CFSYS	SPACED	SPACEG	SYSSUM	XCFGROUP	XCFOVW	XCFPATH
XCFSYS	ZFSFS	ZFSKN	ZFSOVW							

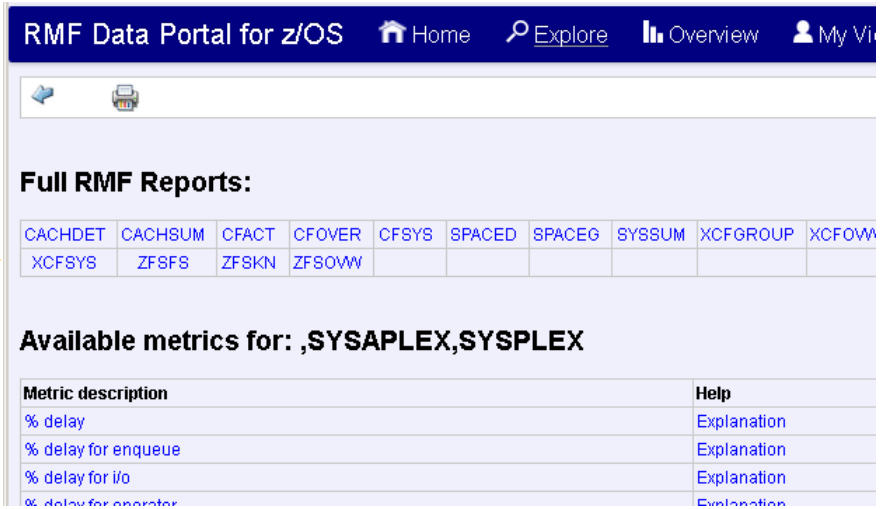
Available metrics for: ,SYSAPLEX,SYSPLEX

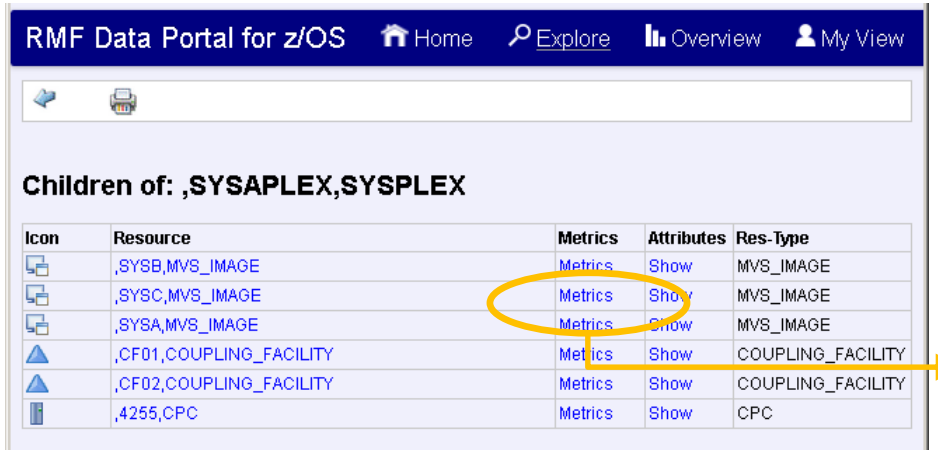
Metric description	Help	Id
% delay	Explanation	8D0160
% delay for enqueue	Explanation	8D1A20
performance index by important WLM service class period	Explanation	
performance index by WLM service class period	Explanation	8D1020
queue time by WLM service class period	Explanation	8D10D0
response time by WLM service class period	Explanation	8D1180
response time goal by WLM service class period	Explanation	8D11C0
response time goal percentile by WLM service class period	Explanation	8D11E0
transaction ended rate by WLM service class period	Explanation	8D1240

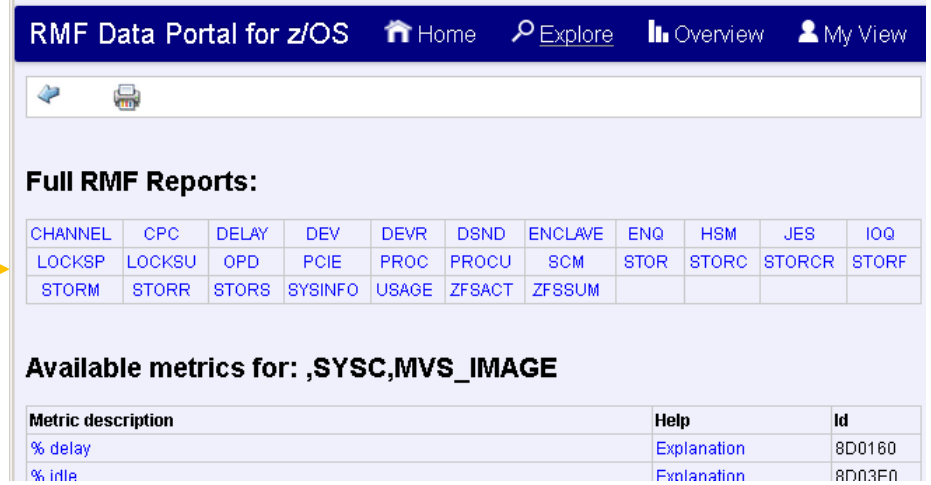
Full RMF Monitor III Reports

- 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

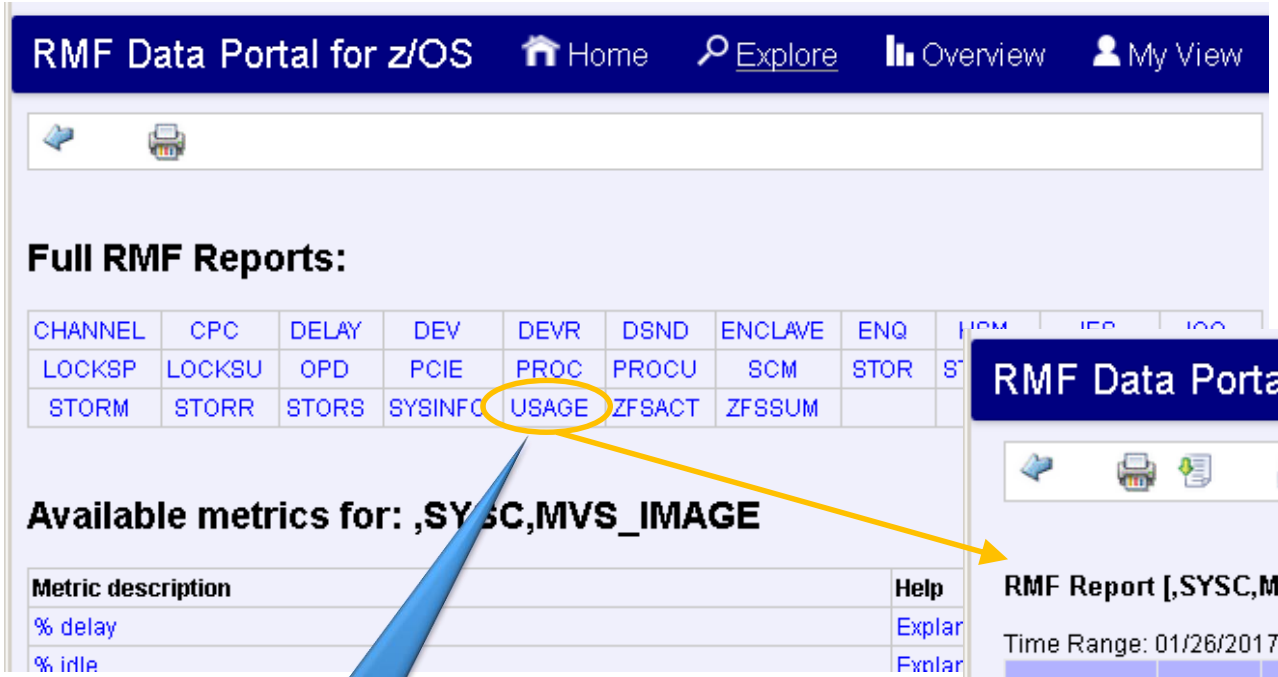




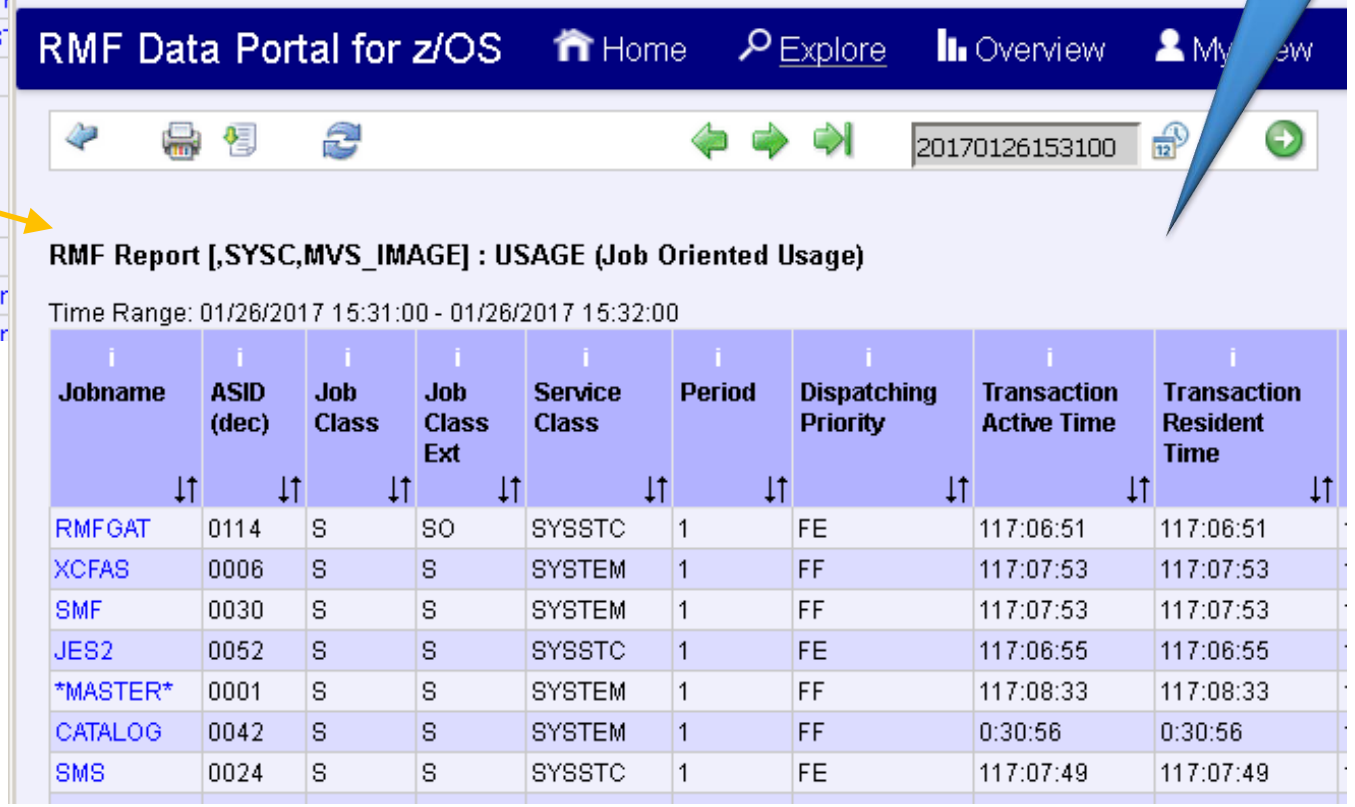




Full RMF Monitor III Reports …

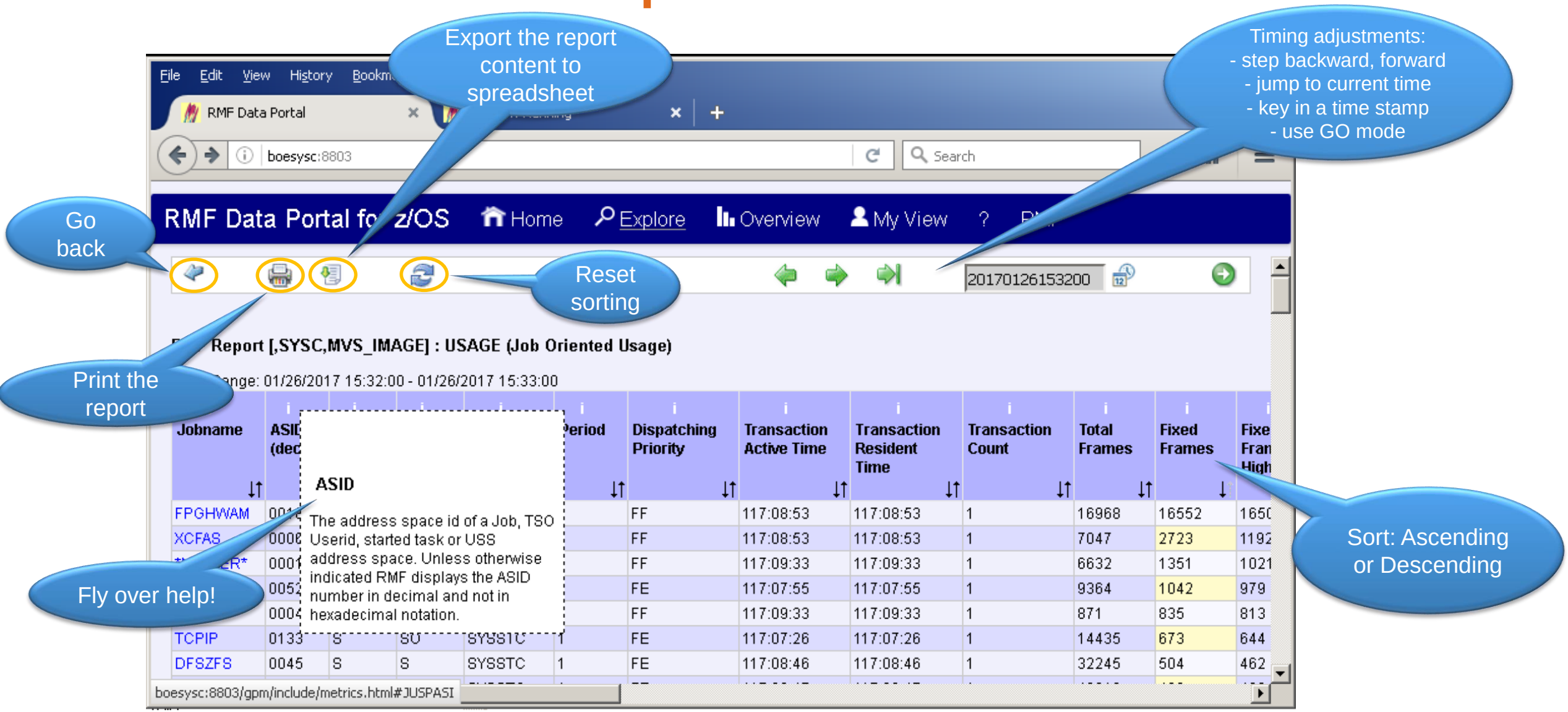


Select MIII Report



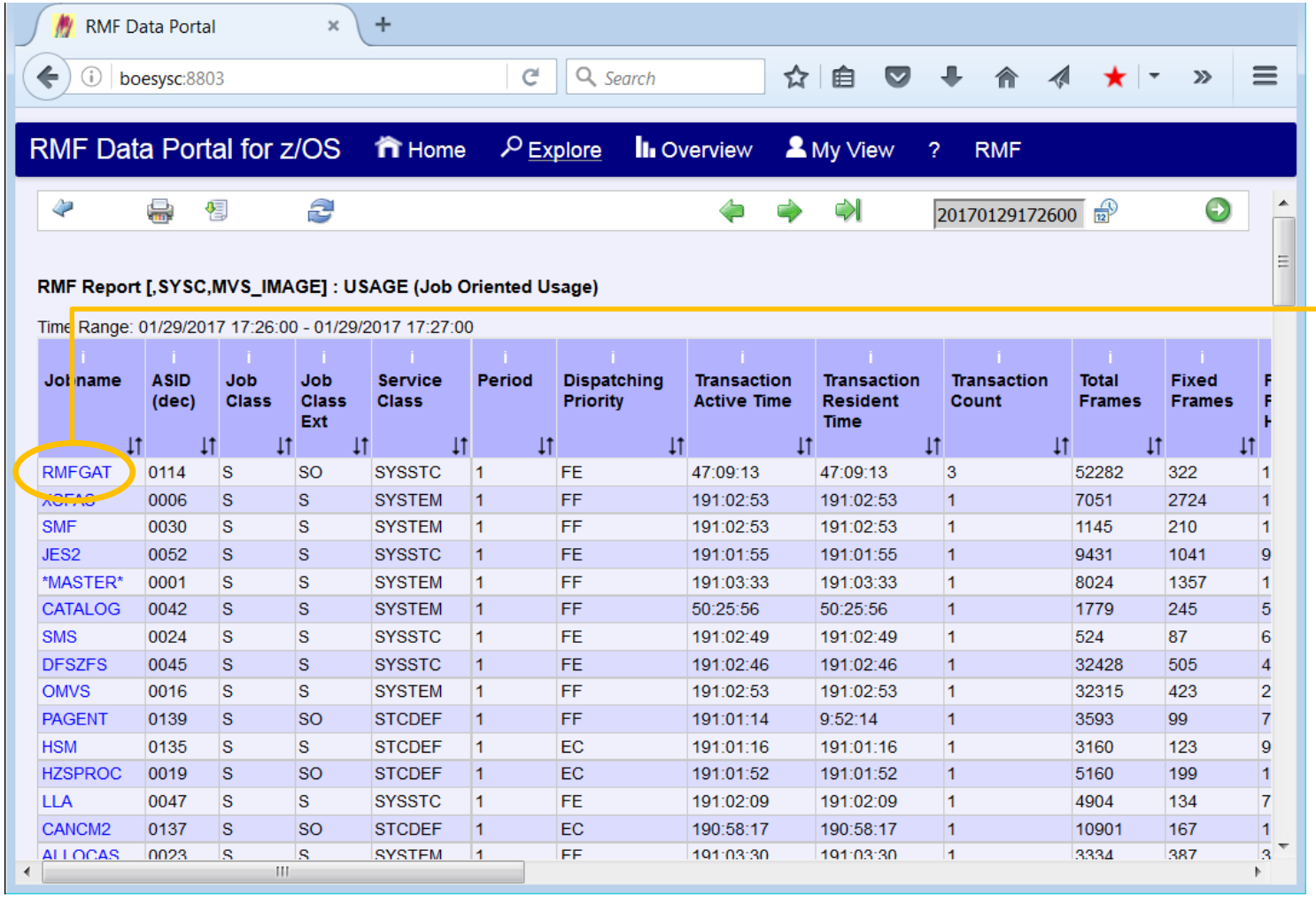
Scrollable and resizable !

Full RMF Monitor III Reports …

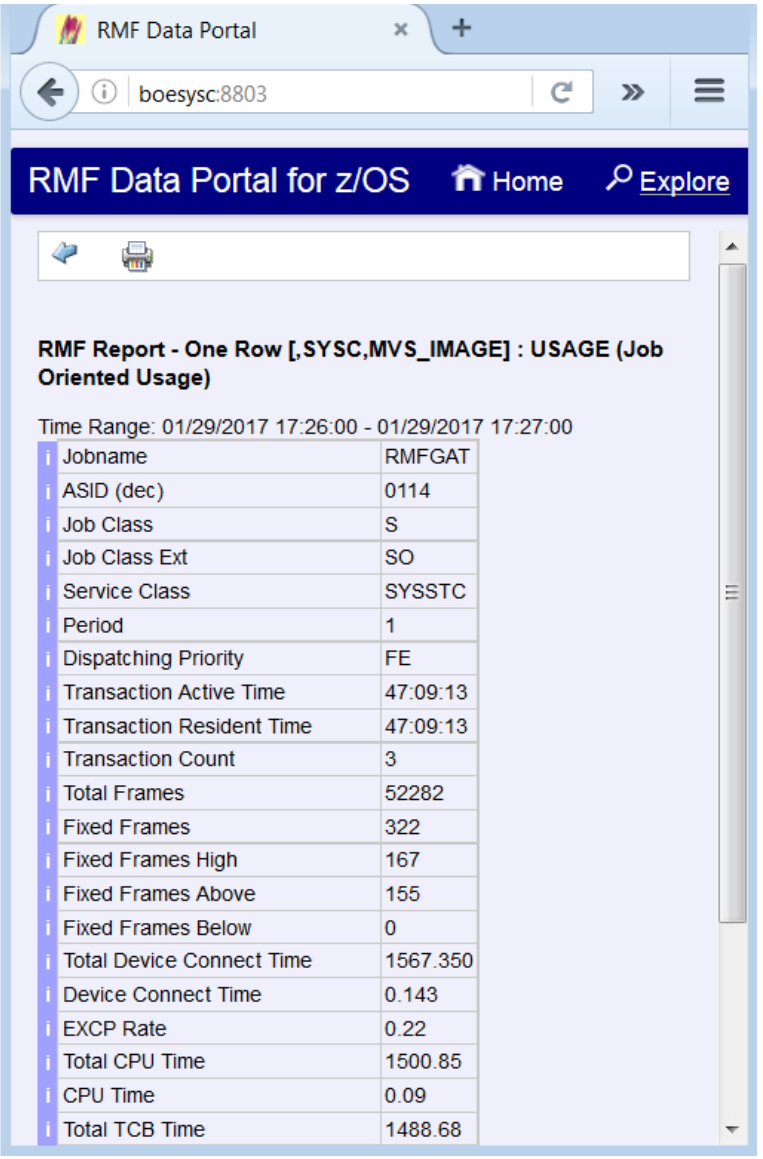


Full RMF Monitor III Reports …

- Flip to vertical view to focus on one single row



Jobname	ASID (dec)	Job Class	Job Class Ext	Service Class	Period	Dispatching Priority	Transaction Active Time	Transaction Resident Time	Transaction Count	Total Frames	Fixed Frames	
RMFGAT	0114	S	SO	SYSSTC	1	FE	47:09:13	47:09:13	3	52282	322	1
XCFAS	0006	S	S	SYSTEM	1	FF	191:02:53	191:02:53	1	7051	2724	1
SMF	0030	S	S	SYSTEM	1	FF	191:02:53	191:02:53	1	1145	210	1
JES2	0052	S	S	SYSSTC	1	FE	191:01:55	191:01:55	1	9431	1041	9
MASTER	0001	S	S	SYSTEM	1	FF	191:03:33	191:03:33	1	8024	1357	1
CATALOG	0042	S	S	SYSTEM	1	FF	50:25:56	50:25:56	1	1779	245	5
SMS	0024	S	S	SYSSTC	1	FE	191:02:49	191:02:49	1	524	87	6
DFSZFS	0045	S	S	SYSSTC	1	FE	191:02:46	191:02:46	1	32428	505	4
OMVS	0016	S	S	SYSTEM	1	FF	191:02:53	191:02:53	1	32315	423	2
PAGENT	0139	S	SO	STCDEF	1	FF	191:01:14	9:52:14	1	3593	99	7
HSM	0135	S	S	STCDEF	1	EC	191:01:16	191:01:16	1	3160	123	9
HZSPROC	0019	S	SO	STCDEF	1	EC	191:01:52	191:01:52	1	5160	199	1
LLA	0047	S	S	SYSSTC	1	FE	191:02:09	191:02:09	1	4904	134	7
CANCM2	0137	S	SO	STCDEF	1	EC	190:58:17	190:58:17	1	10901	167	1
ALLOCAS	0023	S	S	SYSTEM	1	FF	191:03:30	191:03:30	1	3334	387	3

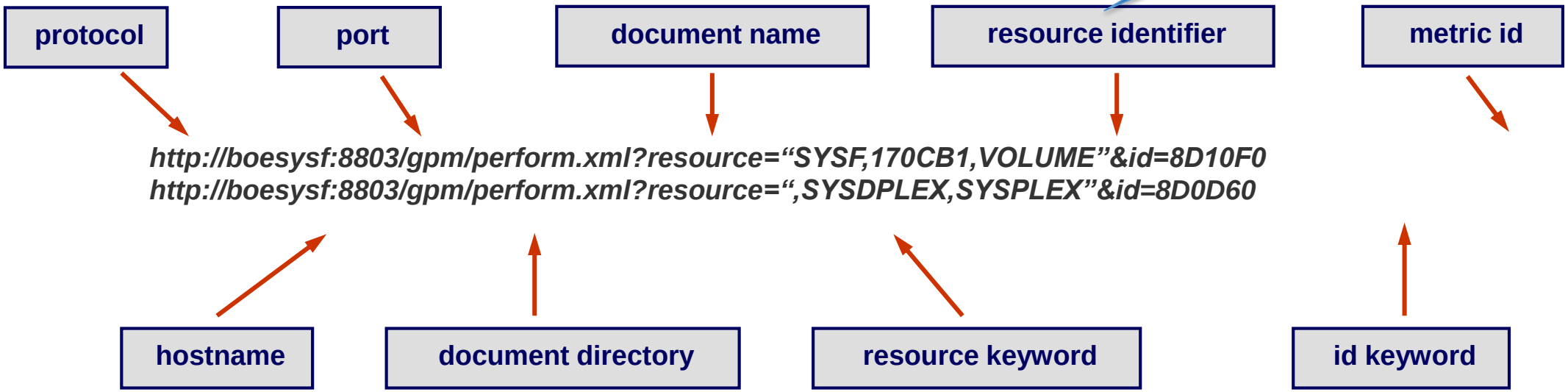


Jobname	RMFGAT
ASID (dec)	0114
Job Class	S
Job Class Ext	SO
Service Class	SYSSTC
Period	1
Dispatching Priority	FE
Transaction Active Time	47:09:13
Transaction Resident Time	47:09:13
Transaction Count	3
Total Frames	52282
Fixed Frames	322
Fixed Frames High	167
Fixed Frames Above	155
Fixed Frames Below	0
Total Device Connect Time	1567.350
Device Connect Time	0.143
EXCP Rate	0.22
Total CPU Time	1500.85
CPU Time	0.09
Total TCB Time	1488.68

HTTP Request Format: Basic Metric Types

- RMF Distributed Dataserver responds to standard HTTP requests
- Examples:
  - Request the single metric ***response time*** for volume 170CB1 of system SYSF
  - Request the list metric # ***users by MVS image*** of sysplex SYSDPLEX

Resouce identifier:
- **High level qualifier (HLQ)**
- **Resource name**
- **Resource type**

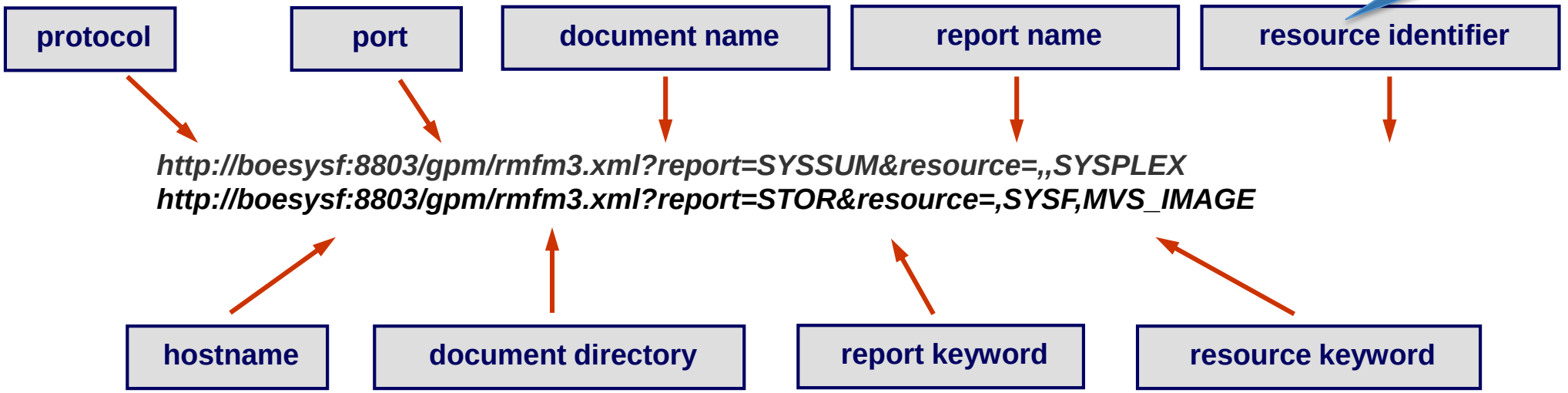


Document names:
- **perform.xml** — **returns the metric specified by the id parameter**
- **contained.xml** — **returns the contained resources**
- **listmetrics.xml** — **returns the list of associated metrics**
- **details.xml** — **returns the properties of the resource**

HTTP Request Format: Full Reports

- Can be used to get Sysplex and single system reports
- Examples:
  - Request the Sysplex Summary report of the resource **SYSPLEX**
  - Request the Storage Delay report of the resource **MVS_IMAGE *SYSF***

Resouce identifier:
- **High level qualifier (HLQ)**
- **Resource name**
- **Resource type**



- **Reports assigned to SYSPLEX resource:**
  CACHDET, CACHSUM, CFACT, CFOVER, CFSYS, SPACEG, SPACED, SYSSUM, XCFGROUP, XCFOVW, XCFPATH, XCFSYS, ZFSFS, ZFSKN, ZFSOVW
- **Reports assigned to MVS_IMAGE resource:**
  CHANNEL, CPC, DELAY, DEV, DEVR, DSND, ENCLAVE, ENQ, HSM, JES, IOQ, LOCKSP, LOCKSU, OPD, PCIE, PROC, PROCU, SCM, STOR, STORC, STORCR, STORF, STORM, STORR, STORS, SYSINFO, USAGE

HTTP Requests for Monitor III Data

- HTTP Parameters for Monitor III requests

&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**

Only valid for basic metric type requests

- Examples

&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

Monitor III XML Batch Facility

- Program GPMXMLM3 can retrieve Full Monitor III reports as XML documents
- Reports are retrieved by means of HTTP Requests
- Sysplex wide Reports: One HTTP request against the Sysplex resource
- Reports with System scope: One HTTP request per system. Combines reports to one XML document

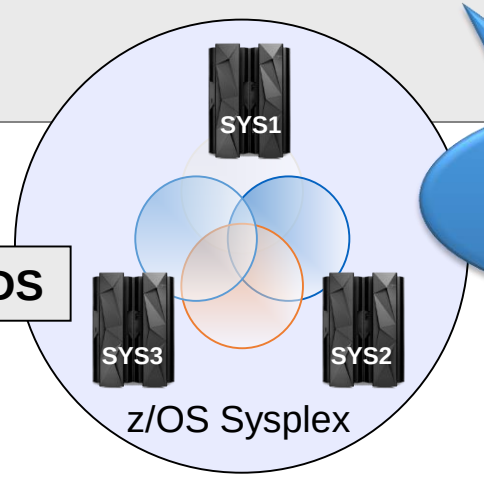
```
//M3XML    PROC REPORT=,              //* Report Type                                  */
//              DATE=0,               //* Begin Time/Date                              */
//              RANGE=0,              //* Length of Reporting Range                    */
//              UID=0,                //* Userid (if DDS Login requires Credentials)   */
//              PWD=0,                //* Password (if no Passtickets are configured)  */
//              APPL=0,               //* Application Name GPMSERVE (for Passtickets)  */
//              HOST=,                //* DDS Hostname (if no Autodetection is required) */
//              PORT=                 //* Port Number (if no default Port 8803)        */
//*
//GPMM3     EXEC PGM=GPMXMLM3,
//  PARM=('&REPORT &DATE &RANGE &UID &PWD &APPL &HOST &PORT')
//*
//X3RPTS    DD   PATH='/u/rmf/m3xml/temp/&REPORT..xml',     //* USS Output Directory for */
//          PATHOPTS=(OWRONLY,OCREAT,OTRUNC),               //* Single System Reports    */
//          PATHMODE=(SIRUSR,SIWUSR,SIRGRP),FILEDATA=TEXT
//X3XSRPTS DD   PATH= '/u/rmf/m3xml/temp/&REPORT..xml',     //* USS Output Directory for */
//          PATHOPTS=(OWRONLY,OCREAT,OTRUNC),               //* Sysplex Reports          */
//          PATHMODE=(SIRUSR,SIWUSR,SIRGRP),FILEDATA=TEXT
//SYSPRINT DD   SYSOUT=*
//SYSOUT   DD   SYSOUT=*
//          PEND
```

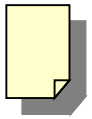
Module GPMXMLM3 is shipped with RMF V2R1

HTTP Request

http://ddshost:8803/gpm/rmfm3.xml?report=CPC&resource=,SYSF,MVS_IMAGE

DDS





XML Response Document

JCL example available with RMF XML Toolkit

Monitor III CSV Batch Facility

- Program GPMCSVM3 can retrieve Full Monitor III reports as CSV documents
- Reports are retrieved by means of HTTP Requests
- Sysplex wide Reports: One HTTP request against the Sysplex resource
- Reports with System scope: One HTTP request per system. Combines reports to one CSV document

```
//M3CSV    PROC REPORT=,              //* Report Type                                  */
//              DATE=0,               //* Begin Time/Date                              */
//              RANGE=0,              //* Length of Reporting Range                    */
//              UID=0,                //* Userid (if DDS Login requires Credentials)   */
//              PWD=0,                //* Password (if no Passtickets are configured)  */
//              APPL=0,               //* Application Name GPMSERVE (for Passtickets)  */
//              HOST=,                //* DDS Hostname (if no Autodetection is required) */
//              PORT=                 //* Port Number (if no default Port 8803)        */
//*
//GPMM3     EXEC PGM=GPMCSVM3,
//  PARM=('&REPORT &DATE &RANGE &UID &PWD &APPL &HOST &PORT')
//*
//C3RPTS    DD   PATH='/u/rmf/m3csv/temp/&REPORT..csv',     //* USS Output Directory for */
//          PATHOPTS=(OWRONLY,OCREAT,OTRUNC),               //* Single System Reports    */
//          PATHMODE=(SIRUSR,SIWUSR,SIRGRP),FILEDATA=TEXT
//C3XSRPTS DD   PATH= '/u/rmf/m3csv/temp/&REPORT..csv',     //* USS Output Directory for */
//          PATHOPTS=(OWRONLY,OCREAT,OTRUNC),               //* Sysplex Reports          */
//          PATHMODE=(SIRUSR,SIWUSR,SIRGRP),FILEDATA=TEXT
//SYSPRINT DD   SYSOUT=*
//SYSOUT   DD   SYSOUT=*
//         PEND
```

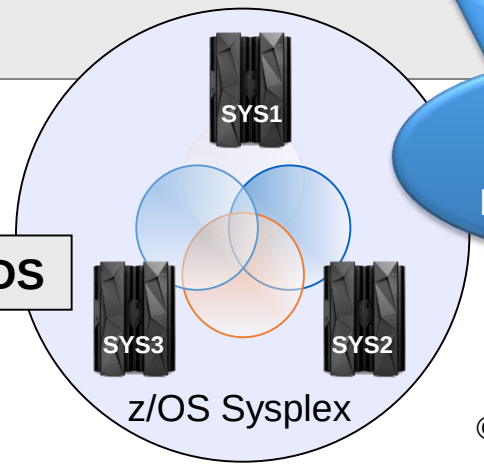
Module GPMCSVM3 is shipped with RMF V2R3

HTTP Request

http://ddshost:8803/gpm/...?report=CPC&resource=,SYSF,MVS_IMAGE

CSV Response Document

DDS



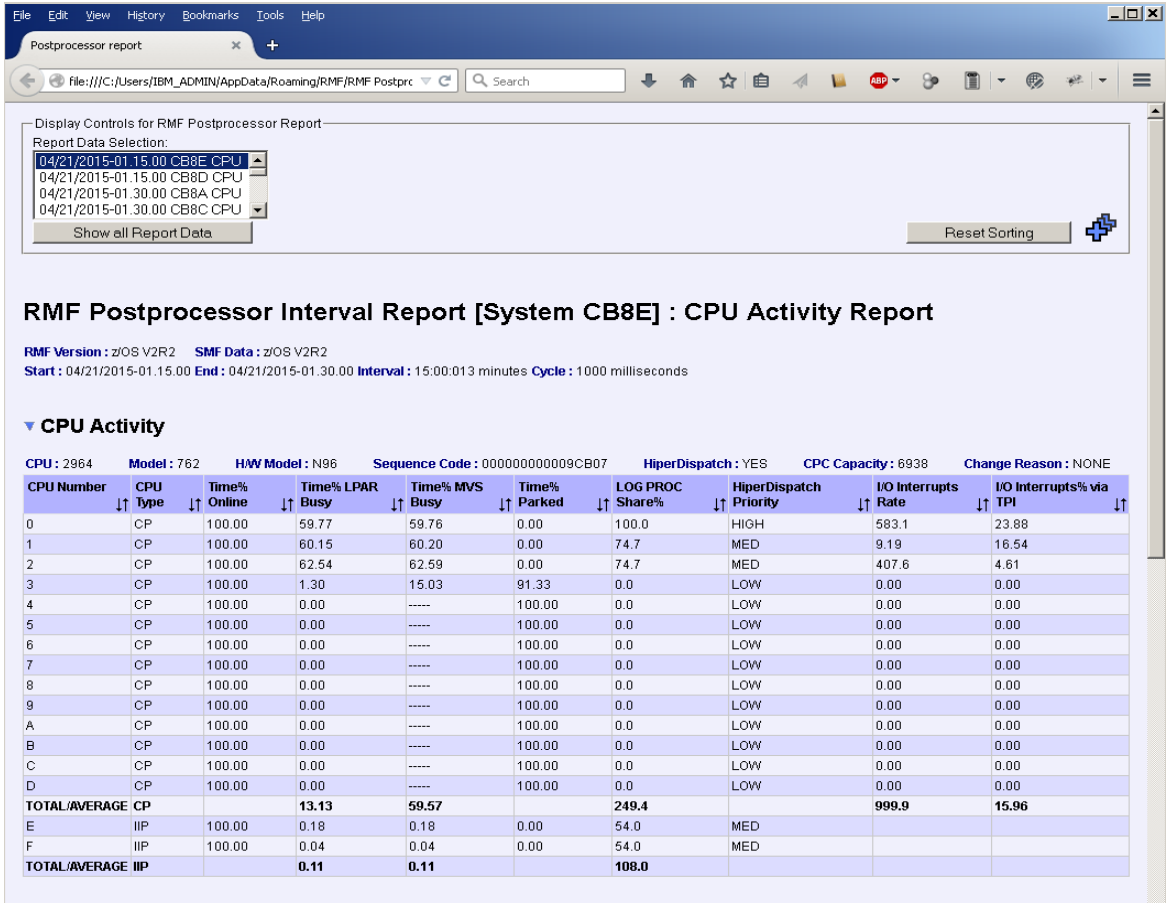
JCL example available with RMF XML Toolkit

Session Objectives

- RMF Distributed Data Server Overview
- DDS Setup, Configuration and Operation
  - Exploring DDS Parmlib Options
  - DDS Operation
- Advanced DDS Configuration Topics
  - Dynamic VIPA
  - Configuring PassTicket Support
  - AT-TLS
- Exploiting RMF Monitor III Data
  - Understanding z/OS RMF Monitor III DDS Resource Model
  - Resources and Metrics
  - The DDS HTTP API
  - Monitor III XML Batch Facility
- Exploiting Historical Data from RMF Postprocessor

HTTP API to access RMF Historical Data

- Application programs can use Distributed Data Server (DDS) HTTP API to retrieve Postprocessor XML reports
- All RMF Postprocessor XML formatted reports supported
- Web browser can be used as Postprocessor Data Portal



File Edit View History Bookmarks Tools Help

Postprocessor report

file:///C:/Users/IBM_ADMIN/AppData/Roaming/RMF/RMF Postprc

Search

Display Controls for RMF Postprocessor Report

Report Data Selection:

04/21/2015-01.15.00 CB8E CPU
04/21/2015-01.15.00 CB8D CPU
04/21/2015-01.30.00 CB8A CPU
04/21/2015-01.30.00 CB8C CPU

Show all Report Data

Reset Sorting

RMF Postprocessor Interval Report [System CB8E] : CPU Activity Report

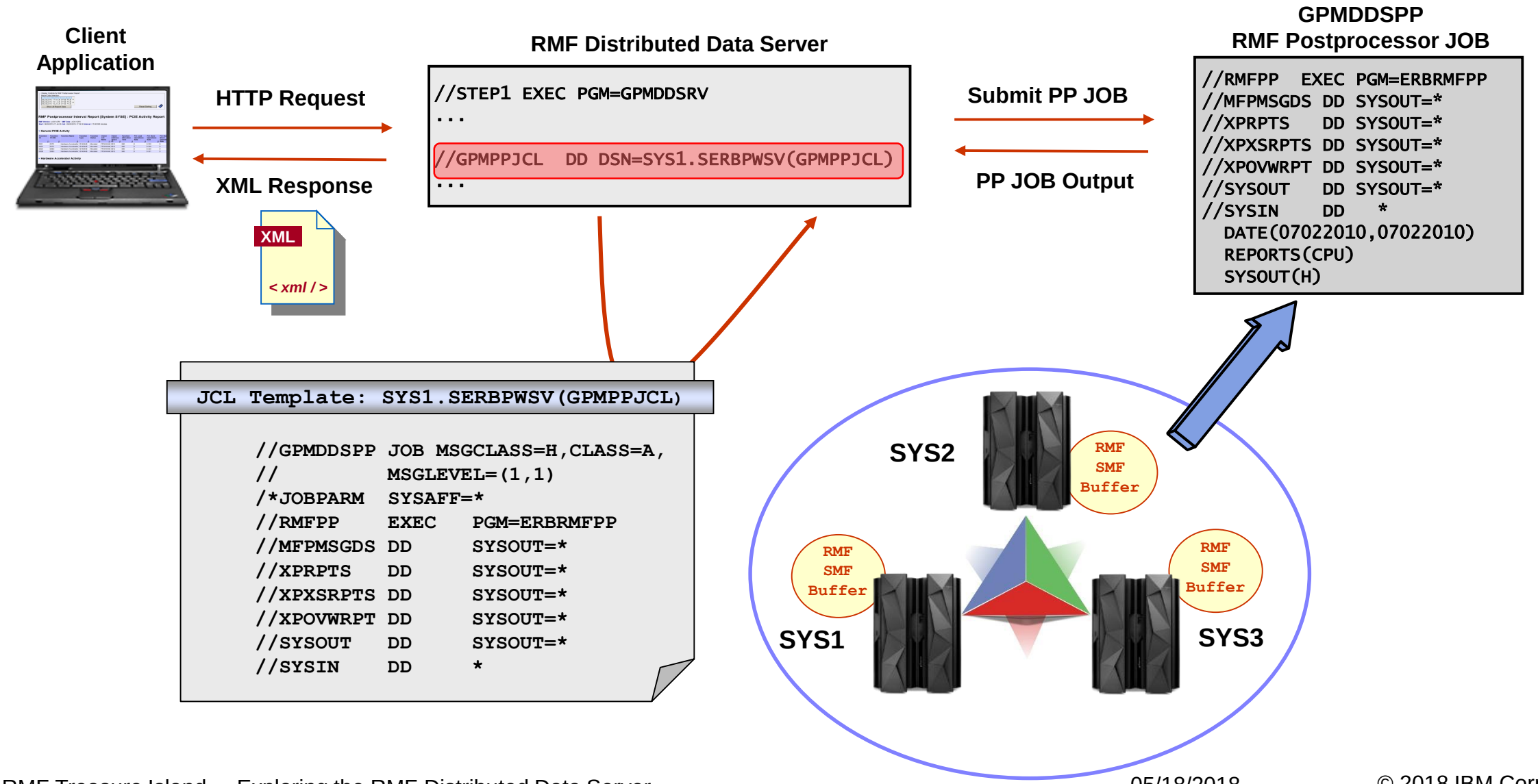
RMF Version : z/OS V2R2 **SMF Data :** z/OS V2R2
Start : 04/21/2015-01.15.00 **End :** 04/21/2015-01.30.00 **Interval :** 15:00:013 minutes **Cycle :** 1000 milliseconds

CPU Activity

CPU : 2964 **Model :** 762 **H/W Model :** N96 **Sequence Code :** 000000000009CB07 **HiperDispatch :** YES **CPC Capacity :** 6938 **Change Reason :** NONE

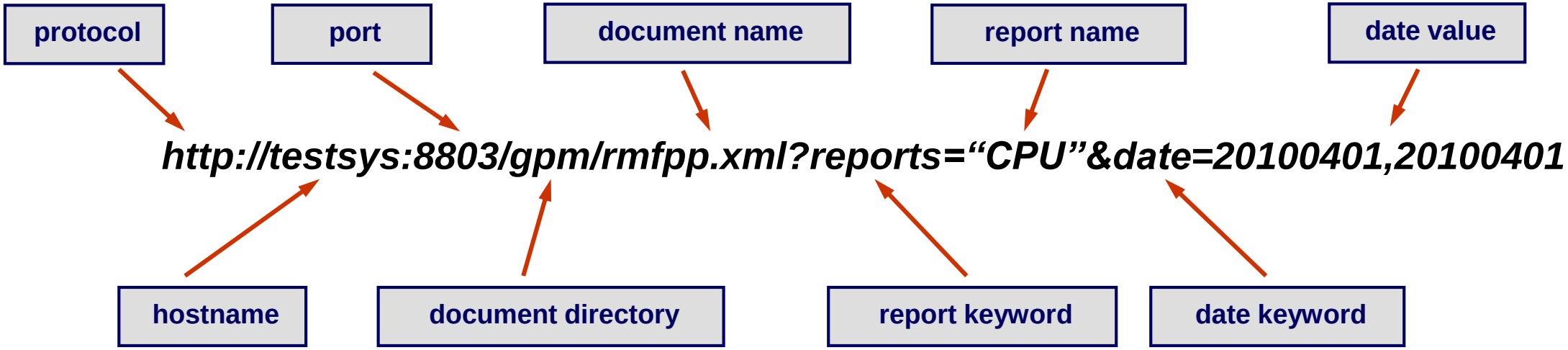
CPU Number	CPU Type	Time% Online	Time% LPAR Busy	Time% MVS Busy	Time% Parked	LOG PROC Share%	HiperDispatch Priority	I/O Interrupts Rate	I/O Interrupts% via TPI
0	CP	100.00	59.77	59.76	0.00	100.0	HIGH	583.1	23.88
1	CP	100.00	60.15	60.20	0.00	74.7	MED	9.19	16.54
2	CP	100.00	62.54	62.59	0.00	74.7	MED	407.6	4.61
3	CP	100.00	1.30	15.03	91.33	0.0	LOW	0.00	0.00
4	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
5	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
6	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
7	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
8	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
9	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
A	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
B	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
C	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
D	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
TOTAL/AVERAGE	**CP**		**13.13**	**59.57**		**249.4**		**999.9**	**15.96**
E	IIP	100.00	0.18	0.18	0.00	54.0	MED		
F	IIP	100.00	0.04	0.04	0.00	54.0	MED		
TOTAL/AVERAGE	**IIP**		**0.11**	**0.11**		**108.0**			

HTTP API to access RMF Historical Data ...



HTTP Requests for Postprocessor Data

- RMF Distributed Data Server responds to standard HTTP requests
- A request using XML document name **rmfpp.xml** returns the requested RMF Postprocessor report
- Example: Request a Postprocessor CPU Activity Report



HTTP Requests for Postprocessor Data ...

- HTTP Parameters for Postprocessor requests

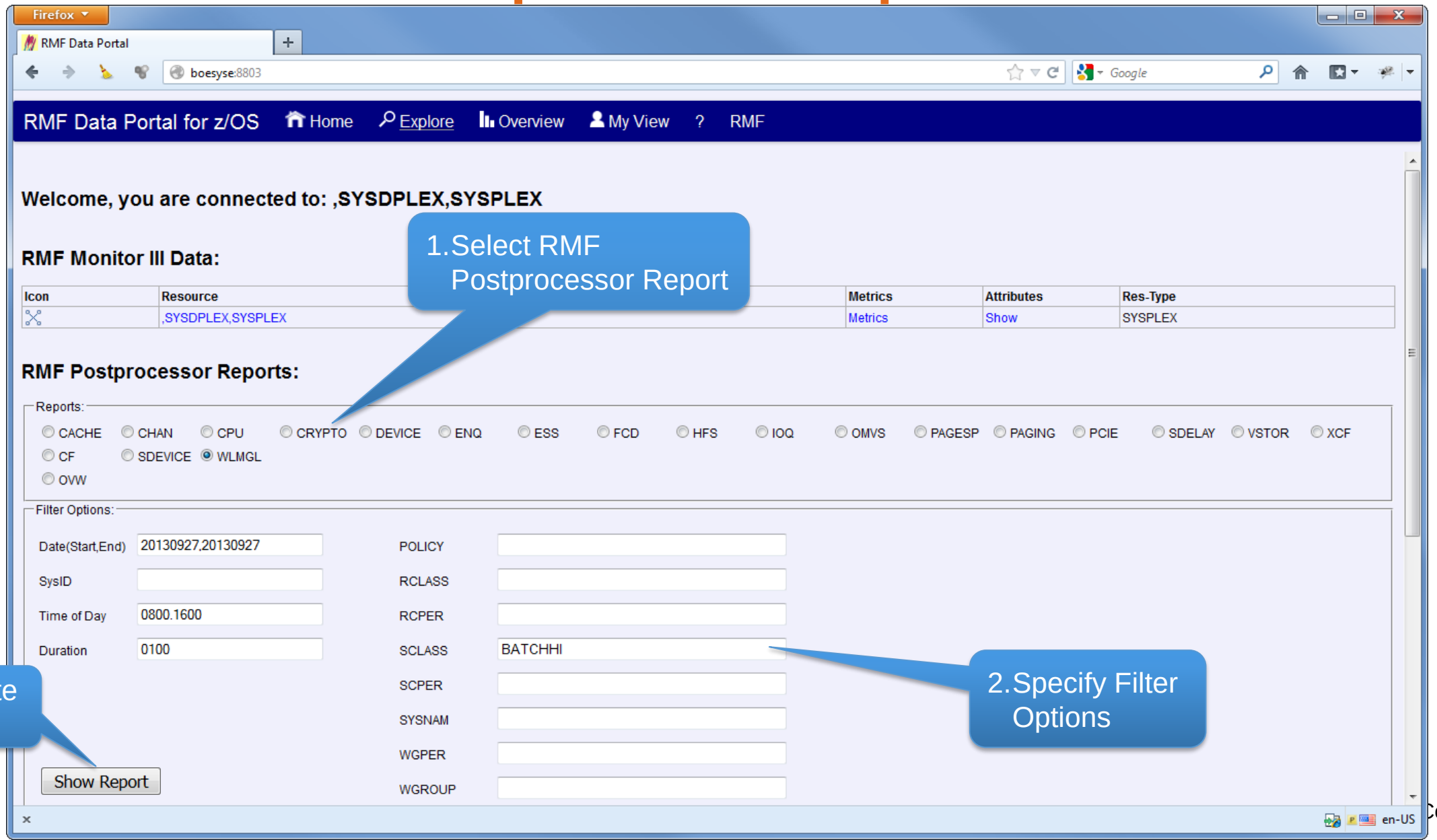
&reports	**list of Postprocessor report names**
&overview	**list of control statements for the Overview report**
&date	**start and end date of the reporting period for the requested Postprocessor report(s)**
&duration	**interval length for the requested Postprocessor duration report(s)**
&timeofday	**start and end time of the reporting period for each day in the reporting period**
&sysid	**system name for single system reports**
&timeout	**timeout period in seconds for the completion of Postprocessor jobs**

- Examples

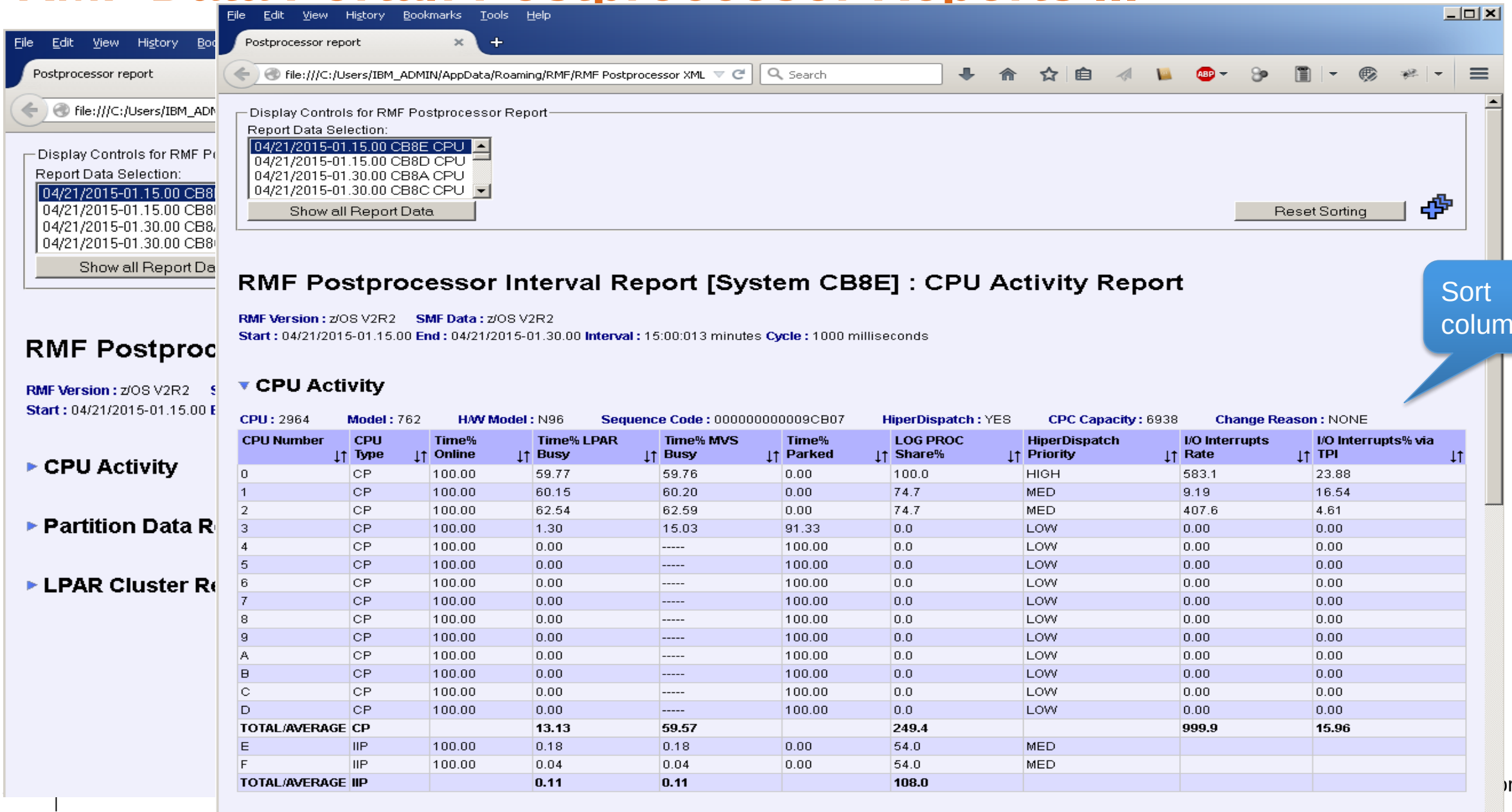
&reports ="CPU,CRYPTO,WLMGL(SCPER(BA*))"	request CPU, CRYPTO and WLMGL(SCPER(BA*)) reports
&overview="(SERVUNIT(TOTSRV(S.SYSTEM)))"	request ‚total service units' for service class S.SYSTEM
&date="20100225,20100226"	request data for Feb. 25th and 26th, 2010
&duration="0200"	specifies a duration report with interval length of 2 hours
&timeofday="0800,1200"	request data from 8 a.m. to 12 a.m.
&sysid="TESTSYS"	request data only from system TESTSYS
&timeout=600	max. time for DDS to wait for PP job is 600 seconds (=10 min.)

Note: &reports and &overview parameters are mutually exclusive.

RMF Data Portal: Postprocessor Reports



RMF Data Portal: Postprocessor Reports ...



CPU Number	CPU Type	Time% Online	Time% LPAR Busy	Time% MVS Busy	Time% Parked	LOG PROC Share%	HiperDispatch Priority	I/O Interrupts Rate	I/O Interrupts% via TPI
0	CP	100.00	59.77	59.76	0.00	100.0	HIGH	583.1	23.88
1	CP	100.00	60.15	60.20	0.00	74.7	MED	9.19	16.54
2	CP	100.00	62.54	62.59	0.00	74.7	MED	407.6	4.61
3	CP	100.00	1.30	15.03	91.33	0.0	LOW	0.00	0.00
4	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
5	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
6	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
7	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
8	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
9	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
A	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
B	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
C	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
D	CP	100.00	0.00	-----	100.00	0.0	LOW	0.00	0.00
TOTAL/AVERAGE	**CP**		**13.13**	**59.57**		**249.4**		**999.9**	**15.96**
E	IIP	100.00	0.18	0.18	0.00	54.0	MED		
F	IIP	100.00	0.04	0.04	0.00	54.0	MED		
TOTAL/AVERAGE	**IIP**		**0.11**	**0.11**		**108.0**			

Information and Tools

- z/OS RMF repository: https://github.com/IBM/IBM-Z-zOS/tree/master/zOS-RMF
  - Product information, newsletters, presentations, ...
- RMF tools: ftp://public.dhe.ibm.com/eserver/zseries/zos/rmf/
  - Spreadsheet Reporter
  - Postprocessor XML Toolkit

- RMF email address: rmf@de.ibm.com

- Documentation and news:
  - RMF Report Analysis, SC34-2665
  - RMF User‘s Guide, SC34-2664
  - RMF Programmer‘s Guide, SC34-2667
  - Latest version of PDF files can be downloaded from: www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zOSV2R3RmfPublications?OpenDocument