z/OS Workload Management Update for z/OS V1.13 and V1.12

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Session 10009
Agenda

- Transaction Management Enhancements
  - Non Shell Enclave Server Management
  - CICS Region / Response Time Management
  - Response Time Distribution for Execution Velocity Goals
- Hiperdispatch APARs
- WLM Support for I/O Priority Manager in DS8K Series
- WLM Support for IBM zEnterprise 196
- Temporary Capacity Reporting via SYSEVENT REQLPDAT
- z/OSMF Workload Management
- WLM support for Unified Resource Manager
- Capacity Provisioning Update Summary
- WLM Tools Overview
WLM Enclaves – An Overview

- An **enclave** is a transaction that can span multiple dispatchable units (SRBs and tasks) in one or several address spaces and is reported on and managed as one unit.
- The enclave is managed separately from the address spaces it runs in.
  - CPU and I/O resources associated with processing the transaction represented by the enclave are managed by the transaction’s performance goal.
  - Storage (MPL level, paging) of the address space is managed to meet the goals of the enclaves it serves (if enclave server address space) or to the performance goal of the address space (if no server address space).
WLM Enclave Server Address Spaces
A Short Retrospective

- An address space becomes an enclave server when
  - An enclave SRB issues SYSEVENT ENCASSOC
  - A TCB of the address space joins an enclave, and does not specify ENCLAVESERVER=NO (which is typically not the case)

- Assumption (Programming Model)
  - All work being executed within the address space is related to enclaves
  - That means
    - There is no significant amount of work (TCBs) executing in such address spaces which is not related to enclaves

- Enclave Server Management
  - CPU and I/O DP is derived from service class of most important enclave
    - Meaning: No CPU and I/O management exists for these server address spaces
  - Storage management is done to meet the served enclave's goals
WLM Enclave Server Management Changes with z/OS 1.12

- New IEAOPT Parameter
  - **ManageNonEnclaveWork = {No|Yes}**

  - **Yes**: Work in the address space, that is not associated to an enclave, is managed towards the goals of the external Service Class to which the address space has been classified to
  - **No**: Non enclave work is managed based on the most important enclave

- Enclave (Queue) server address spaces in which no enclave is running will be managed as regular address spaces

- **Note**: With ManageNonEnclaveWork =Yes the importance and goal of the service class for the address space is more important than it used to be
  - Verify goal settings for server address spaces
OA35428: Runtime Environment and Problem Symptoms
CICS Transaction Environment (No other workload is present)

• Scenario
  • System: 2097-764, 1 LPAR only → 8 nodes with 4 High processors each
  • Workload: Websphere → CICS → DB2
    • Websphere receives work, sends it to CICS TORs which send it to AORs which execute DB2 calls
    • Classification: Websphere Imp=2 and all CICS Imp=3, managed towards response time goals
  
  • Problem: Low system throughput; relatively high response times. System utilization did not exceed 80%
  • Notes:
    • In this scenario, the presence of Websphere is not important because Websphere feeds only CICS
    • It is important that no work (such as batch) exists that could be displaced when the system gets saturated
    • Therefore the same scenario exists for environments which only run a CICS workload
OA35428: Problem Analysis and Circumvention

- Problem Analysis
  - TORs and AORs run at the same dispatch priority
  - TORs need to wait too long to receive work and return results to the caller
  - AORs consume too much CPU
  - Hiperdispatch can amplify the situation because it runs the work at higher utilization on nodes with typically 4 processors
- Circumvention:
  - Move TORs to a service class with higher importance than AORs
  - How can this be done?
    - Possibility 1: Exempt all regions from being managed by response time goals and classify TORs to a service class with higher importance than AORs
    - Possibility 2: Exempt only AORs and move them to a service class with lower importance than the CICS service classes with response time goals
  - Disadvantage: No response time data present or only covers a small portion of the execution path because AORs consume much more than TORs.
• Adjust WLM management to a “Work Manager/Consumer” model
  • A TOR is a region which consumes typically little CPU and just functions as a work receiver and result sender.
    • This is the work manager
    • It needs fast access to CPU
  • An AOR is a server region which typically is much more resource intensive.
    • An AOR doesn’t require the same instantaneous access to CPU than TORs
    • This is the work consumer

• WLM already has experience with such models
  • Websphere Application Server and DB2/DDF work
    • The control regions are managed towards execution velocity goals
    • The work is managed towards response time goals (via enclaves and the servers processing the enclaves are tight to their goals)

• Use the same model also for CICS work
OA35428: Enhancement of WLM Management
Solution to solve the Work Manager/Consumer Model

• Implementation introduce a new option “BOTH”
  • Can be used to classify the CICS TOR Regions
    • For TORs:
      • Use BOTH for “Manage Regions by Goals Of”
      • Define a STC service class for TORs which has a higher importance than the CICS service class with response time goals for the CICS work and AORs
    • For AORs:
      • Stay with TRANSACTION (default)

• Result
  • WLM will manage the TORs towards the goals of the STC service class
  • And WLM will ensure bookkeeping of transaction completions to the correct CICS response time service class

  • The CICS transactions are managed towards CICS response time goals and the AORs are also managed towards these goals like today
  • All reporting capabilities remain as today
OA35428: New WLM Management Option
Structure of Service Classes

- TORs are now managed towards the goal of the service class CICSTOR
  - They still report their transaction completions for management
- AORs are still managed towards the goals of the CICS service classes and the consumption of the internal service class for the region
- Recommendation: CICSTOR should be defined at a higher importance than the CICS service classes
OA35428: New WLM Management Option
Using Option “BOTH”

- Example of using the new option “BOTH” on the classification panel

<table>
<thead>
<tr>
<th>Subsystem-Type</th>
<th>Xref</th>
<th>Notes</th>
<th>Options</th>
<th>Help</th>
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<tr>
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<td>Command == &gt;</td>
<td>scroll == &gt;</td>
<td>PAGE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subsystem Type : : JES  Fold qualifier names?  Y (Y or N)
Description : : Batch Work

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

Action Type Name Start Storage Manage Region
---------- Qualifier ------- Critical Using Goals Of
--- 1 TN CICSTOR* ___ NO BOTH
--- 1 TN CICSAOR* ___ NO TRANSACTION
--- 1 TN CICS* ___ NO TRANSACTION

**************************************** BOTTOM OF DATA ****************************************
OA35428: WLM Management Summary
Options for managing CICS work

1. CICS managed by Response Time Goals
   - All Regions defined as managed towards TRANSACTION goals
     - Existing Method
     - Works well for most environments
       - Older CICS environments which do not have Multi Region Option
       - All environments which are not exclusively CICS workload
       - All environments which don’t have any problem

2. CICS managed by Region Goals
   - If response time goals have not been defined all CICS regions are managed towards REGION goals (exempted from transaction management)
     - Existing Method
     - Works also well for most environments
       - But: Execution velocity goals are more sensitive to hardware and software changes
       - Usually no transaction reporting available
         - This can be enabled for report classes but requires additional definitions

3. CICS managed by Region and Response Time Goals
   - CICS TORs defined as managed towards BOTH goals
   - CICS AORs defined as managed towards TRANSACTION goals
     - New Method introduced with OA35428
     - Works well for most environments too
       - But: Avoids disadvantages of method 2
Response Time Distribution for Velocity Goals (z/OS V1.13)

- Currently WLM reporting does not provide a response time distribution (ended transactions) for workloads with velocity goals

- But it is desirable to have a response time distribution for all transactional workloads, even if they have a velocity goal
  - More data to analyze workload behavior and to detect problems
  - Better support for migration of goal definitions to response time goals

- With z/OS V1.13
  - the IWMRCOLL answer area IWMWRCAA provides also a response time distribution for service class periods with an execution velocity goal,
  - the RMF Postprocessor Workload Activity report (WLMGL) displays the new response time distributions
  - Response Time distributions also added to SMF 99 subtype 2 data
Response Time Distribution for Velocity Goals
The Mid-Point Change Algorithm

- Rationale
  - Velocity goals do not have a “reference“ response time
  - The mid-point (MP) should be set to values which accurately reflect the current workload conditions
  - These conditions may drastically change from time to time, but WLM expects them to be consistent for a time long enough, so that it can compute sensible mid-point (MP) values

- Algorithm
  - The model behind the algorithm is a gaussian RT distribution, with \( d = M/3 \) (\( M \) is the mean, \( d \) is the standard deviation). Ideal would be \( MP = M \)
  - If a trx response time fulfills \( MP/3 \leq RT \leq MP*3 \) counter \( C \) is decreased by a value that reflects the distance of RT to the MP
  - If a trx response time does not fulfill \( MP/3 \leq RT \leq MP*3 \) counter \( C \) is increased by a value that reflects the distance of RT to the MP
  - If counter \( C \) becomes greater than a threshold, a new mid-point is calculated

This is the ideal case:

The mid-point set by WLM is strictly equal to the average response time (\( M \)) of the transactions, so we get a recognizable gaussian distribution
**Response Time Distribution for Velocity Goals**

**RMF WLMGL Enhancement**

**REPORT BY:** POLICY=POLICY01 WORKLOAD=STC SERVICE CLASS=STCDEF RESOURCE GROUP=*NONE PERIOD=1 IMPORTANCE=5

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<thead>
<tr>
<th>CRITICAL</th>
<th>TRANSACTIONS</th>
<th>TRANS-TIME</th>
<th>HHH.MM.SS.TTT</th>
<th>--DASD I/O--</th>
<th>--SERVICE--</th>
<th>SERVICE TIME</th>
<th>--APPL %--</th>
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<td>HSP 0.0</td>
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**GOAL:** EXECUTION VELOCITY 20.0% VELOCITY MIGRATION: I/O MGMT 88.2% INIT MGMT 88.2%

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<th>SYSTEM</th>
<th>RESPONSE TIME</th>
<th>VEL%</th>
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<th>ADRSP</th>
<th>--EXEC USING%--</th>
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<th>UNK IDL</th>
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**---------RESPONSE TIME DISTRIBUTIONS--------**

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<td>-------PERCENT------</td>
<td>HH.MM.SS.TTT</td>
<td>--NUMBER OF TRANSACTIONS--</td>
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<td>IN BUCKET</td>
<td>581</td>
<td>IN BUCKET</td>
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Response Time Distribution for Velocity Goals
IWMRCOLL enhancements for Service and Report Class Periods

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<th>Section</th>
<th>Field</th>
<th>Response time goals</th>
<th>Execution velocity goals</th>
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<td>RCAEIMID (mid-point in</td>
<td>Same as goal value (milliseconds)</td>
<td>0 after policy activation/refresh/IPL</td>
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<tr>
<td>(RCAE period</td>
<td>milliseconds)</td>
<td></td>
<td>New value computed when WLM detects that current workload</td>
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<tr>
<td>header)</td>
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<td></td>
<td>distribution deviates too much from RCAEIMID for a too long time</td>
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<tr>
<td></td>
<td>RCAEIRCT (running</td>
<td>N/A (value always 0)</td>
<td>Total number of RCAEIMID changes since last policy activation</td>
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<tr>
<td></td>
<td>count)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RCAEITST (timestamp of</td>
<td>Policy activation time</td>
<td>Time of last RCAEIMID change or time of last policy activation</td>
</tr>
<tr>
<td></td>
<td>last change)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCAEDIST</td>
<td>RCAEDENT</td>
<td>No change Distribution centered around goal value</td>
<td>Centered around RCAEIMID Reset after each RCAEIMID change</td>
</tr>
</tbody>
</table>

- **RCAEIRCT**
  - Is reset to 0 after each policy activation/refresh/IPL
  - Is incremented each time the report class period becomes heterogeneous (when RCAEPLSC and RCAEPMCI are updated)
  - Is incremented each time a transaction is reported with a new mid-point/timestamp
- The 14 buckets of the report class period's response time distribution are reset to 0 when RCAEIRCT is updated
- RCAEIMID is copied from the current service class period's RCAEIMID each time the report class period's RCAEIRCT is incremented
- RCAEITST is copied from the current service class period's RCAEITST each time the report class period's RCAEIRCT is incremented
### Transaction Management Enhancements: Availability

<table>
<thead>
<tr>
<th>Function</th>
<th>z/OS V1.13</th>
<th>z/OS V1.12</th>
<th>z/OS V1.11</th>
<th>z/OS V1.10</th>
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<tr>
<td>CICS Region/RT Management</td>
<td>+</td>
<td>OA35428</td>
<td>OA35428</td>
<td>OA35428</td>
</tr>
<tr>
<td>RT Distribution for Execution Velocity Goals</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Enclave Server Management**
  - Is enabled via OPT parameter ENCLAVESERVER=YES
- **CICS Region/RT Management**
  - OA35248 supersedes OA34801
    - OA34801 was a temporary solution introduced for a customer to maintain response time reporting while temporarily moving from response time to region management
    - OA34801 introduced a new OPT parameter REPORTCOMPLETIONS={YES|NO}—
      - With OA35428 and with z/OS 1.13 WLM will still accept the new OPT parameter but the reporting functionality introduced by OA34801 is no longer supported.
Agenda

- Transaction Management Enhancements
  - Non Shell Enclave Server Management
  - CICS Region / Response Time Management
  - Response Time Distribution for Execution Velocity Goals

- Hiperdispatch APARs

  - WLM Support for I/O Priority Manager in DS8K Series
  - WLM Support for IBM zEnterprise 196
  - Temporary Capacity Reporting via SYSEVENT REQLPDAT
  - z/OSMF Workload Management
  - WLM support for Unified Resource Manager
  - Capacity Provisioning Update Summary
  - WLM Tools Overview
OA36549: Problem Description

- Very constant load – especially on smaller partitions – can result in an oscillation effect of parking and unparking low processors
- Result: A significant response time increase can be observed (especially for OLTP work)
## Hiperdispatch related WLM APARs

<table>
<thead>
<tr>
<th>APAR</th>
<th>Description</th>
<th>Close Date</th>
<th>Affects</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA35428</td>
<td>Introduces new option to manage CICS environments in a work receiver/consumer model</td>
<td>09/2011</td>
<td>Installation running CICS-only workloads Can be amplified by Hiperdispatch</td>
</tr>
<tr>
<td>OA35860</td>
<td>Correct calculation of CEC free capacity. At the moment the CPU consumption of the <em>PHYSICAL</em> partition is not included. This can lead to too many “unpark” operations under seldom cases.</td>
<td>06/2011</td>
<td>Systems with high <em>PHYSICAL</em> time</td>
</tr>
<tr>
<td>OA35989</td>
<td>Correct overflow condition of CEC free capacity</td>
<td>05/2011</td>
<td>Small systems running on big CECs with very high unused capacity</td>
</tr>
<tr>
<td>OA36459</td>
<td>Modify PARK/UNPARK algorithm to become more sensitive for smaller partitions</td>
<td>10/2011</td>
<td>Smaller partitions at low CEC utilizations</td>
</tr>
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</table>

- **HIPERDISPATCH=YES**
  - **Will be the default when running z/OS 1.13 on z196 or above**
  - Older releases will still have NO as default even on z196
Agenda

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- Hiperdispatch APARs

- WLM Support for I/O Priority Manager in DS8K Series

- WLM Support for IBM zEnterprise 196

- Temporary Capacity Reporting via SYSEVENT REQLPDAT

- z/OSMF Workload Management

- WLM support for Unified Resource Manager

- Capacity Provisioning Update Summary

- WLM Tools Overview
WLM Support for I/O Priority Manager in DS8K Series

- WLM collaborates with the I/O Priority Manager in DS8700 & DS8800 storage servers.
- WLM sends I/O Priority Manager information about the goal fulfillment and importance of z/OS workloads (service classes).
- Passing these performance parameters to the storage server enables the I/O Priority Manager to determine which I/O requests are more important than others and which I/O requests need to be processed faster to fulfill the performance goals defined for the corresponding workload in z/OS.
- Using the passed information from WLM, the I/O Priority Manager throttles I/O requests of workloads which exceed their goals to help I/O requests of workloads which do not fulfill their goals.
- New IEAOPT parameter `STORAGESERVERMGT={YES|NO}`
WLM Support for I/O Priority Manager in DS8K Series

Goal Achievement Data

- WLM derives goal achievement data for service class periods as follows
  - Response Time goal:
    - Importance of period
    - Goal Achievement Value is derived from Performance Index (PI)
      → Dynamic management considering goal achievement of service class
  - Velocity goal:
    - Importance of period
    - Velocity level
      → Static management considering specified goal of service class
  - System service classes
    - Importance: 0
    - Goal Achievement Value: 0 (no monitor)
      → No management
  - Discretionary goal:
    - Importance: 6
    - Goal Achievement Value: 1
      → Static management considering goal type
  - I/O Priority Manager assigns I/O request a Performance Class corresponding to the passed Goal Achievement Data
  - Each Performance Class is associated with a certain maximum throttling level

<table>
<thead>
<tr>
<th>Performance Index</th>
<th>Goal Achievement Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI &lt;= 0.5</td>
<td>1 (significantly overachieve)</td>
</tr>
<tr>
<td>0.5 &lt; PI &lt;= 0.7</td>
<td>2 (overachieve)</td>
</tr>
<tr>
<td>0.7 &lt; PI &lt;= 0.9</td>
<td>3 (slightly over achieve)</td>
</tr>
<tr>
<td>0.9 &lt; PI &lt; 1.4</td>
<td>4 (achieve)</td>
</tr>
<tr>
<td>1.4 &lt;= PI &lt; 2.5</td>
<td>5 (slightly under achieve)</td>
</tr>
<tr>
<td>2.5 &lt;= PI &lt; 4.5</td>
<td>6 (under achieve)</td>
</tr>
<tr>
<td>PI &gt;= 4.5</td>
<td>7 (significantly under achieve)</td>
</tr>
</tbody>
</table>

Importance = 2, PI = 1.9

Performance Class = 3
WLM Support for I/O Priority Manager in DS8K Series

Throttling

- I/O Priority Manager
  - impacts how long an I/O request has to wait for access to the volume
  - does not impact an I/O request if it is served from the storage server cache
  - induced throttling delays are reported as CU Queue Time

- WLM excludes CU Queue Time when calculating I/O delays for service class periods with velocity goal to avoid oscillations of the performance index
  - If WLM support for I/O Priority Manager is turned on, you may have to adjust the velocity goals if you have significant CU Queue Times in your environment
WLM Support for I/O Priority Manager in DS8K Series
Availability

<table>
<thead>
<tr>
<th>Function</th>
<th>z/OS V1.13</th>
<th>z/OS V1.12</th>
<th>z/OS V1.11</th>
<th>Older Releases</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLM Support for I/O Priority Manager in DS8000 series</td>
<td>OA32298</td>
<td>OA32298</td>
<td>OA32298</td>
<td></td>
</tr>
</tbody>
</table>

- The I/O Priority Manager feature is associated with DS8K R6.1.5 and is not available externally until Sept 30, 2011
Agenda

- Transaction Management Enhancements
  - Non Shell Enclave Server Management
  - CICS Region / Response Time Management
  - Response Time Distribution for Execution Velocity Goals
- Hiperdispatch APARs
- WLM Support for I/O Priority Manager in DS8K Series
- WLM Support for IBM zEnterprise 196
- Temporary Capacity Reporting via SYSEVENT REQLPDAT
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WLM Support for IBM zEnterprise 196

- IBM zEnterprise 196 (z196)
  - STSI instruction no longer returns the alternate CPU capability
    - CPU adjustment factors are now calculated based on the Model Capacity Ratings by the machine
  - Supplies additional information about speed change
  - Speed changes may occur due to model changes (*capacity level*), or to physical processor tact (*cycle steering*)

- WLM
  - uses the new MSU values to calculate pricing adjustment factors
  - introduces message IWM064I to explain the reason for a processor speed change
  - makes new HW information available via public data areas IRARCT, IRARMCT, IRARMCTZ and via SYSEVENT QVS
WLM Support for IBM zEnterprise 196
New Message IWM064I

• Existing Message:

  IWM063I WLM POLICY WAS REFRESHED DUE TO A PROCESSOR SPEED CHANGE

• Depending on the reason for the speed change one of the following messages will be issued on *when running on z196 or later* hardware:

  • IWM064I THE SYSTEM IS RUNNING AT NOMINAL CAPACITY.
  • IWM064I THE SYSTEM IS RUNNING AT NOMINAL CAPACITY; MODEL CONVERSION OCCURRED.
  • IWM064I THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A MANUAL CONTROL SETTING.
  • IMM064I THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A MACHINE EXCEPTION CONDITION.
  • IWM064I THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A NON-EXCEPTION MACHINE CONDITION.
  • IWM064I THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF AN EXCEPTION CONDITION EXTERNAL TO THE MACHINE.
WLM Support for IBM zEnterprise 196
Speed Values and MSU calculation

- RCTPCPUA
  - Existing adjustment factor for software pricing
  - Based on STSI alternate capacity value and alternate capacity MP factor table
  - Only valid value for all systems prior to z196 (z10, z9, etc…)
  - Does not allow to depict all possible MSU values precise enough
  - Still contained and updated for compatibility reasons for newer processors

- RCTPCPUA_actual and RCTPCPUA_Scaling
  - New adjustment factor for software pricing
  - Based on new STSI information for software pricing
  - Only valid for all new systems (z196 and future)
  - Allows to depict any possible MSU value

- RCTPCPU_nominal and RCTPCPUA_Scaling
  - Represents the capacity the system may have
  - If this deviates from RCTPCPUA_actual/RCTPCPUA_scaling then the actual system runs with reduced capacity

\[
\text{MSU(old)} = \frac{57600 \cdot \#\text{cps}}{\text{RCTPCPUA}}; \quad \text{MSU(new)} = \frac{57600 \cdot \#\text{cps} \cdot \text{RCTPCPUA}_{\text{actual}}}{\text{RCTPCPUA}_{\text{actual}}}
\]
WLM Support for IBM zEnterprise 196
Extended Data Areas

- **IRARCT**
  - RCTPCPUA; RCTPCPUA_actual; RCTPCPUA_nominal; RCTPCPUA_scaling
    - See previous chart

- **IRARMCTZ**
  - RMCTZ_Capacity_Change_Time
    - Time when the capacity was last changed
  - RMCTZ_Capacity_Adjustment_Indication
    - When zero, the indication is not reported. When in the range 1-99, some amount of reduction is indicated. When 100, the machine is operating at its normal capacity. Primary CPUs and all secondary-type CPUs are similarly affected
  - RMCTZ_Capacity_Change_Reason
    - Indicates the reason which is associated with the present value contained in RMCTZ_Capacity_Adjustment_Indication
  - RMCTZ_CAI_IPL
    - Capacity adjustment indication at IPL
  - RMCTZ_CCR_IPL
    - Capacity change reason at IPL
  - RMCTZ_nominal_CPM
    - Nominal CPU adjustment factor (similar to RMCTCPMP but for nominal speed)
WLM Support for IBM zEnterprise 196
Changed APIs

• Sysevent QVS: (IRAQVS and IWMQVS.H) QVSCECCapacityStatus
  (possible values):

<table>
<thead>
<tr>
<th>Constant</th>
<th>Mnemonic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>QvsCecCapStatUnndef</td>
<td>QvsCecCapacityStatus is undefined (not supported by hardware)</td>
</tr>
<tr>
<td>1</td>
<td>QvsCecCapStatNominal</td>
<td>Machine is running at nominal capacity</td>
</tr>
<tr>
<td>2</td>
<td>QvsCecCapStatRedIntentional</td>
<td>Machine is running with reduced capacity due to a manual control setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e.g. power saving mode, customer initiated)</td>
</tr>
<tr>
<td>3</td>
<td>QvsCecCapStatRedMachEx</td>
<td>Machine is running with reduced capacity due to a machine exception condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e.g. cooling problem)</td>
</tr>
<tr>
<td>4</td>
<td>QvsCecCapStatRed MachNonEx</td>
<td>Machine is running with reduced capacity due to a machine non-exception</td>
</tr>
<tr>
<td></td>
<td></td>
<td>condition (e.g. firmware update)</td>
</tr>
<tr>
<td>5</td>
<td>QvsCecCapStatRed EnvCond</td>
<td>Machine is running with reduced capacity due to an exception condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>external to the machine (e.g. ambient temperature exceeded specified maximum)</td>
</tr>
</tbody>
</table>

• IWMRCOLL
  • IWMWRCAA
    - RCAADJCCPU        CPU adjustment factor
    - RCAADJCCPUNOM    Nominal CPU adjustment factor
    - RCAADJJCCEC      CEC adjustment factor
### WLM Support for IBM zEnterprise 196

**SMF70 Enhancements**

#### SMF record type 70 subtype 1 (CPU Activity) – CPU control section

<table>
<thead>
<tr>
<th>Offset</th>
<th>Name</th>
<th>Length</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>204 xCC</td>
<td>SMF70NCR</td>
<td>4</td>
<td>Binary</td>
<td>Nominal model-capacity rating in MSU/hour. When non-zero, this value is associated with the nominal model capacity as identified in field SMF70MDL. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MCR.</td>
</tr>
<tr>
<td>208 xD0</td>
<td>SMF70NPR</td>
<td>4</td>
<td>Binary</td>
<td>Nominal permanent model-capacity rating. When non-zero, this value is associated with the nominal permanent model capacity as identified in field SMF70MPC. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MPR.</td>
</tr>
<tr>
<td>212 xD4</td>
<td>SMF70NTR</td>
<td>4</td>
<td>Binary</td>
<td>Nominal temporary model-capacity rating. When non-zero, this value is associated with the nominal temporary model capacity as identified in field SMF70MTC. When field SMF70CAI contains a value of 100, this value equals the value in field SMF70MTR.</td>
</tr>
<tr>
<td>216 xD8</td>
<td>SMF70CAI</td>
<td>1</td>
<td>Binary</td>
<td>Capacity-adjustment indication. When zero, the indication is not reported. When in the range from 1 to 99, some amount of reduction is indicated. When 100, the machine is operating at its normal capacity. Temporary capacity changes that affect machine performance (for example, CBU or OOCoD) are not included.</td>
</tr>
<tr>
<td>217 xD9</td>
<td>SMF70CCR</td>
<td>1</td>
<td>Binary</td>
<td>Capacity-change reason. Valid if SMF70CAI is non-zero. When 0, no capacity change took place. When 1, the capacity change is due to the setting of a manual control. When greater than 1, the capacity change is due to an internal machine condition or due to an external machine exception.</td>
</tr>
</tbody>
</table>
## WLM Support for IBM zEnterprise 196 SMF72 Enhancements

SMF record type 72 subtype 3 (Workload Activity) – Workload manager control section

<table>
<thead>
<tr>
<th>Offset</th>
<th>Name</th>
<th>Length</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>172 xAC</td>
<td>R723MADJ</td>
<td>4</td>
<td>Binary</td>
<td>Adjustment factor for CPU rate</td>
</tr>
<tr>
<td>248 xF8</td>
<td>R723NADJ</td>
<td>4</td>
<td>Binary</td>
<td>Nominal adjustment factor for CPU rate</td>
</tr>
</tbody>
</table>
# WLM Support for IBM zEnterprise 196: Availability

<table>
<thead>
<tr>
<th>Function</th>
<th>z/OS V1.13</th>
<th>z/OS V1.12</th>
<th>z/OS V1.11</th>
<th>z/OS V1.10</th>
<th>z/OS V1.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>New message IWM064I API enhancements</td>
<td>+</td>
<td>OA30968</td>
<td>OA30968</td>
<td>OA30968</td>
<td></td>
</tr>
<tr>
<td>New MSU computation</td>
<td>+</td>
<td>OA30968</td>
<td>OA30968</td>
<td>OA30968</td>
<td>OA30968</td>
</tr>
<tr>
<td>New Programming Interface (IRARMCTZ)</td>
<td>+</td>
<td>+</td>
<td>OA31201</td>
<td>OA31201</td>
<td></td>
</tr>
</tbody>
</table>
Agenda

- Transaction Management Enhancements
  - Non Shell Enclave Server Management
  - CICS Region / Response Time Management
  - Response Time Distribution for Execution Velocity Goals
- Hiperdispatch APARs
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- WLM Support for IBM zEnterprise 196
- Temporary Capacity Reporting via SYSEVENT REQLPDAT
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- WLM support for Unified Resource Manager
- Capacity Provisioning Update Summary
- WLM Tools Overview
Temporary Capacity Reporting via SYSEVENT REQLPDAT

• SYSEVENT REQLPDAT was changed to return capacity information about IBM z10 (and later) capacity settings:
  • permanent capacity information
    • The base capacity of the machine
  • temporary capacity data
    • Replacement Capacity: Capacity Backup (CBU), or Planned Event (CPE)
    • Additional Capacity: On/Off Capacity on Demand (OOCoD)
  • The differentiation is relevant for potential license cost or entitlement impact
Temporary Capacity Reporting via SYSEVENT REQLPDAT

- **IRALPDAT new data fields**
  - **LPDATMODELCAPIDENT**
    - The 16-character EBCDIC model-capacity identifier of the configuration.
  - **LPDATMODEL**
    - The 16-character EBCDIC model identifier of the configuration. If not valid, field LPDatModelCapIdent represents both the model-capacity identifier and the model.
  - **LPDATMODELPERMCAPIDENT**
    - The 16-character EBCDIC model-permanent capacity identifier of the configuration.
  - **LPDATMODELTMPCAPIDENT**
    - The 16-character EBCDIC model-temporary capacity identifier of the configuration.
Temporary Capacity Reporting via SYSEVENT REQLLPDAT

- **IRALLPDAT new data fields**
  - **LPDATMODELCAPRATING**
    - When non-zero, an unsigned integer ("MSU rating") as identified by the model-capacity identifier. There is no formal description of the algorithm used to generate this integer.
  - **LPDATMODELPERMCAPRATING**
    - When non-zero, an unsigned integer ("MSU rating") as identified by the model-permanent-capacity identifier.
  - **LPDATMODELTEMPPCAPRATING**
    - When non-zero, an unsigned integer ("MSU rating") as identified by the model-temporary-capacity identifier.
Agenda

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- WLM Support for IBM zEnterprise 196

- Temporary Capacity Reporting via SYSEVENT REQLPDAT

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- WLM support for Unified Resource Manager

- Capacity Provisioning Update Summary

- WLM Tools Overview
z/OSMF Workload Management
The new WLM Control Center in z/OSMF V1.12

- Policy editor
  - Simplified creation and editing of WLM policies supported by best practice checks
  - Support for review and investigation of WLM policies

- Policy repository
  - WLM policies are stored in a repository integrated in the z/OSMF file system
  - Policies can be exported to the local workstation or a host data set as well as imported from a file or a host data set
  - Policies or best-practice recommendations can be printed for further study
  - Integrated operation history makes manual tracking superfluous

- Installation and activation of WLM policies
- Monitoring of the WLM status in the sysplex
- Administration and operation tasks can be performed simultaneously
  - Simplified migration: Policy elements can be copied from one service definition to another
  - Simplified operation: You can start to edit a policy, interrupt the editing to activate a policy, and then continue with the editing without loosing the context

- z/OSMF Workload Management synchronizes automatically with z/OS WLM
- Different authorization levels: View, Install, Modify (V1.13)
z/OSMF Workload Management Service Definition Repository

- Integrated repository for service definitions
- Service definitions can be
  - Imported
  - Exported
  - Printed
  - Viewed or edited
  - Created or Copied
  - Installed on the sysplex
- Indications
  - If service definition is installed and active
  - If service definitions are being viewed or edited
  - If messages exist for a service definition

Click to view, edit, print, install a service definition

Store all service definitions in one repository
z/OSMF Workload Management
Editing Service Definitions

- Simplified creation, modification and review of service definitions
  - Policy elements are presented in tables
  - Tables can be filtered and sorted
  - Direct editing of policy elements within tables
  - Best-practice hints are displayed automatically while specifying policy elements
  - Several service definitions can be opened simultaneously
  - Cut, Copy, Paste of policy elements between service definitions

Best-practice hints help to optimize service definitions

Click to copy element on clipboard for insertion into another service definition

Click to check where the element is used
z/OSMF Workload Management
The new WLM Control Center in z/OSMF V1.12

A complete overview is presented in session 10012

Manage your Workloads and Performance with z/OSMF
Thursday, August 11, 2011: 3:00 PM – 4:00 PM
Agenda

- Transaction Management Enhancements
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- WLM Support for IBM zEnterprise 196

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- WLM Tools Overview
zEnterprise Ensembles

• Ensemble
  • A zEnterprise Ensemble is a collection of zEnterprise Nodes managed as a single virtualized pool of server resources
    • Native LPAR and z/VM Virtual Images
    • Power VM Virtual images
    • IBM Smart Analytics Optimizer for DB2
  • A zEnterprise Node can be a member of at most one Ensemble

• zEnterprise Unified Resource Manager
  • allows for the management and optimization of a zEnterprise Ensemble as a single resource pool
  • System z Hardware Management Console (HMC) is management console
  • Ensemble-wide scope of responsibility
zEnterprise Platform Performance Manager

- Platform management component responsible for goal-oriented resource monitoring, management, and reporting across the zEnterprise Ensemble
  - Core component responsible for definition and implementation of goal-oriented management policy
  - Workload monitoring and reporting based on management policy
  - Extend goal oriented approach of z/OS WLM to platform managed resources
  - Orchestration of autonomic management of resources across virtual servers
    - Provide Intelligent Resource Director like function across the zEnterprise
    - Management functions will evolve over time
  - Pushes management directives to the Support Element, Hypervisors, and OS agents as required across the zEnterprise

- Integration of HMC console support
  - Integrated UI for monitoring, display of workload topology relationships, status alerts, etc.
  - Definition of Performance Management Goals and Policy Administration
- Functionality integrated into the zEnterprise Unified Resource Manager
  - Code structured and packaged as System z firmware
  - Inter-Component communication over trusted internal platform management network
zEnterprise Platform Performance Manager
Resource management based on understanding of overall workload flow

- Applications / middleware has to be instrumented with ARM – Application Response Measurement (Open Group Standard) to collect transaction statistics
  - Enables to monitor the flow of transactions
  - Enables to monitor transaction response times and processing statistics

- OS Agent – guest platform management provider (GPMP)
  - is required to identify individual units of work
  - collects data about processes / address spaces and transactions
  - passes data to Platform Performance Manager
  - On z/OS the data is collected by WLM
Unified Resource Manager Workload Performance Policy

- Defines performance goals for virtual servers in a workload
  - Conceptually similar to simplified z/OS WLM Policy
- Provides basis for monitoring and management of platform resources used by virtual servers in a Workload
- Workload to performance policy relationship:
  - A Workload can have multiple performance policies associated with it
  - Single policy is active at a given time
  - Can dynamically change the policy that is active
    - Through the UI
    - Through a timed based schedule
      - Example: Day shift policy / night shift policy

**Workload Performance Policy**

- Name: Payroll_night_shift
- Importance: High

**Service Class**

- Name: Payroll_1
- Performance goal: Velocity – Fast
- Importance: Very High

**Classification Rule**

- Virtual Server Name = SRV1

**Classification Rule**

- Host Name = sys2.us.ibm.com

...
WLM support for Unified Resource Manager

- The *guest platform management provider* (GPMP) is the interface between the Unified Resource Manager and the z/OS Workload Manager
- GPMP
  - passes to WLM information about the platform wide performance goals of workloads in which the z/OS is participating
  - sends data provided by WLM to the HMC for platform performance monitoring
    - Server configuration and high level performance statistics collected on z/OS
    - Aggregated transaction response time and resource data for the ARM-instrumented applications
- WLM
  - supports GPMP configuration and management by new WLM service definition options, commands, and messages
  - manages the GPMP address space (start, stop, and restart)
  - displays GPMP status information
  - collects and aggregates performance measurements for GPMP
WLM support for Unified Resource Manager Service Definition Enhancements for GPMP

• z/OS V1R12 introduces WLM functionality level LEVEL025 to support Unified Resource Manager and GPMP

• Unified Resource Manager Service Classes can be classified to WLM service and report classes by specifying classification rules for subsystem EWLM
  • Work qualifier ETC (EWLM transaction class name) is no longer supported
  • Work qualifier type ESC (EWLM service class name) is used to correlate Unified Resource Manager service classes with WLM service or report classes

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Qualifier</th>
<th>Name</th>
<th>Start</th>
<th>Service</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>ESC</td>
<td>ETC</td>
<td>Booking</td>
<td>___</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>___</td>
<td>ESC</td>
<td>ESC</td>
<td>System</td>
<td>9</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>___</td>
<td>ESC</td>
<td>ESC</td>
<td>GoldServ</td>
<td>15</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>___</td>
<td>ESC</td>
<td>ESC</td>
<td>ice</td>
<td>23</td>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>

• Although z/OS V1R12 simply disregards ETC classification rules, you have to delete them the next time you modify the EWLM subsystem type classification rules
  • Message IWMAM726 ETC is not a recognized qualifier type is displayed when pressing F3=Exit
  • Rows with ETC rules have to be deleted before F3 becomes successful
To configure GPMP

1) Select option 11 on the Definition Menu

2) Specify Guest Platform Management Provider settings

Specifies whether you want to start the GPMP address space automatically when a WLM policy is activated.

Specifies the systems in the sysplex on which the GPMP should not be started automatically.

After GPMP settings defined, functionality level changes to 25.
WLM support for Unified Resource Manager
GPMP Configuration and Management

- **On policy activation**
  - WLM checks whether the service definition has valid GPMP settings
  - If activate=yes and system name not specified on excluded-list, GPMP is started automatically

- Also, you can use the **MODIFY WLM** command
  - To start the GPMP on a system
  - To stop the GPMP on a system
  - Intended for recovery actions. Recommended is to manage GPMP through WLM

- Once you stopped the GPMP manually, the GPMP switches into “manual mode”. It is not automatically restarted even if a WLM policy with a valid GPMP configuration gets activated
  - Status maintained until next IPL
WLM support for Unified Resource Manager
GPMP related Commands

• Use the MODIFY WLM,GPMP command to start, stop, and modify the guest platform management provider:
  • F WLM,GPMP,START
    • Indicates that you want to start the GPMP
    ```
    16.55.59 WLMG      f wlm,gpmp,start
    16.55.59 WLMG STC00752 $HASP373 HVEMCA    STARTED
    16.55.59 WLMG STC00752 IEF403I HVEMCA - STARTED - TIME=16.55.59
    ```
  • F WLM,GPMP,STOP
    • Indicates that WLM stops the currently active GPMP instance
    ```
    17.03.39 WLMG      f wlm,gpmp,stop
    17.03.39 WLMG STC00753 IEF404I HVEMCA - ENDED - TIME=17.03.39
    17.03.39 WLMG STC00753 $HASP395 HVEMCA    ENDED
    ```
  • F WLM,GPMP,TRACE=NONE|LOW|MEDIUM|HIGH,DEST=FILE|MEmory
    • Enables you to change the GPMP internal tracing level “on the fly” and to change the destination of the trace (file or memory)
WLM support for Unified Resource Manager
GPMP related Commands

- DISPLAY WLM command extensions:

```
IWM025I 11.42.45  WLM DISPLAY 231
ACTIVE WORKLOAD MANAGEMENT SERVICE POLICY NAME: BASEPOL
ACTIVATED: 2010/02/18 AT: 12:57:55 BY: BMAI FROM: TRX2
DESCRIPTION: Base policy for system test
RELATED SERVICE DEFINITION NAME: Ralfpol
INSTALLED: 2010/02/18 AT: 12:57:48 BY: BMAI FROM: TRX2
WLM VERSION LEVEL:      LEVEL025
WLM FUNCTIONALITY LEVEL: LEVEL025
WLM CDS FORMAT LEVEL:    FORMAT 3
STRUCTURE SYSZWLM_WORKUNIT STATUS: CONNECTED
STRUCTURE SYSZWLM_EBAE2097 STATUS: CONNECTED
STATE OF GUEST PLATFORM MANAGEMENT PROVIDER (GPMP): ACTIVE
*SYSNAME*  *MODE*  *POLICY*  *WORKLOAD MANAGEMENT STATUS*
TRX1  GOAL  BASEPOL  ACTIVE
TRX2  GOAL  BASEPOL  ACTIVE

IWM075I 11.45.43  WLM DISPLAY 233
ARM SERVICES ARE ENABLED
GUEST PLATFORM MANAGEMENT PROVIDER JOBNAME=HUENC ASAID=0032
GPMP POLICY IS ACTIVE
NUMBER OF REGISTERED PROCESSES=3, APPLICATIONS=1
```

To display system and GPMP status information, enter:

```
D WLM,SYSTEMS,GPMP
```

To display whether ARM is enabled or disabled, enter:

```
D WLM,AM
```
WLM support for Unified Resource Manager
GPMP related Commands

- The existing **MODIFY WLM,AM=DISABLE|ENABLE** command is not changed, but the logic for DISABLE/ENABLE changed in the following way:

  - Disabling ARM (Application Response Measurement) will terminate a running GPMP
  - Manually starting the GPMP (using the MODIFY WLM,GPMP,START command) when ARM is disabled will result in message IWM078E
  - Activating a WLM policy that contains valid GPMP settings will not result in the start of a GPMP instance, if ARM is disabled
  - The state of the GPMP will be displayed as “DISABLED”, if ARM is disabled
  - If ARM is enabled again, the state of the GPMP will change to “STOPPED”. To start the GPMP again, it has to be started manually
WLM support for Unified Resource Manager

Prerequisites

- Hardware
  - z196 with zEnterprise Unified Resource Manager
  - Guest platform management provider on z/OS cannot be started on pre-z196 servers
    - If started on pre-z196 servers, message `IWM078E GUEST PLATFORM MANAGEMENT PROVIDER CANNOT BE STARTED, FUNCTION NOT AVAILABLE` is issued on the console

- Software
  - z/OS V1R12 and OA30928
  - For z/OS V1R10 and V1R11: OA30928
Agenda

- Transaction Management Enhancements
  - Non Shell Enclave Server Management
  - CICS Region / Response Time Management
  - Response Time Distribution for Execution Velocity Goals

- Hiperdispatch APARs

- WLM Support for I/O Priority Manager in DS8K Series

- WLM Support for IBM zEnterprise 196

- Temporary Capacity Reporting via SYSEVENT REQLPDAT

- z/OSMF Workload Management

- WLM support for Unified Resource Manager

- Capacity Provisioning Update Summary

- WLM Tools Overview
Capacity Provisioning Enhancements in z/OS V1.13

• Capacity Provisioning management enhancements
  • **Provisioning increments** allow for faster or more aggressive provisioning
  • **Recurring time condition** support allows to define recurring time windows
    • Allows to avoid ENABLE and DISABLE commands
  • Statement of Direction to withdraw support for the SNMP
    • z/OS BCPii is the recommend protocol

• Control Center Enhancements
  • Support the 32- and 64-bit versions of Microsoft Windows 7 Professional Edition

• **New with z/OSMF V1.13:**
  • Capacity Provisioning monitoring task
z/OS V1.13: Primary and secondary capacity quantum

- Up to z/OS 1.12 CPM increases capacity in small increments
  - On full speed models adding one processor at a time
- Starting with z/OS 1.13 CPM plans to support primary and secondary activation quantum
  - Primary quantum added for first activation on a given CPC
  - Secondary added on subsequent activations
  - Defined on “Maximum Provisioning Scope” Panels.
    - Only general purpose capacity supports primary and secondary quantum at this time.
  - Retrofit to z/OS V1.11, V1.12
z/OS V1.13: Recurring time conditions

- Previously the CPM policy supported only fixed time intervals
  - Defined by start date/time and end date/time
- Starting with z/OS 1.13 CPM plans to support (weekly) recurring time conditions
  - Defined by start date, end date, start time, end time and day of week to which it applies
- Plan to retrofit to z/OS V1.11, V1.12
Capacity Provisioning Support of zEnterprise 196 Static Power Save Mode

• Commands to disable or enable static power save mode:

  Syntax

  ```
  DISABLE POWERSAVE CPC=name
  ENABLE POWERSAVE CPC=name
  ```

• Existing reports are extended to report on power-save capability, and whether power-save mode can currently be enabled

  ```
  CPC R35 with record * is enabled (default enabled)
  CPC is matched with serial 000020089F25 since 07/23/2010 13:32:13
  Hardware is of type 2817 with model M49
  Current model is 722 with 2119 MSU, 1 zAAPs, and 1 zIIPs
  No usable 00CoD record available
  Power save mode is enabled
  ```

• If power-save mode cannot be re-enabled in current period: “Power save mode is disabled and not allowed”

• For CPCs supporting static power save mode the Provisioning Manager will not consider adding capacity based on the active policy while in power save mode
  • Already activated temporary capacity may be deactivated
  • ACTIVATE RESOURCE and DEACTIVATE RESOURCE commands are not affected by power save mode.

• Requires Automate version of the zEnterprise Unified Resource Management suite
  • CPC Power Saving setting must be “Custom”
  • Also see “Controlling IBM zEnterprise 196 Static Power Save Mode via MVS Capacity Provisioning Manager (CPM)” at [http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101869](http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP101869)
## Capacity Provisioning New Function Overview

<table>
<thead>
<tr>
<th>Function</th>
<th>V1.13</th>
<th>V1.12</th>
<th>V1.11</th>
<th>V1.10</th>
<th>V1.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity increments Recurring time conditions</td>
<td>+</td>
<td>OA35284</td>
<td>OA35284</td>
<td>OA35284</td>
<td>OA35284</td>
</tr>
<tr>
<td>CPCC Windows 7 support</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z196 Static Power Save Mode</td>
<td>+</td>
<td>OA30433</td>
<td>OA30433</td>
<td>OA30433</td>
<td>OA30433</td>
</tr>
<tr>
<td>Samples for security definitions (CIM, CPM, z/OSMF)</td>
<td>+</td>
<td></td>
<td></td>
<td>(OA32854)</td>
<td></td>
</tr>
<tr>
<td>Control Center reporting enhancements, Windows Vista™ support</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CICS/IMS transaction classes support</td>
<td>+</td>
<td></td>
<td></td>
<td>OA29641</td>
<td>OA29641</td>
</tr>
<tr>
<td>RMF provider can locate DDS dynamically</td>
<td>+</td>
<td></td>
<td></td>
<td>OA31118</td>
<td>OA31118</td>
</tr>
<tr>
<td>z/OS BCPii Support and Logical Processor Mgmt</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>OA25426 OA24945</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function</th>
<th>V1.13</th>
<th>V1.12</th>
<th>V1.11</th>
<th>V1.10</th>
<th>V1.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS (CPM) release</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+: Support integrated into release base
Thank You

- Hindi: धन्यवाद
- Traditional Chinese: 多謝
- Thai: ขอบคุณ
- Russian: Спасибо
- English: Thank You
- Spanish: Gracias
- Brazilian Portuguese: Obrigado
- Arabic: شكراً
- Italian: Grazie
- Simplified Chinese: 多谢
- German: Danke
- French: Merci
- Dutch: Bedankt
- Tamil: ஧ன்மமி
- Japanese: ありがとうございました
- Korean: 감사합니다
# WLM Tools: A Summary

<table>
<thead>
<tr>
<th>Tool</th>
<th>Name</th>
<th>Description</th>
<th>Content</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVDEF</td>
<td>Service Definition Formatter</td>
<td>Uses output from WLM Administrative Administration to display content of service definition in a workstation spreadsheet</td>
<td>Excel/workstation</td>
<td>Not updated anymore but still available on WLM Tools page</td>
</tr>
<tr>
<td>WSE</td>
<td>Service Definition Editor</td>
<td>Allows to create, modify, retrieve and install WLM service definitions</td>
<td>Java program on workstation</td>
<td>YES!! Available</td>
</tr>
<tr>
<td>WLMQUE</td>
<td>Application Environment Viewer</td>
<td>Allows to monitor WLM Application Environments</td>
<td>ISPF Tool</td>
<td>YES!! Available</td>
</tr>
<tr>
<td>WLMOPT</td>
<td>OPT Display</td>
<td>Display WLM/SRM OPT Parameters</td>
<td>IPF Tool</td>
<td>No!! Obsoleted by RMF in z/OS V1.11</td>
</tr>
</tbody>
</table>

### WLM Tools

#### Service Definition Editor

The Service Definition Editor in WLM Tools is used to define and manage service definitions for different workloads. Each row in the table represents a service definition, with columns for Service Class, Period, Goal, IMS, Duration, Response Time, and so on. The editor allows for detailed configuration of service parameters and scheduling environments, enabling administrators to fine-tune system performance according to specific needs.

![WLM Service Definition Editor](image)

<table>
<thead>
<tr>
<th>Service Definition</th>
<th>Period</th>
<th>Goal</th>
<th>IMS</th>
<th>Duration</th>
<th>Response Time</th>
<th>Service Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLM/DASD A9/L8STD</td>
<td>1</td>
<td>Velocity</td>
<td>2</td>
<td>600</td>
<td>10</td>
<td>All APPC Transactions</td>
<td>ASCH default Service Class</td>
</tr>
<tr>
<td>WLM/LTIC B4/L6STD</td>
<td>4</td>
<td>Velocity</td>
<td>4</td>
<td>1000</td>
<td>20</td>
<td>All Batch Jobs</td>
<td></td>
</tr>
<tr>
<td>WLM/LTIC B4/L6STD</td>
<td>4</td>
<td>Classification: JES</td>
<td>-</td>
<td>1000</td>
<td>20</td>
<td>Batch Standard VEL 10 IMP 4</td>
<td></td>
</tr>
<tr>
<td>WLM/LTIC B4/L6STD</td>
<td>4</td>
<td>Classification: JES</td>
<td>-</td>
<td>1000</td>
<td>20</td>
<td>Batch Standard VEL 20 IMP 4</td>
<td></td>
</tr>
<tr>
<td>WLM/LTIC B4/L6STD</td>
<td>4</td>
<td>Velocity</td>
<td>4</td>
<td>1000</td>
<td>20</td>
<td>Production TSO Helpers</td>
<td></td>
</tr>
</tbody>
</table>

The editor also supports insertion, deletion, and other operations, allowing for dynamic and flexible management of service definitions.

---

**SHARE in Orlando 2011**
### WLM Tools

**Display WLM/SRM OPT Parameter (WLM Tool, supported up to R10)**

<table>
<thead>
<tr>
<th>Command ==&gt;</th>
<th>WLM OPT Settings</th>
<th>Scroll ==&gt; PAGE</th>
<th>SAVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: AQFT</td>
<td>Version: z/OS 011100</td>
<td>OPT: FT Time: not issued</td>
<td></td>
</tr>
<tr>
<td>OPT-Parameter:</td>
<td>Value:</td>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>ABNORMALTERM</td>
<td>Yes</td>
<td>Abnormal term. used in routing rec.</td>
<td></td>
</tr>
<tr>
<td>BLWLRPTCT</td>
<td>5</td>
<td>CPU cap. to promote blocked work</td>
<td></td>
</tr>
<tr>
<td>BLWINTHD</td>
<td>20</td>
<td>Time blocked work waits for help</td>
<td></td>
</tr>
<tr>
<td>CCCAMTI</td>
<td>3200,3200</td>
<td>AWM time value (defined, used)</td>
<td></td>
</tr>
<tr>
<td>ZAAPWMT</td>
<td>3200,3200</td>
<td>AWM time value for zAAPs (def, used)</td>
<td></td>
</tr>
<tr>
<td>ZIIPAMTI</td>
<td>3200,3200</td>
<td>AWM time value for zIIPs (def, used)</td>
<td></td>
</tr>
<tr>
<td>CNTCLIST</td>
<td>No</td>
<td>Clist commands count individually</td>
<td></td>
</tr>
<tr>
<td>CPENABLE</td>
<td>10,30</td>
<td>LOW.HI thresh for % TPI int. x 100</td>
<td></td>
</tr>
<tr>
<td>DVIO</td>
<td>Yes</td>
<td>Specifies w/ directed VIO is active</td>
<td></td>
</tr>
<tr>
<td>EV</td>
<td>1000,E6</td>
<td>Enq res. CPU Service and DP</td>
<td></td>
</tr>
<tr>
<td>HIPERDISPATCH</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>IFASONORPRIORITY</td>
<td>Yes</td>
<td>Specifies if CPs may help zAAPs</td>
<td></td>
</tr>
<tr>
<td>IPHONORPRIORITY</td>
<td>Yes</td>
<td>Specifies if CPs may help zIIPs</td>
<td></td>
</tr>
<tr>
<td>INITIMP</td>
<td>0,FE</td>
<td>INITIMP value and DP for initiators</td>
<td></td>
</tr>
<tr>
<td>MCCAFCTH</td>
<td>400,800</td>
<td>LOW,HIGH central threshold</td>
<td></td>
</tr>
<tr>
<td>MCCFXEPR</td>
<td>92</td>
<td>% of storage fixed within first 16MB</td>
<td></td>
</tr>
<tr>
<td>MCCFXTPR</td>
<td>80</td>
<td>% of online storage fixed</td>
<td></td>
</tr>
<tr>
<td>PROJECTCPU</td>
<td>No</td>
<td>CPU projection for zAAPs and zIIPs</td>
<td></td>
</tr>
<tr>
<td>RCFCXSTT</td>
<td>66,72</td>
<td>Low,High Logical MPL threshold</td>
<td></td>
</tr>
<tr>
<td>RCFCXET</td>
<td>82,88</td>
<td>Low,High Physical MPL threshold</td>
<td></td>
</tr>
<tr>
<td>RMPTGOM</td>
<td>1000</td>
<td>SRM invocation interval</td>
<td></td>
</tr>
<tr>
<td>STORAGEENDP</td>
<td>Yes</td>
<td>Set Non-swappable AS non dispatchable</td>
<td></td>
</tr>
<tr>
<td>STORAGEWOR</td>
<td>Yes</td>
<td>Issue IRA221D and IRA421D</td>
<td></td>
</tr>
<tr>
<td>IRA405I</td>
<td>46,32,32</td>
<td>IRA405I warning level: 16M,2G,Tot</td>
<td></td>
</tr>
<tr>
<td>VARYCPU</td>
<td>No</td>
<td>VARYCPU is enabled</td>
<td></td>
</tr>
<tr>
<td>VARYCPUMIN</td>
<td>1</td>
<td>VARYCPUMIN value</td>
<td></td>
</tr>
<tr>
<td>WASROUTINGLEVEL</td>
<td>0</td>
<td>WebSphere Routing Level</td>
<td></td>
</tr>
</tbody>
</table>
WLM Tools
Display WLM/SRM OPT Parameter (RMF Monitor II OPT Report)
WLM Tools
WLMOPT – WLM Application Environment Viewer

Command ===>

Selection:  >HELP< >SAVE< >0VW< >ALL< \AE=SYSBATCH
System: AQFT

AppEnv_Type SubName_ WMAS Del Dyn NQ QLen Str Hav Unb Trm Min Max__ ICnt

SYSBATCH JFS JFS2 0031 No No 3 0 12 0 0 0 0 0

WorkQue_ Del Wnt Hav ICnt QueIn_ QueOut QueLen QueTot__ Act_ Idl_

WMLONG No 7 7 0 0 0 0 4 3
WLMSHORT No 3 3 0 0 0 0 2 0
COMBUILD No 2 2 0 0 0 0 1 1

SvAS Binding_ Ter Opr Btc Dem Have Jobname

0043 WMLONG No No Yes No 1 BCNDEVD
0175 WMLONG No No Yes No 1 ALLAEB.2.SEAS.2.JBIN
0166 WMLONG No No Yes No 1 SERV9956
0165 WMLONG No No Yes No 1 SERV9955
015A COMBUILD No No Yes No 1 C90SPACE
0150 WMLONG No No Yes No 1 INIT
0202 WMLONG No No Yes No 1 INIT
0152 COMBUILD No No Yes No 1 INIT
0229 WLMSHORT No No Yes No 1 BMGX1$0119 WMLONG No No Yes No 1 INIT
0050 WLMSHORT No No Yes No 1 ALLAEB.2.SEAS.11.JBIN
01A5 WLMSHORT No No Yes No 1 INIT