z/OS V2.5 IBM Education Assistant

Solution Name: WLM Service Coefficient Removal

Solution Element(s): BCP Workload Manager (WLM), z/OSMF WLM

Agenda

- Trademarks

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- Overview

- Usage & Invocation

- Interactions & Dependencies

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- Installation & Configuration

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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.

- Additional Trademarks:

  - If you need to list any that aren't included on the website above, please do so here. If not, remove the text in this bullet and just say "None".

Objectives

- What are service units …
    - The amount of system resources consumed by an address space or enclave is measured in service units.
    - Service units are calculated based on the CPU, SRB, I/O, and storage (MSO) service the address space or enclave consumes.
    - Service units are the basis for period switching within a service class that has multiple periods. The duration of a service class period is specified in terms of service units.
    - When an address space or enclave running in the service class period has consumed the amount of service specified by the duration, workload management moves it to the next period. The work is then managed to the goal and importance of the new period.
    - Because not all kinds of services are equal in every installation, additional weight can be assigned to one kind of service over another. These weights are called **service coefficients**.

- Assigning different weights (or service coefficients) made sense in the past when resources like storage and I/O were scarce.

- Nowadays it does not make sense to let storage and I/O influence period switch, or weight CPU and SRB service differently.

- We published a Statement of Direction in the z/OS V2.4 announcement (RFA)
  https://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/0/877/ENUSZP19-0410/index.html&request_locale=en#sodx

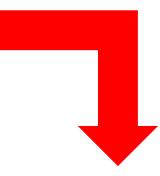- Now, with z/OS V2.5 the specification of service coefficients will be removed.

Overview

- Who (Audience)

  - System or service level administrators

- What (Solution)

  - **Service coefficients** are removed from the **WLM service definition** and can no longer be defined.

- Wow (Benefit / Value, Need Addressed)

  - Simplified user experience because WLM service coefficients no longer required to be defined and considered when calculating the durations for any multi-period service classes.

Usage & Invocation (WLM ISPF Application)

```
Coefficients/Options Notes Options Help
-------------------------------------------------------------
Service Coefficient/Service Definition Options

Enter or change the Service Coefficients:

CPU . . . . . . . . . . . . . _____  (0.1-99.9)
IOC . . . . . . . . . . . . . _____  (0.0-99.9)
MSO . . . . . . . . . . . . . _____  (0.0000-99.9999)
SRB . . . . . . . . . . . . . _____  (0.0-99.9)


Enter or change the service definition options:


I/O priority management  . . . . . . . . NO (Yes or No)
Enable I/O priority groups  . . . . . . NO (Yes or No)
Dynamic alias management  . . . . . . . NO (Yes or No)
Deactivate Discretionary Goal Management NO (Yes or No)
```
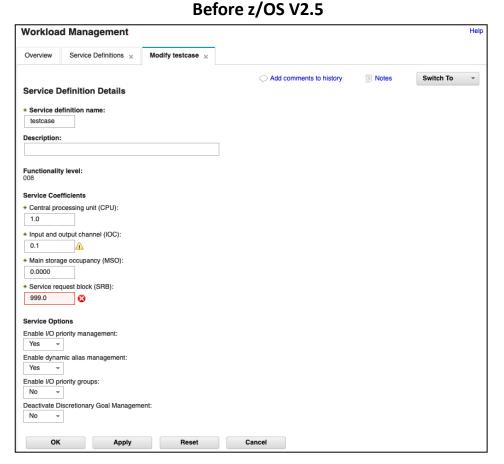
WLM ISPF Application:

Service Coefficients/Options panel
changed into
Service Definition Options panel

```
Options Notes Help
-------------------------------------------------------------
Service Definition Options


Enter or change the service definition options:


I/O priority management  . . . . . . . . NO (Yes or No)
Enable I/O priority groups  . . . . . . NO (Yes or No)
Dynamic alias management  . . . . . . . NO (Yes or No)
Deactivate Discretionary Goal Management NO (Yes or No)
```
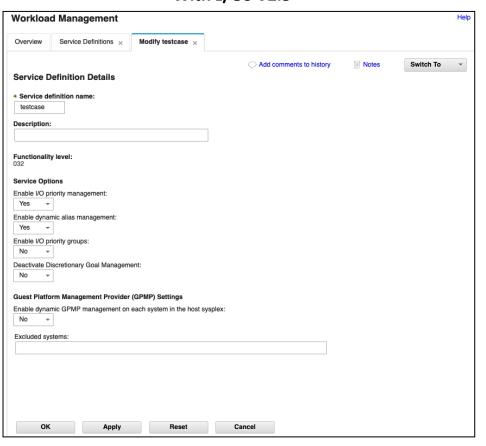
Fields for *Service Coefficients* removed!

Usage & Invocation (z/OSMF WLM – Scenario 1)

User is no longer allowed to specify or change service coefficients in z/OSMF WLM plugin.

When user opens the Service Definition Details panel to view or modify a service definition, the input fields for service coefficients are removed.
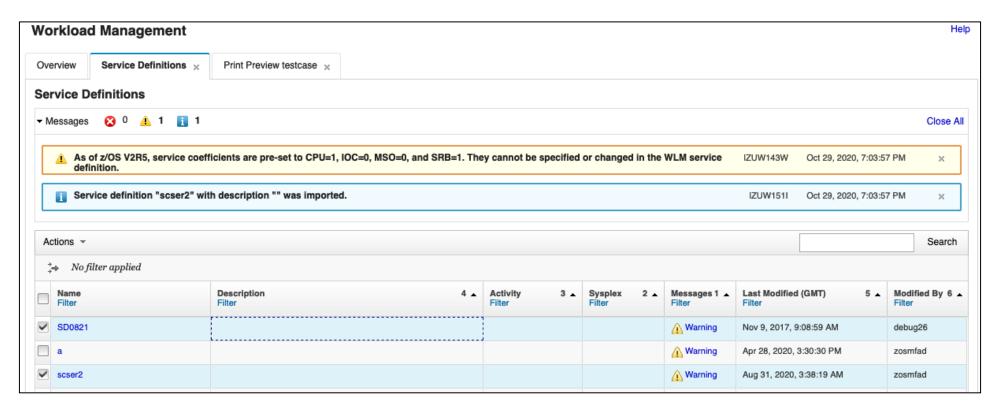
Before z/OS V2.5   **With z/OS V2.5**

Usage & Invocation (z/OSMF WLM – Scenario 2)

User gets warning message when importing a service definition whose service coefficients have already been specified and are different from the pre-set values.

In z/OSMF WLM plugin on z/OS V2.5, when user imports a service definition, which was created with a release prior to z/OS V2.5, and its service coefficients have already been specified and are different from the pre-set values (CPU=1, IOC=0, MSO=0, and SRB=1), a warning message *IZUW143W* will be issued to let user know that the specified value of service coefficients will be ignored by z/OS after installation.

Usage & Invocation (Calculation of Duration)

- If the customer did not prepare his WLM service definition for the removal of the service coefficients, following steps should be taken because the calculation of DURATION for multi-period service classes changes:

Before z/OS V2.5 the DURATION is calculated as:

OLD DUR = (CPU * CPU service units) + (SRB * SRB service units) + (IOC * I/O service units) + (MSO * storage service units)

where CPU, SRB, IOC, and MSO are the installation defined WLM service coefficients. With CPU=1, SRB=1, IOC=0, MSO=0 the new duration is simply calculated as:

NEW DUR = CPU service units + SRB service units

Converting OLD DUR into NEW DUR is calculated as:

NEW DUR = OLD DUR / Total service units * (CPU service units / CPU + SRB service units / SRB)

where CPU and SRB are the old service coefficients and Total service units is the sum of CPU, SRB, IOC, and MSO service units. CPU, SRB, and Total service unit values should be collected for a peak period interval from, for example, the RMF Postprocessor Workload Activity (WLMGL) report.

```
EXAMPLE:        OLD DUR = 90000              - Old default service coefficients used (CPU=10, SRB=10)
                                             - Values from RMF WLMGL peak period interval:
                                                   TOTAL_SU = 6218K
                                                   CPU_SU   = 5877K
                                                   SRB_SU   = 95667

                NEW DUR = 90000/6218K * (5877K/10 + 95667/10) = 8645
```

Usage & Invocation (IWMSVDEF macro)

- Installing and extracting a WLM service definition (IWMDINST and IWMDEXTR services)
  - The mapping of the WLM service definition (macro IWMSVDEF) is updated.
  - For z/OS release compatibility reasons (z/OS V2.5 and previous releases) the fields for service coefficients will be preserved. However, the description of SVDEFCFF is extended as follows:

Table 1. Structure *SVDEFCON* of IWMSVDEF mapping

```
OFFSET      OFFSET
DECIMAL     HEX    TYPE          LENGTH   NAME (DIM)     DESCRIPTION
       0      (0)  STRUCTURE        48    SVDEFCON       Constants
       0      (0)  BIT(8)            1    SVDEFFL1       Flag 1
                   1... ....              SVDEFSCO       Service coefficients were specified
 …
       4      (4)  CHARACTER        16    SVDEFCFF       Service coefficients. Starting with z/OS V2R5, the system takes
                                                         preset values (CPU=1*10000, SRB=1*10000, IOC=0, MSO=0). Any
                                                         deviating values below are ignored.
       4      (4)  UNSIGNED          4    SVDEFCPU       CPU service coefficient * 10000 - the number by which accumulated
                                                         CPU service units will be multiplied (weighted)
       8      (8)  UNSIGNED          4    SVDEFIOC       I/O service coefficient * 10000 - the number by which accumulated
                                                         I/O service units will be multiplied (weighted)
      12      (C)  UNSIGNED          4    SVDEFMSO       Storage service coefficient * 10000 - the number by which
                                                         accumulated storage service units will be multiplied (weighted)
      16     (10)  UNSIGNED          4    SVDEFSRB       SRB service coefficient * 10000 - the number by which accumulated
                                                         SRB service units will be multiplied (weighted)S
```

Usage & Invocation (IWMSVPOL macro)

- Query active service policy (IWMPQRY service)
  - The data being returned by IWMPQRY is defined by the IWMSVPOL macro.
  - Macro IWMSVPOL is updated. For z/OS release compatibility reasons the fields for service coefficients will be preserved. With z/OS V2.5 system preset values are returned:

Table 2. Structure *SVPOLSP* of IWMSVPOL mapping

```
OFFSET      OFFSET
DECIMAL      HEX    TYPE         LENGTH   NAME (DIM)    DESCRIPTION

     0        (0)   STRUCTURE      396    SVPOLSP       Service policy section
     0        (0)   CHARACTER        8    SVPOLNSP      Service policy name
     8        (8)   CHARACTER       32    SVPOLDSP      Service policy description
 ...
   136       (88)   UNSIGNED         4    SVPOLCPU      System pre-set CPU service coefficient (CPU=1*10000) –
                                                        the number by which accumulated CPU service units will
                                                        be multiplied (weighted)
   140       (8C)   UNSIGNED         4    SVPOLIOC      System pre-set I/O service coefficient (IOC=0)
   144       (90)   UNSIGNED         4    SVPOLMSO      System pre-set storage service coefficient (MSO=0)
   148       (94)   UNSIGNED         4    SVPOLSRB      System pre-set SRB service coefficient (SRB=1*10000) –
                                                        the number by which accumulated SRB service units will
                                                        be multiplied (weighted)
   152       (98)   CHARACTER        4    SVPOLECP      EBCDIC representation of CPU service coefficient
   156       (9C)   CHARACTER        4    SVPOLEIO      EBCDIC representation of I/O service coefficient
   160       (A0)   CHARACTER        8    SVPOLEMS      EBCDIC representation of Storage service coefficient
   168       (A8)   CHARACTER        4    SVPOLESR      EBCDIC representation of SRB service coefficient
```

Interactions & Dependencies

- Software Dependencies
  - None.

- Hardware Dependencies
  - None.

- Exploiters
  - Any user of z/OS V2.5

Upgrade & Coexistence Considerations (1)

- To exploit this solution, all systems in the Plex must be at the new z/OS level: **NO**

- Coexistence APAR OA59066 required
  - PTF UJ04767 for z/OS V2.3
  - PTF UJ04768 for z/OS V2.4

- Customers were already asked to prepare for the removals, see
  - Knowledge Center updated with steps to take
    - **z/OS V2R4 Upgrade Workflow from z/OS V2R3 BCP Upgrade Actions Step 4.1.1.7**
    - **z/OS V2R4 Upgrade Workflow from z/OS V2R2 BCP Upgrade Actions Step 4.1.1.12**
    - **z/OS V2R5 Upgrade Workflow from z/OS V2R4 BCP Upgrade Actions Step 4.1.1.4**
    - **z/OS V2R5 Upgrade Workflow from z/OS V2R3 BCP Upgrade Actions Step 4.1.1.5**
    - **z/OS MVS Planning: Workload Management** chapter **Changing your service coefficients**
  - APAR OA59066 providing health checks to tell the customer if he is using WLM service coefficients different from the IBM recommended values and that actions should be taken as explained by the Upgrade Workflows
    - Health check **ZOSMIGV2R4_NEXT_WLM_ServCoeff** provided by APAR OA59066
    - Health check **ZOSMIGV2R3_NEXT2_WLM_ServCoeff** provided by APAR OA59066

Upgrade & Coexistence Considerations (2)

- *How does APAR OA59066 ensures coexistence?*
  - When the service coefficients have not been changed to the IBM recommended values and running a sysplex with z/OS 2.5 and z/OS 2.3 or z/OS 2.4, WLM ensures that all systems internally use CPU=1, SRB=1, IOC=0, and MSO=0 as the service coefficients.
  - As soon as a system with z/OS 2.3 or z/OS 2.4 detects a z/OS 2.5 system in the sysplex, it reactivates the WLM policy and issues message **IWM069I WLM POLICY WAS REFRESHED DUE TO THE CHANGE OF THE SERVICE COEFFICIENTS TO SYSTEM PRESET VALUES (CPU=1, SRB=1, IOC=0, MSO=0).**
  - Consider that this can cause faster or slower period switching within a service class that has multiple periods. And, it might also have impact on your accounting procedures.
  - Thus, clients need to review the durations for any multi-period service classes in their WLM service definition and adjust them accordingly.
  - In the case that the last system with z/OS 2.5 has left the sysplex, the systems with z/OS 2.3 or z/OS 2.4 reactivate the WLM policy again and issue message **IWM069I WLM POLICY WAS REFRESHED DUE TO THE CHANGE OF THE SERVICE COEFFICIENTS BACK TO THE DEFINED VALUES.**

Installation & Configuration

- Clients needs to be aware of:
  - PTFs for coexistence APAR OA59066 required
  - Are there any planning considerations?
    - Be prepared for the removal of the service coefficients and update your WLM service definition as described on the previous slides **before upgrading to z/OS V2.5.**
  - Does installation change any system defaults?
    - When no service coefficients were defined in the WLM service definition, the defaults were CPU=10, SRB=10, IOC=5, and MSO=0.
    - With z/OS V2.5 service coefficients can no longer be defined in the WLM service definition. The coefficients are set to hardcoded values of CPU=1, SRB=1, IOC=0, and MSO=0.
    - Thus, storage and I/O no longer influence period switch, and CPU and SRB service is inflated less and weighted equally.

Summary

- Service coefficients can no longer be defined and are removed from the WLM Service Definition.

- Before upgrading to z/OS V2.5, clients should check their service definition for service coefficient values other than CPU=1, SRB=1, IOC=0, and MSO=0.

- When that is true, clients need to take the steps described on previous slides and update their WLM service definition.

Appendix

- Publication references

  - z/OS V2R4 Upgrade Workflow from z/OS V2R3 BCP Upgrade Actions Step 4.1.1.7

  - z/OS V2R4 Upgrade Workflow from z/OS V2R2 BCP Upgrade Actions Step 4.1.1.12

  - z/OS V2R5 Upgrade Workflow from z/OS V2R4 BCP Upgrade Actions Step 4.1.1.4

  - z/OS V2R5 Upgrade Workflow from z/OS V2R3 BCP Upgrade Actions Step 4.1.1.5

  - z/OS MVS Planning: Workload Management chapter *Changing your service coefficients*

  - IBM Health Checker for z/OS User's Guide