RMF Overview Records and How to Use with the Spreadsheet Reporter

Seattle Share: Session 2156
Bradley Snyder
Email Address: bradley.snyder@us.ibm.com
Phone: 972-561-6998
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<tr>
<td>AlphaBlox*</td>
<td>GDPS*</td>
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<td>FICON*</td>
<td>Pow erPC*</td>
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Agenda

- RMF Overview
- Overview Conditions within RMF
  - Creating Overview Reports and Records
- RMF Spreadsheet Reporter Overview
- Examples of Overview Record Reports
- Summary
RMF Review

RMF is a tool which helps the operators, capacity analysts and system programmers do their jobs effectively.

RMF Monitor I / Postprocessor
- Historical Reporting, Analysis, and Planning

RMF Monitor II and III
- Real-time Reporting, Problem Determination, and Data Reduction

RMF Sysplex Data Server and APIs

SMF

RMF Data Gatherer

SYS1
SYS2
SYS3
SYSn

PM for z/OS
- Processor Utilization of Systems

Windows, OS/2, UNIX, LINUX, WAP-enabled cellular phones

RMF Overview Conditions

- Most data points recorded by RMF can be retrieved individually
  - Allows easier analysis of specific data points from multiple reports in one step

- Since z/OS V1R8, DINTV can be used to create duration reports for periods longer than default RMF interval

- Overview Records and Reports can be generated at same time as other RMF reports
  - Not recommended if using DINTV, as more than the requested reports may be generated

- With z/OS V1R11, Plot reports in the RMF Postprocessor have been removed. Only replacement for many of the plot options is by using RMF Overview Records
### Examples of RMF Overview Conditions

#### Examples from Workload Activity Report

<table>
<thead>
<tr>
<th>Condition</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview Condition: RTIMETOT</strong></td>
<td>REPORT BY: POLICY=DAYTIME WORKLOAD=ONLINE SERVICE CLASS=ONLINE CRITICAL =NONE RESOURCE GROUP=*NONE</td>
</tr>
<tr>
<td>-TRANSACTIONS-</td>
<td>AVG 44.30 ACTUAL 3.203 --DASD I/O-- ---&gt;SERVICE--- SERVICE TIME---APPL %---</td>
</tr>
<tr>
<td>END/5</td>
<td>0.00 R/S AFFIN 0 DISC 0.7 SRB 168248 IIT 17.293</td>
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<tr>
<td>#SWAPS</td>
<td>200 INELIGIBLE 0 Q+PEND 0.3 TOI 3680K HST 0.000 AAP N/A</td>
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<table>
<thead>
<tr>
<th>Condition</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td><strong>Overview Condition: APPLPER</strong></td>
<td>CPU 749.730 CP 89.74</td>
</tr>
<tr>
<td><strong>Overview Condition: TRANTOT</strong></td>
<td>END/5</td>
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<td>#SWAPS</td>
<td>200 INELIGIBLE 0 Q+PEND 0.3 TOI 3680K HST 0.000 AAP N/A</td>
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<table>
<thead>
<tr>
<th>Condition</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview Condition: RESP</strong></td>
<td>TRX SERV 92</td>
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Creating Overview Reports and Records

- **Control Statement:**
  - OVERVIEW(Options)
    - Options are Report and Record

- **With no option specified, only Overview Report will be generated**

```
Top of Data *****************************************************
R M F O V E R V I E W R E P O R T

z/OS V1R11 SYSTEM ID ABCD START 10/16/2009-10.59.40 INTERVAL 20.42.51
CONVERTED TO z/OS V1R11 RMF END 10/22/2009-11.59.59 CYCLE 1.000 SECONDS

NUMBER OF INTERVALS 7 TOTAL LENGTH OF INTERVALS 145.00.00
DATE TIME INT CPUDDF1 TOTDDDF1 NUMPROC CPUBUSY APPLPER EXCPRT
MM/DD HH.MM.SS HH.MM.SS
10/16 10.59.40 01.00.00 50.5 1210 2.0 75.4 133.1 546.387
10/17 10.59.40 01.00.00 0.3 12 2.0 29.2 49.2 201.374
10/18 10.59.40 00.59.59 0.5 22 2.0 24.7 40.8 174.454
10/19 10.59.40 00.59.59 45.4 1040 2.0 69.1 124.3 433.207
10/20 10.59.40 00.59.59 43.3 994 2.0 76.4 137.0 511.804
10/21 10.59.40 01.00.00 51.3 1302 2.0 79.3 142.4 788.302
10/22 10.59.40 01.00.00 37.6 874 2.0 70.3 126.4 469.280

Bottom of Data *****************************************************
```
Creating Overview Reports and Records

- Overview Condition statements specified tell RMFPP which conditions to generate
- Limit of 253 OVW control statements per Postprocessor step
- All available OVW conditions are listed in the RMF User's Guide
- EXCEPT control statement can be used to cause the creation of Overview Records and/or Reports
  - EXCEPT statements define a condition for which RMF is to test
OVW Condition Format

- OVW(Control-stmmt-name(condition-name(qualifier))){,SYSTEMS}{,NOSYSTEMS})

  - Control-stmmt-name – unique name used as column/data header for each specific point of data
  - Condition-name – Specific Overview condition data point to be gathered
  - Qualifier – used to limit the scope of the condition-name specified
    - For example, used to specify the LPAR, Channel, VOLSER, Service Class to gather the specified condition
  - SYSTEMS/NOSYSTEMS – for sysplex wide data, provide data for each system, or just sysplex wide data. SYSTEMS is default

SYSTEMS Example:
OVW Examples

- **From Workload Data:**
  - Want the APPL% for a specific service class, and the total APPL% for the entire LPAR
    - OVW(CIC1APL(APPLPER(S.CICSER)))
    - OVW(POLAPL(APPLPER(POLICY)))
  - Qualifier format for workload data
    - (X.NAME.##)
      - X can be W, S, or R for Workload, Service or Report Class
      - Name is the Workload or SC or RC name
      - # is only specified for Service Class Periods

- **From I/O Data**
  - Want the response time of a volume and channel path busy for connecting channels
    - OVW(RTU101(DART('TU101')))
    - OVW(TBSY1A(CHTBSY(1A)))
    - OVW(TBSY1B(CHTBSY(1B)))
    - OVW(TBSY9C(CHTBSY(9C)))
    - OVW(TBSY9F(CHTBSY(9F)))
# Workload Data and Report Classes

- **For workload activity data, good use of Report Classes is essential for providing detailed, useful information**
  - May have multiple CICS regions in one Service Class, and dozens of CICS transactions in one response time Service Class

- **z/OS V1R11 supports up to 2,048 Report Classes**
  - Prior releases support up to 999 Report Classes

<table>
<thead>
<tr>
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<th>Xref</th>
<th>Notes</th>
<th>Options</th>
<th>Help</th>
</tr>
</thead>
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<td>Modify Rules for the Subsystem Type</td>
<td>Row 1 to 3 of 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command =&gt;</td>
<td></td>
<td>Scroll =&gt; D10F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subsystem Type : CICS

Description :... CICS Classifications

**Action codes:**
- **A=**After
- **B=**Before
- **C=**Copy
- **D=**Delete row
- **M=**Move
- **R=**Repeat
- **I=**Insert rule
- **IS=**Insert Sub-rule

**Qualifier**

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Name</th>
<th>Start</th>
</tr>
</thead>
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<tr>
<td>_____</td>
<td>1</td>
<td>TNG</td>
<td>REPORT</td>
</tr>
<tr>
<td>_____</td>
<td>1</td>
<td>TN</td>
<td>%%%A40</td>
</tr>
<tr>
<td>_____</td>
<td>1</td>
<td>TN</td>
<td>ONL*</td>
</tr>
</tbody>
</table>

**Defaults:**
- CICSDEF
- CICS1 CICREP
- CICS1 CICA40
- CICS1 CICONL

CICS transactions in different RC to better analyze individual response times
RMF Spreadsheet Reporter

- Copy of tool included with z/OS
- Recommend downloading latest version from www.ibm.com
RMF Spreadsheet Reporter

Data Transitions

SMF raw Data

Report Listings

Overview Records

Download

RMF Postprocessor

Report Listings

Overview Records

Generate

Working Sets

Display

Spreadsheet

CPU Contention: System SYSA
What is a 'Working Set'

- **Working Set** is a set of EXCEL Spreadsheets created from RMF Reports
  - One spreadsheet created for each report type AND each interval
- **Macros built into report spreadsheets** will open designated spreadsheets from working set to pull specific data
- **Report.XLS**
  - Spreadsheet that defines what data/intervals are in the other spreadsheets of working set
What is included with the RMF Spreadsheet

- There are several pre-defined EXCEL Spreadsheets that come with the RMF Spreadsheet reporter
  - Spreadsheets cover both RMF Reports or Overview Reporting

- Pre-Built Overview Report spreadsheets will require specific OVW statements in a specific order

- Highlighted Spreadsheet will process ANY set of overview records produced
  - “Open RMF Overview Spreadsheets”
Creating Overview Records

- **Two methods to invoke RMF Post Processor to create Overview Records**
- **Directly in TSO**
  - Should specify target data set for Overview Records to be saved
  - Data set can be transferred, using BINARY format to local system to be processed by the RMF Spreadsheet Reporter
  - Allows automation as batch job can be set to run to have Overview Records ready for processing at specific times
  - Must hand code every Overview Condition desired
- **Using the RMF Spreadsheet Reporter**
  - Can create Overview Records and necessary Working Set all in one step
  - Better for Ad Hoc Reporting
    - Using GUI interface, can run one job at a time
  - Can use MACROs to create Overview Condition statements
Creating Overview Records on TSO

/*Header Information
//RMFOVW EXEC PGM=ERBRMFPP
//SYSPRINT DD SYSOUT=* 
//MFPMMSGDS DD SYSOUT=* 
//MFPPINPUT DD DISP=SHR, DSN=HLQ.CUSTOMER.SMF
//PPOVWREC DD DISP=(,CATLG,DELETE),
// SPACE=(CYL,(100,100),RLSE)
//PPORP001 DD DISP=(,CATLG,DELETE),
// DSNAME=HLQ.OVREP.TEST,
// SPACE=(CYL,(100,100),RLSE)
//SYSIN DD *
NOSUMMARY
OVERVIEW(REPORT,RECORD)
ETOD(1100,1500)
DINTV(0060)
OVW(CPUBAT1(APPLPER(S.BATCH)))
OVW(TOTBAT1(TRANSTOT(S.BATCH)))/* ENDED TRANSACTIONS */
Creating Overview Records Using Spreadsheet Reporter

- Step 1, be sure 'Create Overview Records' is checked in the settings.
Creating Overview Records Using Spreadsheet Reporter

- **Step 2, from system profile select file containing Overview Statements**
  - Standard text file on workstation with list of statements
Creating Overview Records Using Spreadsheet Reporter

- Step 3, Create either Working Set or Overview Record from Main Menu
Creating Control Statements with RMF SR

- **Pre-built Overview Reports** require specific OVW statements in a specific order
  - Use 'Create Overview Control Statement' Macros to avoid errors
    - Every Report Spreadsheet has a tab to create overview records specific to that report
  - Example, use of Cache Subsystem Report to create Control Unit overview data for processing

![Image of Create Overview Control Statement Set dialog box]

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RMF SR Create Overview Control Statement Example

Step 1

- Using the Workload Activity Trend Report
- First, run regular Workload Activity Report and create working set
RMF SR Create Overview Control Statement Example

Step 2

- Open 'Workload Activity Trend Report'
  - Select Working Set just created to import Data

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workload Activity Trend Report (Goal Mode)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This macro allows you to create a spreadsheet from one or multiple Workload Activity reports (in goal mode).

**To create a copy**

Create a copy...

**To start**

Select Working Set and process data...

**To add additional data**

Select Report Working Set and add to existing data...

**To save the results**

Save as ...

To get help

Help
RMF SR Create Overview Control Statement Example

Step 3

- Tab called “Create Overview Control Statements”
- Macro will create TXT file with necessary OVW statements for Workload Overview Report
Output of Macro:

OVW(CPUSHOT1(APPLPER(S.HOTBATCH.1)))
OVW(EXPSHOT1(EXCPRT(S.HOTBATCH.1)))
OVW(MPLSHOT1(TRANSAVG(S.HOTBATCH.1)))
OVW(TOTSHOT1(TRANSTOT(S.HOTBATCH.1)))
OVW(RTMSHOT1(RTIMETOT(S.HOTBATCH.1)))
OVW(SCHSHOT1(SSCHRT(S.HOTBATCH.1)))
OVW(RSPSHOT1(RESP(S.HOTBATCH.1)))
OVW(CPUSPRD1(APPLPER(S.PRDBATHI.1)))
OVW(EXPSPRD1(EXCPRT(S.PRDBATHI.1)))
OVW(MPLSPRD1(TRANSAVG(S.PRDBATHI.1)))
OVW(TOTSPRD1(TRANSTOT(S.PRDBATHI.1)))
OVW(RTMSPRD1(RTIMETOT(S.PRDBATHI.1)))
OVW(SCHSPRD1(SSCHRT(S.PRDBATHI.1)))
OVW(RSPSPRD1(RESP(S.PRDBATHI.1)))
OVW(NUMPROC(NUMPROC))
OVW(CPUBUSY(CPUBSY))
OVW(APPLPER(APPLPER(POLICY)))
OVW(EXCPRT(EXCPRT(POLICY)))
Create Overview Control Statements Spreadsheet

- **One Spreadsheet included with tool has macros to create Overview Records for overview Spreadsheets**
  - No Data input, so all desired specifics must be known

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**Create Overview Control Statements**

This spreadsheet does not process converted RMF data but helps you to define Overview control statements to create Overview records with the Postprocessor from your RMF SMF data. The Overview records created based on the Overview control statements from this spreadsheet can be processed with the Overview Record spreadsheets contained in the RMF Spreadsheet Reporter.

Create Overview control statements for:

- System Overview Report macro (Rmfy9oww.xls)
- Workload Overview Report macro (Rmfy9wkl.xls)
- Device Overview Report macro (Rmfx9dev.xls)
- Cache Subsystem Overview Report macro (Rmfx9cac.xls)
- Channel Overview Report macro (Rmfx9chn.xls)
- LPAR Overview Report macro (Rmfx9cpc.xls)
Customized RMF Overview Reports

- Any Overview Report spreadsheet can be customized to fit specific user requirements
  - Be sure to create new copy of original spreadsheet before doing customization to avoid corruption of original file
  - “Create a Copy” will create brand new copy of original spreadsheet
  - “Save as” will convert spreadsheet and no longer allow import of any new data
The Parts of the “Open RMF Overview Spreadsheet”

- This spreadsheet will process any Overview Records, regardless of order or type
- Three main charts used for Reporting
  - IntervalChart will plot data points for one interval in the data collected
  - DayChart will plot data points for one day only
  - TrendChart will plot data points for every time collected
- Each chart can be modified to only show a selected number of the Overview Records Selected
  - For example, collected data for 30 DASD volumes, but are only interested in showing Response Times for 5
- Data Tabs
  - Data and Data2 tabs contain all of the data collected
  - TrendData is the data reordered for graphing on the Chart tabs
By default, DayChart and TrendChart will plot every point on a stacked array chart
  - Example, used OVW to gather GP and zIIP utilization with DDF Response Time
By changing chart type, and Y Axis Values, chart can by made more useful to show relevant data

- In this case, response time increased as GP utilization rose, no corresponding increase in zIIP time
  
  • Change in application mix?
Modifying Open RMF Overview Spreadsheet

- Columns can be added to either the Data tab or the TrendData tabs to do calculations on existing data.
- Useful for calculating CPU/Tran, Capture ratios, etc.
- Calculations can be saved in Spreadsheet, so that as new data is collected, calculations are automated.
CICS CPU/Transaction Example

- The following data was pulled to calculate CPU/Transaction for CICS
  - OVW(CPURCICS(APPLPER(R.CICREG1.1)))
  - OVW(TOTRCICS(TRANSTOT(R.CICREG1.1)))
  - OVW(TOTSCICS(TRANSTOT(S.CICS.1)))
  - OVW(CPUSSRVR(APPLPER(S.SRVRS.1)))

<table>
<thead>
<tr>
<th>CPURCICS</th>
<th>TOTRCICS</th>
<th>TOTSCICS</th>
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</table>
Manual Calculation from Data

- Use data pulled from previous page to calculate and graph CPU/Tran.
  - Calculation: \(=((\text{APPL}\% / 100) \times (60 \times 15)) / \text{Ended Transaction}\)

<table>
<thead>
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Summary

- **Overview Records** are a powerful way to pull specific information from RMF without needing to run and analyze complete reports
  - Allow for easier combination of different data points from different reports to tell a complete story

- **The RMF Spreadsheet Reporter**, included with RMF, allows for rapid gathering and reporting of RMF Overview Data
  - Pre-built Overview Report Spreadsheets may satisfy most Customer reporting needs
  - “Open RMF Overview Spreadsheets” can report on any set of Overview records to allow customized reporting

- **All possible RMF Overview Conditions** are documented in the RMF User's Guide
  - Use the copy for your z/OS version to avoid using new conditions not supported in older z/OS releases
Questions?