z/OS
2.5

Tailored Fit Pricing for IBM Z

Note

Before using this information and the product it supports, read the information in “Notices” on page 141.

This edition applies to Version 2 Release 5 of z/OS® (5650-ZOS) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Figures

Tables

About the Tailored Fit Pricing Content Solution

Purpose of this information This information is a collection of all of the information that you need to understand and exploit Tailored Fit Pricing for IBM Z. Some of the information contained in this content solution also exists elsewhere in the z/OS library.

Who should read this information This information is intended for system programmers who are responsible for capacity planning, and who are responsible for MVS™ workload management. There is also information for people writing programs or subsystems that monitor performance.

Related information

For an interactive start and technical resources such as articles and workflows, see Tailored Fit Pricing for IBM Z (www.ibm.com/support/z-content-solutions/tailored-fit-pricing/).

To find the complete z/OS library, go to IBM Documentation (www.ibm.com/docs/en/zos).

How to send your comments to IBM

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Important: If your comment regards a technical question or problem, see instead "If you have a technical problem" on page xiii.

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- The comprehensive content collection title: Tailored Fit Pricing for IBM Z
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What's new in Tailored Fit Pricing for IBM Z?

May 2021 enhancements

Tailored Fit Pricing for IBM Z is updated as follows:

- A new Hardware Consumption Solution is added.
- Enterprise Consumption Solution is renamed Software Consumption Solution.
- The option to specify a solution ID using the **SOLUT** system parameter, and a corresponding SMF89SolutionID field in System Management Facility (SMF) record type 89, are added for APAR OA60198.

Chapter 1. What is Tailored Fit Pricing for IBM Z?

Tailored Fit Pricing delivers simplicity, transparency, and predictability of pricing. It offers these comprehensive alternatives to the rolling 4-hour (R4HA) average:

- Software Consumption Solution (formerly known as Enterprise Consumption Solution), which is a cloud-like usage-based licensing model. Compute is measured on the basis of MSUs consumed, which removes the need for manual or automated capping. You can configure your systems to support optimal response times and service level agreements.
- Hardware Consumption Solution, which introduces cloud-like pricing for IBM Z hardware, with an always-on, subscription-based corridor of pay-for-use capacity, on top of purchased capacity, that can alleviate the impact of short, unpredictable spikes in business-critical workloads.
- Enterprise Capacity Solution, which is a full-capacity licensing model that offers maximum predictability and simplicity.

It also offers these solutions for specific workloads that can coexist alongside both traditional and the new enterprise models:

- Application Development and Test Solution (DevTest). which, by removing the need for aggressive cost controls around development and test, promotes a healthy development and test environment on z/OS
- New Application Solution, which allows new applications to be tightly integrated with colocated workloads, with the price predictability of a dedicated environment.

All of these solutions dramatically simplify pricing and deliver flexible deployment options that are tailored to reflect your environment. They allow you to embrace the best technical fit, greatly reducing the need to architect for software costs.

Technology in z/OS provides the framework to enable Tailored Fit Pricing. It provides the capability to meter and report on specific workloads in a similar manner, regardless of the solution deployed. Manual tagging and tracking or other increased monthly overhead is not required.

Requirements

For a summary of the conditions you must meet to implement a Tailored Fit Pricing solution, see Chapter 2, “Requirements for Tailored Fit Pricing for IBM Z,” on page 9.

Related resources

For an interactive start and technical resources such as articles and workflows, see Tailored Fit Pricing for IBM Z (www.ibm.com/support/z-content-solutions/tailored-fit-pricing/).

Deploying workload-specific solutions

When associated with a Tailored Fit Pricing for workload-specific solution such as an Application Development and Test Solution, SMF and the Sub-Capacity Reporting Tool (SCRT) use Tailored Fit Pricing to understand the resource consumption of the solution. This allows SCRT to remove the direct impact of these solutions from the rolling four-hour average of the LPARs where it runs. SCRT also provides an isolated view of the container environment, including the products in use.

With Tailored Fit Pricing for IBM Z, there is no need to isolate a solution to a separate LPAR for pricing purposes and you are not required to build spreadsheets manually to track specific workloads. Tailored Fit Pricing gives you the freedom to deploy a solution where it makes the most sense based on a technical evaluation.

After an initial set up is performed, the SMF data that SCRT uses contains all the information required for Tailored Fit Pricing. There is no need for any complex data collection and analysis, even for cases where the new solution is colocated with other workloads.

You can deploy the Tailored Fit Pricing workload-specific solutions solutions as follows.

- New Application Solution. Add new approved z/OS solutions either:
  - Colocated in an existing LPAR with other unrelated workloads without directly impacting R4HA
  - To a dedicated LPAR.

  For a colocated solution, you can measure the MSU used for the Tailored Fit Pricing colocated solution independently of the other workloads in the LPAR. Optionally, the consumption by the solution may be capped using a function similar to WLM Resource Group capping. The system records data about the colocated solution for accounting SCRT reporting purposes. SCRT analyzes the recorded data and produces a report for consumption by fulfillment systems, removing the workload's MSU utilization from the R4HA.
- Application Development and Test Solution (DevTest), for z/OS-based development and test workloads. The DevTest environment is typically on dedicated LPARs.

Figure 1 on page 2 illustrates the possible placement of workload-specific solutions solutions.

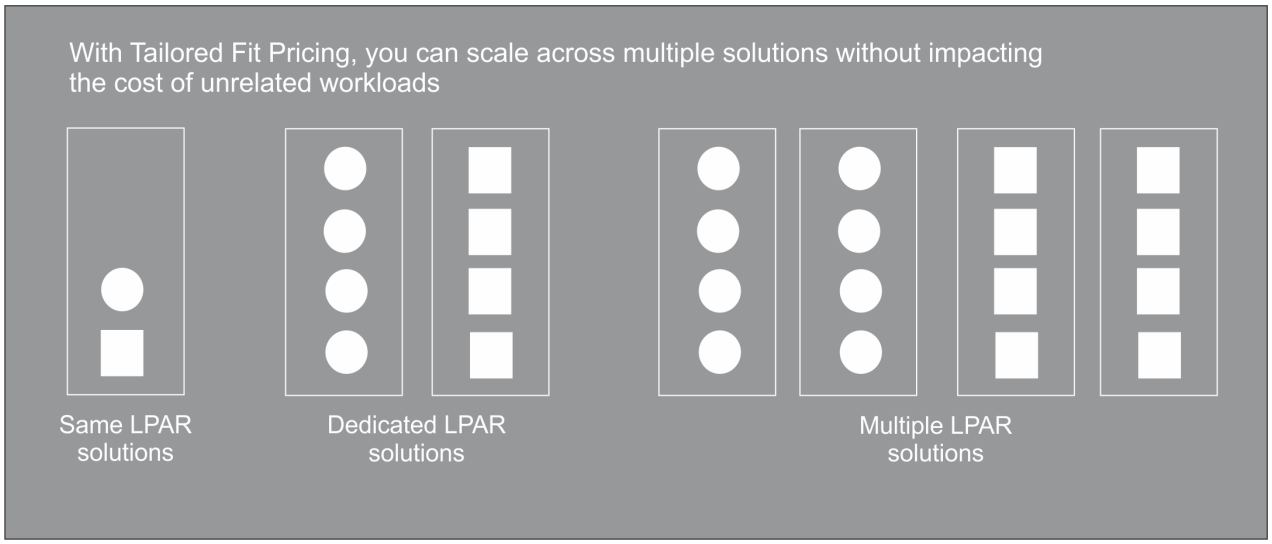


Figure 1. Tailored Fit Pricing lets you place solutions as required by business needs

Getting started

The setup required varies with the Tailored Fit Pricing solution.

Software Consumption Solution

The Software Consumption Solution is a cloud-like usage-based licensing model. Compute is measured on the basis of MSUs consumed, which removes the need for manual or automated capping.

Use the Software Consumption Solution in conjunction with the "Application Development and Test Solution" on page 3 for a comprehensive end-to-end pricing solution for all stages of the application lifecycle.

Implement a Software Consumption Solution as follows:

1. Work with an IBM Sales representative to define the Software Consumption Solution. This includes separate solution IDs for your development and production environments.
2. Obtain the solution IDs from the License Management Support Web portal. For more information, see "Obtain the solution ID from LMS" on page 4.
3. **Dedicated-LPAR solution:** Use either of the following methods to associate the solution IDs for the Software Consumption Solution and the Application Development and Test Solutions:

- The SCRT **CONTAINER** command to specify only those LPARs that are part of the qualified solution.

  For more information, see Chapter 4, "Using SCRT for Tailored Fit Pricing," on page 23.
- The **SOLUT** system parameter when IPLing a z/OS system as part of the qualified solution. **SOLUT** is available with the appropriate level of z/OS service. For more information, see "Dedicated LPARs" on page 24.

Colocated-LPAR solution: Update your SCRT JCL to reflect the solution ID, which is generated as part of the agreement with IBM. For more information, see "SCRT commands for the Software Consumption Solution" on page 23.

4. Send the SCRT report to IBM. The solutions are reported separately.

Hardware Consumption Solution

The Hardware Consumption Solution introduces cloud-like pricing for IBM Z hardware, with an always-on, subscription-based corridor of pay-for-use capacity, on top of purchased capacity, that can alleviate the impact of short, unpredictable spikes in business-critical workloads.

Implement a Hardware Consumption Solution as follows:

1. Work with an IBM Sales representative to define the Hardware Consumption Solution and the Software Consumption Solution that is required with it.

   IBM uses a workload analysis to determine eligibility and fit for the Hardware Consumption Solution.

   For details on a Software Consumption Solution, see "Software Consumption Solution" on page 2.
2. Update your SCRT JCL with control statements for interval rate data reporting. For more information, see Chapter 4, "Using SCRT for Tailored Fit Pricing," on page 23.
3. Send the SCRT report to IBM.

Enterprise Capacity Solution

The Enterprise Capacity Solution is a tailored full-capacity licensing model, offering predictable cost. Charges are connected to the size of the physical environment and are calculated based on the estimated mix of workloads running, with the flexibility to vary actual usage across workloads. Charges include increased capacity for development and test environments and reduced pricing for all types of workload growth. Charging based on the overall size of the physical environment removes the need for manual or automated capping. You can configure your systems to support optimal response times and service level agreements.

To implement an Enterprise Capacity Solution, work with an IBM Sales representative to define a solution. The agreement includes an allowance for application development and test workloads.

Because this is a full-capacity solution, there is no reporting requirement.

Application Development and Test Solution

The Application Development and Test (DevTest) Solution, by removing the need for aggressive cost controls around development and test, promotes a healthy development and test environment on z/OS.

To implement a DevTest Solution, do the following.

1. Work with an IBM Sales representative to define a DevTest Solution. This includes separate solution IDs for your development and production environments. The agreement also includes the decision to use either an LPAR that is dedicated to the workload or an LPAR on which the workload is colocated with other workloads. The DevTest environment is typically on dedicated LPARs.
2. Obtain the solution IDs from the License Management Support Web portal. For more information, see "Obtain the solution ID from LMS" on page 4.
3. **Dedicated-LPAR solution:** Use either of the following methods to associate the solution IDs with the LPAR or system:

- The SCRT **CONTAINER** command to specify only those LPARs that are part of the qualified solution.

  For more information, see Chapter 4, “Using SCRT for Tailored Fit Pricing,” on page 23.
- The **SOLUT** system parameter when IPLing a z/OS system as part of the qualified solution. **SOLUT** is available with the appropriate level of z/OS service. For more information, see “Dedicated LPARs” on page 24.

Colocated-LPAR solution: Create definitions in WLM and then update your SCRT JCL to reflect the solution ID, which is generated as part of the agreement with IBM. For more information, see Chapter 3, “Setting up a colocated Tailored Fit Pricing DevTest or New Application solution,” on page 11.

For more information about updating the SCRT JCL, see Chapter 4, “Using SCRT for Tailored Fit Pricing,” on page 23.

4. Send the SCRT report to IBM. The solutions are reported separately.

New Application Solution

The New Application Solution allows new applications to be tightly integrated with colocated workloads, with the price predictability of a dedicated environment.

To implement a New Application Solution, do the following.

1. Work with an IBM Sales representative to define a New Application Solution. This includes separate solution IDs for your development and production environments. The agreement also includes the decision to use either an LPAR that is dedicated to the workload or an LPAR on which the workload is colocated with other workloads.
2. Obtain the solution IDs from the License Management Support Web portal. For more information, see “Obtain the solution ID from LMS” on page 4.
3. **Dedicated-LPAR solution:** Use either of the following methods to associate the solution IDs with the LPAR or system:
   - The SCRT **CONTAINER** command to specify only those LPARs that are part of the qualified solution.

     For more information, see Chapter 4, “Using SCRT for Tailored Fit Pricing,” on page 23.
   - The **SOLUT** system parameter when IPLing a z/OS system as part of the qualified solution. **SOLUT** is available with the appropriate level of z/OS service. For more information, see “Dedicated LPARs” on page 24.

   Colocated-LPAR solution: Create definitions in WLM and then update your SCRT JCL to reflect the solution ID, which is generated as part of the agreement with IBM. For more information, see Chapter 3, “Setting up a colocated Tailored Fit Pricing DevTest or New Application solution,” on page 11.

   For more information about updating the SCRT JCL, see Chapter 4, “Using SCRT for Tailored Fit Pricing,” on page 23.
4. Send the SCRT report to IBM. The solutions are reported separately.

Obtain the solution ID from LMS

Clients work with an IBM Sales representative to define a solution with an agreed upon price, which triggers the creation of a **Solution ID**. The IBM-provided Solution ID is a 64-character string identifying an approved workload. For any approved solution, the Solution ID ties the system environment to the solution.

The Solution ID is assigned by the IBM License Management Support (LMS) portal. Login to the License Management Support (LMS) (www.ibm.com/software/lms) to obtain the Solution ID. You also use the LMS portal to submit SCRT reports to IBM.

Scenario: New Application Solution

The following scenario provides a high-level illustration of how Tailored Fit Pricing helps the solution architect and system programmer, improving deployment decisions on IBM Z servers. It describes the actions to be taken as well as the roles of other elements, such as WLM, RMF, and SCRT, for a New Application Solution.

- "Step 1: Work with IBM Sales to define a solution and get a solution ID" on page 5
- "Step 2: For a colocated solution, create Tailored Fit Pricing definitions in WLM" on page 5
- "Step 3: For a colocated solution, WLM, RMF and SMF track and record solution usage data" on page 6
- "Step 4: For either a colocated or dedicated solution, use SCRT to collect billing data and report to IBM" on page 7.

Step 1: Work with IBM Sales to define a solution and get a solution ID

Work with an IBM Sales representative to define a New Application Solution with an estimated size of 100 MSUs. This agreement generates a solution ID that correlates the IBM sales contract with the actual solution, and purchased capacity is used for billing purposes. You can obtain the solution ID from the LMS portal.

Where do you go from here? Once you have worked with IBM Sales to design a solution, you'll know whether you are going to create a colocated solution, a dedicated solution, or a solution spanning multiple dedicated LPARs. Proceed as follows based on that decision:

- For a colocated solution, go to "Step 2: For a colocated solution, create Tailored Fit Pricing definitions in WLM" on page 5 and "Step 3: For a colocated solution, WLM, RMF and SMF track and record solution usage data" on page 6.
- For a solution on a dedicated LPAR or multiple dedicated LPARs, go directly to "Step 4: For either a colocated or dedicated solution, use SCRT to collect billing data and report to IBM" on page 7.

Step 2: For a colocated solution, create Tailored Fit Pricing definitions in WLM

For a colocated solution, the system programmer creates tenant resource groups and tenant report classes in the WLM service definition, using either the ISPF WLM administrative application or the z/OSMF WLM task, to identify the WLM-classified workloads that constitute the approved solution workload.

- The tenant resource group defines the address spaces and independent enclaves making up the solution and supports metering and optional capping of the workload's MSU utilization. When defining the tenant resource group for Tailored Fit Pricing purposes, the system programmer must also include the 64-character solution ID obtained in "Step 1: Work with IBM Sales to define a solution and get a solution ID" on page 5 from the LMS web site. The solution ID is the link between the approved workload and SCRT's evaluation, and exclusion from the rolling 4-hour average.
- The system programmer also defines one or more tenant report classes. Tenant report classes are similar to standard report classes. However, tenant report classes are assigned to a tenant resource group and thus provide the metering capability for the tenant resource group. You can configure the information that is reported on behalf of tenant resource groups by associating their tenant report classes with address spaces or enclaves using classification rules.

See the following for more information about setting up WLM:

- "WLM definitions for a colocated Tailored Fit Pricing DevTest or New Application Solution" on page 11
- "Using z/OSMF to define WLM Tailored Fit Pricing definitions" on page 18
- "Using ISPF to define WLM Tailored Fit Pricing definitions" on page 18

Step 3: For a colocated solution, WLM, RMF and SMF track and record solution usage data

Once the WLM service definition is activated with tenant resource group definitions and associated classification rules, WLM tracks the processor consumption on behalf of the tenant resource group-specified workload. RMF then writes each tenant resource group's consumption data to SMF Type 70, Subtype 1 records every recording interval. SCRT analyzes the recorded data and produces a report for consumption by IBM's fulfillment systems, removing the workload's MSU utilization from the R4HA.

The SMF data can also be used:

- By z/OS system programmers or performance analysts to monitor workload resource usage and performance
- For other metering purposes, such as chargeback related to the specific workload.

SMF records written by RMF contain a reference to the tenant resource group, which ties the processing back to the solution ID for SCRT processing.

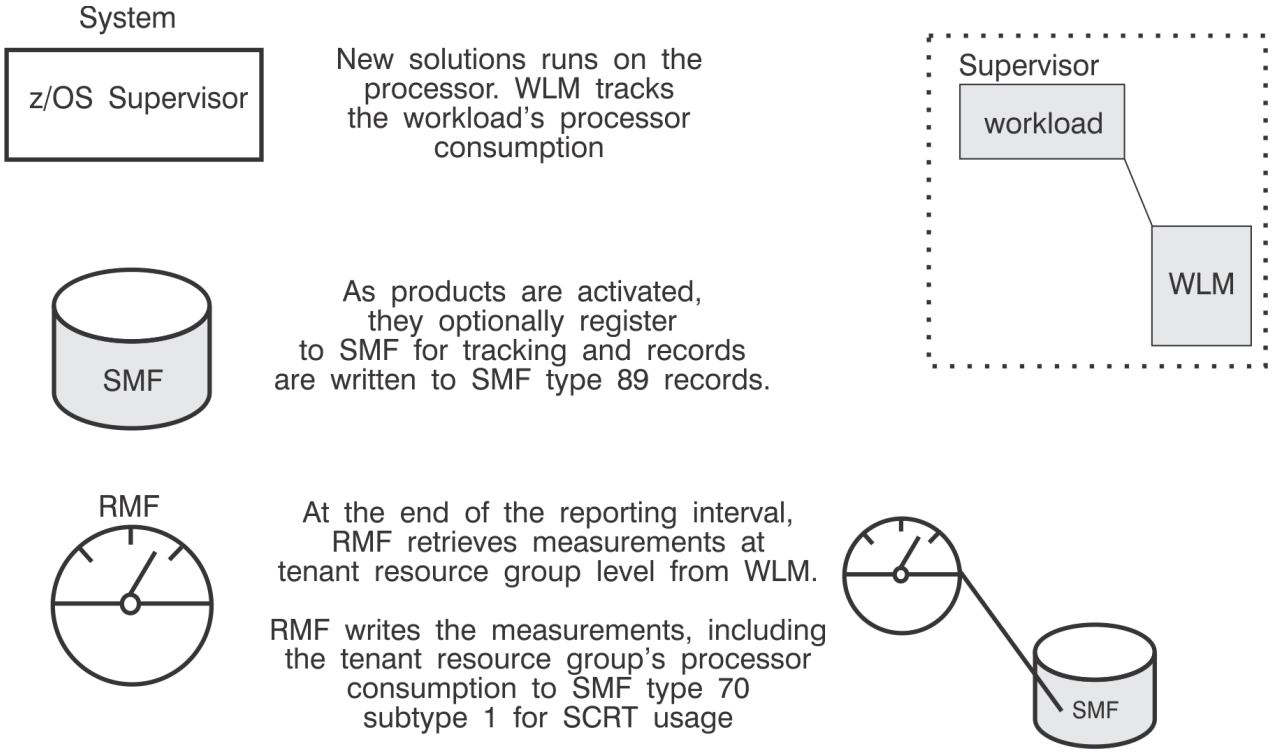


Figure 2. Tailored Fit Pricing: Interaction of solution, SMF, RMF, and SCRT

The system programmer can instruct WLM to limit (cap) processor consumption related to that workload, specified in the tenant resource group definitions. Similarly, the cap can be removed (or not specified), allowing processor consumption for that workload to continue unrestrained based on expected workload consumption, without the workload behavior modification that occurs when a CPU cap is reached.

Tailored Fit Pricing for IBM Z generally requires WLM work qualifiers that correspond to address space or independent enclaves. For specific details on qualification rules, see the terms and conditions of the Tailored Fit Pricing Solution.

Tailored Fit Pricing

Many IBM subsystems and sub-capacity products record their own CPU usage directly to SMF using IFAUSAGE or IFAEDREG, which is written as SMF Type 89 Subtypes 1 and 2 records, respectively. In both Type 70 and Type 89 records, data is written in tenant resource group segments, defining the relevant data for each tenant resource group. The example in Figure 3 on page 7 shows the SMF data recorded on behalf of CICS regions and other information.

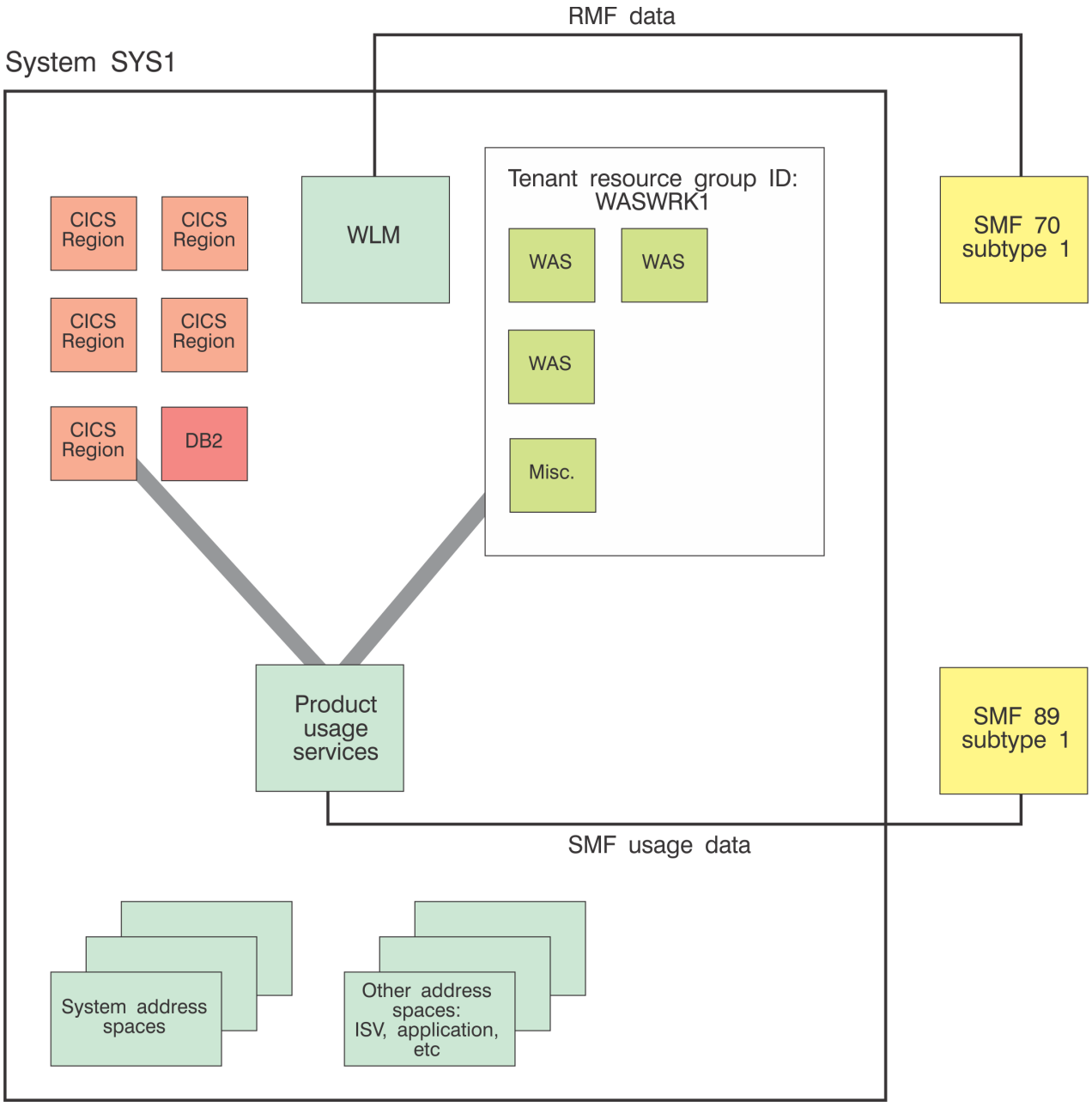


Figure 3. Tailored Fit Pricing data recorded on behalf of a single tenant resource group

For more information, see:

- Chapter 7, “Using RMF with colocated DevTest and New Application Solutions,” on page 133
- Chapter 6, “MVS System Management Facilities (SMF) record type changes for Tailored Fit Pricing,” on page 89

Step 4: For either a colocated or dedicated solution, use SCRT to collect billing data and report to IBM

To collect billing data and report back to IBM, update SCRT with the solution ID. (For a dedicated solution, you can specify the solution ID in parmlib instead.) When creating the next report, SCRT reads appropriate SMF records and reports MSU use for each container. The report includes the solution ID for all defined solutions and, as appropriate, data about the tenant resource groups and other identifying information for each product.

When the system programmer sends the SCRT report to IBM, the IBM uses the solution ID to correlate the workload with the entitled Tailored Fit Pricing solution for that client, validates the workload and its entitled capacity, and handles software billing based on the report.

z/OS clients run the SCRT job monthly to prepare a report of CPU consumed on behalf of workloads run on the system.

For colocated solutions, the CPU resource reported for the address spaces and independent enclaves that are defined to Tailored Fit Pricing are subtracted by SCRT from the LPAR 4- hour rolling average reported for billing purposes. This allows Tailored Fit Pricing workloads to be deployed to existing z/OS systems, colocated with existing workloads, without impacting the monthly license charges that are associated with z/OS and other middleware running on the same system.

For more information, see Chapter 4, “Using SCRT for Tailored Fit Pricing,” on page 23.

Chapter 2. Requirements for Tailored Fit Pricing for IBM Z

The following sections describe the requirements for Tailored Fit Pricing:

Requirements for Tailored Fit Pricing

This topic outlines the technical requirements that must be met to implement a Tailored Fit Pricing solution. Some requirements are described in more detail in other topics. For additional offering requirements, see the Tailored Fit Pricing announcement letter.

The requirements for Tailored Fit Pricing vary with the solution. The specific requirements for a solution must be met before IBM can accept and process sub-capacity reports in which Tailored Fit Pricing solutions are reported. These requirements are in addition to any requirements that are described in a Tailored Fit Pricing solution announcement letter.

- z/OS® V2.2, or later, with the PTFs applied for the following APARs:
  - OA52312 (WLM)
  - OA52694 (RMF™)
  - OA53033 (SMF)
  - PI82528 (SDSF)

  These and any other related PTFs are associated with the IBM.Function.Pricing.Infrastructure fix category.
- Hardware requirements vary based on the offering. The Hardware Consumption Solution is available for customers with z15, z/OS general purpose processors, and a Software Consumption Solution. There can be no dedicated CPs on any LPARs, and WAIT COMPLETION = NO must be specified.
- Sub-Capacity Reporting Tool (SCRT) V28.1, or later.

  SCRT is run for each sub-capacity reporting period and the resulting sub-capacity report is submitted to IBM on a monthly basis. The Hardware Consumption Solution requires that at least one native (not running under z/VM) z/OS system be active at all times during the report period with an RMF (or equivalent) interval of 1, 3, 5, or 15 minutes.
- When a unique solution ID is used to identify the Tailored Fit Pricing solution, you obtain the solution ID through the License Management Support (LMS) website once the solution has been approved.
  - For solutions deployed on an existing sub-capacity LPAR (collocated solutions), you must associate the solution with the tenant resource groups that define the qualified solution. Only work units (that is, address spaces and enclaves) that are associated with the qualified solution are to be classified as part of the tenant resource group.
  - For solutions deployed on separate LPARs, you must do one of the following:
    - Use the **CONTAINER** command to specify only those LPARs that are part of the solution. The **CONTAINER** command associates the LPARs with the solution ID.
    - Specify the **SOLUT** system parameter to associate the z/OS system being IPLed as part of the solution with the solution ID. **SOLUT** is available with the appropriate level of z/OS service.

  A solution name is also used to identify the Tailored Fit Pricing solution.

  - The solution name that you use for a given container must be the one that is associated with the unique solution ID in LMS.
  - You can update the solution name in LMS. However, at the time that you submit your report, the solution name must match the name as defined in LMS for the container (with the associated solution ID).

Requirements for using IBM Cloud Provisioning for Tailored Fit Pricing

To use Cloud Provisioning and Management for z/OS for Tailored Fit Pricing, you must have z/OS V2.3 or later, with the PTFs applied for APAR PI88944.

Requirements for using z/OSMF for Tailored Fit Pricing

- To get z/OSMF WLM support for Tailored Fit Pricing definitions, you must have z/OS V2.2 or later, with the PTFs applied for APAR P189361.
- To get z/OSMF RMF support for Tailored Fit Pricing, you must have z/OS V2.2 or later, with the PTFs applied for APAR P189935.

Chapter 3. Setting up a colocated Tailored Fit Pricing DevTest or New Application solution

A colocated DevTest or New Application solution lets you add new approved z/OS solutions in an existing LPAR with other unrelated workloads without directly impacting the R4HA.

Once the WLM service definition is activated with tenant resource group definitions and associated classification rules, WLM tracks the processor consumption on behalf of the tenant resource group-specified workload. RMF then writes each tenant resource group's consumption data to SMF Type 70, Subtype 1 records every recording interval. SCRT analyzes the recorded data and produces a report for consumption by IBM's fulfillment systems, removing the workload's MSU utilization from the R4HA. SCRT analyzes the recorded data and produces a report for consumption by fulfillment systems, removing the workload's MSU utilization from the R4HA.

Use the following sections to set up a colocated Tailored Fit Pricing solution:

- "WLM definitions for a colocated Tailored Fit Pricing DevTest or New Application Solution" on page 11
- Chapter 4, "Using SCRT for Tailored Fit Pricing," on page 23

WLM definitions for a colocated Tailored Fit Pricing DevTest or New Application Solution

For a colocated Tailored Fit Pricing DevTest or New Application solution, the service level administrator must define tenant resource groups, tenant report classes, and classification rules as part of the WLM service definition.

The tenant resource groups and tenant report classes are comparable to resource groups and report classes. They allow for the metering and optional capping of workloads, along with the ability to map those workloads directly to Tailored Fit Pricing for IBM Z solutions.

- Tenant resource groups have sysplex scope, with support for up to 32 tenant resource groups across the sysplex. For each tenant resource group, the system programmer defines one or more tenant report classes, which can be used in classification rules to associate work with the tenant resource group.
- Tenant report classes are similar to standard report classes. You can configure the information that is reported on behalf of tenant resource groups by associating their tenant report classes with address spaces or enclaves using classification rules.

With this new function, the WLM Administrative Application level changes to 32, which is only available with z/OS V2R2 and above when APAR OA52312 is applied. The functionality level of the WLM service definition changes to 32 as soon as a tenant resource group is defined. A WLM service definition with functionality level 32 cannot be extracted, displayed, modified, installed or activated from a z/OS V2R2 or V2R3 system without APAR OA52312 applied. As soon as the functionality level of the WLM service definition changes to LEVEL032, all actions must be taken from a z/OS V2R2 or z/OS V2R3 system with this APAR applied.

Use *z/OS MVS Planning: Workload Management* for complete information on setting up a complete service definition for your colocated workload. In this document we just show the Tailored Fit Pricing highlights:

- "Some WLM basics for Tailored Fit Pricing" on page 12
- You can define the tenant resource groups and tenant report classes for a Tailored Fit Pricing solution as follows:
  - "Using z/OSMF to define WLM Tailored Fit Pricing definitions" on page 18
  - "Using ISPF to define WLM Tailored Fit Pricing definitions" on page 18
- "WLM application messages" on page 20.

- Once you have WLM definitions set-up for your solution, you can use the following information:
  - Chapter 5, “Using workload reporting services to collect Container Services performance data,” on page 75

Some WLM basics for Tailored Fit Pricing

This topic provides some basic information about WLM related to Tailored Fit Pricing.

Defining tenant report classes

Optionally, classification rules can assign incoming work to a tenant report class. Tenant report classes are similar to report classes and reported likewise. However, it is required that a tenant report class be assigned to a tenant resource group. A tenant resource group allows for additional metering capabilities or association to a solution.

You can define up to 2047 tenant report classes per service definition whereby the sum of report classes and tenant report classes may not exceed 2047.

Defining tenant report classes
Name Tenant report class name **Description** Description of the tenant report class **Tenant Resource Group** Name of the tenant resource group associated with the tenant report class

Name
Eight character identifier of the tenant report class. Each tenant report class must be unique within a service definition and may not have the same name as a report class.

Description
Up to 32 characters that describe the tenant report class.

Tenant Resource Group
Eight character identifier of the tenant resource group that is associated with the tenant report class.

When using tenant report classes in classification rules, note the following:

- A tenant report class cannot be specified on a classification rule with a Reporting Attribute of MOBILE, CATEGORYA, or CATEGORYB. Workload management can report on processor consumption either based on tenant resource groups or based on special reporting options, but not both at the same time.
- A classification rule cannot categorize work into a tenant report class and a service class which is associated with a resource group. Work cannot be subject to capping by means of resource groups and tenant resource groups at the same time.
- As with report classes, tenant report classes are homogeneous or heterogeneous. WLM workload reporting services provide less meaningful data for heterogeneous than for homogeneous tenant report classes. Thus, it is recommended to define separate tenant report classes for each service class and assign them all to the same tenant resource group. If your tenant report class might become heterogeneous, the WLM ISPF applications displays an appropriate warning message.
- The SYSTEM and SYSSTC service classes cannot be associated with a resource group. But, through classification with tenant report classes such work could become part of a tenant resource group that has a processor or memory limit defined:
  - The processor consumption of SYSTEM and SYSSTC work is counted towards the limit of the respective Tenant Resource Group. But, because it represents very important work which is latency sensitive, it will not be capped. Therefore, it is possible that other work may need to be capped more or that the Tenant Resource Group exceeds the defined limit.

  - Address spaces classified into the SYSTEM or SYSSTC service classes will not be associated to a memory pool. Thus, the memory pool of the Tenant Resource Group can fully be used by other work associated with it.
- A memory limit overrules the storage critical attribute assigned in classification rules and any protective storage target managed through SRM. IBM recommends that you do not classify memory sensitive work into a memory pool.

Defining tenant resource groups

Tenant resource groups allow the metering and optional capping of workloads, along with the ability to map those workloads directly to Tailored Fit Pricing for IBM Z solutions. A tenant resource group is comparable to a resource group but accepts and processes an IBM provided 64-character Solution ID. While a resource group is associated with service classes, a tenant resource group is associated with tenant report classes. You must define a tenant resource group before you can define tenant report classes.

When you specify a maximum capacity or memory limit for the tenant resource group, WLM limits the amount of processor capacity or memory available to work, which is classified to the tenant report classes associated with the tenant resource group.

You can define up to 32 tenant resource groups per service definition.

Defining tenant resource groups
Name Tenant Resource Group Name **Description** Description of the tenant resource group. **Tenant ID** Tenant identifier. **Tenant Name** Descriptive name for the Tenant ID. **Solution ID** IBM provided 64-character solution ID. **Tenant Resource Group Type** Description of the tenant resource group type. This is the same as the resource group type. **Capacity Maximum** Specifies the maximum amount of processor capacity that work associated with the tenant resource group may use. **Include Specialty Processor Consumption** Specifies whether capacity maximum applies to the sum of general purpose processor consumption and specialty processor consumption. **Memory Limit** Maximum amount of real memory that address spaces associated with the tenant resource group through classification may use on the local system. The value has a system scope.

Name
Eight characters that identify the name of the tenant resource group. Each tenant resource group must be unique within a service definition and may not have the same name as a resource group.

Description
Up to 32 characters that describe the tenant resource group.

Tenant ID
Up to eight characters that identify a tenant.

Tenant Name
Up to 32 characters that provide a descriptive name for the Tenant ID.

Solution ID
The 64 character Solution ID as provided by IBM.

Tenant Resource Group Type
Optionally, a tenant resource group allows for the control of the maximum processor consumption. Refer to "Defining resource groups" on page 14.

Maximum Capacity
CPU service that this tenant resource group may use. *Maximum* applies to all tenant report classes associated with the tenant resource group. *Maximum* is enforced. There is no default maximum value. Tenant resource group capping will not be enforced while system recovery boost is active in a partition.

Include Specialty Processor Consumption
The attribute specifies whether capacity maximum applies not only to general purpose processors but also to specialty processors. The default is **no**, which ignores CPU consumption of specialty processors when managing the maximum capacity. If **yes** is specified, the total CPU consumption on general purpose and specialty processors is is limited by the Maximum Capacity.

Memory Limit
Maximum amount of real memory that address spaces that are associated with the tenant resource group through classification may use on the local system. The attribute is specified in GB. The attribute value has system scope. Please refer to "Defining resource groups" on page 14 for a detailed description for setting a memory limit.

Tenant report classes representing transaction-oriented work, such as CICS or IMS transactions, can only be assigned to tenant resource groups without a maximum capacity defined. If you assign a tenant resource group with a maximum capacity, the WLM ISPF application displays an appropriate warning message. Although the tenant resource group is accepted, the capacity limit is ignored for the CICS and IMS transactions.

Defining resource groups

A *resource group* is an amount of processor capacity and/or memory. It is optional. Unless you have some special need to limit or protect processor capacity or memory for a group of work, you should skip defining resource groups and let workload management manage all of the processor and memory resource to meet performance goals. You use a resource group to:

- Limit the amount of processor capacity available to one or more service classes.
- Set a minimum for processor capacity for one or more service classes if the work is not achieving its goals.
- Define a minimum and maximum amount of processor capacity sysplex-wide, or on a system level.
- Specify whether capacity values of the resource groups apply to general purpose processors only or to general purpose and specialty processors.
- Limit the amount of memory capacity that is available to one or more service classes on a system level.

You can specify a minimum and maximum amount of processor capacity and a maximum amount of memory to a resource group. You can assign only one resource group to a service class. You can assign multiple service classes to the same resource group. You can define up to 32 resource groups per service definition.

Keep in mind your service class goals when you assign a service class to a resource group. Given the combination of the goals, the importance level, and the resource capacity, some goals might not be achievable when capacity is restricted.

Setting a maximum processing capacity

If work in a resource group is consuming more processor resources than the specified maximum processor capacity, the system caps the associated work accordingly to slow down the rate of processor resource consumption. The system might use several mechanisms to slow down the rate of processor resource consumption, including swapping the address spaces, changing their dispatching priority, and

capping the amount of processor service that can be consumed. Reporting information reflects that the service class might not be achieving its goals because of the resource group capping.

Setting a minimum processing capacity

By setting a minimum processing capacity, you create an overriding mechanism to circumvent the normal rules of importance. If the work in a resource group is not meeting its goals, then workload management attempts to provide the defined minimum amount of CPU resource to that work.

Setting a memory limit

By specifying a memory limit, you explicitly restrict the use of real memory of work that runs in address spaces that are associated with the resource group through classification. For a resource group with a memory limit, the system creates a memory pool. A memory pool does not reserve real memory for use by the pool, but rather tracks the aggregate usage in order to limit the total usage by address spaces connected to the pool.

An address space that is associated with the resource group through classification connects to the memory pool when the address space, or a new job, starts. In that case, all its frames are counted toward the pool limit. When a memory pool approaches its limit, the system takes actions such as initiating self-stealing to page out memory pool pages and thus free up memory pool frames. This protects the real memory allocation of other work that is running on the system.

An address space can be switched to another memory pool or back to system storage either by activating another service policy, or resetting it to another service class.

IBM recommends that you use memory pools only when it is required to limit the use of memory by workloads and for applications which provide guidance on how to operate them in a memory pool.

When you install and activate a service definition that deletes an existing resource group with a memory limit, the system defers deletion of the associated memory pool until all address spaces associated with the memory pool disconnect and end.

When a memory pool approaches its limit, address spaces starting up and connecting to the pool are deferred until enough frames are available through self-stealing from the pool.

Defining resource groups
Name Resource Group name **Description** Description of resource group **Resource Group Type** Description of resource group type **Capacity Maximum** Can be calculated in various ways, depending on which resource group is used, and is explained in the following. **Capacity Minimum** Can be calculated in various ways, depending on which resource group is used, and is explained in the following. **Include Specialty Processor Consumption** Specifies whether minimum and maximum capacity applies to the sum of general purpose processors and specialty processor consumption. **Memory Limit** Maximum amount of real memory the address spaces that are associated with the resource group through classification may use on the local system. The value has a system scope.

Name
Eight characters that identify the name of the resource group. Each resource group must be unique within a service definition.

Description
Up to 32 characters that describe the resource group.

Resource Group Type

Resource groups allow to define a guaranteed maximum and minimum CPU consumption for work on the sysplex and on each individual member of the sysplex. This allows to:

- Prioritize work on a system-level basis.
- Control the minimum and maximum resource consumption.

The following types of resource groups are valid:

Resource Group Type 1
The capacity is specified in unweighted CPU service units per second, the value must be between 0 and 99999999.

Minimum and maximum capacity applies sysplex-wide, that is, WLM ensures that the limits are met within the sysplex.

Resource Group Type 2
The capacity is specified as a percentage of the LPAR share in the general purpose processor pool, the value must be between 0 and 99999. To accommodate specialty processor capacity, values greater than 100 may be specified.

Minimum and maximum capacity has a system scope, that is, WLM ensures that the limits are met on each system within the sysplex.

Resource Group Type 3
The capacity is specified as a number of general purpose processors (CPs), a number of 100 represents the capacity of 1 CP. The number should be between 0 and 999999. To accommodate specialty processors that run at a different speed, a number greater than 100 must be specified to represent the capacity of one specialty processor.

Minimum and maximum capacity has a system scope, that is WLM ensures that the limits are met on each system within the sysplex.

Resource Group Type 4
The capacity is specified in accounted workload MSU that is based on captured time. Minimum and maximum capacity is processor consumption that is expressed in million service units per hour and applies sysplex-wide, that is, WLM ensures that the limits are met within the sysplex. Minimum and maximum must be a value between 0 and 999999.

Resource group type 4 is intended to simplify the specification of a limit expressed in MSU. This limit only applies to captured TCB and SRB times. System management time, also known as uncaptured time, is not included. Furthermore, this limit is managed on a short interval. Thus, it is no four-hour rolling average MSU consumption.

The "CPU capacity table" in *z/OS MVS Planning: Workload Management* shows the service units per second by CPU model. Also, refer to *Large Systems Performance Reference for IBM Z* at https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex to determine the MSU rating of your sysplex.

Capacity
Identifies the amount of available capacity you want workload management to allocate to the resource group. Capacity includes cycles in both TCB and SRB mode. Resource group minimum can equal resource group maximum.

Maximum
CPU service that this resource group might use. *Maximum* specified for this resource group applies to all service classes in that resource group combined. *Maximum* is enforced. There is no default maximum value. If specified, *Maximum* must be greater than 0.

Minimum

CPU service that should be available for this resource group when work in the group is missing its goals. The default is 0. If a resource group is not meeting its minimum capacity and work in that resource group is missing its goal, workload management attempts to give CPU resource to that work, even if the action causes more important work (outside the resource group) to miss its goal. If there is discretionary work in a resource group that is not meeting its minimum capacity, WLM attempts to give the discretionary work more CPU resource if that action does not cause other work to miss its goal.

The minimum capacity setting has no effect when work in a resource group is meeting its goals.

Memory Limit

Maximum amount of memory that address spaces that are associated with the resource group through classification might consume on the local system. The attribute is specified as absolute value in GB. The attribute value has system scope.

Include Specialty Processor Consumption

The attribute specifies whether capacity minimum and maximum apply not only to general purpose processors but also to specialty processors. The default is **no**, which ignores CPU consumption of specialty processors when managing the guaranteed minimum and maximum capacity. If **yes** is specified, the total CPU consumption on general purpose and specialty processors is applied.

Note:

1. You cannot assign a resource group to service classes representing transaction-oriented work, such as CICS or IMS transactions. The ISPF application notifies you with an error message if you attempt to do so. If you want to assign a minimum or a maximum processor capacity and a maximum amount of memory to CICS or IMS work, you can do so by assigning a resource group to their regions. For example, suppose that you have three service classes representing your CICS works: CICSTRN, CICSAORS, and CICSTORS. CICSTRN represents all of your online CICS transactions, and has one period with a short response time goal. CICSAORS and CICSTORS represent all of your CICS AOR and TOR regions, respectively, that process the online transactions. To assign a maximum processor capacity and a maximum amount of memory to your CICSTRN work, define a resource group, and assign it to the regions. So you assign the resource group to the CICSAORS and CICSTORS service classes.
2. Similarly, resource groups with a memory limit cannot be applied to enclave service classes. However, because enclave service classes can be used anywhere, unlike CICS or IMS transaction service classes, the ISPF application does not notify you with an error message if you attempt to do so. As for CICS or IMS, a resource group with a memory limit must be assigned to the service class of the address spaces that join the enclaves.
3. A memory limit overrules the storage critical attribute assigned in classification rules and also any protective storage target managed through SRM.
4. Resource group processor capacity capping is implemented by marking the work units that belong to resource group non-dispatchable for some time slices and dispatchable for the remaining time slices (awake slices). Depending on the configuration, it might not be possible to enforce very low resource group limits. The granularity to which a resource group limit can be managed depends on how much service the work can consume in a system or across the Sysplex, respectively, during one awake time slice. Beginning with z/OS V2.1 the granularity of awake slices is 1/256 of the time.
5. When resource groups are managed based on the general purpose processor service (the attribute, Include Specialty Processor Consumption, specifies no) the dispatchability attribute is also honored by zAAP and zIIP processors.
6. Resource group capping will not be enforced while system recovery boost is active in a partition.

Using IBM Cloud Provisioning for Tailored Fit Pricing

You can use IBM Cloud Provisioning and Management for z/OS to set up collocated DevTest or New Application solutions for Tailored Fit Pricing. For cloud provisioning, use the Resource Management task

in the Cloud Provisioning category of z/OSMF to define domains (systems) and tenants (users). You can define a tenant as a container for Tailored Fit Pricing by specifying a Solution ID for the tenant. Then, any software that you provision for that tenant is treated as part of the solution. This simplifies setup required for collocated Tailored Fit Pricing, because the Resource Management task does the z/OSMF Workload Management setup for you -- including creating the tenant resource group and tenant report classes, and generating the classification rules.

For information about IBM Cloud Provisioning and Management for z/OS, see the following:

Cloud Provisioning (www.ibm.com/docs/en/zos/2.4.0?topic=help-cloud-provisioning)

Using z/OSMF to define WLM Tailored Fit Pricing definitions

For a colocated DevTest or New Application solution, the tenant resource group and tenant report classes for your Tailored Fit Pricing solution are part of the WLM service definition for the workload.

The workload management task in z/OS Management Facility (z/OSMF) provides a browser-based user interface that you can use to manage z/OS workload manager (WLM) service definitions and provide guidelines for WLM to use when allocating resources. Specifically, you can define, modify, view, copy, import, export, and print WLM service definitions. You can also install a service definition into the WLM couple data set for the sysplex, activate a service policy, and view the status of WLM on each system in the sysplex.

Using ISPF to define WLM Tailored Fit Pricing definitions

Note that IBM recommends that you use z/OSMF to define WLM Tailored Fit Pricing definitions. If you do use the WLM ISPF Administrative Application to maintain your service definition, save the service definition using the XML format to ensure that it can be read by older levels of the WLM Administrative Application or the IWMINSTL sample job.

You can use ISPF to define the WLM Tailored Fit Pricing definitions. For a colocated solution, the tenant resource group and tenant report classes for your Tailored Fit Pricing solution are part of the WLM service definition for the workload. Use *z/OS MVS Planning: Workload Management* for the complete information on setting up a complete service definition for your workload using the ISPF administrative application - in this section, we'll just hit the Tailored Fit Pricing highlights. Make sure you use the z/OS V2R3 level or higher of *z/OS MVS Planning: Workload Management* (even if you are using Tailored Fit Pricing on z/OS V2R2).

Using the Definition Menu

The definition menu is the central place for entering your service definition. When you set up a service definition, you must enter a service definition name and optionally, a description on the Definition Menu.

Figure 4 on page 19 shows a sample Definition Menu with the service definition name and a description filled in.

```
  File  Utilities  Notes  Options  Help
 ------------------------------------------------------------------------
 Functionality LEVEL001         Definition Menu         WLM Appl LEVEL025
 Command ===> ____________________________________________________________

 Definition data set . . : none

 Definition name . . . . . ________  (Required)
 Description . . . . . . . ________________________________

 Select one of the following options.
___  1.  Policies                          12. Tenant Resource Groups
     2.  Workloads                         13. Tenant Report Classes
     3.  Resource Groups
     4.  Service Classes
     5.  Classification Groups
     6.  Classification Rules
     7.  Report Classes
     8.  Service Definition Options
     9.  Application Environments
     10.  Scheduling Environments
     11.  Guest Platform Management Provider
```

Figure 4. Definition Menu panel

Changes related to this panel for Tailored Fit Pricing include:

Tenant resource groups(new)
A tenant resource group is comparable to a resource group but accepts and processes a 64-character Solution ID. The processor consumption of all work classified into tenant report classes assigned to the tenant resource group is provided for metering capabilities.

Tenant report classes (new)
A tenant report class is a report class that is assigned to a tenant resource group. When assigning work in classification rules to a tenant report class, the processor consumption is provided for metering capabilities of the tenant resource group.

Policy overrides
You can specify a policy override for a tenant resource group. You specify a policy override by selecting Policies from the Definition Menu and then specifying the appropriate action code.

Working with tenant resource groups

To define a tenant resource group, chose option **12** on the Definition Menu. Define a name, and optionally a description, a tenant ID and name, and a 64-character Solution ID. If you want to specify a capacity limit, define the type (1, 2, 3, or 4) and capacity maximum. If you want to include the consumption of specialty processors in the capacity maximum, specify YES in the corresponding field. For a memory limit, specify the maximum amount in GB.

```
  Tenant-Resource-Group  Notes  Options  Help
------------------------------------------------------------------------------
                        Create a Tenant Resource Group
Command ===> _____________________________________________________________

Enter or change the following information:

Tenant Resource Group Name  ________  (required)
Description . . . . . . . . _________________________________
Tenant ID . . . . . . . . . ________
Tenant Name . . . . . . . . _________________________________
Solution ID . . . . . . . .
     ____________________________________________________________

Define Capacity: __  1.  In Service Units (Sysplex Scope)
                     2.  As Percentage of the LPAR share (System Scope)
                     3.  As a Number of CPs times 100 (System Scope)
                     4.  In accounted workload MSU (Sysplex Scope)
Maximum Capacity  . . . . . . . . . . . . . ________
Include Specialty Processor Consumption NO        (YES or NO)

Memory Limit (System Scope) . . . . . . ________
```

Figure 5. Create a Tenant Resource Group panel

Once you have created a tenant resource group, any other time you choose the tenant resource group option from the definition menu, the application displays a selection list. From here, you can modify your tenant resource group, as well as print, and browse it.

Working with tenant report classes

To define a tenant report class, chose option **13** on the Definition Menu. Define the name of the tenant report class, and optionally a description. You must assign a tenant resource group to the tenant report class. You can type ? in the tenant resource group name field for a list of tenant resource groups.

You can use tenant report classes in classification rules to categorize work.

```
  Tenant-Report-Class  Notes  Options  Help
------------------------------------------------------------------------------
                       Create a Tenant Report Class
Command ===> _____________________________________________________________

Enter or change the following information:

Tenant Report Class Name . . . ________  (Required)
Description  . . . . . . . . . _________________________________

Tenant Resource Group Name . . ________  (Required; name or ?)
```

Figure 6. Create a Tenant Report Class

Once you have created a tenant report class, any other time you choose the tenant report class option from the definition menu, the application displays a selection list. From here, you can modify your tenant report class, as well as print, and browse it.

You can also type **?** in the report class field on the Modify Rules for a Subsystem Type panel for a selection list of tenant report classes.

WLM application messages

IWMAM313 **No more than 2047 report classes and tenant report classes may be defined.**

Explanation

It is not possible to define more than 2047 report classes and tenant report classes.

System action

The requested operation is not performed.

Programmer response

Do not use more than 2047 report classes and tenant report classes.

Module

Workload manager (WLM)

IWMAM512 No more than 32 resource groups may be defined.

Explanation

It is not possible to define more than 32 resource groups.

System action

The requested operation is not performed.

Programmer response

Do not use more than 32 resource groups.

Module

Workload manager (WLM)

IWMAM540 No more than 32 tenant resource groups may be defined.

Explanation

It is not possible to define more than 32 tenant resource groups.

System action

The requested operation is not performed.

Programmer response

Do not use more than 32 tenant resource groups.

Module

Workload manager (WLM)

Using system command RESET to change the service class of work when associated with a tenant resource group

Use system command RESET|E jobname with the SRVCLASS keyword to change the service class of work currently in execution. Resetting to a new service class also resumes quiesced work. The SRVCLASS keyword explains how the system handles the case when the service class is associated with a tenant resource group.

For complete information about the RESET command, see *z/OS MVS System Commands*.

Use this command only at the direction of the system programmer.

The syntax for this form of the RESET command is:

```
RESET|E jobname[,A=asid],
                        {SRVCLASS=classname}
                        {QUIESCE|Q          }
                        {RESUME             }
```

jobname
The name of the job, time-sharing user, or started task whose performance characteristics you want to change. This command affects the current job step and all subsequent job steps in this execution.

A=*asid*
The hexadecimal address space identifier (ASID) of the job, time-sharing user, or started task you want to change. You can specify this keyword before or after the SVRCLASS, QUIESCE, or RESUME parameters.

This parameter is required if there is more than one job with the same job name.

SRVCLASS=*classname*
The name of the service class to be assigned to the job or address space. Resetting to a new service class also resumes quiesced work.

When you issue a RESET against a server (for example, an address space) to a new service class, the goals associated with that service class are ignored. However, the resource group associated with the

new service class is honored. The one exception is the case where the goal for a server is honored when the transactions it is serving have been assigned a discretionary goal.

If the address space you want to change is associated with a tenant resource group, and the new service class is associated with a resource group, the address space is disconnected from the tenant resource group. If the new service class is not associated with a resource group, RESET does not change the connection of the address space with a tenant resource group.

There may be special circumstances under which you would wish to reset an address space with a SYSTEM or SYSSTC service class. See the "Defining Classification Rules" topic in *z/OS MVS Planning: Workload Management* for information about the use of the SYSTEM and SYSSTC service classes.

RESET SRVCLASS will remain in effect until one of the following events occurs:

- The job ends.
- The policy is switched to a new policy in which the target service class has been deleted.
- A RESET RESUME command is issued.

QUIESCE|Q
Requests that the target job or address space be quiesced; that is, given the lowest possible performance characteristics. QUIESCE swaps out swappable work, effectively shutting off that work. QUIESCE just lowers the performance of non-swappable work, leaving it swapped in.

RESET QUIESCE will remain in effect until one of the following events occurs:

- The job ends.
- A RESET RESUME command is issued.

RESUME
Specifies that a job or address space be reclassified. If the job or address space was quiesced by a previous RESET *jobname*,QUIESCE command, or if the job or address space was assigned to a different service class, RESUME causes the work to be reclassified according to the service policy in effect and resumes processing at the performance targets specified in the service policy.

The classification rules used are those in effect at the time the RESET command is issued.

Chapter 4. Using SCRT for Tailored Fit Pricing

The Sub-Capacity Reporting Tool (SCRT) allows you to generate Sub-Capacity reports or Multiplex reports.

The procedure for using SCRT for Tailored Fit Pricing is to update the SCRT JCL SPECIAL DD statement before you run the job that produces the SCRT report. You use

- For a Software Consumption Solution, a CONTAINER and UPDATE CONTAINER command
- For a Hardware Consumption Solution, INTERVAL_RATE_DATA and DETAIL_INTERVAL_RATE_DATA control statements
- For a dedicated LPAR DevTest or New Application solution, a CONTAINER and UPDATE CONTAINER command
- For a colocated LPAR DevTest or New Application solution, an UPDATE CONTAINER command.

There is no SCRT reporting requirement for an Enterprise Capacity Solution.

As an alternative, for a solution with a dedicated LPAR, you can specify the **SOLUT** system parameter in the IEASYSxx member of parmlib when IPLing a z/OS system as part of the qualified solution. The **SOLUT** parameter associates the system with the solution ID. **SOLUT** is available with the appropriate level of z/OS service. For more information, see "Dedicated LPARs" on page 24.

SCRT uses the Tailored Fit Pricing data to understand the resource consumption, and it automatically removes that container's MSU consumption from the LPAR's peak rolling 4-hour average (R4HA).

In this information, we cover the highlights for Tailored Fit Pricing. For complete information about SCRT, see *Using the Sub-Capacity Reporting Tool*, available from the IBM Z software pricing - Licensing - Sub-capacity licensing (www.ibm.com/it-infrastructure/z/software/pricing-licensing).

SCRT commands for the **Software Consumption Solution**

For a Software Consumption Solution, use these commands:

```
CONTAINER CPC=tttt-sssss,
IMAGE_ID=(image1,image2,...,imageN),
ID=solutionID


UPDATE CONTAINER,
ID=solutionID,
SET_NAME="solutionName"
```

Use one CONTAINER command for each machine that the solution runs on and one UPDATE CONTAINER command for each solution ID.

SCRT commands for the Hardware Consumption Solution

For a Hardware Consumption Solution, include the following control statements in the SPECIAL DD of the SCRT job:

```
INTERVAL_RATE_DATA
DETAIL_INTERVAL_RATE_DATA
```

SCRT commands for a dedicated DevTest or New Application solution

For a dedicated solution, use these commands:

```
CONTAINER CPC=tttt-sssss,
IMAGE_ID=(image1,image2,...,imageN),
ID=solutionID


UPDATE CONTAINER,
ID=solutionID,
SET_NAME="solutionName"
```

SCRT commands for a colocated DevTest or New Application solution

For a colocated solution, use this command:

```
UPDATE CONTAINER,
ID=solutionID,
SET_NAME="solutionName"
```

Dedicated LPARs

For a solution with a dedicated LPAR, the method used to associated the solution ID with the system or LPAR affects reporting.

- If a solution ID is provided on the **SOLUT** system parameter when a z/OS system is IPLed, the solution ID is included in the SMF type 89 records from that system. SCRT automatically associates the system with the corresponding solution. Solution IDs assigned in this manner are applied on an hour-by-hour basis. A system may move between containers (or out of a container) during the reporting period.
- When a **CONTAINER** control statement is specified, SCRT associates the specified LPARs with the specified solution. A **CONTAINER** control statement applies to the entire reporting period. If a **CONTAINER** statement is supplied for a system that also has a solution ID specified via the **SOLUT** system parameter, the solution ID specified on the **CONTAINER** statement takes precedence and the system parameter value is discarded.

Using the SOLUT parameter

The **SOLUT** system parameter in the IEASYSxx member of parmlib associates a system with the solution ID when you IPL a z/OS system as part of a dedicated-LPAR solution. **SOLUT** requires the appropriate level of z/OS service. The details of the **SOLUT** parameter follow.

SOLUT

```
SOLUT=solution-id
```

This parameter specifies a 64-character solution ID (*solution-id*) that is provided to you by IBM.

The solution ID associates the system with a Tailored Fit Pricing solution. All system activity that is not otherwise associated with a different solution ID by way of WLM tenant resource groups will be associated with the specified solution ID. The solution ID is reported in SMF type 89 subtype 1 and subtype 2 records.

Value range: An IBM-provided, 64-character Tailored Fit Pricing solution ID.

Default: None. (The system is not associated with a Tailored Fit Pricing solution.)

Associated parmlib member: None.

Reporting for Tailored Fit Pricing

The reporting requirements vary with the solution. See:

- "Reporting for Tailored Fit Pricing for IBM Z - Software Consumption Solution" on page 25 for information about a Software Consumption Solution
- "Reporting for Tailored Fit Pricing for IBM Z - Hardware Consumption Solution" on page 27 for information about a Hardware Consumption Solution
- "Reporting for Tailored Fit Pricing for IBM Z" on page 29 for information about an Application Development and Test and New Application Solution.

The Enterprise Capacity Solution has no reporting requirement.

Reporting for Tailored Fit Pricing for IBM Z - Software Consumption Solution

Tailored Fit Pricing for IBM Z - Software Consumption Solution (Software Consumption Solution) is a tailored usage-based pricing model where compute is measured on a per-MSU consumed basis. Charges are based on the total MSUs consumed annually.

Overview of Software Consumption Solution

- Committed per-MSU consumed licensing simplifies pricing and removes the need for capping.
- Annual MSU entitlements allow seasonal variations to be smoothed over a full 12-month period.
- Aggressive growth pricing is available for all MSU consumption above a committed baseline.
- The Software Consumption Solution is an alternative to a R4HA-based pricing model for all production workloads, whether new, existing, or growth. This greatly improves deployment flexibility, without the requirement for LPAR-level micromanagement of IBM product usage.
- The Software Consumption Solution offers price predictability and flexibility for clients who rely on IBM Z for their mission-critical workloads. It is offered in conjunction with the Application Development and Test Solution to deliver a comprehensive end-to-end pricing solution for all stages of the application lifecycle.

SCRT externals for Software Consumption reporting

SCRT provides the following externals for Software Consumption reporting:

- A report type specific to Software Consumption reporting: SCRT ENTERPRISE TAILORED FIT REPORT.
- The **ENTERPRISE_TAILORED_FIT_PRICING** control statement for requesting an Software Consumption report.
- All systems are required to be assigned to a container. SCRT issues a message and terminates if there are any unassigned systems in the SMF data.
- Software Consumption reports are always in UTC time.
- Existing SCRT externals apply to Software Consumption reporting, except for the following restrictions:
  - The NO89 DD is optional and deprecated for use in Software Consumption reports. Designate NO89 products on a per-container basis via the **NO89_PRODUCT_ID** keyword of the **UPDATE CONTAINER** control statement, instead of on a per-LPAR basis as allowed via the NO89 DD. If the NO89 DD is present, SCRT will process it and apply it to the designated LPARs.
  - The **COUNTRY_MULTIPLEX_PRICING** control statement is not allowed.
  - The **REPORT_TIME** control statement is not allowed.
  - The following SPECIAL DD control statements that apply to special IBM pricing offerings are not allowed:
    - INTEGRATED_WORKLOAD_PRICING
    - IGNORE_WLM_MWP_DATA
    - DIAGMSG=WLMZWPC
    - DIAGMSG=WLMMOB
    - ASSIGN ZCAP

- ASSIGN ZWPC

– The following DD statements are not applicable; SCRT ignores them if they are specified:
  - INPUTCSV
  - IWPTRACE
  - GSTRACE
– The SCRT ISVLIB capability does not support the Enterprise Tailored Fit report type. Instead, use the SCRT report type required by the specific ISV. Either standard or multiplex reporting can be used for ISV reporting that includes container definitions.

Sample configuration for Software Consumption reporting

The sample report for Software Consumption is based on the following hardware and software configuration.

The sample configuration consists of a 3906-7E7 CPC with serial number 00001. The CPC is configured with 3 LPARs, all running z/OS natively. LPAR1 and LPAR2 are assigned to the Production1 container, which is based on a consumption metric. LPAR3 is assigned to the DevTest1 container, which is a capacity-based container.

Sample control statement input for Software Consumption reporting

The sample Software Consumption report is based on the following SPECIAL DD control statement input to SCRT:

```
CONTAINER CPC=3906-00001,IMAGE_ID=LPAR1,
ID=D911111-N285B66-88AF33BB8C-NSZZZZZZ-7203-417E-90DB-53931E-3788B8
CONTAINER CPC=3906-00001,IMAGE_ID=LPAR2,
ID=D911111-N285B66-88AF33BB8C-NSZZZZZZ-7203-417E-90DB-53931E-3788B8
CONTAINER CPC=3906-00001,IMAGE_ID=LPAR3,
ID=D911111-N6EE848-5A09B977D0-NTZZZZZZ-1DDE-4F4B-821D-3D8B30-301310
UPDATE CONTAINER,SET_NAME="Production1",
ID=D911111-N285B66-88AF33BB8C-NSZZZZZZ-7203-417E-90DB-53931E-3788B8
UPDATE CONTAINER,SET_NAME="DevTest1",
ID=D911111-N6EE848-5A09B977D0-NTZZZZZZ-1DDE-4F4B-821D-3D8B30-301310
```

Under Software Consumption reporting, all LPARs must be assigned to a container.

Sample report for Software Consumption reporting

An Software Consumption report has the same basic format and content as a Country Multiplex Pricing sub-capacity report with containers, except for the following points:

- Section B5 does not report sub-capacity four-hour rolling average (4HRA) values for z/OS products.
- Section B5 does not report sub-capacity 4HRA peaks for containers that are based on a consumption metric.
- Sections E5, P5, and Q5 are not present in the report unless z/TPF or z/VSE® or both are present in the reporting environment.
- The CPS header sections do not report the container's peak 4HRA for containers that are based on a consumption metric.

The following sample report highlights the differences between a sub-capacity Country Multiplex Pricing report and an Software Consumption Solution report.

Figure 7 on page 27 shows section B5 of the report. No product-level 4HRA information is presented in section B5.

```
==B5========= SCRT ENTERPRISE TAILORED FIT REPORT - IBM Corp ====================

SCRT Tool Release                              28.2.0
Name of Person Submitting Report:              Joe Contact
E-Mail Address of Report Submitter:            customer@example.com
Phone Number of Report Submitter:              888-555-5555

Customer Name                                  Example Corp
Run Date/Time                                  09 May 2020 - 11:12
Report Period                                  2 Apr, 2020 - 1 May, 2020 inclusive (30 days)
Number of processors in Multiplex                     1

Machine identifier                                                                  M1C1
Customer number                                                                     US-S000000000
Machine Serial Number                                                               02-00001
Machine Type and Model                                                              3906-7E7
Machine Rated Capacity (MSUs)                                                       15369
Machine Model Changed                                                               N
Exclude Data                                                                        N
Missing LPAR Data                                                                   N
Missing CPC Data                                                                    N

Container Identifier   Container Name                    MSU   Time
CPS2                   DevTest1                         4139   06 Apr 2020 - 16:00 UTC       4139

Container Identifier   Container Name    TOTAL MSU Consumption
CPS1                   Production1                    4185373                              4185373
```

Figure 7. Sample report for Software Consumption Solution: Section B5

In section B5, no product-level 4HRA information is presented. The DevTest1 container is capacity-based and reports the 4HRA information for that container, but it does not report MSU consumption. The Production1 container is consumption-based and reports MSU consumption, but it does not report any 4HRA information.

Figure 8 on page 27 shows the CPS1 header section for the Production1 container.

```
==CPS1============================================================

Solution ID             D911111-N285B66-88AF33BB8C-NSZZZZZZ-7203-417E-90DB-53931E-3788B8
Solution Name           Production1
Total MSU Consumption                4185373
```

Figure 8. Sample report for Software Consumption Solution: CPS1 header section

The solution associated with the CPS1 container is a consumption-based solution. No peak 4HRA is reported for the container.

Figure 9 on page 27 shows the CPS2 header section for the Production1 container.

```
==CPS2============================================================

Solution ID                    D911111-N6EE848-5A09B977D0-NTZZZZZZ-1DDE-4F4B-821D-3D8B30-301310
Solution Name                  DevTest1
Peak Four Hour Rolling Average                4139
```

Figure 9. Sample report for Software Consumption Solution: CPS2 header section

The solution associated with the CPS2 container is a capacity-based solution. No MSU consumption is reported for the container.

Reporting for Tailored Fit Pricing for IBM Z - Hardware Consumption Solution

SCRT supports Tailored Fit Pricing for IBM Z - Hardware Consumption Solution reporting based on interval rate data.

Hardware Consumption reporting identifies reporting period hours in which the MSU rate of a CPC exceeded the purchased capacity of the CPC within any 15-minute period. The MSU rate may exceed the purchased capacity as a result of additional active capacity from Capacity on Demand or other hardware offerings.

How SCRT calculates MSU rate data

SCRT MSU rate calculations are based on the reported effective dispatch time (EDT) on general purpose processors for all LPARs on the CPC. The EDT for all LPARs is summed for each 15-minute interval and converted to an hourly MSU rate based on the machine capacity factors at the time. All of the required information is included in the SMF 70 records.

SCRT requires SMF 70 records from at least one LPAR with SMF interval lengths of 1, 3, 5, or 15 minutes. When the interval lengths are less than 15 minutes, SCRT rolls up those intervals into 15-minute periods. (This occurs specifically for section I5 and related calculations only and is not generally true for other SCRT report values.)

SCRT externals for Hardware Consumption reporting

SCRT provides the following externals in support of Hardware Consumption reporting:

- The **INTERVAL_RATE_DATA** control statement for requesting that SCRT include the interval rate data section I5 in an SCRT report.
- The **DETAIL_INTERVAL_RATE_DATA** control statement for requesting that SCRT include the detailed interval rate data section V9 in an SCRT report.
- A new CPC MSU Rate Above Permanent Capacity Rating section (I5) in SCRT reports. For details about this section, see "Sample report for Hardware Consumption reporting" on page 28.
- A new Detailed Interval Data section (V9) in SCRT reports. For details about this section, see "Sample report for Hardware Consumption reporting" on page 28.

Sample report for Hardware Consumption reporting

An SCRT report with interval rate data enabled for Hardware Consumption reporting (by specifying the **INTERVAL_RATE_DATA** control statement) displays an additional report section, section I5. Section I5 appears per CPC and reports every hour during which the MSU rate of any 15-minute interval within the hour exceeded the permanent (purchased) capacity. If multiple 15-minute intervals exceed the permanent capacity, section I5 reflects the highest excess over capacity.

Figure 10 on page 28 shows an example of section I5.

```
==I5============================================================
CPC MSU RATE ABOVE PERMANENT CAPACITY RATING

Date/Time             MSU Rate     Perm Capacity     Excess Over Capacity
02 Mar 2019 -00:00        7766              5771                     1995
02 Mar 2019 -01:00        6238              5771                      467
02 Mar 2019 -21:00        6418              5771                      647
02 Mar 2019 -22:00        6143              5771                      372
```

Figure 10. Sample SCRT report: CPC MSU Rate Above Permanent Capacity Rating section (I5)

The column headings in section I5 are defined as follows:

Date/Time
The reporting period hour during which the interval occurred.

MSU Rate
The 15-minute MSU rate that resulted in the highest excess over capacity in the reporting period hour.

Perm Capacity
The permanent capacity of the CPC during the reporting period hour.

Excess Over Capacity
The difference between the MSU rate and the permanent capacity.

If the **DETAIL_INTERVAL_RATE_DATA** control statement is specified to include detailed interval data, the Detailed Interval Data section (V9) also appears in the report. Section V9 appears per CPC and provides finer granularity for interval rate data by showing a (typically) 15-minute view of the CPC MSU rate.

Figure 11 on page 29 shows an example of section V9.

```
==V9================================================================
DETAILED INTERVAL DATA

                                                                                                                  Hour  Hour MSU   MSU   Perm   Perm      Temp   Temp
            Date/Time            IntervalStart        IntervalEnd          IntLen  TypeMod  Rating   R4HA  Consumed   Rate  Model  Capacity  Model  Capacity

3906-6A477  02 Mar 2019 - 00:00  02 Mar 2019 - 00:00  02 Mar 2019 - 00:15      15  3906-763   7898   1122       796   7766    743      5771    763      7898
3906-6A477  02 Mar 2019 - 00:00  02 Mar 2019 - 00:15  02 Mar 2019 - 00:30      15  3906-763   7898   1122       796   7642    743      5771    763      7898
3906-6A477  02 Mar 2019 - 00:00  02 Mar 2019 - 00:30  02 Mar 2019 - 00:45      15  3906-763   7898   1122       796   6468    743      5771    763      7898
3906-6A477  02 Mar 2019 - 00:00  02 Mar 2019 - 00:45  02 Mar 2019 - 01:00      15  3906-763   7898   1122       796   5603    743      5771    763      7898
3906-6A477  02 Mar 2019 - 01:00  02 Mar 2019 - 01:00  02 Mar 2019 - 01:15      15  3906-763   7898   1063      1209   6238    743      5771    763      7898
3906-6A477  02 Mar 2019 - 01:00  02 Mar 2019 - 01:15  02 Mar 2019 - 01:30      15  3906-763   7898   1063      1209   5903    743      5771    763      7898
3906-6A477  02 Mar 2019 - 01:00  02 Mar 2019 - 01:30  02 Mar 2019 - 01:45      15  3906-763   7898   1063      1209   6032    743      5771    763      7898
3906-6A477  02 Mar 2019 - 01:00  02 Mar 2019 - 01:45  02 Mar 2019 - 02:00      15  3906-763   7898   1063      1209   4962    743      5771    763      7898
```

Figure 11. Sample SCRT report: Detailed Interval Data section (V9)

The column headers in section V9 are defined as follows:

Column 1 (untitled)
The CPC being reported

Data/Time
The reporting period hour during which the interval occurred.

IntervalStart
The start of the interval within the reporting period hour.

IntervalEnd
The end of the interval within the reporting period hour.

IntLen
The length of the interval, in minutes.

TypeMod
The active machine model and type.

Rating
The MSU rating of the active machine model.

Hour R4HA
The rolling 4-hour average CPU utilization of all LPARs that reported data for the report period hour. This value is for the entire hour, not the sub-hour interval.

Hour MSU Consumed
The total MSU consumed by all LPARs that reported data for the report period hour. This value is for the entire hour, not the sub-hour interval.

MSU Rate
The MSU rate of the CPC over the interval.

Perm Model
The permanent machine model during the interval.

Perm Capacity
The permanent machine capacity during the interval.

Temp Model
The temporary machine model during the interval.

Temp Capacity
The temporary machine capacity during the interval.

Reporting for Tailored Fit Pricing for IBM Z

Tailored Fit Pricing for IBM Z (Tailored Fit Pricing) provides simplified software pricing for qualified solutions and combines flexible deployment options with competitive economics that are directly relevant to those solutions.

Tailored Fit Pricing can scale from collocated solutions within existing LPARs, through separate LPARs, up to multi-LPAR solutions, without directly impacting the cost of unrelated workloads.

Tailored Fit Pricing is a framework that IBM solutions can use; it is not linked to a single, announced offering or solution. Each container-eligible solution has its own set of terms and conditions that apply to it.

Overview of Tailored Fit Pricing for IBM Z

Tailored Fit Pricing for IBM Z provides a mechanism for a qualified solution to be isolated from directly impacting the cost of traditional workloads in a customer environment, whether collocated on an existing LPAR or located on separate LPARs.

The Tailored Fit Pricing framework allows you to deploy a solution where you want it based on the best technical fit.

SCRT provides isolated reporting for each Tailored Fit Pricing solution that it finds on a CPC or in a multiplex. Each container reports a metric appropriate to the solution type associated with the container, such as peak rolling 4-hour average utilization or total MSU consumption. There is no concept of product sub-capacity tracking within a container.

For a new, collocated solution, z/OS provides enhanced tracking capability using tenant resource groups (TRGs) in z/OS Workload Management (WLM) to meter and report on a specific solution. This process requires a one-time setup step to define and classify the solution in WLM.

After this one-time setup step, z/OS meters and reports on the workload monthly. There is no requirement to generate INPUTCSV files or to otherwise modify your monthly reporting process. Solution-specific data is captured in enhanced SMF type 70 subtype 1 and type 89 subtype 1 and 2 records. SCRT analyzes the SMF data and removes the impact of any container TRGs from the LPARs on which they ran.

For a separate LPAR solution, a SPECIAL DD command associates an LPAR with a Tailored Fit Pricing solution. During SCRT processing, the named LPARs are removed from the traditional non-container environment. These LPARs do not contribute to product sub-capacity values.

For both collocated and separate LPAR solutions, Tailored Fit Pricing solutions that are found to be running in your environment are reported in a separate section of the SCRT report, isolated from the traditional sub-capacity environment.

When used in conjunction with Country Multiplex Pricing, SCRT provides aggregation of a container across multiple CPCs.

Note: Tailored Fit Pricing for IBM Z is only supported for z/OS systems.

For more information about Tailored Fit Pricing for IBM Z and announced solutions, see Container Pricing for IBM Z (www.ibm.com/it-infrastructure/z/software/pricing-container).

Interactions with traditional sub-capacity offerings

Tailored Fit Pricing for IBM Z provides isolation for qualified solutions. While each solution has specific terms and conditions, there are a set of basic interactions and rules that dictate the impact of a container on your traditional sub-capacity environment. In general, within a container, IBM pricing offerings such as Mobile Workload Pricing, do not apply.

Collocated solutions

SMF type 70 subtype 1 records provide SCRT with a summary view of all TRGs in your environment. Only TRGs with a valid solution ID in the SMF records are evaluated for the Tailored Fit Pricing algorithm.

For each LPAR in the environment, on a per-hour basis, SCRT aggregates the weighted rolling 4-hour average of each TRG that has a valid solution ID. When determining the rolling 4-hour average for a TRG for a given hour, the duration of the LPAR is used for the hour. One hundred percent of this aggregate rolling 4-hour average is removed from the standard sub-capacity (SMF70LAC-based) value for the LPAR on a per-hour basis.

Additionally, SCRT uses enhanced TRG tracking via SMF type 89 subtype 1 and 2 records to adjust product usage and instance values, respectively. This adjustment occurs only for products that are executing as part of a TRG that can be associated with a Tailored Fit Pricing solution.

For Getting Started Sub-Capacity Pricing (GSSP) eligible products and IBM Z Collocated Application Pricing (zCAP) net-new defining programs, on a per-hour basis, SCRT aggregates the general-purpose processor time for each TRG that has a valid solution ID, and removes it from the product-level LPAR CPU time values. This has the effect of lowering the CPU time that is used to calculate the product's GSSP or zCAP usage value.

For zCAP, Mobile Workload Pricing (MWP), and IBM Z Workload Pricing for Cloud (zWPC) INPUTCSV processing, SCRT similarly adjusts the general-purpose processor LPAR CPU time. This serves to decrease the maximum allowed INPUTCSV time for the defining program, as appropriate.

For instance based products, such as z/OS Connect EE, on a per-hour basis, SCRT aggregates the instances of the product running in TRGs with a valid solution ID and removes them from the product-level LPAR instance values.

For all products, both SMF type 89 subtype 1 CPU time and subtype 2 instance counts are evaluated on a per-hour basis to determine whether products executing in a container TRG are also active in the traditional, non-container environment. In cases where a product did not accrue any CPU time or instances outside of a container TRG, SCRT considers that product to be inactive for the hour.

Separate LPAR solutions

Tailored Fit Pricing for IBM Z allows for an entire LPAR to be selected as part of a solution. The solution ID and applicable systems are provided to SCRT via one of more of the following options:

- If a solution ID is provided on the **SOLUT** system parameter when a z/OS system is IPLed, the solution ID is included in the SMF type 89 records from that system. SCRT automatically associates the system with the corresponding solution. Solution IDs assigned in this manner are applied on an hour-by-hour basis. A system may move between containers (or out of a container) during the reporting period.
- When a **CONTAINER** control statement is specified, SCRT associates the specified LPARs with the specified solution. A **CONTAINER** control statement applies to the entire reporting period. If a **CONTAINER** statement is supplied for a system that also has a solution ID specified via the **SOLUT** system parameter, the solution ID specified on the **CONTAINER** statement takes precedence and the system parameter value is discarded.

When an LPAR or system is associated with a solution ID, SCRT removes the named LPAR from the standard sub-capacity configuration. These systems do not contribute to any traditional product sub-capacity values for the reporting period and, therefore, are removed from aggregation.

SCRT supports the execution of co-located Tailored Fit Pricing for IBM Z solutions on LPARs that are part of a separate LPAR solution (that is, a container within a container). When a co-located solution runs on an LPAR that is associated with a different solution, SCRT removes the impact of the co-located solution from the solution associated with the LPAR.

SCRT externals for Tailored Fit Pricing for IBM Z

SCRT provides the following externals for Tailored Fit Pricing for IBM Z:

- The optional **CONTAINER** command (control statement) lets you to specify the LPARs that are part of a qualified container solution.
- The **UPDATE CONTAINER** command (control statement) lets you to specify the required solution name for each container.
- The optional **UPDATE SOLUTION ID** command (control statement) lets you to substitute a new or corrected solution ID found in the SMF data.
- The **IGNORE CONTAINER** command (control statement) lets you specify that container processing is to be ignored for a specific container for the indicated time interval.

- The **CPSTRACE DD** statement lets you specify an output data set or file to contain detailed information about container solution execution.

CONTAINER control statement

In cases where an LPAR is dedicated to a qualified Tailored Fit Pricing solution, use the **CONTAINER** control statement (or the appropriate SCRT GUI panel) to associate the LPAR with a container solution ID.

IBM authorizes the use of the **CONTAINER** control statement only in cases where you have signed or otherwise agreed to the terms and conditions of a Tailored Fit Pricing solution. Any LPARs that are part of a Tailored Fit Pricing solution must be dedicated to the solution or workload indicated as part of the agreement. The solution ID that you specify on the **CONTAINER** statement must match the solution ID provided on the IBM License Management Support (LMS) website for the qualified workload.

For the format of the **CONTAINER** command, see csscrtspecialdd.dita#csscrtspecialdd/wtf.

UPDATE CONTAINER control statement

Use the **UPDATE CONTAINER** control statement to associate the LMS-provided solution name with a Tailored Fit Pricing solution based on the associated solution ID and to designate NO89 products that run in the container. The **UPDATE CONTAINER** statement is required for Tailored Fit Pricing solutions.

Each Tailored Fit Pricing solution, whether found in SMF data or specified using the **CONTAINER** control statement, must have a solution name associated with it via an **UPDATE CONTAINER** statement. The name specified on the **UPDATE CONTAINER** statement must match the name specified for the container (as identified by the unique solution ID) in the LMS web application.

For the format of the **UPDATE CONTAINER** command, see csscrtspecialdd.dita#csscrtspecialdd/igcon.

UPDATE SOLUTION_ID control statement

Use the optional **UPDATE SOLUTION_ID** control statement to replace a solution ID associated with a container TRG with a new or corrected solution ID. The replacement solution ID must correspond to the qualified workload that ran in the container.

The **UPDATE SOLUTION_ID** control statement is only intended for use under rare circumstances, such as when a TRG is defined with a solution ID that is incorrect or not applicable.

For the format of the **UPDATE SOLUTION_ID** command, see csscrtspecialdd.dita#csscrtspecialdd/upsol.

IGNORE CONTAINER control statement

Use the optional **IGNORE CONTAINER** control statement to request that SCRT ignore a Tailored Fit Pricing solution for a specified time interval.

The **IGNORE CONTAINER** control statement is only intended for use under rare circumstances and as directed by IBM.

For the interval specified on an **IGNORE CONTAINER** control statement, SCRT does not apply the Tailored Fit Pricing algorithm and considers any Tailored Fit Pricing tenant resource groups (TRGs) and dedicated LPARs that are associated with the specified solution ID to be part of the standard sub-capacity environment. Specifically:

- Tailored Fit Pricing LPARs are aggregated into standard sub-capacity product reporting.
- The rolling 4-hour average contribution and product data for the Tailored Fit Pricing TRG are not removed from the product values for the LPAR.
- Container peak calculations ignore the specified time range.

For the format of the **IGNORE CONTAINER** command, see csscrtspecialdd.dita#csscrtspecialdd/igcon.

CPSTRACE DD statement

You can use the optional CPSTRACE DD statement to specify a data set or file that is to contain detailed, hour-by-hour tracking for Tailored Fit Pricing reporting. The trace output is organized as comma-separated fields to allow the file to be read by a spreadsheet application.

The CPSTRACE output contains a section for each container. Each container section begins with a header record, followed by an hour-by-hour view of the TRGs and dedicated LPARs that contributed to the container's rolling 4-hour average utilization for each hour.

- When using the default SCRT processing and multiple CPCs are found in the input SMF data, the CPSTRACE output displays a Tailored Fit Pricing solution that spans multiple CPCs on a per CPC basis. The default SCRT processing does not support aggregation across CPCs.
- When using Country Multiplex Pricing, the CPSTRACE output for a single container spans each CPC on which the container is found.

The CPSTRACE output is divided into two sub-reports labeled CPSTRACE 1 and CPSTRACE 2. Each sub-report contains a section for each container.

- The CPSTRACE 1 sub-report output contains a section for each container. Each container section begins with a header record followed by an hour-by-hour view of the TRGs and dedicated LPARs that contributed to the container's rolling 4-hour average utilization for each hour.
- The CPSTRACE 2 sub-report output contains a section for each container. Each container section begins with a header record followed by an hour-by-hour view of the TRGs and dedicated LPARs that contributed to the container's MSU consumption for each hour.

Figure 12 on page 33 shows an example of the format of the CPSTRACE output.

```
==CPSTRACE=============================================================
Container Pricing Detailed Data

==CPSTRACE 1===========================================================
Four Hour Rolling Average

CPS1   DevTest Solution     Z111111-N31BB29-8FC80FDC07-NSDTZZZZ-91CC-465B-98CA-0565FF-E42B4F
CPS1   Date Time            Processor     Partition -  LPAR1     LPAR2     CPC       Container
CPS1                        (tttt-ssssss)  TRG -        (lpar)    TRG1      Total     Total
CPS1   02 Aug 2018 - 00:00  3906-12345                  1450        49      1449          1449
CPS1   02 Aug 2018 - 01:00  3906-12345                  2283       251      2534          2534
CPS1   02 Aug 2018 - 02:00  3906-12345                  2638       275      2913          2913
CPS1   02 Aug 2018 - 03:00  3906-12345                  2795       531      3326          3326
CPS1   02 Aug 2018 - 04:00  3906-12345                  1976       841      2817          2817
⋮

==CPSTRACE 2===========================================================
MSU Consumption

CPS1   DevTest Solution     Z111111-N31BB29-8FC80FDC07-NSDTZZZZ-91CC-465B-98CA-0565FF-E42B4F
CPS1   Date Time            Processor     Partition -  LPAR1     LPAR2     CPC       Container
CPS1                        (tttt-ssssss)  TRG -        (lpar)    TRG1      Total     Total
CPS1   02 Aug 2018 - 00:00  3906-12345                  5803       197      6000          6000
CPS1   02 Aug 2018 - 01:00  3906-12345                  3330       810      4140          4140
CPS1   02 Aug 2018 - 02:00  3906-12345                  1423        93      1516          1516
CPS1   02 Aug 2018 - 03:00  3906-12345                   627      1024      1651          1651
CPS1   02 Aug 2018 - 04:00  3906-12345                  2529      1437      3966          3966
⋮
```

Figure 12. Example of CPSTRACE output (formatted)

Each row for a specific Tailored Fit Pricing solution (CPS) begins with a solution token assigned by SCRT. Each CPS token begins with CPS followed by a number (for instance, CPS1), and corresponds to the CPS token for that container (as indicated by the unique solution ID) in the SCRT report for a CPC.

The first CPS*n* row contains the unique IBM-assigned solution ID for the Tailored Fit Pricing solution.

The following fields appear in the header record:

Date Time
The day, month, year, and time corresponding to the data presented on the row of the CPSTRACE output.

Processor
The machine type (*tttt*) and serial number (*sssss*) of the CPC on which the Tailored Fit Pricing solution ran.

Partition
The LPARs on which the Tailored Fit Pricing solution ran, either in one or more TRGs or in one or more dedicated LPARs or both.

TRG
The name assigned to the tenant resource group in z/OS WLM, or `(lpar)` for a dedicated LPAR (assigned using the CONTAINER command). If a dedicated LPAR has co-located workloads for other solutions, the hourly values reflect the net contribution of the LPAR to the container, already reduced by co-located solutions.

CPC Total
The total four-hour rolling average utilization or MSU consumption for the container on the CPC for the hour.

Container Total
The total four-hour rolling average utilization or MSU consumption for the container for the hour. If Country Multiplex Pricing is in use, this value includes the contributions from all CPCs on which the container ran.

If Country Multiplex Pricing is in use, each CPC on which the container was active is displayed on the hour row.

Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z

This topic provides a detailed example of Tailored Fit Pricing for IBM Z using collocated Tailored Fit Pricing solutions in a standard sub-capacity environment.

Sample configuration for a collocated solution for Tailored Fit Pricing

The sample sub-capacity report for Tailored Fit Pricing for IBM Z is based on the following hardware and software configuration.

The sample configuration consists of a 2964 Model 7A1 CPC with a serial number of 02-01234. The CPC is configured with 4 LPARs, all running z/OS natively. The z/OS systems in SYS1, SYS2, SYS4, and SYS5 have z/OS SYSIDs of SYS1, SYS2, SYS4, and SYS5, respectively. Each LPAR is running a set of container tenant resource groups.

The z/OS systems are running a combination of the following z/OS products:

- Db2® 11 for z/OS
- IBM MQ for z/OS V8
- CICS® TS for z/OS V5*

*In this example, CICS TS for z/OS V5 is only active in container tenant resource groups.

Sample control statement input for a collocated solution for Tailored Fit Pricing

The sample sub-capacity report for Tailored Fit Pricing for IBM Z is based on the following control statement input to SCRT.

The following SPECIAL DD control statement was specified in the JCL for the SCRT job. You can request similar function when using SCRT for Windows and Linux®.

```
UPDATE CONTAINER,
ID=D911111-N4ED9AD-DB3D215CAF-NTZZZZZZ-07F5-4EDF-AF34-E062EB-0ADCD7,
SET_NAME="ContainerName",
NO89_PRODUCT_ID=(5698-BMP)
```

The **UPDATE CONTAINER** control statement is required for each solution ID that is found in the input SMF data or that is assigned using the **CONTAINER** control statement. The **UPDATE CONTAINER** control statement associates a container (represented by its unique solution ID) with a solution name.

The solution name associated with the container is assigned via the IBM LMS website and is available upon approval of the solution. You can use LMS to modify the solution name as you prefer; however, the solution name that you specify to SCRT must match the one defined in LMS.

Sample sub-capacity report for a collocated solution for Tailored Fit Pricing

A sub-capacity report for Tailored Fit Pricing for IBM Z has the same basic format and report sections as a sub-capacity report for a base z/OS system. However, a sub-capacity report with Tailored Fit Pricing solutions contains additional report sections that provide an overview of active containers, as well as container-specific report sections in both the billing-related and customer verification sections of the report.

The following sample report highlights the differences between a sub-capacity report for a base z/OS system and one that contains Tailored Fit Pricing solutions.

Billing-related section

The billing-related section of a sub-capacity report for Tailored Fit Pricing for IBM Z displays the following report sections:

- Customer information
- Tool Information
- Special Conditions
- Product Summary Information
- Missing LPAR Data Details
- Missing CPC Data Details
- Active Containers
- Container Billing Summary for each container
- Container Active Products for each container
- Container Product Metrics

There are no differences between the customer information, Tool Information, Special Conditions, Product Summary Information, Missing LPAR Data Details, and Missing CPC Data Details sections for a basic z/OS sub-capacity report and one for Tailored Fit Pricing.

Figure 13 on page 35 shows the customer information and Tool Information sections of the sample sub-capacity report for Tailored Fit Pricing.

```
==B5========= SCRT SUB-CAPACITY MVM REPORT - IBM Corp ====================

Run Date/Time                                        06 Oct 2020 - 10:34
Name of Person Submitting Report:                    Jane Customer
E-Mail Address of Report Submitter:                  jane@abc.com
Phone Number of Report Submitter:                    8885550123

Customer Name                                        ABC Corp
Customer Number                                      US-S000000000
Machine Serial Number                                02-01234
Machine Type and Model                               2964-7A1
Machine Rated Capacity (MSUs)                        10171
Purchase Order Number                                (optional)
Customer Comments (255 chars max)                    (optional)

For recurring charge (MLC) products, the data supplied in this report will be used to adjust
the billable MSUs in inventory for all MLC Products listed under the MLC Product Name
column on this report.  In accordance with our agreement, IBM will treat a change in product
licensed capacity as an order.  If the MSUs have changed since the last report, software billing
based on inventory MSUs will increase or decrease accordingly.
```

```
==C5============================================================
TOOL INFORMATION

Tool Release                                         28.2.0
Reporting Period                                     2 Sep, 2020 - 1 Oct, 2020 inclusive (30 days)
```

Figure 13. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Customer information and Tool Information sections

There is no Special Conditions section for this sample report.

Figure 14 on page 36 shows the Product Summary Information, Missing LPAR Data Details, and Missing CPC Data Details sections of the sample sub-capacity report for Tailored Fit Pricing.

```
==E5============================================================
PRODUCT SUMMARY INFORMATION

MLC Product Name                          MLC Product ID    Tool MSUs

z/OS V2                                   5650-ZOS               137

DB2 11 for z/OS                           5615-DB2               137
IBM MQ for z/OS V8                        5655-W97               137


==H4============================================================
MISSING LPAR DATA DETAILS

Active LPARs with no                                                                    Justification for low data
SMF/SCRT89 records      Detected               Resolved (missing hours)          Est Peak MSU   collection (255 chars max)

C0B                     25 Sep 2020 - 11:00    25 Sep 2020 - 16:00 (5 hours)              50   (required)
C0A                     25 Sep 2020 - 11:00    25 Sep 2020 - 16:00 (5 hours)              60   (required)
C0B                     25 Sep 2020 - 11:00    25 Sep 2020 - 16:00 (5 hours)              70   (required)
C0D                     25 Sep 2020 - 11:00    25 Sep 2020 - 16:00 (5 hours)              80   (required)

Total Missing Hours                            20

OS Product Name         OS Product ID        Est Peak MSU   Date/Time               C08    C0A    C0B    C0D
z/OS V2                 5650-ZOS                    260   25 Sep 2020 - 11:00      50     60     70     80


==H6============================================================
MISSING CPC DATA DETAILS

CPC with no SMF/SCRT89                                                          Justification for low data
data from any LPAR          Detected               Resolved (missing hours)     collection (255 chars max)

2964-12345                  02 Sep 2020 - 00:00    25 Sep 2020 - 11:00 (563 hours)  (required)
2964-12345                  25 Sep 2020 - 16:00    02 Oct 2020 - 00:00 (152 hours)  (required)

Total Missing Hours                                715
```

Figure 14. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Product Summary Information, Missing LPAR Data Details, and Missing CPC Data Details sections

In the Product Summary Information section, the values listed in the **Tool MSUs** column represent the peak sub-capacity values that SCRT calculated for each product using the appropriate sub-capacity rules for that product. SCRT uses the Tailored Fit Pricing for IBM Z algorithm and SMF data to adjust the rolling 4-hour average sub-capacity MSU values for the sub-capacity eligible programs on a given CPC.

The Missing LPAR Data Details section includes missing data for LPARs that are configured as part of a Tailored Fit Pricing solution using the **CONTAINER** control statement. As with non-container LPARS, 100 percent of all SMF data is required for Tailored Fit Pricing for IBM Z LPARs.

Active Containers section

The optional Active Containers section appears in the sub-capacity report because SCRT found one or more solution IDs in the configuration in one of the following ways:

- In SMF type 70 subtype 1 records associated with a tenant resource group
- Assigned using the **CONTAINER** control statement and associated with one or more dedicated LPARs

The Active Containers section provides a cross-reference of container identifiers (assigned by SCRT) to solution IDs.

In the sample configuration, there is one Tailored Fit Pricing solution active on the CPC. SCRT assigned the CPS1 container identifier to the container with solution ID Z894E15-F5F120B-D905DF9E5B-C5389F64-8E79-4B8E-81D6-ABC6A5-81B989.

The format of the SCRT container identifier always begins with the CPS prefix. SCRT then adds a numeric suffix for each container that it finds in the configuration (as identified by a unique solution ID). The SCRT container identifier is then used to identify the container in other sections of the sub-capacity report.

Figure 15 on page 37 shows the Active Containers section for the sample configuration.

```
==K5============================================================
ACTIVE CONTAINERS

SCRT Container Identifier                   Solution ID

CPS1                                        Z894E15-F5F120B-D905DF9E5B-C5389F64-8E79-4B8E-81D6-ABC6A5-81B989
```

Figure 15. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Active Containers section

Container Billing Summary section for container CPS1

SCRT generates a Container Billing Summary section for each Tailored Fit Pricing solution that it finds in the environment.

The header of each Container Billing Summary section contains the container ID assigned by SCRT within the header itself. For instance, the Container Billing Summary section for Tailored Fit Pricing solution CPS1 contains CPS1 within the header, as shown in Figure 16 on page 37.

```
==CPS1==========================================================

Solution ID                                 Z894E15-F5F120B-D905DF9E5B-C5389F64-8E79-4B8E-81D6-ABC6A5-81B989
Solution Name                               CICS-only Container 1
Peak Four Hour Rolling Average                                 14
Total MSU Consumption                                         255
```

Figure 16. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container Billing Summary section

The Container Billing Summary section contains the following fields:

Solution ID
The 64-character IBM solution ID that represents the Tailored Fit Pricing for IBM Z qualified solution.

Solution Name
The solution name associated with the Tailored Fit Pricing solution in the LMS website.

Peak Four Hour Rolling Average
The peak rolling 4-hour average utilization for the Tailored Fit Pricing solution. This value is the sum of the rolling 4-hour average utilization for each tenant resource group and LPAR that has specified the container solution ID for the concurrent peak hour.

- For each standalone LPAR that is part of the container, the value is based on the weighted average SMF70LAC value for the hour.
- For each tenant resource group that is part of the container, the value is based on the weighted average SMF70_TRG_LAC value for the hour.

These values are added together to determine the sub-capacity MSU value for the container. The highest value during the reporting period is the displayed peak value.

Total MSU Consumption
The total MSUs used (consumed) by the Tailored Fit Pricing solution during the reporting period.

To calculate this value, SCRT calculates the MSUs consumed for each tenant resource group and standalone LPAR that is part of the Tailored Fit Pricing solution.

- For tenant resource groups, SCRT takes the service units on general purpose processor value reported in the SMF70_TRG_SUCP field of SMF type 70 subtype 1 records and converts this value to MSUs on a per-hour basis for each applicable tenant resource group.
- For dedicated LPARs, SCRT takes the effective dispatch time of the LPAR reported in the SMF70EDT field of SMF type 70 subtype 1 records and converts this value to MSUs on a per-hour basis for each applicable LPAR.

These calculated MSU values are then added together and reported as the total MSU consumption.

Container Active Products section for container CPS1

The Container Active Products section (E7) is similar to the Product Summary Information section of the sub-capacity report. This section lists all products that SCRT found to be running as part of a container tenant resource group or dedicated LPAR during the reporting period. Unlike the Product Summary Information section, product family roots are not reported in this section.

A key difference between the Container Active Products section and the Product Summary Information Section is that there are no tool MSU values reported for container products. This is a fundamental concept of Tailored Fit Pricing: The sub-capacity values of individual products are not reported for a container. Instead, Tailored Fit Pricing solutions are priced according to the container metric, such as the peak rolling 4-hour average utilization of the container or the total MSU consumption of the container.

Figure 17 on page 38 shows the Container Active Products section for Tailored Fit Pricing solution CPS1.

```
==E7============================================================
CONTAINER ACTIVE PRODUCTS

MLC Product Name                              MLC Product ID

z/OS V2                                       5650-ZOS
CICS TS for z/OS V5                           5655-Y04

IPLA Product Name                             IPLA Product ID

File Export for z/OS V1                       5697-I12
```

Figure 17. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container Active Products section

MSU Consumption Data Collection section

The MSU Consumption Data Collection section (H7) tracks the completeness of data collection for Tailored Fit Pricing solutions that are billed based on an MSU consumption metric at sub-hour granularity. For each container, the section reports, on an LPAR-by-LPAR basis, the total possible number of minutes during which the container could have been running and the total number of minutes of MSU consumption data that was actually collected from SMF type 70 records. The difference between these two values is reported as the number of minutes of missing MSU consumption data.

Justification for missing data is required if the number of missing minutes exceeds the IBM-designated threshold.

“MSU Consumption Data Collection section” on page 38 shows an example of the MSU Consumption Data Collection section for solution CPS1.

```
==H7==============================================================
MSU CONSUMPTION DATA COLLECTION

LPAR   Total Possible Minutes   Minutes Collected   Missing Minutes   Justification

D0                      3600                3560                40   (optional)
D2                      1440                1420                20   (optional)
Total                                                           60   (required)
```

Figure 18. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: MSU Consumption Data Collection section

In "MSU Consumption Data Collection section" on page 38, the container could have been active for 3600 minutes on system D0 and 1440 minutes on system D2. Systems D0 and D2 collected MSU consumption data for 3560 minutes and 1420 minutes, respectively, during the reporting period, resulting in 40 and 20 missing minutes, respectively. A justification for the 60 missing minutes is required on the **Total** line. Optional justifications can be supplied per LPAR in order to provide additional detail.

When possible, SCRT does not report missing minutes that are near an hour in which an IPL or shutdown occurred. SCRT does not report LPARs that are designated to be part of a different container.

z/VM guest images that are not running with RMF Monitor I VMGUEST do not collect the required data to calculate MSU consumption. Guest images that are missing the required configuration are indicated with an `(xi)` footnote and the following footnote text at the end of the section:

```
(xi) VM guest image was running without RMF Monitor I VMGUEST data collection active.
```

When investigating missing time reported in this section, it can be helpful to refer to the Sub-Hour Data Collection Details section (V6), which you can enable by specifying the **GENERATE_DETAILED_DATA** control statement (or the CLI or GUI equivalent).

Container Product Metrics section

The Container Products Metrics section tracks products that have product-specific metrics that are not based on MSUs.

A value reported in the **Product Units** column is based on the product-specific algorithm, as applied to each tenant resource group and dedicated LPAR that is part of the Tailored Fit Pricing solution. This behavior is similar to how standard sub-capacity reporting aggregates product values for the metric outside of a container.

Since container CPS1 in the sample scenario does not use any products with a non-MSU metric, a separate example is shown in Figure 19 on page 39.

```
==J7==============================================================
CONTAINER PRODUCT METRICS

Product Name                                Product ID   Product Units   Product Metric

IBM z/OS Connect EE V2                      5655-CEE               40   Simultaneous Instances
```

Figure 19. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container Product Metrics section

In Figure 19 on page 39, z/OS Connect EE V2 has a peak **Product Units** value of 40 simultaneous instances. Therefore, during the peak hour, the sum of all instances reported in tenant resource groups and dedicated LPARs related to the Tailored Fit Pricing solution is 40.

Customer verification section

The customer verification section presents information that supports and expands upon the information in the Product Summary Information section. The customer verification section of a sub-capacity report for Tailored Fit Pricing for IBM Z contains the following report sections:

- SMF / SCRT89 Input Data Statistics
- Detail LPAR Data Section
- Detail LPAR Usage Data
- Product Max Contributors
- Product Grid Snapshot
- Container Verification section for each container
- Container Product Grid Snapshot
- Container Max Contributors

Other sections that are not displayed for the sample configuration may be displayed under different conditions.

There are no differences between the SMF / SCRT89 Input Data Statistics and Detail LPAR Data sections for a basic z/OS sub-capacity report and one for Tailored Fit Pricing

Figure 20 on page 40 shows the SMF / SCRT89 Input Data Statistics and Detail LPAR Data sections of the sample sub-capacity report for Tailored Fit Pricing.

```
==M5============================================================
SMF/SCRT89 INPUT DATA STATISTICS

                    SYSID    Input Data Start     Input Data End

SYS1                SYS1     25 Sep 2020 - 11:00  25 Sep 2020 - 16:00
SYS2                SYS2     25 Sep 2020 - 11:00  25 Sep 2020 - 16:00
SYS4                SYS4     25 Sep 2020 - 11:00  25 Sep 2020 - 16:00
SYS5                SYS5     25 Sep 2020 - 11:00  25 Sep 2020 - 16:00

CPC                          25 Sep 2020 - 11:00  25 Sep 2020 - 16:00
```

```
==N5============================================================
Detail LPAR Data section

                    Highest  Hour Count  Date/Time            2nd Highest  Hour Count  Date/Time

SYS1                    214           1  25 Sep 2020 - 15:00          166           1  25 Sep 2020 - 14:00
SYS2                     27           1  25 Sep 2020 - 15:00           25           1  25 Sep 2020 - 14:00
SYS4                     28           1  25 Sep 2020 - 15:00           27           1  25 Sep 2020 - 14:00
SYS5                     24           2  25 Sep 2020 - 14:00           23           1  25 Sep 2020 - 13:00

CPC                     293           1  25 Sep 2020 - 15:00          242           1  25 Sep 2020 - 14:00
```

Figure 20. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: SMF / SCRT89 Input Data Statistics and Detail LPAR Data sections

Detail LPAR Usage Data section

There are no differences between the Detail LPAR Usage Data section for a basic z/OS sub-capacity report and a sub-capacity report generated using Tailored Fit Pricing for IBM Z.

Product Max Contributors section

The MSU values that are listed in the Product Max Contributors section are the same for a basic z/OS sub-capacity report and for a report with Tailored Fit Pricing for IBM Z, with one exception: Whenever SCRT finds tenant resource groups for a Tailored Fit Pricing solution in the configuration and all Tailored Fit Pricing conditions have been met, SCRT generates a **Container MSU Reduction** column. For each

standard sub-capacity product that is eligible to be reduced, this the **Container MSU Reduction** column reports the calculated reduction that was applied during the peak hour. The reduction only applies to products based on standard sub-capacity values.

Figure 21 on page 41 shows the Product Max Contributors section for the sample configuration.

```
==P5============================================================
PRODUCT MAX CONTRIBUTORS

Product Name                          Product ID  Highest  Date/Time            LPAR   LPAR   LPAR   LPAR     Container MSU
                                                                                SYS1   SYS2   SYS4   SYS5     Reduction

z/OS V2                               5650-ZOS        137  25 Sep 2020 - 15:00    64     25     26     22             156
DB2 11 for z/OS                       5625-DB2        137  25 Sep 2020 - 15:00    64     25     26     22             156
IBM MQ for z/OS V8                    5655-M15        137  25 Sep 2020 - 15:00    64     25     26     22             156
```

Figure 21. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Product Max Contributors section

Product Grid Snapshot section

There are no differences between the Product Grid Snapshot section for a basic z/OS sub-capacity report and a sub-capacity report generated using Tailored Fit Pricing for IBM Z.

Figure 22 on page 41 shows the Product Grid Snapshot section for the sample configuration.

```
==Q5============================================================
PRODUCT GRID SNAPSHOT

Product Name                              Product ID     SYS1     SYS2     SYS4     SYS5

z/OS V2                                   5650-ZOS       0.60%    0.60%    0.60%    0.60%
DB2 11 for z/OS                           5615-DB2       0.60%    0.60%    0.60%    0.60%
```

Figure 22. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Product Grid Snapshot section

Container Verification Section for container CPS1

SCRT generates a Container Verification section for each Tailored Fit Pricing solution that it finds in the environment. For each container, the Container Verification Section displays the Container Product Grid Snapshot section and Container Max Contributors section.

Container Product Grid Snapshot section

The Container Product Grid Snapshot section shows the products that ran in each container tenant resource group or dedicated LPAR for the container identified in the Container Verification section header. This section is similar to the Product Grid Snapshot section for a standard sub-capacity report and shows the percentage of time a product was active during the reporting period in each container tenant resource group or dedicated LPAR that is assigned to the container. (Note that products supported by the SCRT NO89 control statement are not listed in the Container Product Grid Snapshot section because this section is intended to report on the times when products actually ran.)

In the sample configuration, there are four tenant resource groups assigned to container CPS1. The Container Product Grid Snapshot section identifies these tenant resource groups first by the LPAR on which they ran, then by the tenant resource group name.

Figure 23 on page 42 shows the Container Product Grid Snapshot section for container CPS1. In this section, the TGCICS21 tenant resource group ran on four separate LPARs: SYS1, SYS2, SYS4, and SYS5.

The percentage of the reporting period that each product was active in the TGCICS21 tenant resource group is reported for each LPAR on which TGCICS21 ran.

```
==Q7============================================================
Container Product Grid Snapshot

                                                    SYS1       SYS2       SYS4       SYS5
Product Name                                Product ID     TGCICS21   TGCICS21   TGCICS21   TGCICS21

z/OS V2                                     5650-ZOS          0.60%      0.60%      0.60%      0.60%
CICS TS for z/OS V5                         5655-Y04          0.60%      0.60%      0.60%      0.60%
```

Figure 23. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container Product Grid Snapshot section

Container Max Contributors section

The Container Max Contributors section shows the highest observed utilization values for the specific container identified in the Container Verification section header.

The highest hour depends on when the product ran in each of the tenant resource groups that specify the contain solution ID, along with any active, dedicated LPARs on the CPC that are configured with the **CONTAINER** control statement as part of the Tailored Fit Pricing solution.

Figure 24 on page 42 shows the Container Max Contributors section for container CPS1.

```
==T4============================================================
CONTAINER MAX CONTRIBUTORS

           TRG            Highest     Date/Time               Contribution to Highest

SYS2       TGCICS21                                                                 0
SYS4       TGCICS21                                                                 0
SYS1       TGCICS21                                                                14
SYS5       TGCICS21                                                                 0

CPS1                           14     25 Sep 2020 - 15:00
```

Figure 24. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container Max Contributors section

The Container Max Contributors section contains the following fields:

LPAR name (not labeled)
The name of the LPAR (displayed in the first column) that contributed to the Tailored Fit Pricing solution during the peak hour.

The named LPAR appears here either because a tenant resource group that ran on the LPAR specifies the associated solution ID, or it is a dedicated LPAR that was configured with the **CONTAINER** control statement as part of the Tailored Fit Pricing solution.

TRG
The name of the tenant resource group that ran on the LPAR named in the first column. The TRG is considered part of the Tailored Fit Pricing solution because it is defined with a solution ID.

If an asterisk (*) appears in this field, the LPAR is a dedicated container LPAR so there is no applicable TRG.

Highest
Displayed for a container row, this is the highest combined rolling 4-hour average utilization that was observed for the container, based on all of the dedicated LPARs and TRGs on which the container ran.

Date/Time
The date and time when the highest rolling 4-hour average utilization value was first reached.

Contribution to Highest
The amount of the contribution to the **Highest** value reported for the Tailored Fit Pricing solution, reported for each dedicated LPAR and TRG that on which the container ran.

In Figure 24 on page 42, container CPS1 had a 14 MSU peak on 25 September 2020 at 15:00. Although the TGCICS21 tenant resource group was active on four LPARs, the only recorded contribution came from the TGCICS21 running on LPAR SYS1.

Container MSU Consumption Contributors section

The Container MSU Consumption Contributors section shows the contribution to the total MSU consumption of the solution by each tenant resource group or LPAR.

Figure 25 on page 43 shows an example of the Container MSU Consumption Contributors section for a container named CPS1.

```
==T6============================================================
CONTAINER MSU CONSUMPTION CONTRIBUTORS

CPS1       Z194E15-nnnnnnn-nnnnnnnnnn-nnnnnnnn-nnnn-nnnn-nnnn-nnnnnn-nnnnnn

           TRG            Contribution to Total Consumed

LPAR1      TRG1                                    26712
LPAR1      TRG2                                    48081
LPAR1      TRG3                                    16027
LPAR2      TRG4                                    29383
LPAR2      TRG5                                    48081
LPAR3      *                                       16027

CPS1                                              184311
```

Figure 25. Sample sub-capacity report for a collocated solution for Tailored Fit Pricing for IBM Z: Container MSU Consumption Contributors section

The Container MSU Consumption Contributors section contains the following fields:

LPAR name (not labeled)
The name of the LPAR (displayed in the first column) that contributed to the solution's MSU consumption during the reporting period.

The named LPAR appears here either because a tenant resource group that ran on the LPAR specifies the associated solution ID, or it is a dedicated LPAR that was configured with the **CONTAINER** control statement as part of the Tailored Fit Pricing solution.

TRG
The name of the tenant resource group that ran on the LPAR named in the first column. The TRG is considered part of the Tailored Fit Pricing solution because it is defined with a solution ID.

If an asterisk (*) appears in this field, the LPAR is a dedicated container LPAR so there is no applicable TRG.

Contribution to Total Consumed
The amount of the contribution from the tenant resource group or LPAR to the total MSU consumption for the container.

In Figure 25 on page 43, container CPS1 consumed a total of 184311 MSU. LPAR1 had three tenant resource groups, TRG1, TRG2, and TRG3, contributing 26712 MSU, 48081 MSU, and 16027 MSU, respectively. LPAR2 had two tenant resource groups, TRG4 and TRG5, contributing 29383 MSU and 48081 MSU, respectively. LPAR3 is a dedicated container LPAR and contributed 16027 MSU.

Sample multiplex report for a standalone LPAR solution for Tailored Fit Pricing for IBM Z

This topic provides an example of Tailored Fit Pricing for IBM Z using standalone LPARs in a Tailored Fit Pricing solution with Country Multiplex Pricing (CMP) active.

Many of the multiplex report sections for Tailored Fit Pricing are the same as in a standard sub-capacity report with Tailored Fit Pricing active. This topic focuses on the specific differences that impact the multiplex report.

Sample configuration for a standalone solution for Tailored Fit Pricing

The sample multiplex report for Tailored Fit Pricing for IBM Z is based on the following hardware and software configuration.

The sample configuration consists of two CPCs:

- A 2965 Model J03 CPC with a serial number of 51-Z1Z11. The CPC is configured with 1 LPAR (LPAR1) running z/OS natively. The z/OS system in LPAR1 has a z/OS SYSID of SYS1.
- A 3906 Model 797 CPC with a serial number of 51-54321. The CPC is configured with 1 LPAR (LPARA) running z/OS natively. The z/OS system in LPARA has a z/OS SYSID of SYSA.

The z/OS systems are running a combination of the following z/OS products:

- Db2 10 for z/OS
- Db2 11 for z/OS
- WebSphere® MQ for z/OS V7
- CICS TS for z/OS V4
- WebSphere Transformation Extended for z/OS V8

In this example, LPAR1 on CPC 51-Z1Z11 is configured to be part of a Tailored Fit Pricing solution.

Sample control statement input for a standalone solution for Tailored Fit Pricing

The sample multiplex report for Tailored Fit Pricing for IBM Z is based on the following control statement input to SCRT.

The following SPECIAL DD control statement was specified in the JCL for the SCRT job. You can request similar function when using SCRT for Windows and Linux.

```
CONTAINER CPC=2965-Z1Z11,IMAGE_ID=LPAR1,
ID=D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB
```

The **CONTAINER** control statement indicates that an LPAR is dedicated to a Tailored Fit Pricing solution, and it associates one or more LPARs or z/VM® systems with a container represented by its unique solution ID.

```
UPDATE CONTAINER,
  ID=D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB,
  SET_NAME="Test and Dev"
```

The **UPDATE CONTAINER** control statement is required for each solution ID that is found in the input SMF data or is assigned by using the **CONTAINER** control statement. The **UPDATE CONTAINER** control statement associates a container (represented by its unique solution ID) with a solution name.

The solution name associated with the container is assigned via the IBM LMS website and is available upon approval of the solution. You can use LMS to modify the solution name as you prefer; however, the solution name that you specify to SCRT must match the one defined in LMS.

Sample multiplex report for a standalone solution for Tailored Fit Pricing

A multiplex report for Tailored Fit Pricing for IBM Z has the same basic format and report sections as a multiplex report for an environment without Tailored Fit Pricing. However, a multiplex report with Tailored Fit Pricing solutions contains additional report sections that provide an overview of active containers, as

well as container-specific report sections in both the billing-related and customer verification sections of the report.

Only CPC M1C1 is shown in this sample report, as CPC M2C1 does not include any container tenant resource groups or LPARs.

Many of the report sections are the same as in a standard sub-capacity report with Tailored Fit Pricing; therefore, this topic focuses on the specific changes that impact the multiplex report.

The following sample report highlights the differences between a multiplex report for a base z/OS system and one that contains Tailored Fit Pricing solutions.

Multiplex summary section
The multiplex summary section contains information about the version of SCRT that was used to generate the multiplex report, customer information, a summary of the machine configuration that makes up the multiplex, and the multiplex MSU values for the reporting period.

Figure 26 on page 45 shows the multiplex summary section for the sample configuration.

```
==B5========= SCRT MULTIPLEX REPORT - IBM Corp ====================

SCRT Tool Release                              28.2.0
Name of Person Submitting Report:              Jane Customer
E-Mail Address of Report Submitter:            jane@abc.com
Phone Number of Report Submitter:              888-555-1212

Customer Name                                  ABC Corp
Run Date/Time                                  03 Dec 2020 - 14:13
Report Period                                  2 Nov, 2020 - 1 Dec, 2020 inclusive (30 days)
Number of processors in Multiplex                         2
```

Figure 26. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Multiplex summary section

Machine summary section
Most of the fields in the machine summary section are unchanged when Tailored Fit Pricing is active in a multiplex environment.

The main difference is the appearance of two container summary information subsections. The first subsection displays the simultaneous multiplex peak value for the Tailored Fit Pricing solution and the contribution from each machine in the multiplex. The second subsection displays the total MSU consumption for the Tailored Fit Pricing solution and the contribution from each machine in the multiplex.

Figure 27 on page 46 shows the machine summary section for the sample configuration.

```
Machine identifier                                                              M1C1           M2C1
Customer number                                                                 US-S000000000  US-S000000000
Machine Serial Number                                                           51-Z1Z11       51-54321
Machine Type and Model                                                          2965-J03       3906-797
Machine Rated Capacity (MSUs)                                                   82             11115
Machine Model Changed                                                           N              N
Exclude Data                                                                    N              N
Missing LPAR Data                                                               Y              Y
Missing CPC Data                                                                Y              Y

MLC Product Name                              Number     MSU    Time
z/OS V2                                       5650-ZOS     84   27 Nov 2020 - 21:00                    84
DB2 for z/OS                                  (All)        84   27 Nov 2020 - 21:00                    84
DB2 11 for z/OS                               5615-DB2     84   27 Nov 2020 - 21:00                    84
DB2 10 for z/OS                               5605-DB2     84   27 Nov 2020 - 21:00                    84
CICS TS for z/OS V4                           5655-S97     84   27 Nov 2020 - 21:00                    84
WebSphere MQ for z/OS V7                      5655-R36     84   27 Nov 2020 - 21:00                    84

IPLA Product Name                             Number     MSU    Time
WebSphere Transformation Extender for z/OS V8 5655-R95      2   27 Nov 2020 - 20:00                     2
IPLA z/OS-Based                               (All)        84   27 Nov 2020 - 21:00                    84

Container Identifier   Container Name                    MSU    Time
CPS1                   DevTest Solution                   56   27 Nov 2020 - 21:00           56

Container Identifier   Container Name    TOTAL MSU Consumption
CPS1                   DevTest Solution                 5234                                5234
```

Figure 27. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Machine summary section

In the machine summary section, the container summary information subsections immediately follow the product summary information and contain the data for the current reporting period for each container. Since the CMP algorithm analyzes data across a multiplex (not just a single CPC), the reported data has a different scope than in a standard sub-capacity report.

The first container summary information subsection for a multiplex report contains the following fields:

Container Identifier
: The SCRT-assigned container identifier. This identifier is assigned by SCRT as it analyzes containers during report processing.

Container Name
: The name assigned to this container via the **UPDATE CONTAINER** command (or the CLI or GUI equivalent).

MSU
: Reports the concurrent sub-capacity peak utilization, in MSUs, across all CPCs in the multiplex. This differs from the value in a non-multiplex environment where separate peaks are calculated per CPC. SCRT calculates the peak concurrent sub-capacity MSU value for the multiplex from all of the sub-capacity eligible products listed on the report.

Time
: Reports the date and time when the highest sub-capacity utilization peak in the multiplex was first reached.

Machine Identifier MSU fields
: For each CPC in the multiplex, these fields report the contribution to the multiplex concurrent peak, in MSUs.

In the sample configuration, there is one Tailored Fit Pricing solution defined: CPS1. Tailored Fit Pricing solution CPS1 has a multiplex peak value of 56 MSUs. The peak occurred on 27 November 2017 at 21:00 local time. Machine M1C1 contributed all 56 MSUs to the peak.

In the sample environment, no non-container LPARs ran on machine M1C1; therefore, there is no contribution to non-container product peak values.

The second container summary information subsection for a multiplex report contains the following fields:

Container Identifier
The SCRT-assigned container identifier. This identifier is assigned by SCRT as it analyzes containers during report processing.

Container Name
The name assigned to this container via the **UPDATE CONTAINER** command (or the CLI or GUI equivalent).

TOTAL MSU Consumption
Reports the total MSU consumption of this Tailored Fit Pricing solution across all CPCs in the multiplex.

Machine Identifier MSU consumption fields
For each CPC in the multiplex, these fields report the contribution to the total MSU consumption of the Tailored Fit Pricing solution.

Machine summary section for CPC M1C1
SCRT generates a machine summary section for each CPC that it finds in the multiplex.

The header for each machine summary section contains the SCRT-generated machine identifier within the header itself. For instance, the machine summary section for CPC M1C1 contains the M1C1 value within the header, as shown in Figure 28 on page 47.

There are no differences in the machine information section, Product Summary Information section, Missing LPAR Data Details section, or Missing CPC Data Details section for a multiplex report with Tailored Fit Pricing solutions compared to a non-container multiplex report.

```
==M1C1============================================================

Machine identifier                          M1C1
Customer number                             US-S000000000
Machine serial number                       02-12345
Machine Type and Model                      3906-760
Machine Rated Capacity (MSUs)               82
```

```
==E5==============================================================
PRODUCT SUMMARY INFORMATION
```

```
==H4==============================================================
MISSING LPAR DATA DETAILS

Active LPARs with no                                                                                    Justification for low data
SMF/SCRT89 records      Detected                Resolved (missing hours)           Est Peak MSU         collection (255 chars max)

LPAR1                   27 Nov 2020 - 18:00     28 Nov 2020 - 06:00 (12 hours)                50      (required)

Total Missing Hours                             12

OS Product Name         OS Product ID   Multiplex Peak MSU   Est Peak MSU   Date/Time              LPAR1
z/OS V2                 5650-ZOS                       200             50   27 Nov 2020 - 18:00       50
```

```
==H6==============================================================
MISSING CPC DATA DETAILS

                                                                                                        Justification for low data
CPC with no SMF/SCRT89 data from any LPAR    Detected             Resolved (missing hours)          collection (255 chars max)
M1C1                                         02 Nov 2020 - 00:00  27 Nov 2020 - 15:00 (615 hours)  (required)

Total Missing Hours                                               615
```

Figure 28. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Machine summary section for CPC M1C1

Since no LPARs on CPC M1C1 ran outside of a Tailored Fit Pricing solution during the reporting period, the Product Summary Information section for CPC M1C1 shows no product data.

Note: The Missing LPAR Data Details section continues to report on LPARs that are assigned to a Tailored Fit Pricing solution. There is no change in data collection requirements.

Active Containers section

The Active Containers section provides a cross reference of SCRT-assigned container identifiers to solution IDs.

There is no difference between an Active Containers section for Country Multiplex Pricing and one for a standard sub-capacity report.

When Country Multiplex Pricing is active, in cases where a single container runs on multiple CPCs (as identified by the solution ID), the SCRT-assigned container identifier is used to identify the container across CPCs in the multiplex.

shows the Active Containers section for CPC M1C1.

```
==K5============================================================
ACTIVE CONTAINERS

SCRT Container Identifier                    Solution ID

CPS1                                         D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB
```

Figure 29. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Active Containers section

In the sample configuration, there is one Tailored Fit Pricing for IBM Z solution active on the CPC.

Container Billing Summary section for container CPS1

SCRT generates a Container Billing Summary section for each Tailored Fit Pricing solution that it finds in the environment for each CPC in the multiplex on which the container ran.

The header for each Container Billing Summary section contains the SCRT-assigned container identifier within the header itself. The Container Active Products section immediately follows the header, as shown in Figure 30 on page 48.

```
==CPS1==========================================================

Solution ID                                  D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB
Solution Name                                Test and Dev
Peak Four Hour Rolling Average                                                56
Total MSU Consumption                                                        759


==E7============================================================
CONTAINER ACTIVE PRODUCTS

MLC Product Name                             MLC Product ID

z/OS V2                                      5650-ZOS
DB2 11 for z/OS                              5615-DB2
CICS TS for z/OS V4                          5655-S97
```

Figure 30. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Container Billing Summary and Container Active Products sections

There is no difference in format between the Container Billing Summary sections for Country Multiplex Pricing and the Container Billing Summary sections for standard sub-capacity pricing.

The data in the header of the Container Billing Summary section for a multiplex report differs from a standard sub-capacity report in that the reported peak rolling 4-hour average MSUs correspond to the contribution of the CPC to the multiplex peak value, instead of any individual peak that may have occurred on the CPC.

For more information about the Container Billing Summary section, see "Container Billing Summary section for container CPS1" on page 37.

Customer verification section for CPC M1C1
The customer verification section of a multiplex report contains information that supports and expands on the information in the Product Summary Information section.

The detail data sections for customer verification follow the machine information section (M7) shown in Figure 31 on page 49.

There are no differences between the Detail LPAR Data Section and Detail LPAR Usage Section of a multiplex report with Tailored Fit Pricing and a standard multiplex report.

```
==M7============================================================

Machine identifier                      M1C1
Customer number                         US-S000000000
Machine serial number                   51-Z1Z11
Machine Type and Model                  2965-J03
Machine Rated Capacity (MSUs)           82
```

Figure 31. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Customer verification section for CPC M1C1 - Machine information

Figure 32 on page 49 shows the Product Max Contributors and Product Grid Snapshot sections for CPC M1C1. No product peak information is displayed in the Product Max Contributors section for CPC M1C1 because no work ran in the standard sub-capacity (non-container) environment.

```
==P5============================================================
PRODUCT MAX CONTRIBUTORS

Product Name                            Product ID  Highest  Date/Time
```

```
==Q5============================================================
PRODUCT GRID SNAPSHOT

Product Name                                    Product ID

z/OS V2                                         5650-ZOS
DB2 11 for z/OS                                 5615-DB2
CICS TS for z/OS V4                             5655-S97
```

Figure 32. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Product Max Contributors and Product Grid Snapshot sections

Figure 33 on page 50 shows the Container Product Grid Snapshot and Container Max Contributors sections for solution CPS1. There are no differences between these sections for a multiplex report and a standard sub-capacity report.

```
==Q7============================================================
CONTAINER PRODUCT GRID SNAPSHOT

CPS1                                        D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB

                                                                LPAR1
Product Name                                Product ID          *

z/OS V2                                     5650-ZOS            1.90%
DB2 11 for z/OS                             5615-DB2            1.90%
CICS TS for z/OS V4                         5655-S97            1.90%
```

```
==T4============================================================
CONTAINER MAX CONTRIBUTORS

CPS1                                        D9F4555-177C847-3DE17A3049-70AD6FC2-B263-4CBD-84EB-AA22CB-6915BB

                                            TRG       Highest   Date/Time            Contribution to Highest
LPAR1                                       *                                                          84

CPS1                                                     84   27 Nov 2020 - 21:00

* indicates the entire LPAR was configured as part of the Container
```

Figure 33. Sample multiplex report for a standalone Tailored Fit Pricing solution with Country Multiplex Pricing: Container Product Grid Snapshot section

In the Container Max Contributors section for the sample environment, an asterisk (*) appears in the TRG (tenant resource group) column to indicate cases where the entire LPAR is part of the Tailored Fit Pricing solution.

SPECIAL DD statement

You can use the optional SPECIAL DD statement to specify one or more of the SCRT control statements listed in Table 1 on page 50 .

Table 1. SCRT SPECIAL control statements

Control statement name	Usage
CONTAINER	Associate an LPAR with a Tailored Fit Pricing solution ID.
IGNORE CONTAINER	Ignore a Tailored Fit Pricing solution for a specified time interval.
UPDATE CONTAINER	Associate an LMS-provided solution name with a Tailored Fit Pricing solution ID and, optionally, designate the NO89 products that are running in the container.
UPDATE SOLUTION_ID	Replace a solution ID associated with a container tenant resource group with a new or corrected solution ID.

All of the keywords on the control statements in the SPECIAL DD can be in upper, lower, or mixed case. Each control statement must start in column one with a keyword indicating the control statement name. Each control statement can be up to 71 bytes long. Control statements that are longer than 71 characters will result in syntax errors. If any errors are found on SPECIAL control statements, SCRT issues a message and terminates processing with return code 16 without generating reports for any CPCs.

CONTAINER control statement

In cases where an LPAR is dedicated to a qualified Tailored Fit Pricing solution, use the **CONTAINER** control statement (or the appropriate SCRT GUI panel) to associate the LPAR with a container solution ID.

Whenever a valid **CONTAINER** control statement is encountered, SCRT removes the specified LPARs from the traditional sub-capacity environment and aggregation, and associates them with the Tailored Fit Pricing solution indicated by the provided solution ID.

IBM authorizes the use of the **CONTAINER** control statement only in cases where you have signed or otherwise agreed to the terms and conditions of a Tailored Fit Pricing solution. Any LPARs that are part of a Tailored Fit Pricing solution must be dedicated to the solution or workload indicated as part of the agreement. The solution ID that you specify on the **CONTAINER** statement must match the solution ID provided on the IBM License Management Support (LMS) website for the qualified workload.

Each **CONTAINER** control statement starts with the CONTAINER keyword. All subsequent parameters are delimited by commas. At least one parameter must follow the CONTAINER keyword. Remaining parameters may be specified on subsequent continuation lines. Each line that is being continued must end with a comma.

The **CONTAINER** control statements are processed in the order in which they are specified. Later control statements override earlier control statements. For instance, you can assign all images to a single solution ID using the IMAGE_ID=*ALL format, then override the solution ID assignment for a subset of images by specifying additional **CONTAINER** control statements.

The general syntax for the **CONTAINER** control statement is as follows:

```
CONTAINER CPC=tttt-sssss,IMAGE_ID=(image1,image2,…,imageN),ID=solutionID
```

The keywords and values are:

CONTAINER
(Required) Identifies the beginning of the control statement.

CPC=*tttt-sssss*
CPC=*ALL
(Required) Specifies the CPC machine type (*tttt*) and serial number (*sssss*) to which this control statement applies, in the format *tttt-sssss* (for instance, 2094-12345). This parameter does not support a list of values. If SCRT does not find the specified value in any of the SMF records being processed, it issues an error message and terminates processing with return code 16.

You can specify CPC=*ALL to assign the specified solution ID to multiple images in a single **CONTAINER** control statement. The solution ID is assigned to all images on all CPCs that match the **IMAGE_ID** specification, or to all images if the **IMAGE_ID** keyword is not specified.

There are conditions under which the CPUs on a CPC might be assigned a serial number that differs from the serial number assigned to the CPC. For native z/OS systems, this can occur due to a hardware CPU serial number assignment by special request to IBM. For guest systems, you can assign a unique CPU serial number to the virtual machine on which those guest systems run. Whenever the CPU serial numbers differ from the CPC serial number, you must use the appropriate serial number for the **CONTAINER** control statement. Otherwise, SCRT either will not include the intended data or will issue an error message indicating that the CPC serial number is not found in the SMF data being processed.

ID=*solutionID*
(Required) Specifies the IBM-provided 64-character solution ID (*solutionID*) provided to you through the IBM LMS website.

Only a single solution ID can be specified on the **CONTAINER** command. This should be the solution ID associated with the Tailored Fit Pricing solution running on the named LPARs.

IMAGE_ID=*image_id*
IMAGE_ID=(*image_id1*,...,*image_idn*)
IMAGE_ID=*ALL
(Required) Specifies the operating system image ID, in one of the following formats:

image_id
A single image ID.

(*image_id1*,...,*image_idn*)
A list of image IDs. The list can be split across multiple lines of the control statement.

***ALL**
Assigns the specified solution ID to multiple images in a single **CONTAINER** control statement. The solution ID is assigned to all images on the specified CPC or, if CPC=*ALL is specified, to all images on all CPCs.

- For native z/OS systems, use the LPAR name as the image ID.
- For guest z/OS systems, use the **SID** value from the SMFPRM*xx* member as the image ID.

If SCRT does not find the specified value or list of values in any of the SMF records being processed, it issues an error message and terminates processing for this CPC with return code 16.

IGNORE CONTAINER control statement

Use the optional **IGNORE CONTAINER** control statement to request that SCRT ignore a Tailored Fit Pricing solution for a specified time interval.

The **IGNORE CONTAINER** control statement is only intended for use under rare circumstances and as directed by IBM.

For the interval specified on an **IGNORE CONTAINER** control statement, SCRT does not apply the Tailored Fit Pricing algorithm and considers any Tailored Fit Pricing tenant resource groups (TRGs) and dedicated LPARs that are associated with the specified solution ID to be part of the standard sub-capacity environment. Specifically:

- Tailored Fit Pricing LPARs are aggregated into standard sub-capacity product reporting.
- The rolling 4-hour average contribution and product data for the Tailored Fit Pricing TRG are not removed from the product values for the LPAR.
- Container peak calculations ignore the specified time range.

Each **IGNORE CONTAINER** control statement starts with the IGNORE CONTAINER keywords. All subsequent parameters are delimited by commas. At least one parameter must follow the IGNORE CONTAINER keywords. Parameters may be specified on subsequent continuation lines. Each line that is being continued must end with a comma.

The general syntax for the **IGNORE CONTAINER** control statement is as follows:

```
IGNORE CONTAINER,
ID=solutionID,
START=yyyy/mm/dd/hh[/UTC],
RESUME=yyyy/mm/dd/hh[/UTC]
```

The keywords and values are:

IGNORE CONTAINER
(Required) Identifies the beginning of the control statement.

ID=*solutionID*
(Required) Specifies the 64-character solution ID (*solutionID*) of the Tailored Fit Pricing solution that is to be ignored for the specified time interval, or *ALL. When specifying ID=*ALL, the **START** and **RESUME** keywords are not required; if specified, they are ignored.

START=*yyyy/mm/dd/hh*[/UTC]
(Required) Specifies the starting date and time (hour), in local SMF time or UTC time, of the measurement interval for the container that is to be ignored by the Tailored Fit Pricing algorithm. Specify the **START** value in one of the following formats:

yyyy/mm/dd/hh
Use this format to specify the date and time values in local time.

***yyyy/mm/dd/hh*/UTC**
Use this format to specify the date and time values in UTC time.

The values are:

yyyy
The year. Valid values are 2000 - 2025.

mm
The month. Valid values are 01 - 12.

dd
The day of the month. Valid values are 01 - 31, depending on the month.

hh
The hour. Valid values are 00 - 23. (For instance, 00 starts the day at midnight.)

UTC
(Optional) Indicates that the date and time values are specified in UTC time; otherwise, SCRT assumes local time.

RESUME=*yyyy*/*mm*/*dd*/*hh*[/UTC]
(Required) Specifies the date and time (hour), in local SMF time or UTC time, of the measurement interval for the container when the Tailored Fit Pricing algorithm is to resume processing for the container. The formats and values are the same as for the **START** parameter.

UPDATE CONTAINER control statement

Use the **UPDATE CONTAINER** control statement to associate the LMS-provided solution name with a Tailored Fit Pricing solution based on the associated solution ID and to designate NO89 products that run in the container. The **UPDATE CONTAINER** statement is required for Tailored Fit Pricing solutions.

Each Tailored Fit Pricing solution, whether found in SMF data or specified using the **CONTAINER** control statement, must have a solution name associated with it via an **UPDATE CONTAINER** statement. The name specified on the **UPDATE CONTAINER** statement must match the name specified for the container (as identified by the unique solution ID) in the LMS web application.

Each **UPDATE CONTAINER** control statement starts with the UPDATE CONTAINER keywords. All subsequent parameters are delimited by commas. At least one parameter must follow the UPDATE CONTAINER keywords. Parameters may be specified on subsequent continuation lines. Each line that is being continued must end with a comma.

The general syntax for the **UPDATE CONTAINER** control statement is:

```
UPDATE CONTAINER,
ID=solutionID,
SET_NAME="solutionName",
NO89_PRODUCT_ID={productId|(productID1,...,productIDn)}
```

The keywords and values are:

UPDATE CONTAINER
(Required) Identifies the beginning of the control statement.

ID=*solutionID*
(Required) Specifies the 64-character IBM-provided solution ID (*solutionID*) for the qualified Tailored Fit Pricing solution.

SET_NAME="*solutionName*"
(Required) Specifies the IBM-provided solution name (*solutionName*) for the qualified Tailored Fit Pricing solution. The value specified here must correspond to the solution ID specified in LMS. The text must be enclosed within double quotation marks and can contain blanks but should not contain commas nor any special characters that cannot be correctly translated from EBCDIC to ASCII encoding.

NO89_PRODUCT_ID=*pid*
NO89_PRODUCT_ID=(*pid1*,...,*pidn*)
(Optional) Specifies a NO89 product ID (PID) or a list of NO89 product IDs that are to be assigned to the associated container. To specify a list of product IDs, separate the product IDs with commas and enclose the list in parentheses.

UPDATE SOLUTION_ID control statement

Use the optional **UPDATE SOLUTION_ID** control statement to replace a solution ID associated with a container TRG with a new or corrected solution ID. The replacement solution ID must correspond to the qualified workload that ran in the container.

The **UPDATE SOLUTION_ID** control statement is only intended for use under rare circumstances, such as when a TRG is defined with a solution ID that is incorrect or not applicable.

Each **UPDATE SOLUTION_ID** control statement starts with the UPDATE SOLUTION_ID keywords. All subsequent parameters are delimited by commas. At least one parameter must follow the UPDATE SOLUTION_ID keywords. Parameters may be specified on subsequent continuation lines. Each line that is being continued must end with a comma.

The general syntax for the **UPDATE SOLUTION_ID** control statement is as follows:

```
UPDATE SOLUTION_ID,
OLD=oldSolutionID,
NEW=newSolutionID
```

The keywords and values are:

UPDATE SOLUTION_ID
(Required) Identifies the beginning of the control statement.

OLD=*oldSolutionID*
(Required) Specifies the 64-character solution ID (*oldSolutionID*) that is to be replaced in the input SMF data. This solution ID is defined to WLM TRGs and, due to a rare circumstance, must be replaced with a new value.

NEW=*newSolutionID*
(Required) Specifies the 64-character solution ID (*newSolutionID*) that is to replace the solution ID specified by the **OLD** parameter. This is the solution ID that represents the qualified Tailored Fit Pricing solution, as identified in the LMS web application.

Using SCRT on Windows and Linux systems

SCRT for Windows and Linux uses a graphical user interface (GUI) to guide you through the steps to generate a sub-capacity report. A command line interface (CLI) is also available.

This topic describes the requirements for SCRT on these platforms, how to install and set up SCRT, and how to generate sub-capacity reports.

The requirements for the various SCRT program parameters are identical to those you use when you run SCRT on a z/OS system. Similarly, the requirements for the various pricing metrics and offerings supported by SCRT are the same as when you run SCRT on a z/OS system.

Using the SCRT graphical user interface

In order to generate sub-capacity reports on Windows or Linux systems, you must:

1. Copy the SMF or SCRT89 data from your host system to the target Windows or Linux system on which you intend to run SCRT.
2. Run the SCRT for Windows and Linux graphical user interface (GUI), as described in "Running the SCRT graphical user interface" on page 55.

For details about the sub-capacity report output for the various pricing metrics and offerings that SCRT supports, see the appropriate chapter for that offering.

Running the SCRT graphical user interface

SCRT for Windows and Linux uses a common graphical user interface (GUI) across all the platforms on which it runs, including Windows, Linux, and Linux for z Systems.

SCRT also provides a command line interface, described in "Using the SCRT command line interface" on page 71.

The steps to start the SCRT GUI differ based on the platform on which it runs.

Starting the SCRT GUI on a Windows system

1. From the **Start** menu, navigate to the IBM Sub-Capacity Reporting Tool program group.
2. Click **SCRT** to start SCRT for IBM reporting or **SCRT for ISV** to start SCRT for ISV reporting.

Starting the SCRT GUI on a Linux or Linux system

1. Navigate (**cd**) to the directory where you installed SCRT.
2. Start SCRT in one of the following ways:
   - To start SCRT for IBM reporting, enter:

     ```
     ./SCRT
     ```

   - To start SCRT for ISV reporting, enter:

     ```
     ./SCRT\ for\ ISV
     ```

The SCRT user profile

SCRT maintains a profile to store user and environment information between program executions.

- On Windows systems, the profile is stored in the `%APPDATA%\SCRT` directory.
- On Linux systems, the profile is stored in the `$XDG_CONFIG_HOME/SCRT` directory. If the **XDG_CONFIG_HOME** environment variable is not set, the profile is stored in the `$HOME/.config/SCRT` directory.

  Prior to SCRT V24.11.0, on Linux systems, the profile was stored in the user's home directory. To use a profile from an earlier SCRT release, copy the profile (`profile.txt`) into the new location prior to starting SCRT.

Notes:

1. Only the values that were used during the previous program execution are saved.
2. The profile is not saved until report generation time.

Navigating the SCRT panels

SCRT uses a series of dialog panels to guide you through the report generation process—a wizard-based approach.

This topic describes the wizard process to help you understand all of the required steps to generate sub-capacity reports or multiplex reports.

Customer parameter panel

The customer parameter panel appears when you start SCRT.

On this panel, you enter information similar to that on the PARMS DD statement in the JCL for the SCRT program that runs on z/OS.

Figure 34 on page 56 shows an example of the customer parameter panel. (When running SCRT for ISV reporting, the customer parameter panel also contains the **ISV Library File** field where you can specify the vendor-supplied library file.)

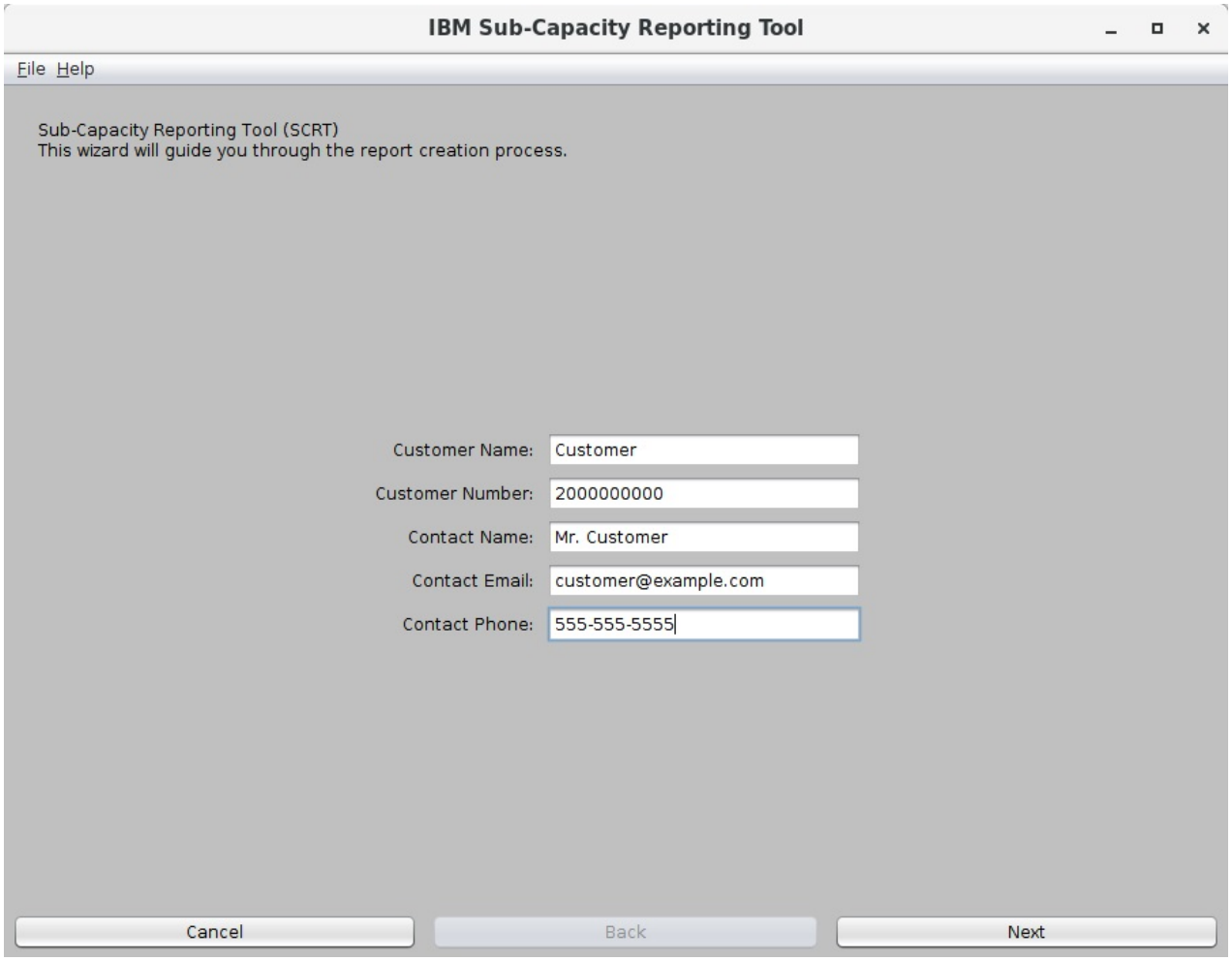


Figure 34. SCRT for Windows and Linux: Customer parameter panel

Fill in the parameter values as described in "PARMS DD statement" in the SCRT user's guide, *Using the Sub-Capacity Reporting Tool*, available from the IBM Z software pricing - Licensing - Sub-capacity licensing (www.ibm.com/it-infrastructure/z/software/pricing-licensing). When finished, click **Next**.

After SCRT successfully generates a report using these parameter values, it saves the values in the user profile. When running SCRT for ISV reporting, the parameters are saved in a vendor-specific profile. The next time you start SCRT, the program automatically populates the customer parameter panel with the saved values.

SMF or SCRT89 data selection panel

On the SMF or SCRT89 data selection panel, specify one or more files that contain all of the SMF or SCRT89 data (or both) that SCRT is to process. Your selection must include all of the files necessary for SCRT to generate a sub-capacity report or multiplex report; it is analogous to the SMF DD statement in the JCL for the SCRT program that runs on z/OS.

Figure 35 on page 57 shows an example of the SMF or SCRT89 data selection panel.

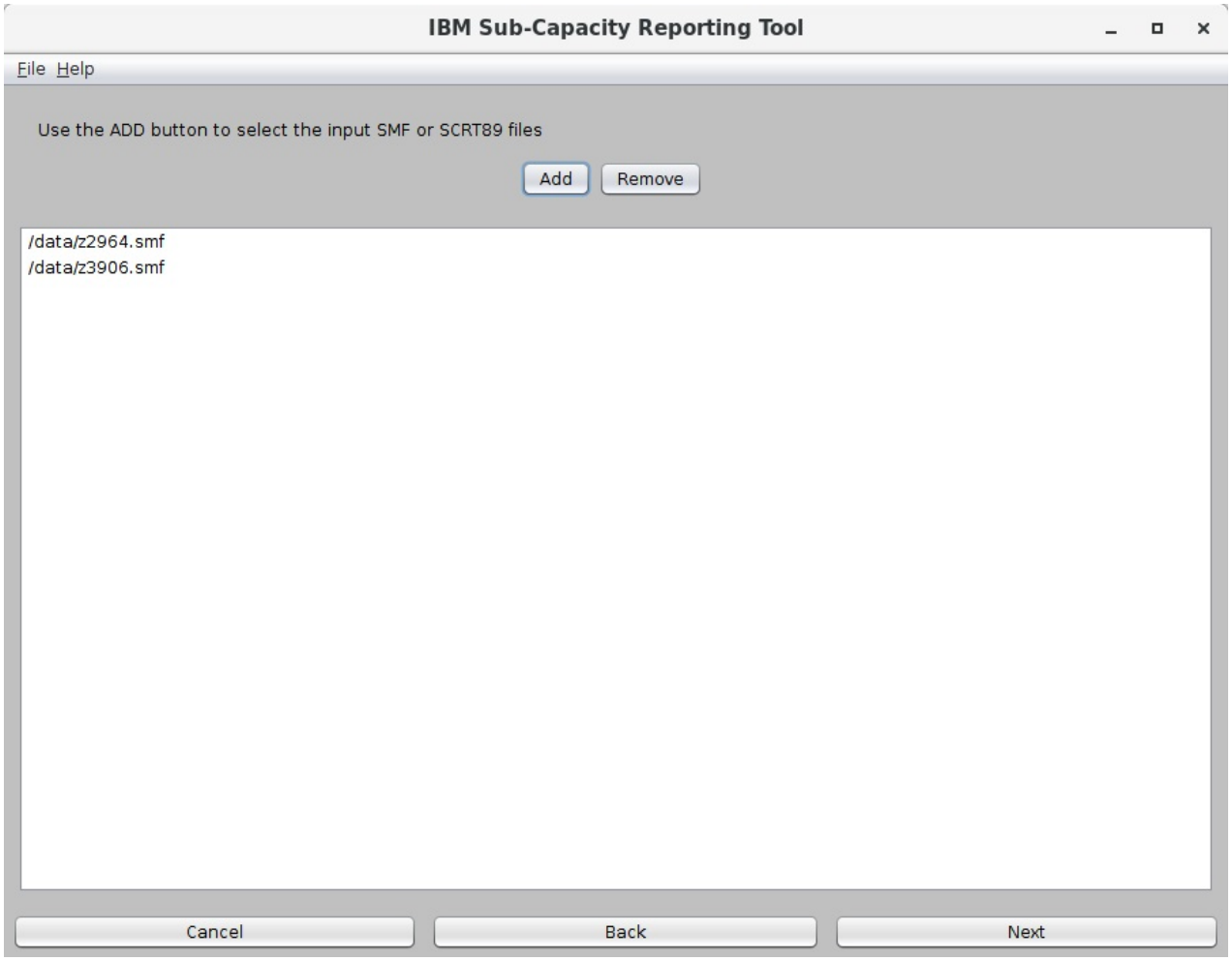


Figure 35. SCRT for Windows and Linux: SMF or SCRT89 data selection panel

Important: SCRT expects the SMF or SCRT89 data to retain a specific data format.

Click **Add** to add data files to the list. If necessary, click **Remove** to remove files. When finished, click **Next**.

When you click **Next**, SCRT performs an initial scan of the data to identify all of the CPCs, LPARs, and operating systems that are in use in the input environment. Large data files might require several minutes to complete before advancing to the next panel.

Notes:

- Data that is transmitted from a z/OS system must have file names with a `.smf` extension.
- Data that is transmitted from a z/VSE system in blocked mode can have file names with a `.bin`, `.scrt89`, or `.vse` extension.

Customer number panel

Use the customer number panel to assign additional customer numbers to the CPCs that SCRT found in the SMF or SCRT89 data. By default, SCRT assigns the customer number that you entered on the customer parameter panel to all of the CPCs.

Figure 36 on page 58 shows an example of the customer number panel.

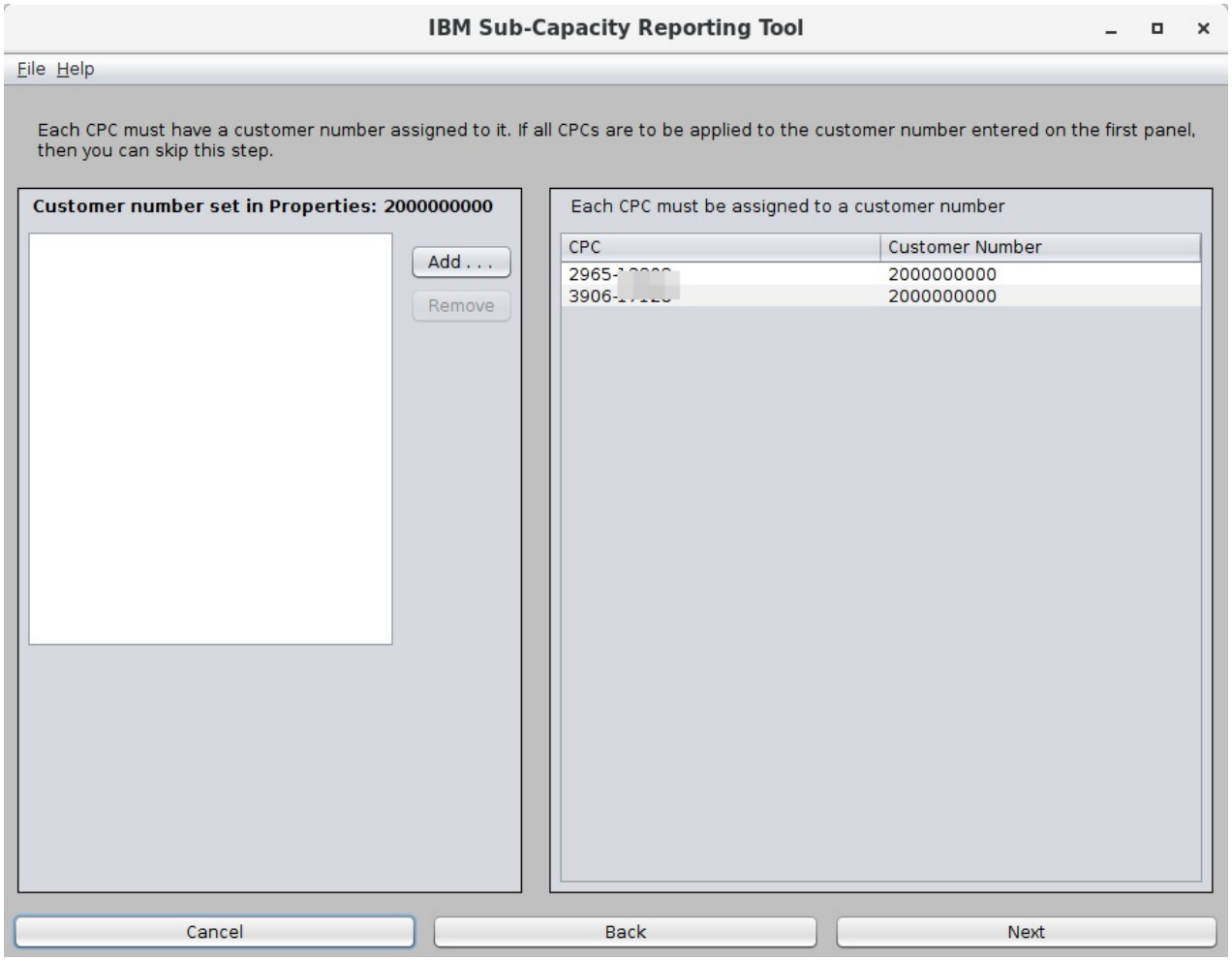


Figure 36. SCRT for Windows and Linux: Customer number panel

To enter additional customer numbers, click **Add**.

After entering alternate customer numbers, you can assign them to the CPCs listed in the **CPC** column. To do so, click inside the **Customer Number** cell for the desired CPC and select a customer number from the drop-down list.

When finished, click **Next**.

Reporting period panel

The reporting period panel allows you to select the reporting period that SCRT is to use to evaluate all of the input data.

Figure 37 on page 59 shows an example of the reporting period panel.

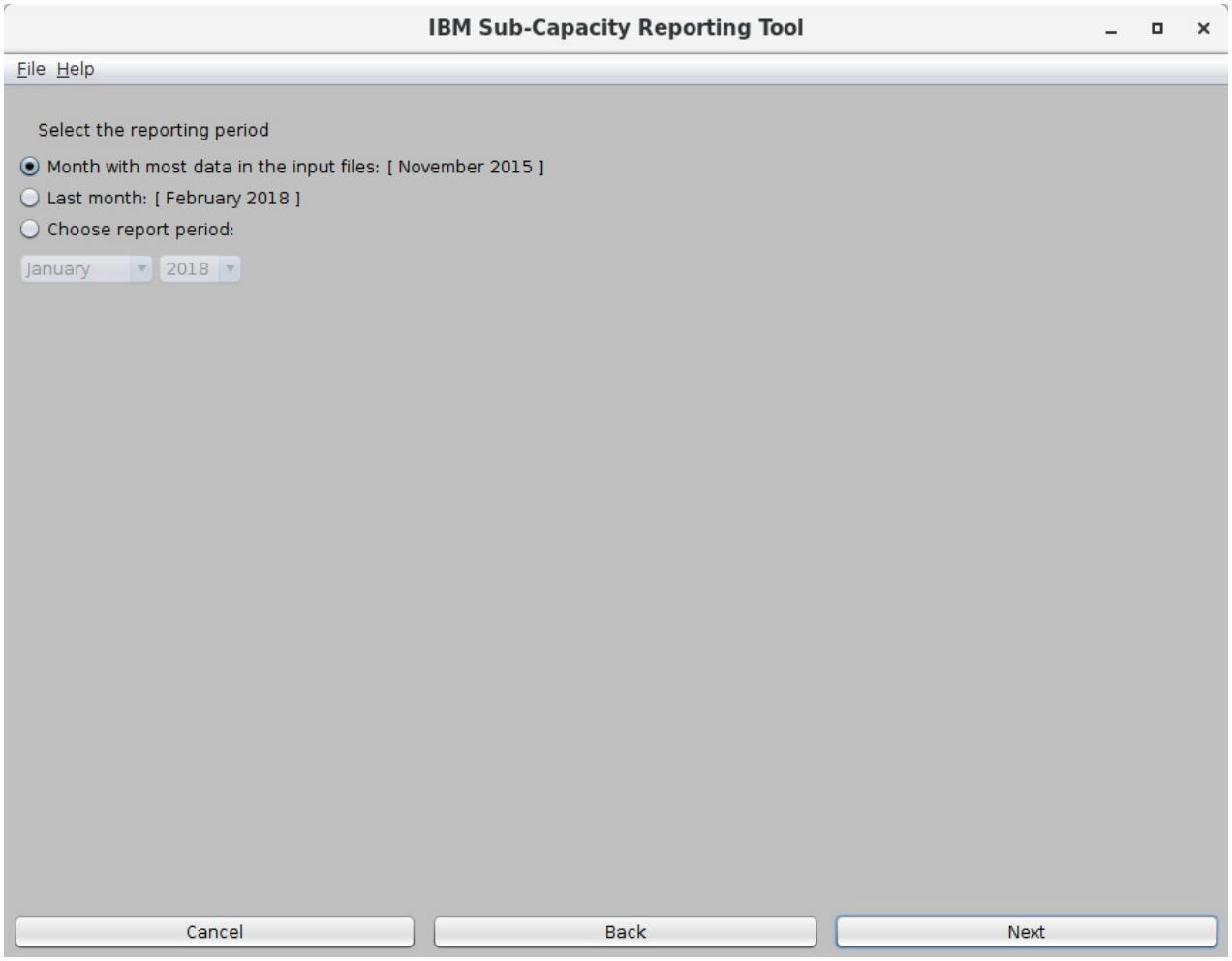


Figure 37. SCRT for Windows and Linux: Reporting period panel

You have three options to select the reporting period:

- **Month with the most data in the input files**

  This option is analogous to running SCRT on a z/OS system without specifying a reporting period. SCRT uses the month that is most represented in the input data, as indicated in brackets.
- **Last month**

  The option uses the month prior to the current calendar month.
- **Choose report period**

  This option allows you to specify any reporting period. Note that if you select a reporting period that is not represented in the input data, SCRT will not generate any reports.

Select the desired option, then click **Next**.

NO89 product selection panel

Use the NO89 product selection panel to select the NO89 products that you use and specify the location where they run. This is a two-step process, as represented by the two tabs on the panel: the **NO89 Product List** tab and the **Product Assignment** tab.

Figure 38 on page 60 shows an example of the NO89 product selection panel with the **NO89 Product List** tab selected.

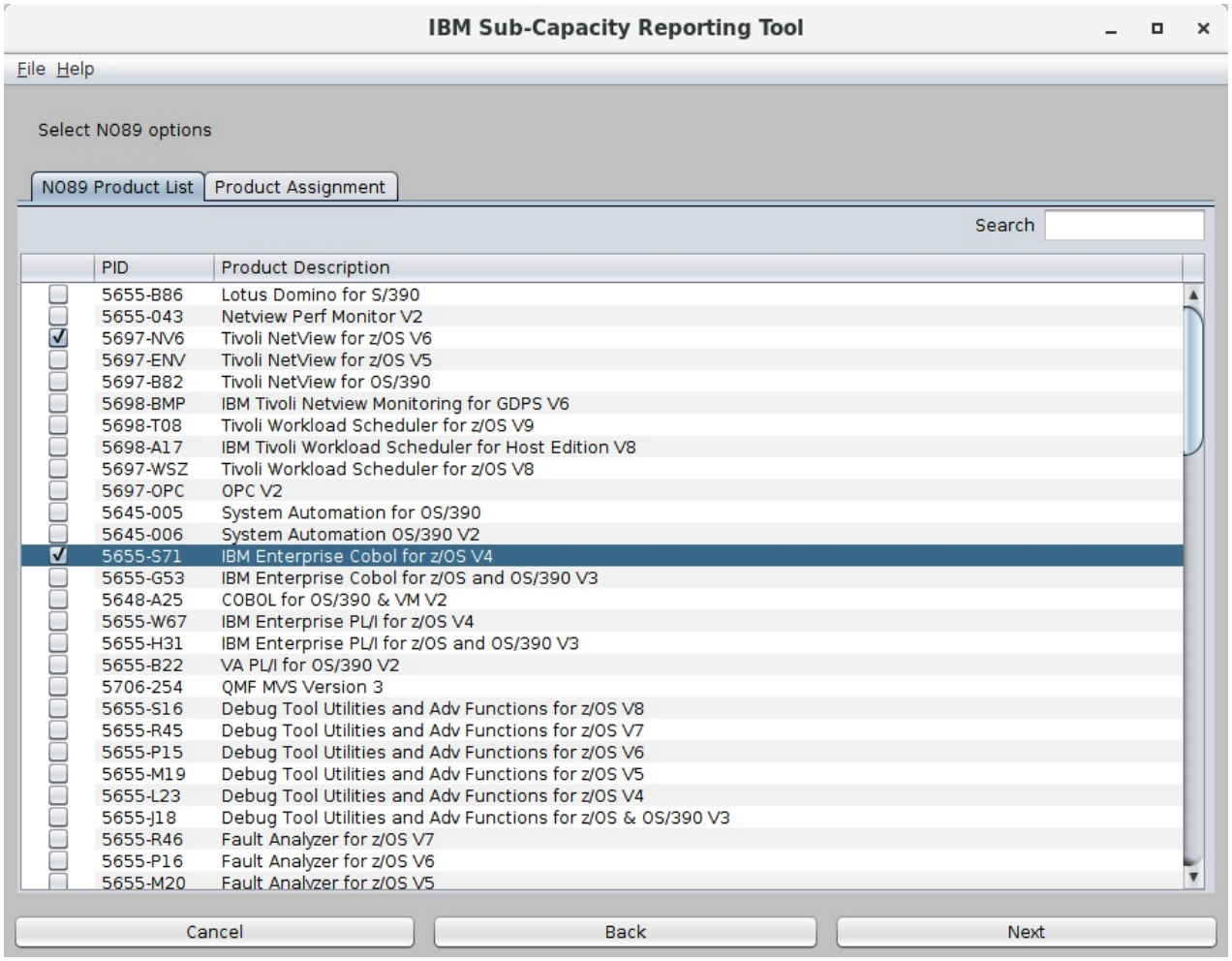


Figure 38. SCRT for Windows and Linux: NO89 product selection panel — NO89 Product List tab

On the **NO89 Product List** tab, select a NO89 product. SCRT automatically switches to the **Product Assignment** tab so that you can assign that NO89 product to the correct LPARs. Repeat this process for each NO89 product that you use.

Figure 39 on page 61 shows an example of the NO89 product selection panel with the **Product Assignment** tab selected.

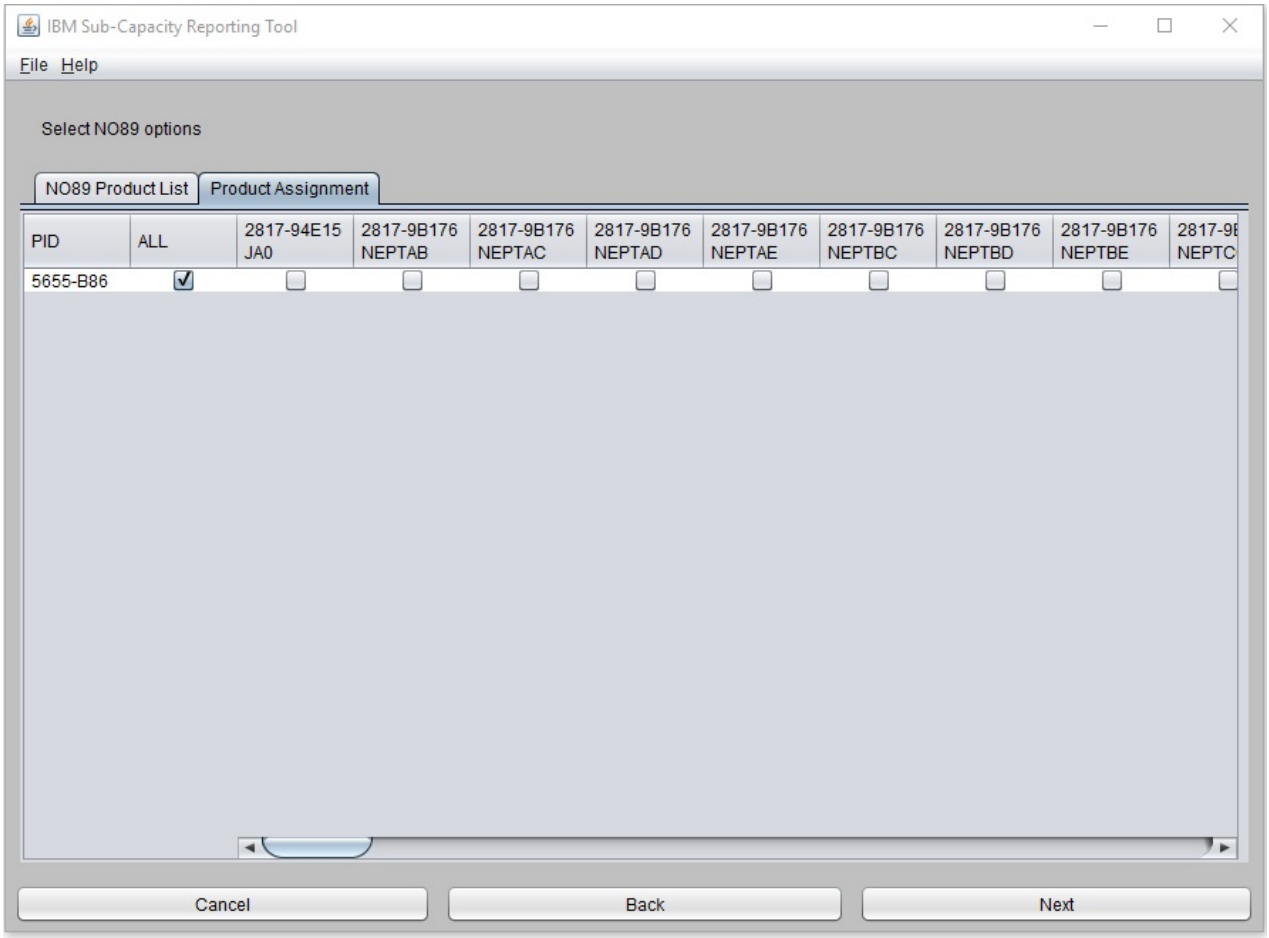


Figure 39. SCRT for Windows and Linux: NO89 product selection panel — Product Assignment tab

The **Product Assignment** tab lists the NO89 products that you selected and allows you to assign the products to the specific LPARs on which they run. Click the check boxes to select or clear the LPARs on which each NO89 product ran during the reporting period. When finished, click **Next**.

Upon generating a report, SCRT saves the selections you made on the NO89 product selection panel and will populate the panel with these selections the next time you run the tool.

Processing options panel

The processing options panel contains two tabs: **Input CSV** and **Processing Options**.

Note: This panel is not applicable and does not appear when using SCRT for ISV reporting.

Use the **Input CSV** tab to specify one or more `.csv` files to provide input data for Mobile Workload Pricing (MWP), IBM Z Collocated Application Pricing (zCAP), or IBM Z Workload Pricing for Cloud (zWPC).

Figure 40 on page 62 shows an example of the **Input CSV** tab.

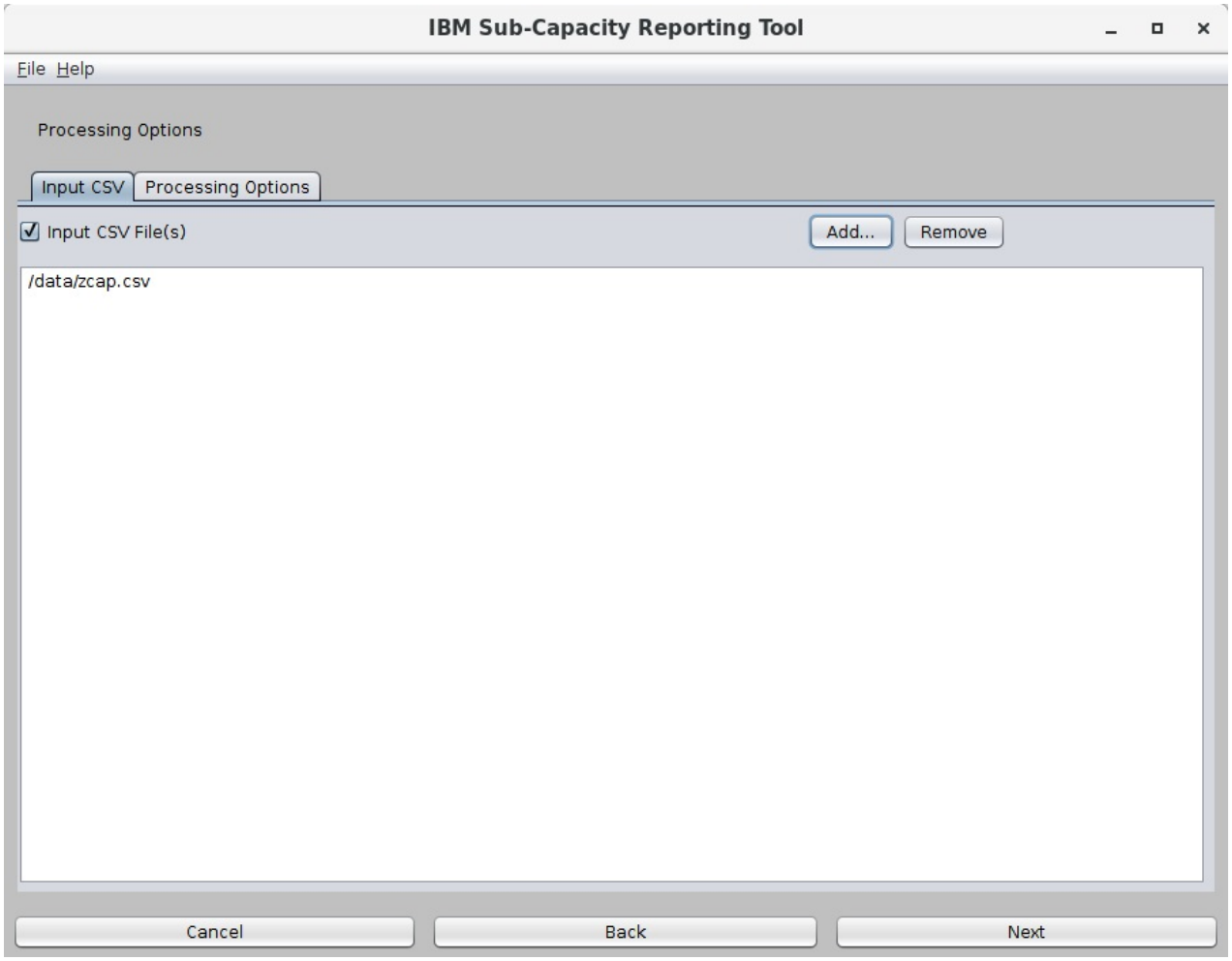


Figure 40. SCRT for Windows and Linux: Input CSV tab

To submit MWP or zCAP pricing data, you must first select the **Input CSV File(s)** check box. Then, click **Add** to locate and specify the necessary input files. Note that the format and rules for using these files are the same as for using the INPUTCSV DD statement in the JCL for the SCRT program that runs on z/OS. For details, see the information about using the INPUTCSV DD in the appropriate chapter for MWP or zCAP.

Use the **Processing Options** tab to select the report type and any pricing offerings that you might require for SCRT processing. Figure 41 on page 63 shows an example of the **Processing Options** tab.

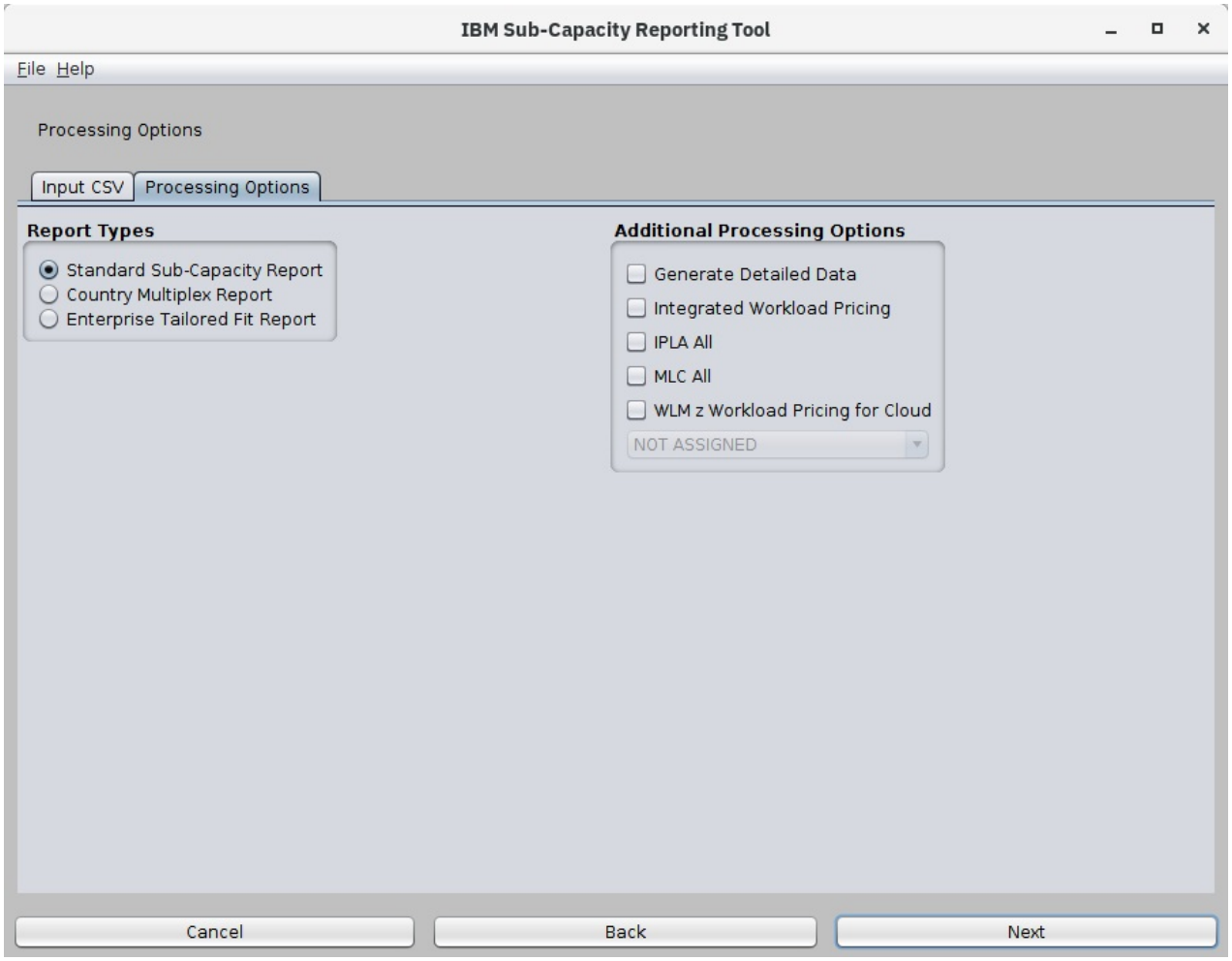


Figure 41. SCRT for Windows and Linux: Processing Options tab

To select the report type, select one of the **Report Types** buttons. You can select a standard sub-capacity report, a Country Multiplex report (for IBM Country Multiplex Pricing), or an Enterprise Tailored Fit report (for Tailored Fit Pricing for IBM Z - Software Consumption Solution). The report types are mutually exclusive; you can select only one.

To select a special pricing option, select the **Additional Processing Options** check box for that option. You can select one or more options, as appropriate. For more information about these offerings, see csscrtspecialdd.dita#csscrtspecialdd or the appropriate chapter about that offering.

When IBM Z Workload Pricing for Cloud (zWPC) is in use, select the **WLM z Workload Pricing for Cloud** check box and select the appropriate WLM reporting attribute from the drop-down list. This is analogous to specifying the **`Assign ZWPC`** control statement on the SPECIAL DD statement.

When finished, click **Next**.

Detected solution IDs panel

The detected solution IDs panel lists all of the solution IDs that were assigned to tenant resource groups in the input data and allows you to update solution IDs.

Figure 42 on page 64 shows an example of the detected solution IDs panel.

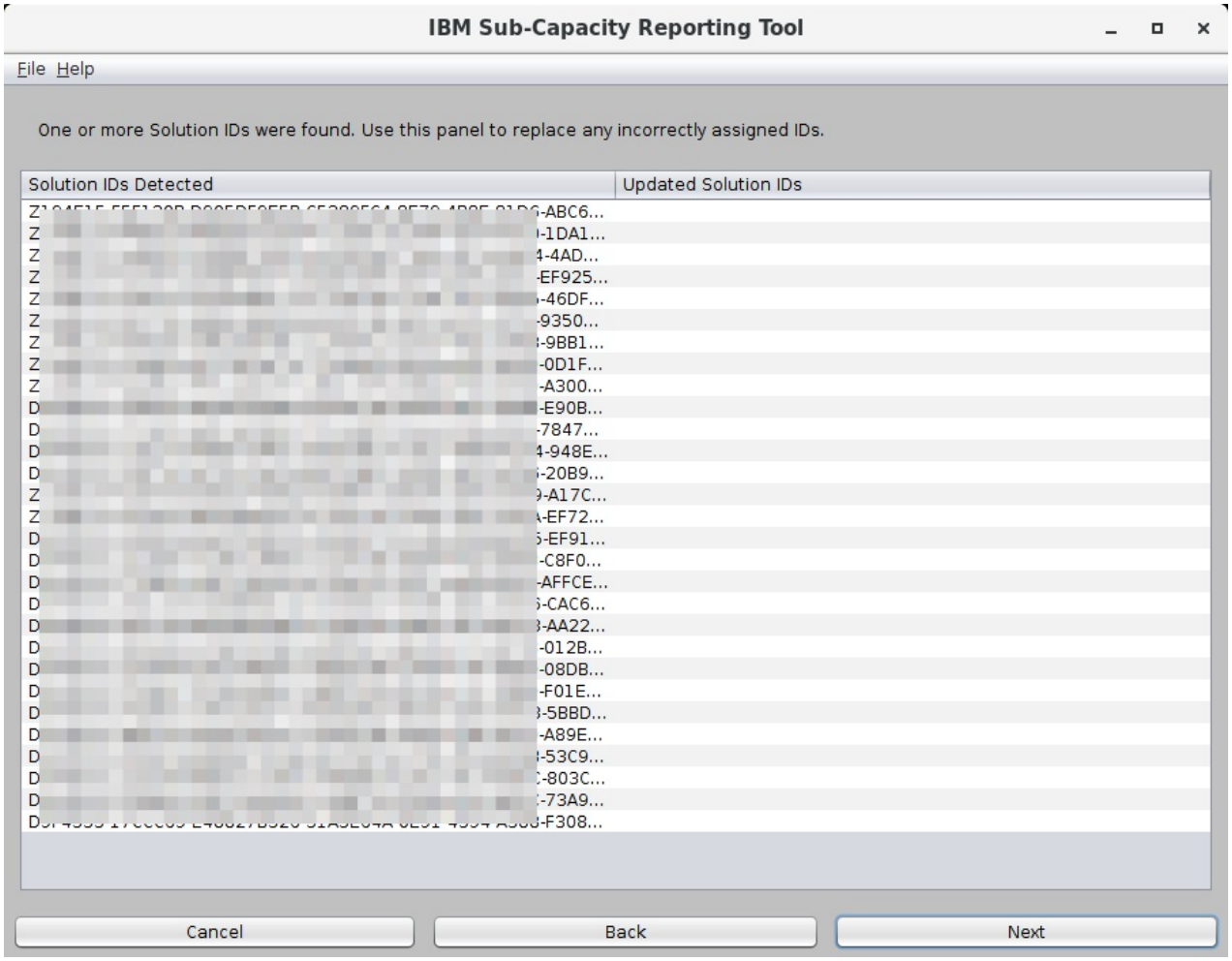


Figure 42. SCRT for Windows and Linux: Detected solution IDs panel

To update a solution ID in the **Solution IDs Detected** column, enter the new solution ID on the corresponding row in the **Updated Solution IDs** column. This is analogous to using the **UPDATE SOLUTION_ID** control statement in the SPECIAL DD in the SCRT JCL or using the **--update-solution-id** option in the SCRT CLI.

When finished, click **Next**.

Container settings assignment panel

On the container settings assignment panel, you can:

- Assign solution names to the containers that SCRT detected in the input data.
- Assign an entire LPAR (or LPARs) to be part of a container. You can assign an LPAR to an existing container or to a new container.
- Ignore individual containers on a per-hour basis for purposes of SCRT reporting.

Figure 43 on page 65 shows an example of the container settings assignment panel.

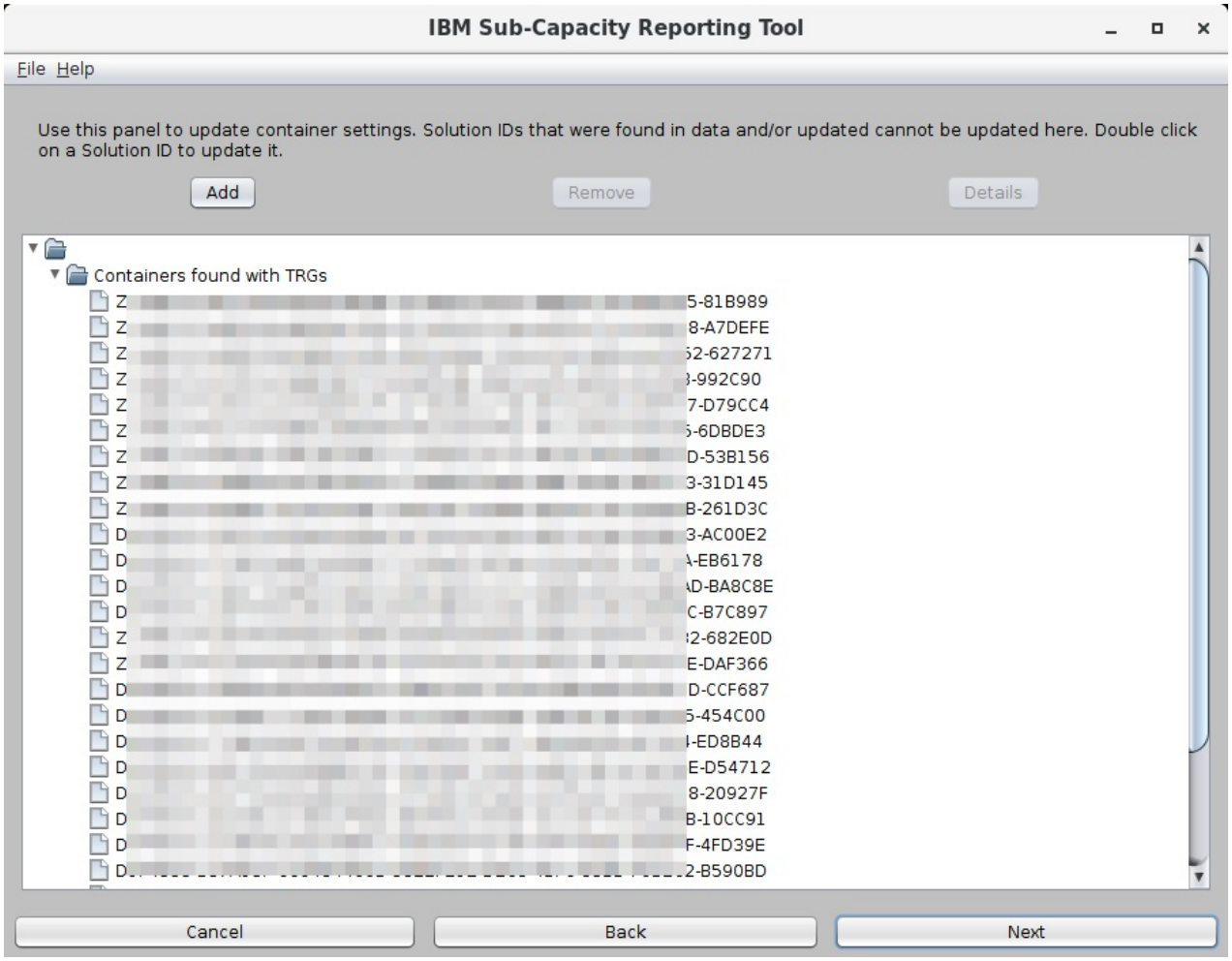


Figure 43. SCRT for Windows and Linux: Container settings assignment panel

- To assign a name to a container, double click a solution ID to launch the Update Container dialog and enter the container name. This is analogous to using the **UPDATE CONTAINER** control statement in the SPECIAL DD in the SCRT JCL or using the **--update-container** option in the SCRT CLI.
- To assign an entire LPAR to an existing container, double click the desired solution ID to launch the Update Container dialog and select the LPAR (or LPARs) from the table. To assign an entire LPAR to a new container, click **Add** and use the Update Container dialog to set the solution ID and select the LPAR (or LPARs) from the table. This is analogous to using the **CONTAINER** control statement in the SPECIAL DD in the SCRT JCL or using the **--container** option in the SCRT CLI.
- To ignore individual containers for SCRT reporting, double click the desired solution ID to launch the Update Container dialog and use the **Ignore Container** tab to add, edit, or remove the time intervals that you want SCRT to ignore. This is analogous to using the **IGNORE CONTAINER** control statement in the SPECIAL DD in the SCRT JCL or using the **--ignore-container** option in the SCRT CLI.
- To assign NO89 products to a container, double-click the desired solution ID to launch the Update Container dialog, and use the **NO89 Products** tab to add products to the container. This is analogous to using the **NO89_PRODUCT_ID** keyword on the **UPDATE CONTAINER** control statement in the SPECIAL DD in the SCRT JCL or using the **--update-container** option in the SCRT CLI.

When finished, click **Next**.

Exclude panel

Use the Exclude panel to direct SCRT to exclude the processing of certain data that is reported on SMF or SCRT89 records. This panel is analogous to the **Exclude** control statement on the SPECIAL DD statement in the JCL for the SCRT program that runs on z/OS, and the same rules and restrictions apply here.

Figure 44 on page 66 shows an example of the Exclude panel.

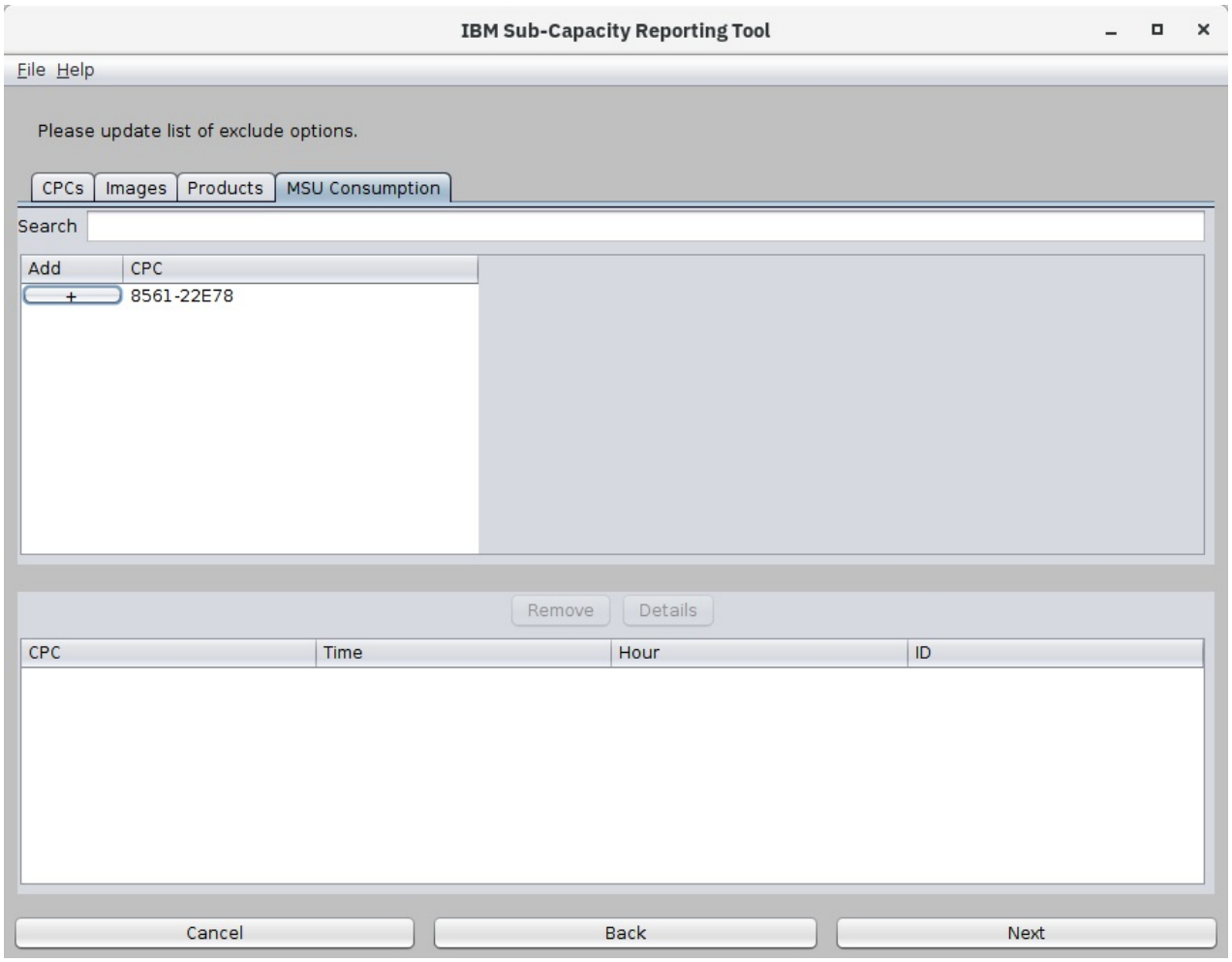


Figure 44. SCRT for Windows and Linux: Exclude panel

The Exclude panel has four tabs: **CPCs**, **Images**, **Products**, and **MSU Consumption**. The first three tabs allow you to begin specifying an Exclude statement at the CPC, image, or product level. The **MSU Consumption** tab allows you to begin specifying an Exclude statement for excluding an amount of consumed MSUs.

To create an Exclude statement that is not based on MSU consumption:

1. Select the appropriate tab. A list of items of the selected type (CPCs, images, or products, depending on which tab you selected) appears, as found in the input data.
2. To exclude an item, click the check box in the **Add** column for that item. This generates an exclude statement, which appears in the list of exclude statements.
3. To further customize the Exclude statement, either double-click it or select it and click **Details**. The **Set Exclude options** window appears, as shown in Figure 45 on page 67.

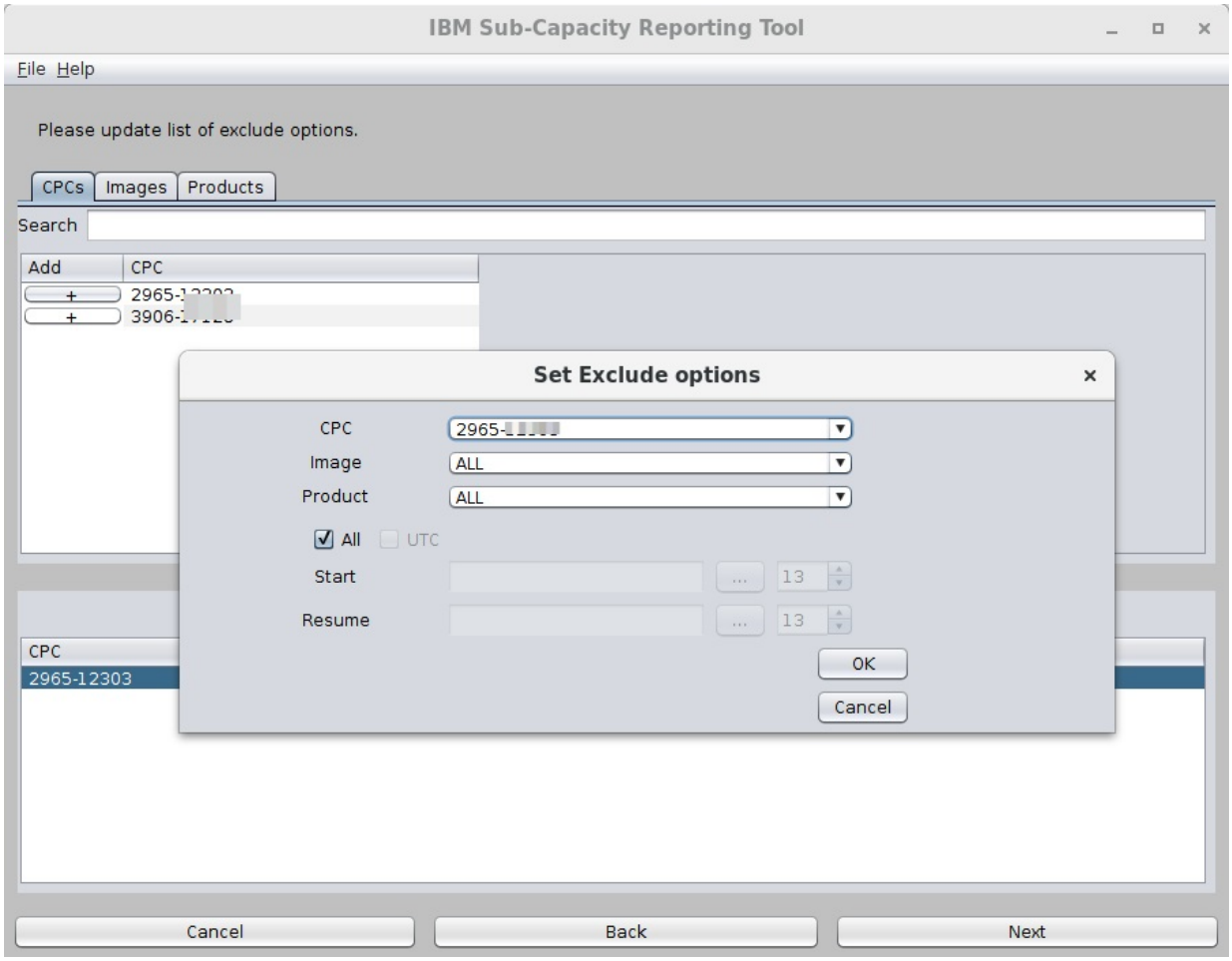


Figure 45. SCRT for Windows and Linux: Exclude panel — Set Exclude options

4. Customize the Exclude statement options by providing additional information, including the **Start** and **Resume** dates and hours.

   To specify the entire reporting period, select the **All** check box. To indicate that the start and resume values are in UTC, select the **UTC** check box.

5. Click **OK**.
6. If necessary, repeat steps 1 - 5 to create additional Exclude statements.
7. When finished, click **Next**.

To create an Exclude statement for MSU consumption:

1. Select the **MSU Consumption** tab. A list of CPCs appears, as found in the input data.
2. To exclude MSU consumption from a Tailored Fit Pricing solution on a CPC, click the check box in the **Add** column for that CPC. The Set Exclude Options dialog is displayed, as shown in Figure 46 on page 68.
3. On the Set Exclude Options dialog, select the solution ID to which the exclude should apply, enter the amount of CPU time, in seconds, to exclude, and select a date and hour at which the incident being excluded occurred. Click **OK** to continue.

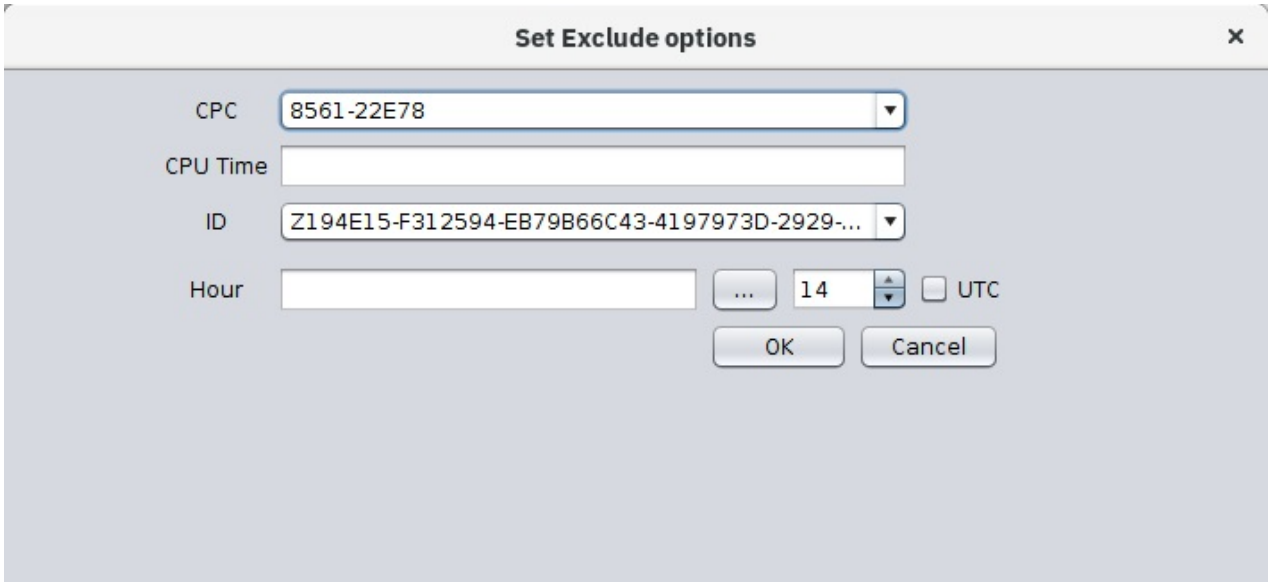


Figure 46. SCRT for Windows and Linux: Exclude panel — Set Exclude options for MSU consumption

Report preview panel

The report preview panel is the last panel before SCRT generates a report. The panel provides a summary of all of the processing options that you requested on the preceding panels.

Figure 47 on page 69 shows an example of the exclude panel.

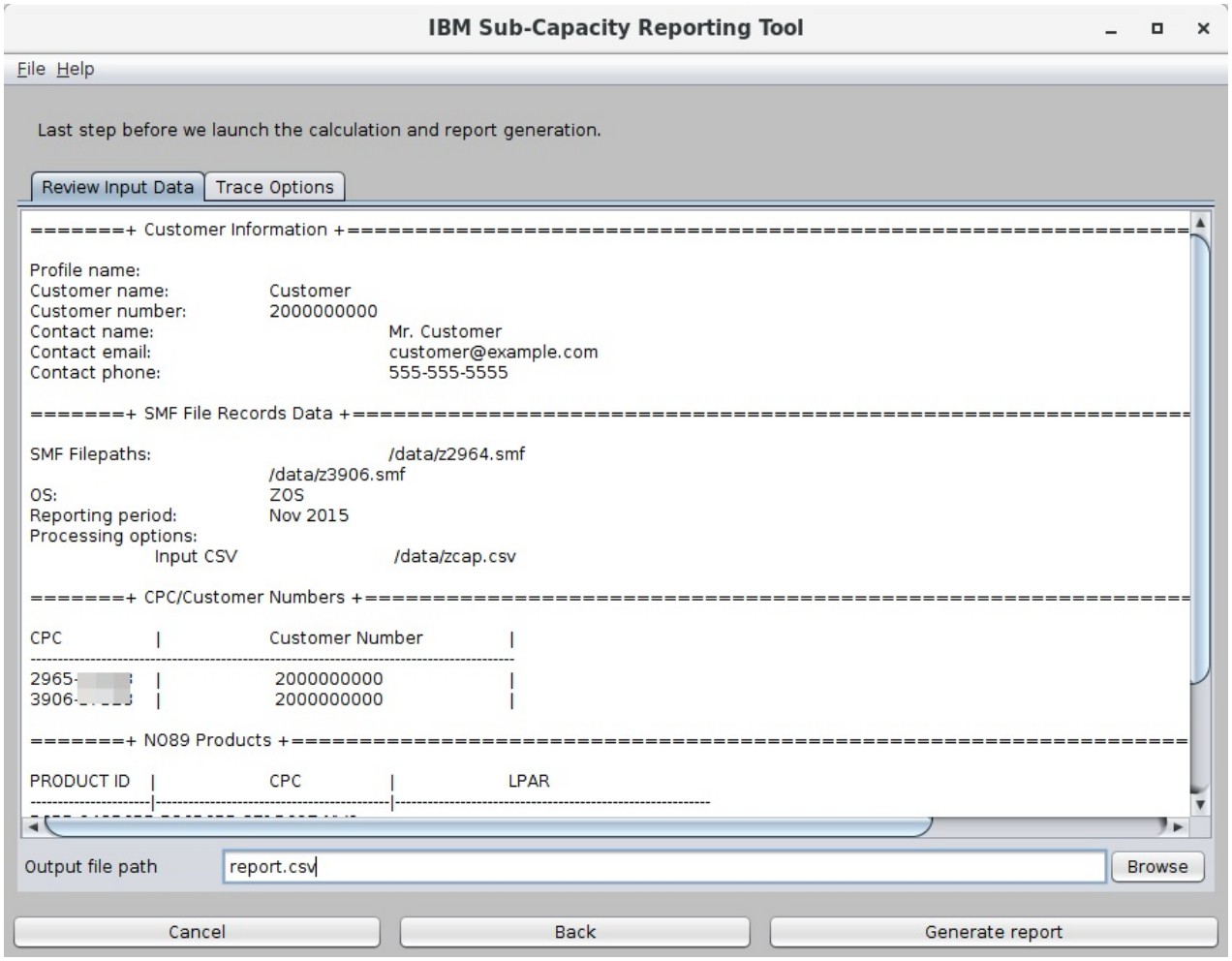


Figure 47. SCRT for Windows and Linux: Report preview panel

The report preview panel provides the option to request detailed report output. This is the same function as provided by the **`Generate_Detailed_Data`** control statement in the SPECIAL DD statement in the JCL for the SCRT program that runs on z/OS. To request a detailed report, select the **Generate detailed report** check box.

In the **Output file name** field, specify the fully-qualified path and file name where SCRT is to write the report output.

Optionally, to enable GSTRACE or CPSTRACE output, go to the **Trace Options** tab, select the **GSTRACE** or **CPSTRACE** checkbox, and specify the path and file name to which SCRT is to write the trace output, as shown in Figure 48 on page 70.

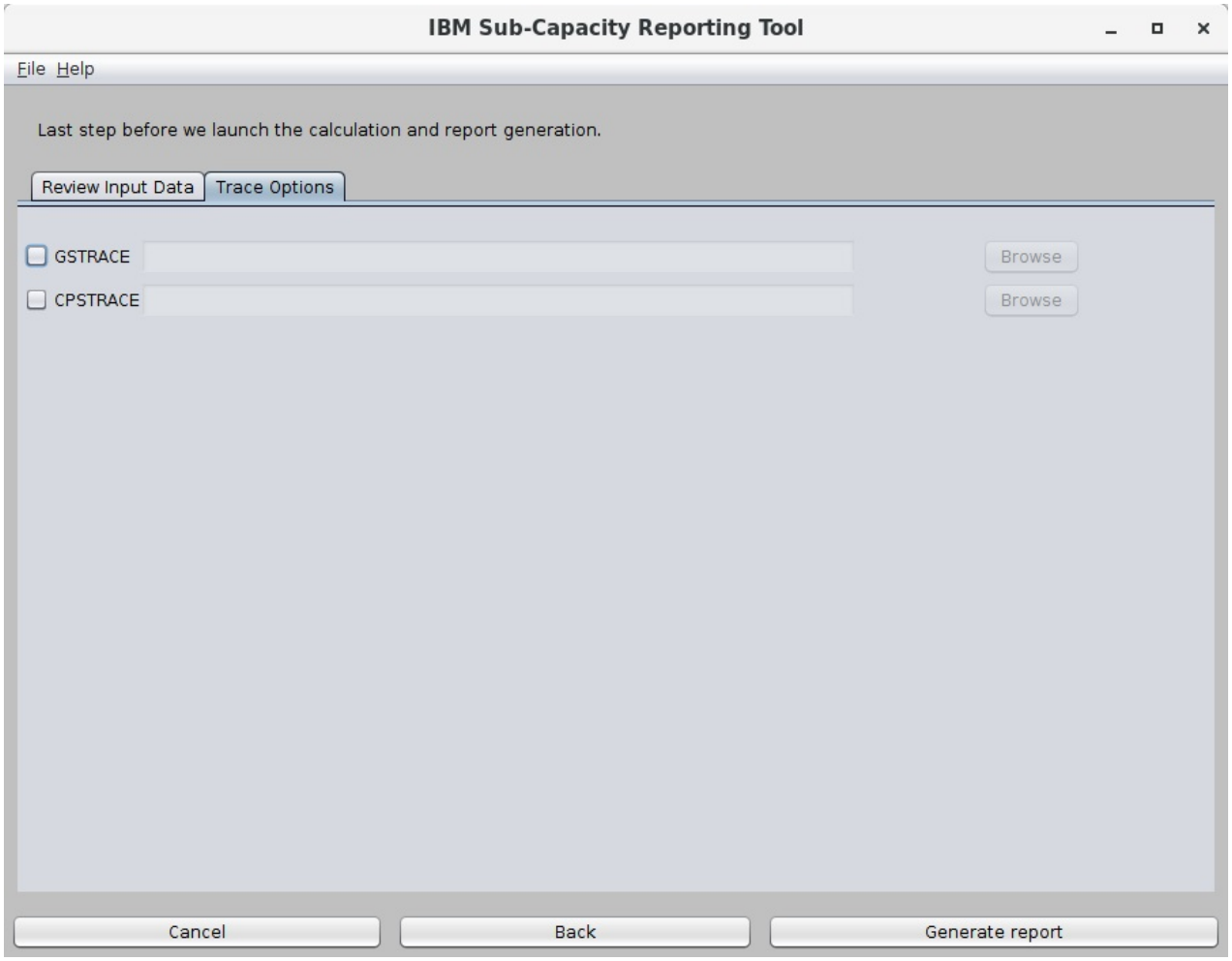


Figure 48. SCRT for Windows and Linux: Trace Options tab on the report preview panel

Click **Generate report** to begin SCRT processing. The processing time, before advancing to the next panel, depends on the volume of SMF or SCRT89 input data to be processed.

Report results panel

The report results panel appears when SCRT processing is complete and report output has been generated successfully. The panel provides information about the report generation process.

Figure 49 on page 71 shows an example of the exclude panel.

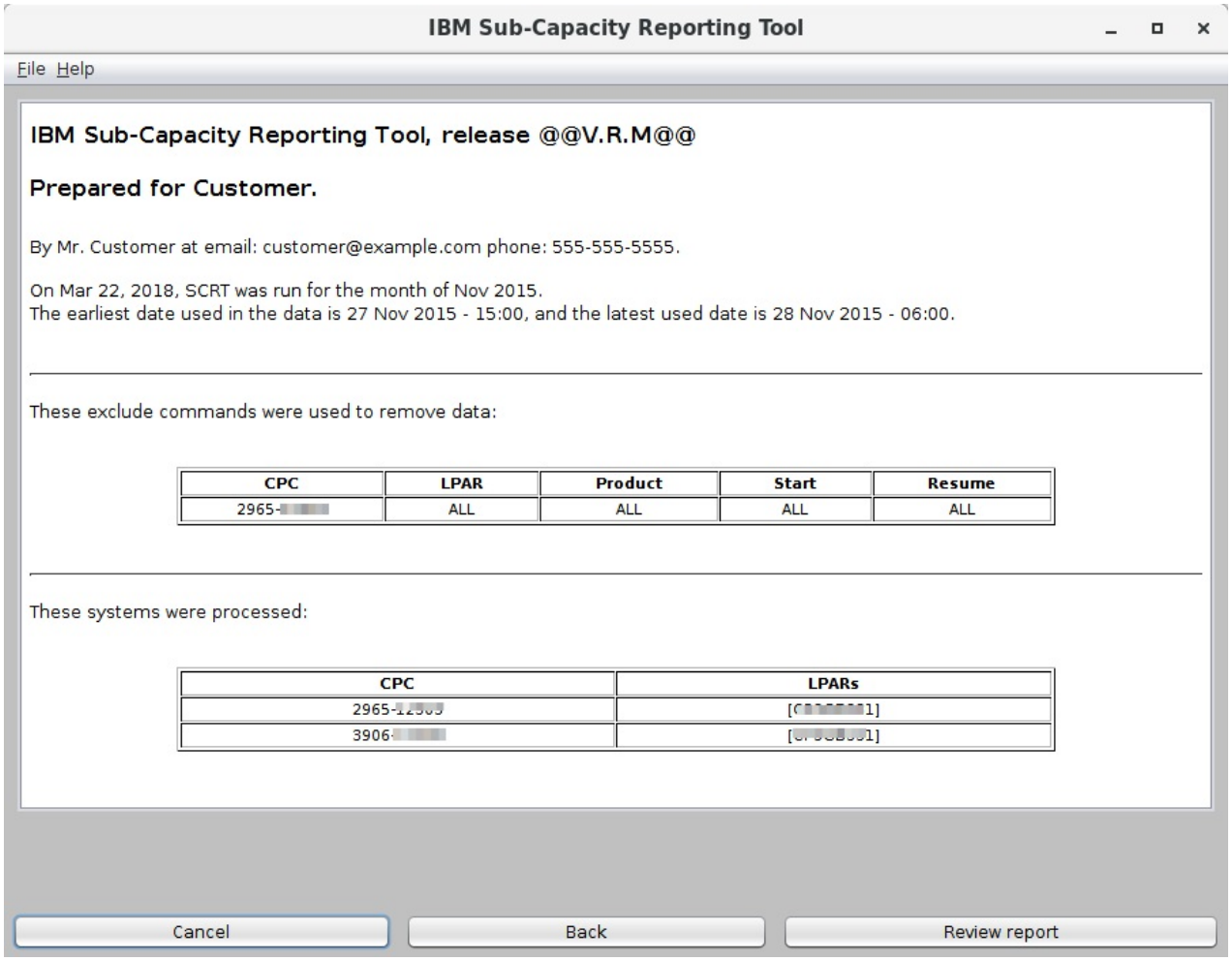


Figure 49. SCRT for Windows and Linux: Report results panel

Note: On Windows-based systems, the report results panel includes a **Review report** button that opens the generated report. This button is not present on Linux-based systems.

The SCRT Wizard is now concluded. Click **Cancel** to exit.

Proceed with the same report submission process as for reports generated on z/OS.

Using the SCRT command line interface

SCRT supports a command line interface (CLI) on Windows and Linux platforms.

The CLI supports the same SCRT processing options as the Windows and Linux graphical user interface (GUI).

Note: The CLI is included when you install the SCRT deliverable for Windows or Linux.

Prerequisites for using the command line interface

Observe the following prerequisites for running the SCRT CLI:

- SCRT must be installed on a Windows or Linux system.
- SMF or SCRT89 data sets must be copied to the Windows or Linux system.

Running the SCRT command line interface

Issue the appropriate command to invoke the SCRT CLI on a Linux or Windows system.

Optionally, SCRT also provides sample scripts (a .bat file for Windows systems and a shell script for Linux systems) in the `samples` directory which you can customize and use to invoke the CLI.

Invoking the command line interface on Linux systems

1. From your local shell, navigate to the SCRT installation directory.
2. Issue the following command to invoke the command-line utility and specify the processing options, followed by one or more paths to the SMF or SCRT89 input data sets:

```
./scrtc options {SMFpaths|SCRT89paths}
```

Invoking the command line interface on Windows systems

1. From a Windows command prompt, navigate to the SCRT installation directory.
2. Issue the following command to invoke the command-line utility and specify the processing options, followed by one or more paths to the SMF or SCRT89 input data sets:

```
scrtc options {SMFpaths|SCRT89paths}
```

Specifying command line options

The SCRT command line utility accepts a number of options that provide the same SCRT processing options as the Windows and Linux GUI interface.

- Many command line options have equivalent short and long forms. You can specify either form and you can mix forms between options.
  - Long form options begin with two hyphens (--).
  - Short form options begin with one hyphen (-).
  - If an option has no short form, you must specify the long form.
- Most command line options take an argument. Use a blank character to separate the option from the argument.
- If an argument contains blank characters or characters that have special meaning to the operating system or shell, enclose the argument in double quotation marks (").

Table 2 on page 72 describes the command line options.

Table 2. SCRT command line options

Long form	Short form	Required	Description
--container	*none*	no	For Tailored Fit Pricing for IBM Z, associates an LPAR with a container solution ID. For details, see ./containerPricingcliopts.dita#containerPricingcliopts/cont.
--ignore-container	*none*	no	For Tailored Fit Pricing for IBM Z, designates a period of time for which SCRT is to ignore a container. For details, see ./containerPricingcliopts.dita#containerPricingcliopts/ignore.
--update-container	*none*	no	For Tailored Fit Pricing for IBM Z, updates the attributes of a container, such as the container name. For details, see ./containerPricingcliopts.dita#containerPricingcliopts/upcont.
--update-solution-id	*none*	no	For Tailored Fit Pricing for IBM Z, replaces the specified solution ID with a newly specified solution ID. For details, see ./containerPricingcliopts.dita#containerPricingcliopts/upsol.

Associating an LPAR with a solution ID

Use the **--container** option to associate an LPAR with a solution ID for Tailored Fit Pricing for IBM Z.

Example:

```
--container CPC=3906-00000,IMAGE_ID=SYS1,
   ID=Z1nnnnn-nnnnnnn-nnnnnnnnnn-nnnnnnnn-nnnn-nnnn-nnnn-nnnnnn-nnnnnn
```

Updating container properties

Use the **--update-container** option to associate the LMS-provided solution name with a Tailored Fit Pricing solution based on the associated solution ID and to designate NO89 products that run in the container. The syntax for the option is the same as for the **UPDATE CONTAINER** control statement in the SPECIAL DD in the SCRT JCL.

Examples:

- Specifying the name of a container:

```
--update-container ID=D911111-N4ED9AD-DB3D215CAF-NTZZZZZZ-07F5-4EDF-AF34-E062EB-0ADCD7,
   SET_NAME="Container-Name"
```

- Specifying a single NO89 product:

```
--update-container ID=D911111-N4ED9AD-DB3D215CAF-NTZZZZZZ-07F5-4EDF-AF34-E062EB-0ADCD7,
   SET_NAME="Container-Name",NO89_PRODUCT_ID=nnnn-nnn
```

- Specifying multiple NO89 products:

```
--update-container ID=D911111-N4ED9AD-DB3D215CAF-NTZZZZZZ-07F5-4EDF-AF34-E062EB-0ADCD7,
   SET_NAME="Container-Name",NO89_PRODUCT_ID=(nnnn-nnn,mmmm-mmm,...)
```

The container name must be enclosed in double quotation marks. Depending on your operating system shell or environment, you might need to escape the quotation marks.

IBM requires that the specified container name match the container name that was specified when the solution ID was assigned in the LMS web portal.

Replacing one solution ID with another

Use the **--update-solution-id** option to replace one solution ID with another for Tailored Fit Pricing for IBM Z. The syntax for the option is the same as for the **UPDATE SOLUTION_ID** control statement in the SPECIAL DD in the SCRT JCL.

Example:

```
--update-solution-id OLD=Z1nnnnn-nnnnnnn-nnnnnnnnnn-nnnnnnnn-nnnn-nnnn-nnnn-nnnnnn-nnnnnn,
   NEW=Z1mmmmm-mmmmmmm-mmmmmmmmmm-mmmmmmmm-mmmm-mmmm-mmmm-mmmmmm-mmmmmm
```

You can use this option to correct an incorrect solution ID in the input data.

Discarding container-related information

Use the **--ignore-container** option to instruct SCRT to ignore container-related information for the specified solution ID and time interval. The syntax for the option is the same as for the **IGNORE CONTAINER** control statement in the SPECIAL DD in the SCRT JCL.

Examples:

- To ignore data for a container for a specified time interval:

```
--ignore-container ID=Z1nnnnn-nnnnnnn-nnnnnnnnnn-nnnnnnnn-nnnn-nnnn-nnnn-nnnnnn-nnnnnn,
   START=yyyy/mm/dd/hh,RESUME=yyyy/mm/dd/hh
```

- To ignore all containers for the entire reporting period:

```
--ignore-container ID=*ALL
```

  When specifying ID=*ALL, the **START** and **RESUME** keywords are not required; if specified, they are ignored.

Chapter 5. Using workload reporting services to collect Container Services performance data

The workload reporting services are intended for monitoring or reporting products to collect performance data. They replace some of the existing methods of collecting data, and provide a means to collect data for the goal-oriented processing with the service policy.

When to use the workload reporting services

Because the data collection is cumulative, performance monitors can collect information based on their own reporting intervals. But the collection is stopped and re-started when a significant change occurs in workload management, such as when a new policy is activated, or a system failure occurs. Performance monitors should “bookend” their intervals when such a significant change occurs in workload management. For each of these events, event notification facility (ENF) signals are issued. SRM samples the states of address spaces, and an ENF signal is issued when a new set of samples is available. The performance monitor can use the ENF signals to guide its reporting interval. For example, when an ENF code for a new policy activation is issued, the performance monitor can end its last reporting interval, and start the next reporting interval for the newly activated service policy.

To enable the performance monitor to know when a workload reporting change is taking place, such as when a policy is activated, there is a ENF system event code. ENF event code 41 and its related qualifiers indicate when changes are taking place related to service policies. ENF code 41 guides the performance monitor's reporting intervals, and helps it to issue the services at the appropriate times.

Interpreting report class data

Through classification rules WLM allows you to associate transactions with report classes or tenant report classes for reporting purposes. Since service IWMRCOLL processes tenant report classes like report classes, the term report class always refers to both report classes and tenant report classes in the following.

Report classes can be used to report on a subset of transactions running in a single service class but also combine transactions running in different service classes within one report class. In the first case a report class is called homogeneous, and in the second case it is called heterogeneous.

A report class period is homogeneous if there is only one service class found contributing to this report class period in a given report interval. To allow a reporting product to determine whether a report class period is homogeneous in its reporting interval, WLM offers two indicators returned by IWMRCOLL:

mixed-class-indication timestamp
: This timestamp indicates when workload data associated with a different service class last contributed data to a report class period that was currently collecting data from another service class (see Figure 50 on page 76).

service class index
: This index indicates the last service class whose data was collected in the report class period.

Figure 50 on page 76 illustrates the concept of the mixed-class-indication timestamp in relation to the time interval in which a caller collects workload data.

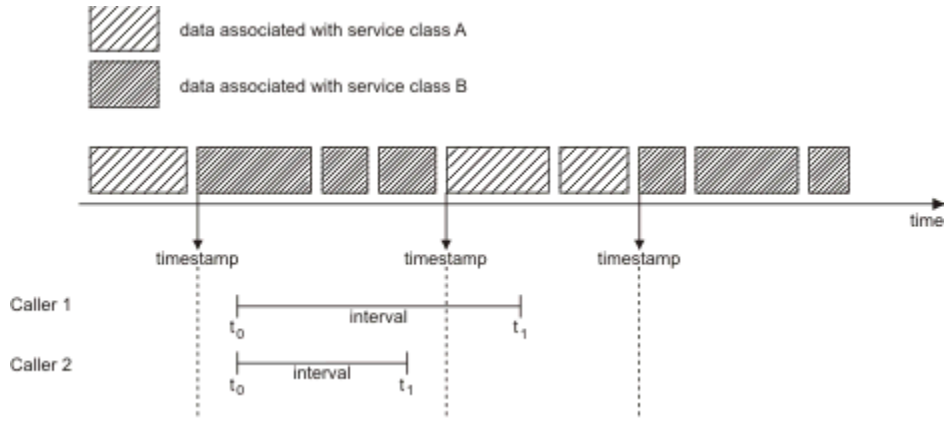


Figure 50. Mixed-class-indication timestamp in relation to the time interval

A caller invokes IWMRCOLL twice in order to get interval data, first at time t_0 to start the interval and second at time t_1 to end collecting data. With the second invocation at t_1, the caller gets back the mixed-class-indication timestamp. If the returned timestamp is ≥ t_0, as it is for caller 1, it means that transaction data from a different service class started contributing data to the same report class period. The report class is heterogeneous. If the returned timestamp is outside the interval (smaller than t_0), as it is for caller 2, it means that the report class remained homogenous during the calling interval.

Being able to see that a period is homogeneous allows the reporting product to format response time distribution buckets and work manager delay data for this period while it would not report this data for a heterogeneous period. If the timestamp indicates that the report class is heterogeneous, it is recommended to collapse the periods which means to report the data as if the report class had only one period.

Using the IWM4QTNT service

The IWM4QTNT service provides CPU service consumption of tenant resource groups defined in the WLM service definition. Long-term average service on general purpose processors used by the tenant resource groups is provided as well as the consumption on specialty engines.

Table 3 on page 76 shows a sample sequence of how you can use IWM4QTNT to obtain CPU service consumption of tenant resource groups on a single system.

Table 3. Using IWM4QTNT with the workload reporting services

Action	Reason
Issue REQSRMST SYSEVENT	To get information about IWM4QTNT availability
Set up a reporting interval	To prepare for subsequent IWM4QTNT requests
Issue IWM4QTNT specifying ANSLEN and QUERYLEN	To obtain length of storage needed. IWM4QTNT returns ANSTOKN required for subsequent calls to IWM4QTNT
Issue GETMAIN	To get storage needed to hold information returned by IWM4QTNT
Issue IWM4QTNT ANSTOKN=token	To get CPU service consumption data per tenant resource group mapped by IWMWQTAA

IWM4QTNT — Query tenant resource group consumption

IWM4QTNT is the interface reporting products should use to obtain CPU service consumption of tenant resource groups defined in the WLM service definition. Long-term average service on general purpose processors used by the tenant resource groups is provided as well as the consumption on specialty engines.

To help the caller keep track of changes in workload management, this service returns a token, ANSTOKN. ANSTOKN is a required input on all subsequent calls to IWM4QTNT. When a change occurs in workload management, for example, when a new policy is activated, IWM4QTNT returns a new token value. The caller's code should check the reason codes to see if the ANSTOKN has changed since the last call to IWM4QTNT. If the token has changed, the performance monitor should reset its reporting interval. If the token has not changed, the performance monitor can continue with its existing reporting interval.

There are also some ENF event codes to keep track of changes in workload management. For information about the ENF codes, see *z/OS MVS Programming: Authorized Assembler Services Reference EDT-IXG*

The caller must provide an area of storage in the ANSAREA parameter and the length of that area in the ANSLEN parameter for IWM4QTNT to return the CPU consumption. IWM4QTNT return the actual length of the information in the QUERYLEN parameter. The answer area is mapped by the IWMWQTAA data area.

If the storage area provided is insufficient, no data is returned by IWM4QTNT but an appropriate return and reason code is issued and the required amount of storage is returned in the QUERYLEN parameter. If a user does not know the size of the answer area required by the service, he should issue IWM4QTNT with ANSLEN set to zero. The length of the answer area will be placed in QUERYLEN.

Environment

The requirements for the caller are:

Minimum authorization:	Supervisor state or program key mask (PKM) allowing keys 0-7
Dispatchable unit mode:	Task
Cross memory mode:	Any PASN, any HASN, any SASN
AMODE:	64-bit
ASC mode:	Primary or access register. If in access register ASC mode, specify SYSSTATE ASCENV = AR before invoking IWM4QTNT.
Interrupt status:	Enabled for I/O and external interrupts
Locks:	No locks held.
Control parameters:	Control parameters must be in the primary address space. The caller of IWM4QTNT must provide storage for an answer area mapped by IWMWQTAA. This answer area may reside in the caller's primary address space, or in a dataspace accessible via the current unit of work's dispatchable unit access list (DUal).

Programming requirements

You must include the CVT and the IWMYCON mapping macros in the program.

Restrictions

The caller cannot have an EUT FRR established.

Input register information

Before issuing the IWM4QTNT macro, the caller does not have to place any information into any register unless using it in register notation for a particular parameter, using it as a base register, or using it to provide the ALET of the storage area.

Output register information

When control returns to the caller, the GPRs contain:

Register
Contents

0
Reason code if GR15 return code is non-zero

1
Used as work registers by the system

2-13
Unchanged

14
Used as work registers by the system

15
Return code

When control returns to the caller, the ARs contain:

Register
Contents

0-1
Used as work registers by the system

2-13
Unchanged

14-15
Used as work registers by the system

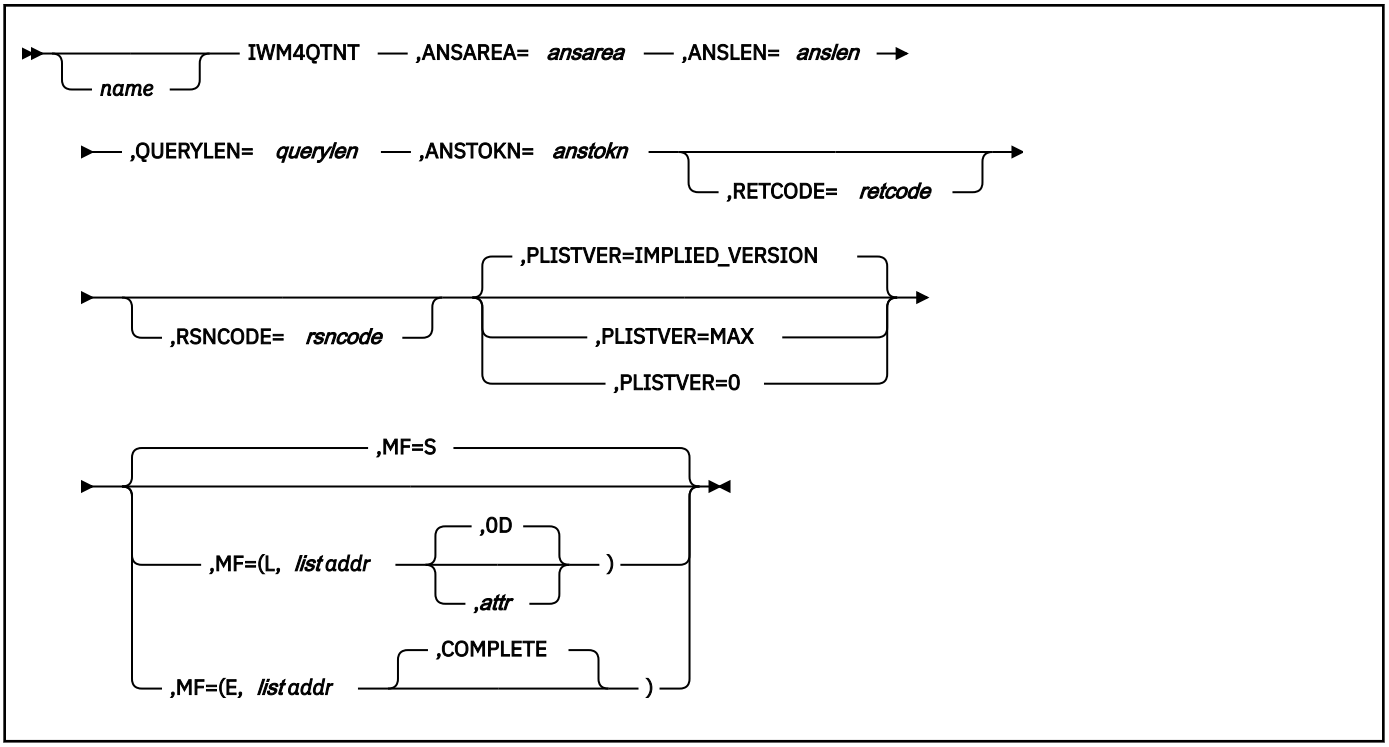
Some callers depend on register contents remaining the same before and after issuing a service. If the system changes the contents of registers on which the caller depends, the caller must save them before issuing the service, and restore them after the system returns control.

Performance implications

None.

Syntax

The syntax of the IWM4QTNT macro is as follows:



Parameters

The parameters are explained as follows:

name
An optional symbol, starting in column 1, that is the name on the IWM4QTNT macro invocation. The name must conform to the rules for an ordinary assembler language symbol.

,ANSAREA=ansarea
A required output parameter that contains the address of a storage area to hold the information returned by IWM4QTNT. The area is mapped by the IWMWQTAA mapping macro.

To code: Specify the RS-type address, or address in register (2)-(12) of a character field.

,ANSLEN=anslen
A required input parameter that contains the length of the storage area (answer area) you are providing on ANSAREA.

To code: Specify the RS-type address or address in register (2)-(12) of a fullword field.

,ANSTOKN=anstoken
A required input/output parameter that contains a token value. On your first call to IWM4QTNT, you specify ANSTOKEN as an output parameter. IWM4QTNT provides a token value that is required for subsequent calls to IWM4QTNT.

To code: Specify the RS-type address, or address in register (2)-(12) of an 8-character field.

,MF=S
,MF=(L,*list addr*)
,MF=(L,*list addr,attr*)
,MF=(L,*list addr*,0D)
,MF=(E,*list addr*)
,MF=(E,*list addr*,COMPLETE)
An optional input parameter that specifies the macro form.

Use MF=S to specify the standard form of the macro, which builds an inline parameter list and generates the macro invocation to transfer control to the service. MF=S is the default.

Use MF=L to specify the list form of the macro. Use the list form together with the execute form of the macro for applications that require reentrant code. The list form defines an area of storage that the

execute form uses to store the parameters. Only the PLISTVER parameter may be coded with the list form of the macro.

Use MF=E to specify the execute form of the macro. Use the execute form together with the list form of the macro for applications that require reentrant code. The execute form of the macro stores the parameters into the storage area defined by the list form, and generates the macro invocation to transfer control to the service.

,list addr
The name of a storage area to contain the parameters. For MF=S and MF=E, this can be an RS-type address or an address in register (1)-(12).

,attr
An optional 1- to 60-character input string that you use to force boundary alignment of the parameter list. Use a value of 0F to force the parameter list to a word boundary, or 0D to force the parameter list to a doubleword boundary. If you do not code *attr*, the system provides a value of 0D.

,COMPLETE
Specifies that the system is to check for required parameters and supply defaults for omitted optional parameters.

,PLISTVER=IMPLIED_VERSION
,PLISTVER=MAX
,PLISTVER=0
An optional input parameter that specifies the version of the macro. PLISTVER determines which parameter list the system generates. PLISTVER is an optional input parameter on all forms of the macro, including the list form. When using PLISTVER, specify it on all macro forms used for a request and with the same value on all of the macro forms. The values are:

- **IMPLIED_VERSION**, which is the lowest version that allows all parameters specified on the request to be processed. If you omit the PLISTVER parameter, IMPLIED_VERSION is the default.
- **MAX**, if you want the parameter list to be the largest size currently possible. This size might grow from release to release and affect the amount of storage that your program needs.

  If you can tolerate the size change, IBM recommends that you always specify PLISTVER=MAX on the list form of the macro. Specifying MAX ensures that the list-form parameter list is always long enough to hold all the parameters you might specify on the execute form, when both are assembled with the same level of the system. In this way, MAX ensures that the parameter list does not overwrite nearby storage.
- **0**, if you use the currently available parameters.

To code: Specify one of the following:

- IMPLIED_VERSION
- MAX
- A decimal value of 0

,QUERYLEN=*querylen*
A required output parameter that contains the length of the storage area required by IWM4QTNT to contain all the performance data for active tenants while the ANSTOKN is valid.

To code: Specify the RS-type address, or address in register (2)-(12) of a fullword field.

,RETCODE=*retcode*
An optional output parameter into which the return code is to be copied from GPR 15. If you specify 15, GPR15, REG15, or R15 (with or without parentheses), the value will be left in GPR 15.

To code: Specify the RS-type address of a fullword field, or register (2)-(12), or (15), (GPR15), (REG15), or (R15).

,RSNCODE=*rsncode*
An optional output parameter into which the reason code is to be copied from GPR 0. If you specify 0, 00, GPR0, GPR00, REG0, REG00, or R0 (with or without parentheses), the value will be left in GPR 0.

To code: Specify the RS-type address of a fullword field, or register (0) or (2)-(12), (00), (GPR0), (GPR00), REG0), (REG00), or (R0).

ABEND codes

None.

Return codes and reason codes

The following table identifies the hexadecimal return and reason codes and the equate symbol associated with each reason code. IBM support personnel may request the entire reason code, including the **xxxx** value.

Table 4. Return and Reason Codes for the IWM4QTNT Macro

Return Code	Reason Code	Equate Symbol, Meaning, and Action
0	—	**Equate Symbol**: IwmRetCodeOk **Meaning**: Successful completion. All requested data returned. **Action**: None required.
4	—	**Equate Symbol**: IwmRetCodeWarning **Meaning**: Successful completion, unusual conditions noted.
4	xxxx040A	**Equate Symbol**: IwmRsnCodeOutputAreaTooSmall **Meaning**: The output area supplied is too small to receive all the available information. The correct answer area length is returned in the QUERYLEN field. **Action**: None required. If necessary, reinvoke the service with an output area of sufficient size to receive all information.
4	xxxx040F	**Equate Symbol**: IwmRsnCodeStateInvDataRet **Meaning**: The token value specified on the ANSTOKN keyword is associated with a WLM state that is no longer valid. The new system state is represented by the token returned in the ANSTOKN field. The answer area provided is large enough to contain the available data. However, the new answer area length is returned in the QUERYLEN field. **Action**: Reinvoke the service with the token passed with the ANSTOKN keyword.
8	—	**Equate Symbol**: IwmRetCodeInvocError **Meaning**: Invalid invocation environment or parameters.
8	xxxx0801	**Equate Symbol**: IwmRsnCodeSrbMode **Meaning**: The caller is in SRB mode. **Action**: Avoid requesting this function while in SRB mode.

Table 4. Return and Reason Codes for the IWM4QTNT Macro (continued)		
Return Code	**Reason Code**	**Equate Symbol, Meaning, and Action**
8	xxxx0803	**Equate Symbol**: IwmRsnCodeDisabled **Meaning**: The caller is disabled. **Action**: Avoid requesting this function while disabled.
8	xxxx0804	**Equate Symbol**: IwmRsnCodeLocked **Meaning**: The caller is locked. **Action**: Avoid requesting this function while locked.
8	xxxx0808	**Equate Symbol**: IwmRsnBadPl **Meaning**: Error accessing parameter list. **Action**: Check for possible storage overlay.
8	xxxx0810	**Equate Symbol**: IwmRsnCodeEutFrr **Meaning**: The caller has an EUT FRR set. **Action**: Avoid requesting this function with an EUT FRR set.
8	xxxx0830	**Equate Symbol**: IwmRsnCodeBadAlet **Meaning**: The caller specified an invalid alet for the storage pointed to by the ANSAREA keyword. **Action**: Check for possible storage overlay of the parameter list or variable.
8	xxxx0832	**Equate Symbol**: IwmRsnCodeStateInvNoDatRet **Meaning**: The token value specified on the ANSTOKN keyword is associated with a WLM state that is no longer valid. A new token has been returned. The storage provided is not large enough to contain all of the data available because of the state change. No data was returned. The length of the new answer area required is returned in the QUERYLEN field. **Action**: Reinvoke the service with an output area of sufficient size to receive all information and the token passed with the ANSTOKN keyword.
C	—	**Equate Symbol**: IwmRetCodeEnvError **Meaning**: Environmental error
C	xxxx0C01	**Equate Symbol**: IwmRsnCodeNoStg **Meaning**: Storage is not available for the request. **Action**: There is a storage shortage. The function may work successfully at a later time.
C	xxxx0C0A	**Equate Symbol**: IwmRsnCodeSuspended **Meaning**: Data collection is suspended as a result of a component error. No data can be returned for this IWM4QTNT invocation, future invocations may be successful. **Action**: Reinvoke this service.

Table 4. Return and Reason Codes for the IWM4QTNT Macro (continued)		
Return Code	**Reason Code**	**Equate Symbol, Meaning, and Action**
10	—	**Equate Symbol**: IwmRetCodeCompError **Meaning**: Component error **Action**: No action required. The function may work successfully if invoked again.

Example

For tenant consumption information from a system, specify:

```
IWM4QTNT  ANSAREA=(R6),ANSLEN=(R8),
          QUERYLEN=QLEN,ANSTOKN=ATOKN,
          RETCODE=RC,RSNCODE=RSN,MF=(E,MFQTNT)
```

Mapping a service definition

The service definition is installed and extracted from the WLM couple data set either in XML format, or as a data area mapped by the IWMSERVD mapping macro. The XML structure is defined by the DTD described in "Structure of the XML service definition (DTD)" on page 84. The IWMSERVD macro points to the following sections:

IWMSVDEF
Maps the following service definition information:

- Service policies
- Workloads
- Service classes
- Report classes and tenant report classes
- Resource groups and tenant resource groups

IWMSVDCR
Maps the service definition classification rule information.

IWMSVNPA
Maps the service definition notepad area.

IWMSVAEA
Maps the service definition application environments.

IWMSVSEA
Maps the service definition scheduling environments.

Querying the active classification rules

IWMCQRY lets a caller query the classification rules associated with the active service policy. The classification rules determine how incoming work is assigned a service class and/or report class or tenant report class. The data returned by this macro is mapped by IWMSVDCR. For a description of the IWMSVDCR macro, see *z/OS MVS Data Areas, Vol 3*.

Optionally, a caller can request the active service policy identifier by specifying the **POLICY_ID** parameter. This is the active policy containing the classification rules returned by this macro. The caller can then compare the service policy ID with the policy identification information returned by the IWMPQRY macro to ensure they are the same.

Some data sections in the IWMSVDCR data area may not be available through IWMCQRY. For example, the time stamps indicating when a classification GROUP was last updated and by whom may not be available. For a complete list of fields that are not available refer to IWMSVDCR as described in *z/OS MVS*

Data Areas, Vol 3. The complete classification rules associated with a service policy are returned by the IWMDEXTR macro and mapped by IWMSVDCR.

A caller can use the classification rules together with the active service policy to determine the goals associated with incoming work. The service class goals are in the active service policy mapping returned by the IWMPQRY service.

The information returned is not serialized upon return to the caller, and so may be out of date if a service definition was modified, installed, and a new policy activated.

Structure of the XML service definition (DTD)

This section describes the following:

- The structure of the XML output of IWMDEXTR
- The layout of the XML service definition (DTD) that can be passed to IWMDINST

To obtain XML output, specify the TYPE=XML parameter for the IWMDEXTR service.

To install such an XML service definition with the IWMDINST service, also specify the TYPE=XML parameter.

The following DTD defines the structure of an XML service definition:

```
<!ELEMENT ServiceDefinition ( Name, Description?, CreationDate?, CreationUser?,
  ModificationDate?, ModificationUser?, Level, ReplId?, ProdId?, Notes,
  ResourceGroups, TenantResourceGroups?, Workloads, ServicePolicies, ReportClasses, TenantReportClasses?,
  ClassificationGroups, Classifications, ServiceParameter,
  ApplicationEnvironments?, Resources?, SchedulingEnvironments?, GPMPSettings?,
  Extensions? ) >

<!ATTLIST ServiceDefinition
     xmlns         CDATA  #IMPLIED
     codepage  CDATA   #IMPLIED >

<!ELEMENT Name ( #PCDATA ) >
<!ELEMENT Description ( #PCDATA ) >
<!ELEMENT CreationDate ( #PCDATA ) >
<!ELEMENT CreationUser ( #PCDATA ) >
<!ELEMENT ModificationDate ( #PCDATA ) >
<!ELEMENT ModificationUser ( #PCDATA ) >
<!ELEMENT Level ( #PCDATA ) >
<!ELEMENT ReplId ( #PCDATA ) >
<!ELEMENT ProdId ( #PCDATA ) >

<!ELEMENT Notes ( Note* ) >
<!ELEMENT Note ( #PCDATA ) >

<!ELEMENT ResourceGroups ( ResourceGroup* ) >
<!ELEMENT ResourceGroup ( Name, Description?, CreationDate, CreationUser,
  ModificationDate, ModificationUser, Type?, CapacityMinimum?,
  CapacityMaximum?, MemoryLimit?, IncludeSpecialtyProcessorConsumption?) >

<!ELEMENT TenantResourceGroups ( TenantResourceGroup* ) >
<!ELEMENT TenantResourceGroup (
  Name, Description?, SolutionId?, TenantId?, TenantName?,
  CreationDate, CreationUser,
  ModificationDate, ModificationUser, Type?, CapacityMinimum?,
  CapacityMaximum?, MemoryLimit?, IncludeSpecialtyProcessorConsumption?) >

<!ELEMENT Type ( #PCDATA ) >

<!ELEMENT SolutionId ( #PCDATA ) >
<!ELEMENT TenantId ( #PCDATA ) >
<!ELEMENT TenantName ( #PCDATA ) >

<!ELEMENT CapacityMaximum ( #PCDATA ) >
<!ELEMENT CapacityMinimum ( #PCDATA ) >
<!ELEMENT MemoryLimit ( #PCDATA ) >

<!ELEMENT IncludeSpecialtyProcessorConsumption ( #PCDATA ) >

<!ELEMENT Workloads ( Workload* ) >
<!ELEMENT Workload ( Name, Description?, CreationDate, CreationUser,
  ModificationDate, ModificationUser, ServiceClasses ) >

<!ELEMENT ServiceClasses ( ServiceClass* ) >
<!ELEMENT ServiceClass ( Name, Description?, CreationDate, CreationUser,
  ModificationDate, ModificationUser, CPUCritical?, IOPriorityGroup?,
  HonorPriority?, ResourceGroupName?, Goal ) >

<!ELEMENT ResourceGroupName ( #PCDATA ) >
```

```
<!ELEMENT Goal ( (AverageResponseTime | PercentileResponseTime | Velocity)*,
  Discretionary? ) >

<!ELEMENT AverageResponseTime ( Importance, Duration?, ResponseTime ) >

<!ELEMENT Importance ( #PCDATA ) >
<!ELEMENT Duration ( #PCDATA ) >
<!ELEMENT ResponseTime ( #PCDATA ) >

<!ELEMENT PercentileResponseTime ( Importance, Duration?, ResponseTime,
  Percentile ) >

<!ELEMENT Percentile ( #PCDATA ) >

<!ELEMENT Velocity ( Importance, Duration?, Level ) >

<!ELEMENT Discretionary EMPTY >

<!ELEMENT ServicePolicies ( ServicePolicy* ) >
<!ELEMENT ServicePolicy ( Name, Description?, CreationDate, CreationUser,
  ModificationDate, ModificationUser, ServiceClassOverrides,
  ResourceGroupOverrides, TenantResourceGroupOverrides? ) >

<!ELEMENT ServiceClassOverrides ( ServiceClassOverride* ) >
<!ELEMENT ServiceClassOverride ( ServiceClassName, CPUCritical?,
  IOPriorityGroup?, HonorPriority?, ResourceGroupName?, Goal ) >

<!ELEMENT ServiceClassName ( #PCDATA ) >
<!ELEMENT CPUCritical ( #PCDATA ) >
<!ELEMENT IOPriorityGroup ( #PCDATA ) >
<!ELEMENT HonorPriority ( #PCDATA )  >

<!ELEMENT ResourceGroupOverrides ( ResourceGroupOverride* ) >
<!ELEMENT ResourceGroupOverride ( ResourceGroupName, Type?,
  CapacityMinimum?, CapacityMaximum?, MemoryLimit??,
  IncludeSpecialtyProcessorConsumption? ) >

<!ELEMENT TenantResourceGroupOverrides (TenantResourceGroupOverride* ) >
<!ELEMENT TenantResourceGroupOverride (TenantResourceGroupName, Type?,
  CapacityMinimum?, CapacityMaximum?, MemoryLimit?,
  IncludeSpecialtyProcessorConsumption? ) >

<!ELEMENT ReportClasses ( ReportClass* ) >
<!ELEMENT ReportClass ( Name, Description?, CreationDate,
  CreationUser, ModificationDate, ModificationUser ) >

<!ELEMENT TenantReportClasses (TenantReportClass* ) >
<!ELEMENT TenantReportClass ( Name, TenantResourceGroupName,
  Description?, CreationDate,
  CreationUser, ModificationDate, ModificationUser ) >

<!ELEMENT TenantResourceGroupName ( #PCDATA ) >

<!ELEMENT ClassificationGroups ( ClassificationGroup* ) >
<!ELEMENT ClassificationGroup ( Name, Description?, CreationDate,
  CreationUser, ModificationDate, ModificationUser, QualifierType,
  QualifierNames ) >

<!ELEMENT QualifierType ( #PCDATA ) >

<!ELEMENT QualifierNames ( QualifierName* ) >
<!ELEMENT QualifierName ( Name, Description?, Start? ) >

<!ELEMENT Classifications ( Classification* ) >
<!ELEMENT Classification ( SubsystemType, Description?, CreationDate,
  CreationUser, ModificationDate, ModificationUser,
  DefaultServiceClassName?, DefaultReportClassName?, EWLMClassification?,
  ClassificationRules? ) >

<!ELEMENT SubsystemType ( #PCDATA ) >
<!ELEMENT DefaultServiceClassName ( #PCDATA ) >
<!ELEMENT DefaultReportClassName ( #PCDATA ) >

<!ELEMENT ClassificationRules ( ClassificationRule* ) >
<!ELEMENT ClassificationRule ( Description?, QualifierType, QualifierValue,
  Start?, ServiceClassName?, ReportClassName?, StorageCritical?, RegionGoal?,
  ReportingAttribute?, ClassificationRule* ) >

<!ELEMENT QualifierValue ( #PCDATA ) >
<!ELEMENT Start ( #PCDATA ) >
<!ELEMENT ReportClassName ( #PCDATA ) >
<!ELEMENT RegionGoal ( #PCDATA ) >
<!ELEMENT StorageCritical ( #PCDATA ) >
<!ELEMENT ReportingAttribute ( #PCDATA ) >
<!ELEMENT ServiceParameter ( ServiceCoefficients, ServiceOptions? ) >

<!ELEMENT ServiceCoefficients ( CPU, IOC, MSO, SRB )? >

<!ELEMENT CPU ( #PCDATA ) >
<!ELEMENT IOC ( #PCDATA ) >
<!ELEMENT MSO ( #PCDATA ) >
<!ELEMENT SRB ( #PCDATA ) >
```

```
<!ELEMENT EWLMClassification ( #PCDATA ) >

<!ELEMENT ServiceOptions ( IOPriorityManagement, DynamicAliasManagement?,
  IOPriorityGroupsEnabled?, DeactivateDiscretionaryGoalManagement? ) >

<!ELEMENT IOPriorityManagement ( #PCDATA ) >
<!ELEMENT DynamicAliasManagement ( #PCDATA ) >
<!ELEMENT IOPriorityGroupsEnabled ( #PCDATA ) >
<!ELEMENT DeactivateDiscretionaryGoalManagement ( #PCDATA ) >

<!ELEMENT ApplicationEnvironments ( ApplicationEnvironment* ) >
<!ELEMENT ApplicationEnvironment (  Name, Description?, SubsystemType, Limit,
  ProcedureName?, StartParameter? ) >

<!ELEMENT StartParameter ( #PCDATA ) >
<!ELEMENT Limit ( #PCDATA ) >
<!ELEMENT ProcedureName ( #PCDATA ) >

<!ELEMENT Resources ( Resource* ) >
<!ELEMENT Resource ( Name, Description? ) >

<!ELEMENT SchedulingEnvironments ( SchedulingEnvironment* ) >
<!ELEMENT SchedulingEnvironment ( Name, Description?, ResourceNames ) >

<!ELEMENT ResourceNames ( ResourceName* ) >
<!ELEMENT ResourceName ( Name, RequiredState ) >

<!ELEMENT RequiredState ( #PCDATA ) >

<!ELEMENT GPMPSettings  ( Activation, ExcludedHostSystems? ) >
<!ELEMENT Activation ( #PCDATA  ) >
<!ELEMENT ExcludedHostSystems  ( ExcludedHostSystem*  ) >
<!ELEMENT ExcludedHostSystem ( Name  ) >

<!ELEMENT Extensions ( ServiceDefinitionExtensions?,
  ResourceGroupExtensions?, ResourceGroupAttributeExtensions?,
  WorkloadExtensions?, ServiceClassExtensions?,
  ServiceClassAttributeExtensions?, ServicePolicyExtensions?,
  ReportClassExtensions?, ClassificationExtensions?,
  ApplicationEnvironmentExtensions?, ResourceExtensions?,
  SchedulingEnvironmentHeaderExtensions?,
  SchedulingEnvironmentExtensions?,
  SchedulingEnvironmentResourceExtensions? ) >

<!ELEMENT ServiceDefinitionExtensions ( ServiceDefinitionExtension* ) >
<!ELEMENT ServiceDefinitionExtension (VendorId?, RelatedObject,
  ExtensionData?) >

<!ELEMENT VendorId ( #PCDATA ) >
<!ELEMENT RelatedObject ( #PCDATA ) >
<!ELEMENT ExtensionData ( #PCDATA ) >

<!ELEMENT ResourceGroupExtensions ( ResourceGroupExtension* ) >
<!ELEMENT ResourceGroupExtension (VendorId?, RelatedObject, ServicePolicyName?,
  ExtensionData?) >

<!ELEMENT ServicePolicyName ( #PCDATA ) >

<!ELEMENT ResourceGroupAttributeExtensions ( ResourceGroupAttributeExtension* ) >
<!ELEMENT ResourceGroupAttributeExtension (VendorId?, RelatedObject,
  ServicePolicyName?, ExtensionData?) >

<!ELEMENT WorkloadExtensions ( WorkloadExtension* ) >
<!ELEMENT WorkloadExtension (VendorId?, RelatedObject, ServicePolicyName?,
  ExtensionData?) >

<!ELEMENT ServiceClassExtensions ( ServiceClassExtension* ) >
<!ELEMENT ServiceClassExtension (VendorId?, RelatedObject, ServicePolicyName?,
  ExtensionData?) >

<!ELEMENT ServiceClassAttributeExtensions ( ServiceClassAttributeExtension* ) >
<!ELEMENT ServiceClassAttributeExtension (VendorId?, RelatedObject,
  ServicePolicyName?, ExtensionData?) >

<!ELEMENT ServicePolicyExtensions ( ServicePolicyExtension* ) >
<!ELEMENT ServicePolicyExtension (VendorId?, RelatedObject, ServicePolicyName?,
  ExtensionData?) >

<!ELEMENT ReportClassExtensions ( ReportClassExtension* ) >
<!ELEMENT ReportClassExtension (VendorId?, RelatedObject, ServicePolicyName?,
  ExtensionData?) >

<!ELEMENT ClassificationExtensions ( ClassificationExtension* ) >
<!ELEMENT ClassificationExtension (VendorId?, RelatedObject, ExtensionData?) >

<!ELEMENT ApplicationEnvironmentExtensions ( ApplicationEnvironmentExtension* ) >
<!ELEMENT ApplicationEnvironmentExtension (VendorId?, RelatedObject,
  ExtensionData?) >

<!ELEMENT ResourceExtensions ( ResourceExtension* ) >
<!ELEMENT ResourceExtension (VendorId?, RelatedObjectName?, ExtensionData?) >

<!ELEMENT SchedulingEnvironmentHeaderExtensions
```

```
  ( SchedulingEnvironmentHeaderExtension* ) >
<!ELEMENT SchedulingEnvironmentHeaderExtension
  (VendorId?, RelatedObject, ExtensionData?) >

<!ELEMENT SchedulingEnvironmentExtensions
  ( SchedulingEnvironmentExtension* ) >
<!ELEMENT SchedulingEnvironmentExtension
  (VendorId?, RelatedObject, ExtensionData?) >

<!ELEMENT SchedulingEnvironmentResourceExtensions
  ( SchedulingEnvironmentResourceExtension* ) >
<!ELEMENT SchedulingEnvironmentResourceExtension
  (VendorId?, RelatedObject, ExtensionData?) >
```

Table 5 on page 87 lists the valid name spaces and the corresponding functionality levels:

Table 5. Valid name spaces and corresponding functionality levels

Name space	Level
http://www.ibm.com/xmlns/prod/zwlm/1993/09/ServiceDefinition.xsd	001
http://www.ibm.com/xmlns/prod/zwlm/1994/09/ServiceDefinition.xsd	002
http://www.ibm.com/xmlns/prod/zwlm/1997/03/ServiceDefinition.xsd	003
http://www.ibm.com/xmlns/prod/zwlm/1997/09/ServiceDefinition.xsd	004
http://www.ibm.com/xmlns/prod/zwlm/1998/09/ServiceDefinition.xsd	006
http://www.ibm.com/xmlns/prod/zwlm/1999/03/ServiceDefinition.xsd	007
http://www.ibm.com/xmlns/prod/zwlm/1999/09/ServiceDefinition.xsd	008
http://www.ibm.com/xmlns/prod/zwlm/2000/09/ServiceDefinition.xsd	011
http://www.ibm.com/xmlns/prod/zwlm/2001/09/ServiceDefinition.xsd	013
http://www.ibm.com/xmlns/prod/zwlm/2005/12/ServiceDefinition.xsd	017
http://www.ibm.com/xmlns/prod/zwlm/2006/09/ServiceDefinition.xsd	019
http://www.ibm.com/xmlns/prod/zwlm/2008/09/ServiceDefinition.xsd	021
http://www.ibm.com/xmlns/prod/zwlm/2009/09/ServiceDefinition.xsd	023
http://www.ibm.com/xmlns/prod/zwlm/2010/09/ServiceDefinition.xsd	025
http://www.ibm.com/xmlns/prod/zwlm/2012/09/ServiceDefinition.xsd	029
http://www.ibm.com/xmlns/prod/zwlm/2015/12/ServiceDefinition.xsd	030
http://www.ibm.com/xmlns/prod/zwlm/2016/12/ServiceDefinition.xsd	031
http://wlm.ibm.comm/xmlns/prod/zwlm/2017/12/ServiceDefinition.xsd	032
http://www.ibm.com/xmlns/prod/zwlm/2017/09/ServiceDefinition.xsd	035

Chapter 6. MVS System Management Facilities (SMF) record type changes for Tailored Fit Pricing

Tailored Fit Pricing updates the following SMF record types:

- Record type 70 (46) , subtype 1
- Record type 72 (48), subtype 3
- Record type 79 (4F), subtypes 1, 2, and 5
- Record type 89 (59), subtype 1

For complete information about SMF records, see *z/OS MVS System Management Facilities (SMF)*.

Record Type 70 (46) — RMF Processor Activity

Tailored Fit Pricing updates SMF record type 70, subtype 1. In this section we hit just the sections updated for Tailored Fit Pricing. For complete information about SMF record type 70, see *z/OS MVS System Management Facilities (SMF)*.

Record type 70 is written for each measurement interval and when the session terminates. As with all SMF records produced by RMF, it contains a header section followed by the RMF product section.

Macro to Symbolically Address Record Type 70: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For information on using RMF, see *z/OS Resource Measurement Facility User's Guide*. For information on Monitor I and II, see *z/OS RMF Report Analysis*.

Record mapping

Header/Self-defining Section

This section contains the common SMF record headers fields and the triplet fields (offset/length/number), if applicable, that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF70LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word).
2	2	SMF70SEG	2	binary	Segment descriptor (see record length field).
4	4	SMF70FLG	1	binary	System indicator: **Bit** **Meaning when set** **0** New record format **1** Subtypes used **2** Reserved. **3-6** Version indicators* **7** System is running in PR/SM mode.

Offsets		Name	Length	Format	Description
5	5	SMF70RTY	1	binary	Record type 70 (X'46').
6	6	SMF70TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF70DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	E	SMF70SID	4	EBCDIC	System identification (from the SMFPRMxx SID parameter).
18	12	SMF70SSI	4	EBCDIC	Subsystem identification (‘RMF’).
22	16	SMF70STY	2	binary	Record subtype.
24	18	SMF70TRN	2	binary	Number of triplets in this record. A triplet is a set of three SMF fields (offset/length/number values) that defines a section of the record. The offset is the offset from the RDW.
26	1A		2		Reserved.
28	1C	SMF70PRS	4	binary	Offset to RMF product section from the RDW.
32	20	SMF70PRL	2	binary	Length of RMF product section.
34	22	SMF70PRN	2	binary	Number of RMF product sections.
Individual header extension for subtype 1:					
36	24	SMF70CCS	4	binary	Offset to CPU control section from RDW.
40	28	SMF70CCL	2	binary	Length of CPU control section.
42	2A	SMF70CCN	2	binary	Number of CPU control section.
44	2C	SMF70CPS	4	binary	Offset to CPU data section from RDW.
48	30	SMF70CPL	2	binary	Length of CPU data section.
50	32	SMF70CPN	2	binary	Number of CPU data sections in this record.
52	34	SMF70ASS	4	binary	Offset to ASID Data Area section from RDW.
56	38	SMF70ASL	2	binary	Length of ASID Data Area section.
58	3A	SMF70ASN	2	binary	Number of ASID Data Area sections.
60	3C	SMF70BCS	4	binary	Offset to PR/SM Partition data section from RDW.
64	40	SMF70BCL	2	binary	Length of PR/SM Partition data section.
66	42	SMF70BCN	2	binary	Number of PR/SM Partition data sections.
68	44	SMF70BVS	4	binary	Offset to PR/SM Logical Processor data section from RDW.
72	48	SMF70BVL	2	binary	Length of PR/SM Logical Processor data section.
74	4A	SMF70BVN	2	binary	Number of PR/SM Logical Processor data sections.
76	4C	SMF70CNS	4	binary	Offset to CPU-identification name sections.
80	50	SMF70CNL	2	binary	Length of CPU-identification name section.
82	52	SMF70CNN	2	binary	Number of CPU-identification name sections.
84	54	SMF70COS	4	binary	Offset to Logical Core data section from RDW.
88	58	SMF70COL	2	binary	Length of Logical Core data section.
90	5A	SMF70CON	2	binary	Number of Logical Core data sections.
92	5C	SMF70TNS	4	binary	Offset to Tenant Resource Group data section from RDW.
96	60	SMF70TNL	2	binary	Length of Tenant Resource Group data section.
98	62	SMF70TNN	2	binary	Number of Tenant Resource Group data sections.
Individual header extension for subtype 2:					
36	24	SMF7023S	4	binary	Offset to Cryptographic CCA Coprocessor data section.

Offsets		Name	Length	Format	Description
40	28	SMF7023L	2	binary	Length of Cryptographic CCA Coprocessor data section.
42	2A	SMF7023N	2	binary	Number of Cryptographic CCA Coprocessor data sections.
44	2C	SMF7024S	4	binary	Offset to Cryptographic Accelerator data section.
48	30	SMF7024L	2	binary	Length of Cryptographic Accelerator data section.
50	32	SMF7024N	2	binary	Number of Cryptographic Accelerator data sections.
52	34	SMF702CS	4	binary	Offset to ICSF Services data section.
56	38	SMF702CL	2	binary	Length of ICSF Services data section.
58	3A	SMF702CN	2	binary	Number of ICSF Services data sections.
60	3C	SMF7025S	4	binary	Offset to Cryptographic PKCS11 Coprocessor data section.
64	40	SMF7025L	2	binary	Length of Cryptographic PKCS11 Coprocessor data section.
66	42	SMF7025N	2	binary	Number of Cryptographic PKCS11 Coprocessor data sections.

Subtype 1 — CPU, PR/SM, and ICF Activity

CPU Control Section

There is one section per record.

Offsets		Name	Length	Format	Description
0	0	SMF70MOD	2	binary	CPU processor family.
2	2	SMF70VER	1	binary	CPU version number — meaning varies with model number.
3	3	SMF70BNP	1	binary	Number of physical processors assigned for use by PR/SM.
4	4	SMF70INB	1	binary	PR/SM indicator bits **Bit** — **Meaning when set** **0** — PR/SM diagnose X'204' failure. **1** — Number of physical processors has changed. **2** — Dispatch interval time has been changed. **3** — An additional partition, that is not included in the count of configured partitions, is presented with a name of “PHYSICAL”. This partition includes all of the uncaptured time that was used by the LPAR management time support feature but could not be attributed to a specific logical partition. **4** — PR/SM - Diagnose X'204' extended data is supported. **5** — Simplified Diagnose X'204' data provided for system running as z/VM guest. CPU consumption by z/VM itself provided with partition data section for logical partition named PHYSICAL. **6-7** — Reserved.

Offsets		Name	Length	Format	Description
5	5	SMF70STF	1	binary	Flag **Bit** **Meaning when set** **0** The STSI facility is available for the CPC. **1** Physical CPU adjustment factor has been changed. **2** Service units available to MVS image have been changed. **3** SMF70LAC is provided for systems running in LPAR mode or as a z/VM guest. The value does no longer include CPU wait times. **4** SMF70MDL is the model-capacity identifier and SMF70HWM is the physical model. If this bit is OFF, SMF70MDL represents both model-capacity and physical model. **5** OPT parameter BLWLTRPCT changed. **6** OPT parameter BLWLINTHD changed. **7** Field SMF70GAU is valid.
6	6	SMF70GTS	2	binary	Dispatch accumulated interval time in milliseconds. A zero value indicates that the dispatch interval was dynamically determined.
8	8	SMF70MDL	16	EBCDIC	CPC model identifier. See bit 4 of SMF70STF.
24	18	SMF70DSA	2	binary	Number of Diagnose samples.
26	1A	SMF70IFA	2	binary	Number of zAAPs online at the end of the interval.
28	1C	SMF70CPA	4	binary	Physical CPU adjustment factor based on alternate CPU capability. This value is replaced by SMF70CPA_actual and SMF70CPA_scaling_factor.
32	20	SMF70WLA	4	binary	Processor capacity available to MVS image measured in MSUs (millions of service units) per hour. The value takes into account whether or not the image has a defined capacity limit. (For systems running as VM guest, this is the VM capacity).
36	24	SMF70LAC	4	binary	Long-term average of CPU service (millions of service units). Scope of the value depends on bit 3 of SMF70STF.
40	28	SMF70HOF	8	binary	Hypervisor date/time offset in STCK format (aka Sysplex timer offset).
48	30	SMF70HWM	16	EBCDIC	CPC physical model identifier. Valid if bit 4 of SMF70STF is set.
64	40	SMF70SUP	2	binary	Number of zIIPs online at the end of the interval.
66	42	SMF70GJT	8	EBCDIC	Time in STCK format when the partition that wrote this record has joined or left a capacity group (last change of group name). Also set at IPL time, when the partition is not a member of a capacity group.
74	4A	SMF70POM	4	EBCDIC	EBCDIC plant code that identifies the plant of manufacture for the configuration. The plant code is left-justified with trailing blank characters if necessary.

Offsets		Name	Length	Format	Description
78	4E	SMF70CSC	16	EBCDIC	EBCDIC sequence code of the configuration. The sequence code is right-justified with leading EBCDIC zeroes if necessary.
94	5E	SMF70HHF	1	binary	Additional flags. **Bit** **Meaning when set** **0** HiperDispatch mode supported **1** HiperDispatch mode is active **2** HiperDispatch mode changed during interval **3** Failure returned by HISMT service. Values in Logical Core data section and values provided in SMF70MCF, SMF70MCFS, SMF70MCFI, SMF70CF, SMF70CFS, SMF70CFI, SMF70ATD, SMF70ATDS, and SMF70ATDI are invalid. **4** Absolute MSU capping is active for this partition. **5** SMF70OS_PRTCT is valid. **6-7** Reserved.
95	5F	SMF70CR	1	binary	ZEP field 0.
96	60	SMF70PMI	4	binary	Accumulated number of blocked dispatchable units per second that may get promoted in their dispatch priority. To get the average promote event rate, divide SMF70PMI by SMF70SAM.
100	64	SMF70PMU	4	binary	Number of blocked dispatchable units being promoted during the interval.
104	68	SMF70PMW	4	binary	Accumulated number of address spaces and enclaves being blocked during the interval. To get the average number of waiters for promote, divide SMF70PMW by SMF70SAM.
108	6C	SMF70PMP	4	binary	Maximum number of address spaces and enclaves found being blocked during the interval.
112	70	SMF70PMT	2	binary	1/1000s of the CPU capacity for promote slices (OPT parameter BLWLTRPCT).
114	72	SMF70PML	2	binary	Swapped-in starvation threshold. When an address space or enclave has not received CPU service within this time interval although it has ready-to-run work, it is considered being blocked (OPT parameter BLWLINTHD).
116	74	SMF70MPC	16	EBCDIC	CPC model identifier indicating the permanent capacity of the CPC, without the temporarily increased capacity and the temporarily available replacement capacity. The identifier is left justified with trailing blanks if necessary. This field is zero, if not supported by the hardware.
132	84	SMF70MTC	16	EBCDIC	CPC model identifier indicating the temporary capacity of the CPC, which is the total of permanent capacity and temporarily increased capacity, without the temporarily available replacement capacity. The identifier is left justified with trailing blanks if necessary. This field is zero, if not supported by the hardware.

Offsets		Name	Length	Format	Description
148	94	SMF70MCR	4	binary	CPC model capacity rating associated with the model as identified by SMF70MDL. This field is zero, if not supported by the hardware.
152	98	SMF70MPR	4	binary	CPC permanent model capacity rating associated with the model as identified by SMF70MPC. This field is zero, if not supported by the hardware.
156	9C	SMF70MTR	4	binary	CPC temporary model capacity rating associated with the model as identified by SMF70MTC. This field is zero, if not supported by the hardware.
160	A0	SMF70ZEP	4	binary	ZEP field 1.
164	A4	SMF70ZER	8	binary	ZEP field 2.
172	AC	SMF70ZEE	8	binary	ZEP field 3.
180	B4	SMF70ZEC	8	binary	ZEP field 4.
188	BC	SMF70NRM	4	binary	Normalization factor for zIIP. Multiply zIIP time by this value and divide by 256 to get the equivalent time on a CP.
192	C0	SMF70GAU	4	binary	Long-term average of CPU service in millions of service units which would be allowed by the limit of the capacity group but is not used by its members. If the value is negative, the group is capped. Valid if bit 7 of SMF70STF is set.
196	C4	SMF70ZEI	8	binary	ZEP field 5.
204	CC	SMF70NCR	4	binary	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.
208	D0	SMF70NPR	4	binary	Nominal permanent model-capacity rating in MSU/hour. 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.
212	D4	SMF70NTR	4	binary	Nominal temporary model-capacity rating in MSU/hour. 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.
216	D8	SMF70CAI	1	binary	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.
217	D9	SMF70CCR	1	binary	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.

Offsets		Name	Length	Format	Description
218	DA	SMF70MCP	2	binary	Maximum CPU ID available for this IPL.
220	DC	SMF70ICP	2	binary	Highest CPU ID installed at IPL time.
222	DE	SMF70CCP	2	binary	Highest CPU ID currently installed. This number can increase upon dynamic CPU addition.
224	E0	SMF70CPA_actual	4	binary	Physical CPU adjustment factor based on Model Capacity Rating (will be used for converting processor time to service units). This value together with SMF70CPA_scaling_factor replaces SMF70CPA.
228	E4	SMF70CPA_scaling_ factor	4	binary	Scaling factor for SMF70CPA_actual.
232	E8	SMF70MCF	4	binary	Multithreading maximum capacity numerator for general purpose processors. Divide this value by 1024 to get the multithreading maximum capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
236	EC	SMF70MCFS	4	binary	Multithreading maximum capacity numerator for zIIP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
240	F0	SMF70MCFI	4	binary	Multithreading maximum capacity numerator for zAAP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
244	F4	SMF70CF	4	binary	Multithreading capacity numerator for general purpose processors. Divide this value by 1024 to get the multithreading capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
248	F8	SMF70CFS	4	binary	Multithreading capacity numerator for zIIP. Divide this value by 1024 to get the multithreading capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
252	FC	SMF70CFI	4	binary	Multithreading capacity numerator for zAAP. Divide this value by 1024 to get the multithreading capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
256	100	SMF70ATD	4	binary	Average Thread Density numerator for general purpose processors . Divide this value by 1024 to get the average number of active threads for all general purpose processors that were dispatched to physical hardware and configured ONLINE for the complete interval.
260	104	SMF70ATDS	4	binary	Average Thread Density numerator for zIIP. Divide this value by 1024 to get the average number of active threads for all zIIPs that were dispatched to physical hardware and configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
264	108	SMF70ATDI	4	binary	Average Thread Density numerator for zAAP. Divide this value by 1024 to get the average number of active threads for all zAAPs that were dispatched to physical hardware and configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.

Offsets		Name	Length	Format	Description
268	10C	SMF70LACM	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute MOBILE. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACM.
272	110	SMF70LACA	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute CATEGORYA. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACA.
276	114	SMF70LACB	4	binary	Long-term average of CPU service (millions of service units) consumed by transactions classified with reporting attribute CATEGORYB. If an address space or enclave is part of a tenant resource group, it will not contribute to SMF70LACB.
280	118	SMF70ADJ	4	binary	Logical adjustment factor for CPU rate.
284	11C	SMF70LACCR	4	binary	Long-term average of CPU service (millions of service units) consumed by DFSMS data set encryption. Valid only for IBM z14® and later CPCs.
288	120	SMF70MaxPU	2	binary	When non-zero, this field indicates how many processor cores are physically available in this particular machine. When the value is 0, it is not defined for this model.
290	122	SMF70OS_PRTCT	1	binary	When non-zero, the OSPROTECT system parameter with a value other than SYSTEM is in effect. X'01' indicates OSPROTECT=1. For machines after IBM z14, may be 0 with OSPROTECT=1.
291	123	*	1	binary	Reserved.
292	124	SMF70MDL_CBP	16	EBCDIC	Reserved for future use.
308	134	SMF70MCR_CBP	4	binary	Reserved for future use.
312	138	SMF70NCR_CBP	4	binary	Reserved for future use.
316	13C	SMF70LAC_CBP	4	binary	Reserved for future use.
320	140	SMF70CPA_actual_CBP	4	binary	Reserved for future use.
324	144	SMF70_IPL_TIME	8	binary	IPL time of partition, in TOD format.
332	14C	SMF70_TRG_M_CNT	4	binary	Number of times sampling of tenant resource group memory consumption happened.
336	150	SMF70CRW	4	binary	Reserved.
340	154	SMF70CPC_TYPE	4	binary	CPC Type.

Tenant Resource Group data section

This section contains general tenant resource group and tenant information as well as processor consumption measurements for the interval.

Offsets		Name	Length	Format	Description
0	0	SMF70_TRG_NAME	8	EBCDIC	Tenant resource group name.
8	8	SMF70_TRG_DESC	32	EBCDIC	Tenant resource group description.
40	28	SMF70_TRG_TNTID	8	EBCDIC	Tenant identifier.
48	30	SMF70_TRG_TNTNAME	32	EBCDIC	Tenant name.
80	50	SMF70_TRG_SBID	64	EBCDIC	Solution ID.
144	90	SMF70_TRG_SUCP	8	binary	Service units on CPs consumed by tenant resource group.

Offsets		Name	Length	Format	Description
152	98	SMF70_TRG_SUIFA	8	binary	Service units on zAAPs consumed by tenant resource group.
160	A0	SMF70_TRG_SUSUP	8	binary	Service units on zIIPs consumed by tenant resource group.
168	A8	SMF70_TRG_LAC	4	binary	Long-term average service on general purpose processors in millions of service units per hour consumed by tenant resource group.
172	AC	SMF70_TRG_LAC_CBP	4	binary	Reserved for future use.
176	B0	SMF70_TRG_FLAGS	2	binary	Reserved for future use.
178	B2		2		Reserved.
180	B4	SMF70_TRG_MEM	8	binary	Memory consumption of tenant resource group in units of 4K frames.

Record Type 72 (48) — Workload Activity, Storage Data, and Serialization Delay

Tailored Fit Pricing updates SMF record type 72, subtype 3. In this section we hit just the sections updated for Tailored Fit Pricing. For complete information about SMF record type 72, see *z/OS MVS System Management Facilities (SMF)*.

Subtype 3: Workload Activity — is written for each service class and active report class in the active service policy. A report class becomes active as soon as work has been assigned to that report class.

Workload Manager control section
Identifies the policy, workload and service/report class name and contains workload data.

Resource Group data section
Contains information about the resource group to which the service class or tenant report class belongs.

Macro to Symbolically Address Record Type 72: The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

For information on using RMF, see *z/OS Resource Measurement Facility User's Guide*. For more information on Monitor I, II, and III, see *z/OS RMF Report Analysis*. For information on the MVS workload manager, see *z/OS MVS Planning: Workload Management* and *z/OS MVS Programming: Workload Management Services*.

Subtype 3: Workload Activity

Workload Manager Control Section

Offsets		Name	Length	Format	Description
0	0	R723MSCF	1	binary	Service/Report class flags. **Bit** **Meaning when set** **0** Indicator for a report class **1** Workload activity data not available **2** Policy data not available **3** Execution velocity includes I/O delays **4** Indicator for CPU protection **5** Indicator for storage protection **6** Indicator for dynamic alias tuning **7** Indicator for I/O priority group HIGH
1	1	R723MFLG	1	binary	Flags. **Bit** **Meaning when set** **0** Indicator for zAAP crossover **1** Indicator for zAAP honor priority **2** Indicator for zIIP honor priority **3** Failure returned by HISMT service. Multithreading maximum capacity numerator values are invalid. **4** Indicator that service class is not eligible for honor priority processing. When on, specialty engine eligible work in this service class will not be offloaded to CPs for help processing. **5** Indicator for a tenant report class **6** Service class and tenant report class periods that are associated with a resource group and have assigned a discretionary goal are excluded from workload management. **7** Reserved
2	2	*	2		Reserved.
4	4	R723MNSP	8	EBCDIC	Policy name.
12	C	R723MDSP	32	EBCDIC	Policy description.
44	2C	R723MTPA	8	binary	Local time/date of policy activation (STCK format).
52	34	R723MCPU	4	binary	CPU service coefficient * 10,000.
56	38	R723MIOC	4	binary	I/O service coefficient. Always zero.

Offsets		Name	Length	Format	Description
60	3C	R723MMSO	4	binary	Storage service coefficient. Always zero.
64	40	R723MSRB	4	binary	SRB service coefficient * 10,000
68	44	R723MTVL	4	binary	WLM sample interval (in milliseconds).
72	48	R723MTV#	4	binary	Number of times when WLM sampling code ran.
76	4C	R723MOPT	2	EBCDIC	Suffix of the IEAOPTxx parmlib member.
78	4E		2		Reserved.
80	50	R723MWNM	8	EBCDIC	Workload name.
88	58	R723MWDE	32	EBCDIC	Workload description.
120	78	R723MCNM	8	EBCDIC	Service/Report class name.
128	80	R723MCDE	32	EBCDIC	Service/Report class description.
160	A0	R723MCPG	2	binary	Number of periods belonging to this service or report class.
162	A2	R723MSUB	1	binary	Number of entries in the work/resource manager state section belonging to a subsystem.
163	A3	*	3		Reserved.
166	A6	R723MERF	6	EBCDIC	Enqueue residency CPU service factor.
172	AC	R723MADJ	4	binary	Adjustment factor for CPU rate.
176	B0	R723MIDN	8	EBCDIC	Service definition name.
184	B8	R723MIDD	32	EBCDIC	Service definition description.
216	D8	R723MTDI	8	binary	Local time/date the service definition was installed (STCK format).
224	E0	R723MIDU	8	EBCDIC	Userid that installed the service definition.
232	E8	R723CLSC	8	EBCDIC	Service class that last contributed to this report class. Blank if this is a service class.
240	F0	R723NFFI	4	binary	Normalization factor for zAAP. Multiply zAAP service times or service units with this value and divide by 256 to calculate the CP equivalent value.
244	F4	R723NFFS	4	binary	Normalization factor for zIIP. Multiply zIIP service units with this value and divide by 256 to calculate the CP equivalent value.
248	F8	R723NADJ	4	binary	Nominal adjustment factor for CPU rate.
252	FC	R723CECA	4	binary	CEC adjustment factor.
256	100	R723MCF	4	binary	Multithreading maximum capacity numerator for general purpose processors. Divide this value by 1024 to get the MT maximum capacity factor for all general purpose processors that were configured ONLINE for the complete interval.
260	104	R723MCFS	4	binary	Multithreading maximum capacity numerator for zIIP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zIIPs that were configured ONLINE for the complete interval. A zero value is reported if no zIIP is currently installed.
264	108	R723MCFI	4	binary	Multithreading maximum capacity numerator for zAAP. Divide this value by 1024 to get the multithreading maximum capacity factor for all zAAPs that were configured ONLINE for the complete interval. A zero value is reported if no zAAP is currently installed.
268	10C	R723CPA_actual	4	binary	Physical CPU adjustment factor based on Model Capacity Rating.
272	110	R723CPA_scaling_factor	4	binary	Scaling factor for R723CPA_actual.

Offsets		Name	Length	Format	Description
276	114	R723CPA_actual_zCBP	4	binary	Reserved for future use.

Resource Group Data Section

Offsets		Name	Length	Format	Description
0	0	R723GGNM	8	EBCDIC	Resource group name.
8	8	R723GGDE	32	EBCDIC	Resource group description.
40	28	R723GGLT	1	binary	Resource group flags. **Bit** **Meaning when set** **0** Maximum capacity was specified **1** Minimum capacity was specified **2** Specification of R723GGMN and R723GGMX is in percentage of the LPAR share rather than in service units. In addition, the scope of the resource group is system-wide rather than sysplex-wide. **3** Specification of R723GGMN and R723GGMX is in percentage of a single processor capacity rather than in service units. In addition, the scope of the resource group is system-wide rather than sysplex-wide. **4** Memory limit was specified. **5** Specification of R723GGMN and R723GGMX is in MSU/h rather than in service units. **6** Specialty processor consumption is included into the WLM capping algorithms, i.e. R723GGMN and R723GGMX limit the combined general purpose and specialty processor consumption. **7** Reserved.
41	29	R723GGTF	1	binary	Tenant Resource Group Flags. **Bit** **Meaning when set** **0** Indicator for a tenant resource group **1-7** Reserved
42	2A		2		Reserved.
44	2C	R723GGMN	4	binary	If bit 1 of R723GGLT is ON, minimum capacity of the resource group. If bit 2, bit 3, and bit 5 of R723GGLT are OFF, this value is in unweighted CPU service units per second. In addition, the scope of the resource group is sysplex-wide. If bit 2, bit 3, or bit 5 of R723GGLT is ON, see the description of R723GGLT.
48	30	R723GGMX	4	binary	If bit 0 of R723GGLT is ON, maximum capacity of the resource group. If bit 2, bit 3, and bit 5 of R723GGLT are OFF, this value is in unweighted CPU service units per second. In addition, the scope of the resource group is sysplex-wide. If bit 2, bit 3, or bit 5 of R723GGLT is ON, see the description of R723GGLT.
52	34	R723GGML	4	binary	If bit 4 of R723GGLT is ON, memory limit (in GB) of the resource group. The scope of the resource group is system-wide.
56	38	R723GGTI	8	EBCDIC	Tenant identifier. Only valid if bit 0 of R723GGTF is ON.

Offsets		Name	Length	Format	Description
64	40	R723GGTN	32	EBCDIC	Tenant name. Only valid if bit 0 of R723GGTF is ON.
96	60	R723GGKY	64	EBCDIC	Solution ID. Only valid if bit 0 of R723GGTF is ON.

Record Type 79 (4F) — RMF Monitor II activity

Tailored Fit Pricing updates SMF record type 79, subtypes 1, 2, and 5. In this section we hit just the sections updated for Tailored Fit Pricing. For complete information about SMF record type 70, see *z/OS MVS System Management Facilities (SMF)*.

Reference information:

- For information on using RMF, see *z/OS Resource Measurement Facility User's Guide*.
- For information on Monitor I and II, see *z/OS RMF Report Analysis*.
- For more information on performance groups, see *z/OS MVS Initialization and Tuning Guide*.

Record type 79 is written during a Monitor II background session when feedback is requested as SMF records. It is written at each measurement interval and when the session is terminated. It contains a section that is identical for all Monitor II reports and a subtype section that is unique for each report. The subtypes are:

Subtype 1
Contains information that describes address space state data (and address space state data by job name) for each address space identifier included.

Subtype 2
Contains information that describes address space resource data (and address space resource data by job name) activity. The length depends on the number of devices.

Subtype 5
Contains information that describes address space SRM data (and address space SRM data by job name).

Macro to symbolically address record type 79

The SMF record mapping macro for all records produced by RMF is ERBSMFR. Its format is ERBSMFR (*n1*,*n2*,...) where *n1*,*n2*, ... are the SMF record types you want to map. Note that the parentheses are required only when two or more record types are specified. The mapping macro resides in SYS1.MACLIB.

Subtype 1 — Address Space State Data

ASD and ASDJ data section

Offsets		Name	Length	Format	Description
0	0	R791ASID	2	binary	Address space identifier.
2	2	R791JBN	8	EBCDIC	Name of job.
10	A	R791DMN	2	binary	Reserved.
12	C	R791NPG	2	binary	Reserved.
14	E	R791PGP	2	binary	Reserved.
16	10	R791TTOD	4	binary	Real time into transaction (milliseconds).

Offsets		Name	Length	Format	Description
20	14	R791CL	2	EBCDIC	Current location. (Set to IN when all other indicators are off.) **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
22	16	R791TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.

Offsets		Name	Length	Format	Description
24	18	R791SRC	2	EBCDIC	Reason for last swap-out **Contents** **Meaning** **TO** Terminal output **TI** Terminal input **LW** Long wait **XS** Auxiliary storage shortage **RS** Central storage shortage **DW** Detected wait **MP** Memory Pool shortage **NQ** CAP enqueue **EX** CAP exchange **US** CAP uni-swap **TS** Transition swap **IC** Improve central storage usage **IP** Improve system paging rate **MR** Make room for a user who has been swapped out too long **AW** APPC WAIT (swapped out, because waiting for APPC services) **IW** OMVS input wait **OW** OMVS output wait **SR** In-real swap **00** Unknown.
26	1A	R791DP	2	binary	Dispatcher priority.
28	1C		6		Reserved.
34	22	R791SWC	2	binary	Transaction swap count.
36	24	R791SWMR	2	binary	SRM work load recommendation value.
38	26		4		Reserved.
42	2A	R791WMS	4	binary	SRM service for the current transaction since the last swap-in.
46	2E	R791TCPU	4	binary	CPU time (TCB + SRB) for current job step, in milliseconds.
50	32		4		Reserved.
54	36	R791ESCT	4	binary	Number of pages on expanded storage frames.
58	3A		2		Reserved.
60	3C	R791PIN	4	binary	Page-in count.

Offsets		Name	Length	Format	Description
64	40	R791TRTM	4	binary	Transaction residency time, in milliseconds.
68	44	R791FLG	1	binary	**Bit** **Meaning when set** **0** Cross memory address space **1** Data in R791CTAR is valid **2** Data in R791VAL is valid **3** Reserved. **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** Address space matched a classification rule in the active policy which prevents managing the region based on the response time goals of its served transactions **7** Server has temporal affinity to clients.
69	45	R791FLG2	1	binary	Additional bits. **Bit** **Meaning when set** **0** Service class assigned by classification, or RESET SRVCLASS was designated CPU-critical in the active policy. **1** Address space matched a classification rule in the active policy which was designated storage-critical. **2** Address space is serving transactions which belong to a service class that was designated storage-critical in the active policy's classification rules, or is running in SYSTEM/SYSSTC. **3** CPU protection was assigned either to the address space or to transaction service classes being served by the space. **4** Storage protection was assigned either to the address space or to transaction service classes being served by the space. **5** The dispatching priority of the address space is currently promoted due to a chronic resource contention. **6** Address space is a CICS TOR that matched a classification rule in the active policy which allows managing the region based on the region goals but also ensures that completed transactions are reported and used for management of the CICS AORs. **7** Honor priority ineligibility was assigned either to the address space or to transaction service classes being served by the space.
70	46	R791FMCT	4	binary	Number of central storage frames.
74	4A	R791WSS	4	binary	Working set at last swap in.

Offsets		Name	Length	Format	Description
78	4E	R791TWSS	4	binary	RSM target working set size.
82	52	R791ESHP	4	binary	Number of hiperspace expanded storage pages used by job.
86	56	R791ESVI	4	binary	Number of VIO expanded storage pages used by job.
90	5A	R791HIN	4	binary	Number of ESO hiperspace page-ins by block.
94	5E	R791HRMS	4	binary	Number of ESO hiperspace read misses by job (a read miss is an attempt to read a frame that is not in expanded storage).
98	62	R791BPIN	4	binary	Number of blocked pages brought in from DASD.
102	66	R791PINE	4	binary	Number of pages brought in from expanded storage.
106	6A	R791BPNE	4	binary	Number of blocked pages brought in from expanded storage.
110	6E	R791CTAR	4	binary	Central storage target number of frames.
114	72	R791VAL	4	binary	Recommendation value for working-set-managed address spaces.
118	76	R791SCL	8	EBCDIC	Service class name.
126	7E	R791SCP	2	binary	Service class period.
128	80	R791WKLD	8	EBCDIC	Workload name.
136	88	R791RGRP	8	EBCDIC	Resource group name.
144	90	R791SPI	4	binary	Number of page-ins from auxiliary storage for shared page groups.
148	94	R791CMNI	4	binary	Number of common pages for current transaction.
152	98	R791PNV	4	binary	Number of non-VIO pages for current transaction.
156	9C	R791PVIO	4	binary	Number of VIO pages for current transaction.
160	A0	R791EXCT	4	binary	EXCP count for this step.
164	A4	R791TCPC	4	binary	Total CPU time consumed in this address space, in milliseconds.
168	A8	R791ASST	4	binary	CPU time consumed by preemptible-class SRBs running on behalf of this address space, in milliseconds.
172	AC	R791PHTM	4	binary	CPU time consumed by preemptible-class SRBs running in this address space, in milliseconds.
176	B0	R791RCL	8	EBCDIC	Report class name.
184	B8	R791MLIM	8	binary	Address space memory limit, in megabytes.
192	C0	R791TIFA	4	binary	CPU time in milliseconds consumed on zAAPs.
196	C4	R791TCP	4	binary	CPU time in milliseconds consumed on standard CPs. Only valid if zAAPs or zIIPs are in the configuration.
200	C8	R791TIFC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zAAP.
204	CC	R791NFFI	4	binary	Normalization factor for zAAP time. Used to convert between real zAAP times and "normalized" zAAP times, that is, the equivalent time on a standard CP. Multiply R791TIFA by this value and divide by 256 to calculate the normalized zAAP time.
208	D0	R791TSUP	4	binary	CPU time in milliseconds consumed on zIIPs
212	D4	R791TSUC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zIIP.
216	D8	R791NFFS	4	binary	Normalization factor for zIIP time. Used to convert between real zIIP times and "normalized" zIIP times, that is, the equivalent time on a standard CP. Multiply R791TSUP by this value and divide by 256 to calculate the normalized zIIP time.
220	DC	R791EXCW	8	binary	EXCP count (double word).

Offsets		Name	Length	Format	Description
228	E4	R791PHTA	4	binary	zAAP-only equivalent of R791PHTM. This is normalized time.
232	E8	R791PHTI	4	binary	zIIP-only equivalent of R791PHTM. This is normalized time.
236	EC	R791FLG3	1	binary	Additional flags. **Bit** **Meaning when set** **0** Service class was assigned by classification, or RESET SRVCLASS belongs to I/O priority group HIGH in the active policy. **1** I/O priority group HIGH was assigned either to the address space or to transaction service classes served by the address space. **2** R791RGRP is the name of a tenant resource group and R791RCL is the name of a tenant report class. **3** General purpose and specialty processor consumption is considered by WLM capping algorithms for this address space. **4-7** Reserved.
237	ED		3		Reserved.

Subtype 2 — Address Space Resource Data

ARD and ARDJ data section

Offsets		Name	Length	Format	Description
0	0	R792ASID	2	binary	Address space identifier.
2	2	R792JBN	8	EBCDIC	Name of job.
10	A	R792DMN	2	binary	Reserved.
12	C	R792NPG	2	binary	Reserved.

Offsets		Name	Length	Format	Description
14	E	R792CL	2	EBCDIC	Current location **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
16	10	R792TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.
18	12	R792TRC	2	binary	Transaction count.
20	14	R792TTOD	4	binary	Transaction elapsed time, in milliseconds.
24	18	R792PRFX	4	binary	Number of private fixed frames.
28	1C		2		Reserved.
30	1E	R792SVAR	4	binary	SRM service absorption rate for step.
34	22	R792TCPU	4	binary	Total TCB time for step, in milliseconds.
38	26	R792PSS1	4	binary	High order word - CPU page seconds, in milliseconds. One page in storage for one second is one page second.
42	2A	R792PSS2	4	binary	Low order word - step product of frame, in milliseconds. One page in storage for one second is one page second.
46	2E	R792EJST	4	binary	Total processor time (TCB+SRB), in milliseconds.

Offsets		Name	Length	Format	Description
50	32	R792TSRM	4	binary	Total SRM service for job or session.
54	36	R792RTM	4	binary	Resident time for step, in milliseconds.
58	3A	R792EXCP	2	binary	EXCP count for this step.
60	3C	R792CMNI	4	binary	Number of common pages for current transaction.
64	40	R792PNV	4	binary	Number of non-VIO pages for current transaction.
68	44	R792PVIO	4	binary	Number of VIO pages for current transaction.
72	48	R792FXBL	4	binary	Number of fixed frames below 16 megabytes.
76	4C	R792PSWP	4	binary	Number of pages swapped in and out for current transaction.
80	50	R792LPAI	4	binary	Number of link pack area (LPA) pages paged in for current transaction.
84	54	R792CSAI	4	binary	Number of CSA pages paged in for current transaction.
88	58	R792LSQA	4	binary	Number of fixed local system queue area (LSQA) fixed frames.
92	5C	R792NLQF	4	binary	Number of non-local system queue area (LSQA) fixed frames.
96	5E	R792TDEV	4	binary	Total device connect time in milliseconds.
100	64		2		Reserved.
102	66	R792PIN	4	binary	Page-in count.
106	6A	R792TRTM	4	binary	Transaction residency time.
110	6E	R792FLG	1	binary	Flags **Bit** **Meaning when set** **0** Cross-memory address space **1** Incorrect RSM data obtained for address space **2** Reserved **3** Reserved **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** Address space matched a classification rule in the active policy which prevents managing the region based on the response time goals of its served transactions **7** Server has temporal affinity to clients.

Offsets		Name	Length	Format	Description
111	6F	R792FLG2	1	binary	Additional bits. **Bit** **Meaning when set** **0** Service class assigned by classification, or RESET SRVCLASS was designated CPU-critical in the active policy. **1** Address space matched a classification rule in the active policy which was designated storage-critical. **2** Address space is serving transactions which belong to a service class that was designated storage-critical in the active policy's classification rules, or is running in SYSTEM/SYSSTC. **3** CPU protection was assigned either to the address space or to transaction service classes being served by the space. **4** Storage protection was assigned either to the address space or to transaction service classes being served by the space. **5** The dispatching priority of the address space is currently promoted due to a chronic resource contention. **6** Address space is a CICS TOR that matched a classification rule in the active policy which allows managing the region based on the region goals but also ensures that completed transactions are reported and used for management of the CICS AORs. **7** Honor priority ineligibility was assigned either to the address space or to transaction service classes being served by the space.
112	70	R792LSQR	4	binary	Local system queue area (LSQA) pages in central storage.
116	74	R792LSQE	4	binary	Local system queue area (LSQA) pages in expanded storage.
120	78	R792ARS	4	binary	Average number of real frames for step.
124	7C	R792TWSS	4	binary	SRM target working set size for this job.
128	80	R792PHSP	4	binary	Number of hiperspace pages for the current transaction.
132	84	R792EXCT	4	binary	EXCP count for this step.
136	88	R792SCL	8	EBCDIC	Service class name.
144	90	R792SCP	2	binary	Service class period.
146	92	R792WKLD	8	EBCDIC	Workload name.
154	9A	R792RGRP	8	EBCDIC	Resource group name.
162	A2		2		Reserved.
164	A4	R792TCPC	4	binary	Total CPU time consumed in this address space, in milliseconds.
168	A8	R792ASST	4	binary	CPU time consumed by preemptible-class SRBs running on behalf of this address space, in milliseconds.
172	AC	R792PHTM	4	binary	CPU time consumed by preemptible-class SRBs running in this address space, in milliseconds.
176	B0	R792FXAB	4	binary	Number of fixed frames between 16M and 2G (z/Architecture® mode).
180	B4	R792TIFA	4	binary	CPU time in milliseconds consumed on zAAPs.

Offsets		Name	Length	Format	Description
184	B8	R792TCP	4	binary	CPU time in milliseconds consumed on standard CPs. Only valid if zAAPs or zIIPs are in the configuration.
188	BC	R792TIFC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zAAP.
192	C0	R792NFFI	4	binary	Normalization factor for zAAP time. Used to convert between real zAAP times and "normalized" zAAP times, that is, the equivalent time on a standard CP. Multiply R792TIFA by this value and divide by 256 to calculate the normalized zAAP time.
196	C4	R792TSUP	4	binary	CPU time in milliseconds consumed on zIIPs.
200	C8	R792TSUC	4	binary	CPU time in milliseconds consumed on standard CPs by work that was eligible for zIIP.
204	CC	R792NFFS	4	binary	Normalization factor for zIIP time. Used to convert between real zIIP times and "normalized" zIIP times, that is, the equivalent time on a standard CP. Multiply R792TSUP by this value and divide by 256 to calculate the normalized zIIP time.
208	D0	R792EXCW	8	binary	EXCP count (double word).
216	D8	R792PHTA	4	binary	zAAP-only equivalent of R792PHTM. This is normalized time.
220	DC	R792PHTI	4	binary	zIIP-only equivalent of R792PHTM. This is normalized time.
224	E0	R792FLG3	1	binary	Additional flags. **Bit** **Meaning when set** **0** Service class was assigned by classification, or RESET SRVCLASS belongs to I/O priority group HIGH in the active policy. **1** I/O priority group HIGH was assigned either to the address space or to transaction service classes served by the address space. **2** R792RGRP is the name of a tenant resource group. **3** General purpose and specialty processor consumption is considered by WLM capping algorithms for this address space. **4-7** Reserved.
225	E1		3		Reserved.

Subtype 5 — Address Space SRM Data

ASRM and ASRMJ Data Section

Offsets		Name	Length	Format	Description
0	0	R795ASID	2	binary	Address space identifier.
2	2	R795JBN	8	EBCDIC	Name of job.
10	A	R795DMN	2	binary	Reserved.
12	C	R795NPG	2	binary	Reserved.
14	E	R795PGP	2	binary	Reserved.
16	10	R795TTOD	4	binary	Real time into transaction.

Offsets		Name	Length	Format	Description
20	14	R795CL	2	EBCDIC	Current location (set to IN when all other indicators are off) **Contents** **Meaning** **DL** Out queue/delayed **IN** In storage **LO** Logically swapped out **NS** Non-swappable **PR** Privileged **OT** Swapped out and ready **WL** Wait queue/long wait **WM** Wait queue/MSO **WO** Wait queue/reasons other than WM, WL, or WT **WT** Wait queue/terminal wait **>>** Transitioning out **<<** Transitioning in.
22	16	R795TAS	2	binary	Type of user **Contents** **Meaning** **0** Batch **1** Started task **2** Mount task **3** TSO/E **4** ASCH **5** OMVS address space.
24	18	R795TROD	4	binary	Transaction resident time.
28	1C	R795TCNT	2	binary	Transaction count.
30	1E	R795SWC	2	binary	Transaction swap count.
32	20	R795CPUS	4	binary	Total processor service units for transaction (zeros when ASID is out of storage).
36	24	R795MSOS	4	binary	Total main storage origin (MSO) service units for transaction (zeros when ASID is out of storage).
40	28	R795IOCS	4	binary	Total IOC service units for transaction (zeros when ASID is out of storage).
44	2C	R795WMS	4	binary	Total service units for transaction (zeros when ASID is out of storage).

Offsets		Name	Length	Format	Description
48	30	R795TOTL	4	binary	Total service units for job or TSO/E session (zeros when ASID is out of storage).
52	34	R795TOT	4	binary	Total service units for transaction since last swap-in.
56	38	R795SRBS	4	binary	Total SRB service units for transaction (zeros when ASID is out of storage).
60	3C	R795FLG	1	binary	Flags. **Bit** **Meaning when set** **0-2** Reserved **3** Reserved **4** If ON: this address space is a server address space If OFF: goal specified for this address space is being honored by WLM **5** Address space has been quiesced by a RESET command **6** R795RGRP is the name of a tenant resource group. **7** Reserved.
61	3D	R795SCL	8	EBCDIC	Service class name.
69	45	R795SCP	2	binary	Service class period.
71	47	R795WKLD	8	EBCDIC	Workload name.
79	4F	R795RGRP	8	EBCDIC	Resource group name.

Record type 89 (X'59') — Usage Data

The type 89 record provides information about product usage on a particular MVS system. The usage reporting program analyzes the data collected in the type 89 record. For more information see *z/OS MVS Product Management*. The record is generated on a scheduled interval (1 hour maximum).

Record type 89 has two subtypes:

- Subtype 1 — Usage data

  Contains, for the scheduled interval, summary usage data for all products across the system that have registered to request usage recording. These products must issue the IFAUSAGE macro to specify:

  – Registration information.
  – Level and scope of data collection (task or address space level).
  – Start and end of collection period.

- Subtype 2 — State Data

  Contains, for the scheduled interval, summary state data for all products across the system that have registered to indicate that they are running. These products issue the MVS Register service to indicate that they are running. MVS uses information a product supplies to determine if the product is enabled and to maintain a list of active products.

The installation controls the scheduling of the type 89 record by checking the INTERVAL value specified for the SMF address space. Because SMF is a started task, this is the INTERVAL value for SUBSYS=STC in the SMFPRMxx member. If the INTERVAL value is less than or equal to one hour, then that value is used as the reporting interval for type 89 records. If that value is greater than one hour, or if no INTERVAL value is specified, then one hour is used as the reporting interval for type 89 recording.

There are two sets of interval START and STOP times in the record:

- Usage data interval START/STOP.
- Reporting interval START/STOP.

The usage data interval represents the hourly buckets that the usage reporting program records product usage in. This interval is synchronized to the top of the hour.

The reporting interval represents the increment when the type 89 records are generated and is also synchronized to the top of the hour. For example, if you specified an interval value of 30 minutes, type 89 records would be generated at 9:00, 9:30, 10:00... If you are collecting usage data at the task level, you may want to synchronize interval processing to the top of the hour in your SMFPRMxx member because task level data collection is scheduled by interval processing.

SMF type 89 records are generated on the interval as requested; if no products are registered, then a type 89 record is generated with a product count of 0.

Product intersection time data sections are generated when a product registers at the ADDRSP level, and then invokes a product that registers at the TASK level. When no product intersections occur, the product intersection count in SMF89CNN is zero.

SMFPRM*xx* parameters are described in *z/OS MVS Initialization and Tuning Reference*. The usage reporting program is described in *z/OS MVS Product Management*. The Register service is described in *MVS Programming: Registration Services*.

Record environment

The following conditions exist for the generation of each of the subtypes of this record:

Macro
SMFEWTM, BRANCH=YES (record exit: IEFU84)

Mode

Subtype
Mode

1
SRB

2
SRB

Storage Residency
31-bit

SUBSYS
STC

Record mapping

Header/self-defining section

This section contains the common SMF record header fields and, if applicable, the triplet fields (offset/length/number) that locate the other sections on the record.

Offsets		Name	Length	Format	Description
0	0	SMF0LEN	2	binary	Record length. This field and the next field (total of four bytes) form the RDW (record descriptor word).
2	2	SMF0SEG	2	binary	Segment descriptor (see record length field).

Offsets		Name	Length	Format	Description
4	4	SMF0FLG	1	binary	System indicator: **Bit** **Meaning when set** **0-2** Reserved **3-6** Version indicators* **7** Reserved.
5	5	SMF0RTY	1	binary	Record type 0 (X'00')
6	6	SMF0TME	4	binary	Time since midnight, in hundredths of a second, that the record was moved into the SMF buffer.
10	A	SMF0DTE	4	packed	Date when the record was moved into the SMF buffer, in the form 0*cyydddF*.
14	E	SMF0SID	4	EBCDIC	System identification (from the SID parameter).
18	12	SMF0JWT	4	binary	Limit, in minutes, of continuous wait for the job (taken from JWT parameter). Continuous wait time is defined as time spent waiting while the application program is in control. For example, for data sets allocated dynamically (while the application program is running, for example) either or both of the following count toward a job's continuous wait time: • The time required to recall a data set from HSM Migration Levels 1 or 2 • The time required to mount a tape If a data set was allocated statically (for a DD statement, for example) these activities will not be counted towards the job's continuous wait time.
22	16	SMF0BUF	4	binary	This field contains meaningless information.
26	1A	SMF0VST	4	binary	Number of 1K bytes in virtual storage.
30	1E	SMF0OPT	1	binary	SMF options: **Bit** **Meaning when set** **0** Reserved **1** Reserved **2** Reserved. **3** Data set accounting. Record types selected. This bit is on when one of the following record types is selected: 14, 15, 17, 18, 62, 63, 64, 67 or 68. **4** Volume accounting. Record types 10 or 69 selected. **5** Reserved. **6** Type 17 records will be written for temporary data sets (REC(ALL)). **7** Reserved.

Offsets		Name	Length	Format	Description
31	1F	SMF0RST	4	binary	Number of 1K bytes in central storage. This field is only accurate below 4 TB. For larger systems, this field contains X'FFFFFFFF'. The SMF0RS4K field always accurately represents the system size.
35	23	SMF0RSV	1		Reserved.
36	24	SMF0OSL	8	EBCDIC	MVS product name.
44	2C	SMF0SYN	8	EBCDIC	System name (from the SYSNAME parameter in the IEASYSxx parmlib member).
52	34	SMF0SYP	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).
60	3C	SMF0TZ	4	binary	Difference in time between local time and Greenwich mean time in binary units of 1.048576 seconds. The value of SMF0TZ is copied from the CVTTZ field. For more information about the CVTTZ field, see the CVT mapping macro in *z/OS MVS Data Areas* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary).
64	40	SMF0MSWT	4	binary	Started task wait time limit (SMFPRMxx SWT(*hhmm*) value) converted to minutes.
68	44	SMF0MTWT	4	binary	TSO wait time limit (SMFPRMxx TWT(*hhmm*) value) converted to minutes.
72	48	SMF0TBUF	2	binary	The number of megabytes specified by the SMFTBUFF IEASYSxx parmlib option. If the SMFTBUFF parameter value is incorrectly specified or SMFTBUFF is not specified, this value will be zero, and the default buffer size of 5 megabytes was used during IPL SMF initialization processing.
74	4A	SMF0RS4K	8	binary	Number of 4K frame units in central storage.

Self Defining Section

Offsets		Name	Length	Format	Description
0		SMF992COF	4	binary	Offset to class data sections from beginning of the record.
4	4	SMF992CLN	2	binary	Length of class data sections.
6	6	SMF992CON	2	binary	Number of class data sections. There is one per service class.
8	8	SMF992CPOF	4	binary	Offset to period data section from beginning of record (including RDW).
12	C	SMF992CPLN	2	binary	Length of period data section.
14	E	SMF992CPON	2	binary	Number of period data sections.
16	10	SMF992ECOF	4	binary	Offset to EWLM class section from beginning of record (including RDW).
20	14	SMF992ECLN	2	binary	Length of EWLM class section.
22	16	SMF992ECON	2	binary	Number of EWLM class section.

Record product section

This section provides information about the type 89 record, the system, and the recording interval.

Triplet information

This section is located in the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89PRO

Length
SMF89PRL

Number
SMF89PRN - This field is always "1" because each type 89 record that is generated has one record product section.

Offsets		Name	Length	Format	Description
0	0	SMF89PNM	8	EBCDIC	Record product name - "SMF".
8	8	SMF89RVN	4	binary	Record version number - "1".
12	0C	SMF89OSL	8	EBCDIC	MVS system level (For example, SP4.3.0).
20	14	SMF89IST	4	binary	Reporting interval START Time (local, hundredths of a second from midnight). This field and SMF89IET define the recording interval. This is different from the usage data interval that is used to collect data into hourly buckets.
24	18	SMF89ISD	4	packed	Reporting interval START Date in the form 0*cyydddF*.
28	1C	SMF89IET	4	binary	Reporting interval END Time (local, hundredths of a second from midnight). This field and SMF89IST define the recording interval. This is different from the usage data interval that is used to collect data into hourly buckets.
32	20	SMF89IED	4	packed	Reporting interval END Date in the form 0*cyydddF*.
36	24	SMF89PFL	1	binary	**Bit** **Meaning when set** **0** Reserved. **1** Indicates that LICENSE=zNALC was specified in IEASYSxx. (SMF89ZNA) **2 - 7** Reserved.
37	25		3	binary	Reserved
40	28	SMF89HOF	8	binary	Hypervisor date/time offset in STCK format. When present, this field contains the sysplex timer offset value.
48	30	SMF89DTO	8	binary	Local data/time offset, copied from CVTLDTO.
56	38	SMF89_CoreMode_CP	2	binary	The number of CPUs that are active on a CP core.
58	3A	SMF89_CoreMode_zAAP	2	binary	The number of CPUs that are active on a zAAP core.
60	3C	SMF89_CoreMode_zIIP	2	binary	The number of CPUs that are active on a zIIP core.

System ID section

This section provides information about the system (both hardware and software) at the time the usage data was collected.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89SIO

Length
SMF89SIL

Number

SMF89SIN - This field is always 1 because each type 89 record that is generated has one system ID section.

Offsets		Name	Length	Format	Description
0	0	SMF89SYN	8	EBCDIC	MVS system name (SYSNAME from IEASYSxx).
8	8	SMF89UST	4	binary	Usage data interval START time (local, hundredths of a second from midnight). This is usually an hour value (such as 01:00:00.00) except in the case of the first record during an IPL (which reports the “IPL” time). This is different from the recording interval that is used to report on the generation of the usage records. This field and SMF89UET define the hour "bucket"that the usage data reflects. This field is only filled in for the SMF89 subtype 1 records.
12	0C	SMF89USD	4	packed	Usage data interval START Date in the form 0*cyydddF*. This field is only filled in for the SMF89 subtype 1 records.
16	10	SMF89UET	4	binary	Usage data interval END time (local, hundredths of a second from midnight). This is usually an hour value (such as 01:00:00.00). This field and SMF89UST define the hour "bucket" that the usage data reflects. This field is only filled in for the SMF89 subtype 1 records.
20	14	SMF89UED	4	packed	Usage data interval END date in the form 0*cyydddF*. This field is only filled in for the SMF89 subtype 1 records.
24	18	*	4	binary	Reserved.
28	1C	*	4	binary	Reserved.
32	20	SMF89CMN	2	packed	CPU model number.
34	22	SMF89CVN	1	binary	CPU version number.
35	23	SMF89LPI	1	binary	LPAR indicators: **Bit** **Meaning when set** **0** The one digit LPAR ID contained in SMF89LP2 (bit 4) is valid (SMF89LPV). **1** The two digit LPAR ID contained in field SMF89LP3 is valid (SMF89LPM). **2 - 3** Reserved. **4-7** The one digit LPAR ID (X'0-F') (SMF89LP2). **Note:** 1. For a one digit LPAR ID (X'0-F'), both SMF89LPV (bit 0) and SMF89LPM (bit 1) is on and both SMF89LP2 (bits 4-7) and field SMF89LP3 contain the LPAR ID. 2. For the two digit LPAR ID (greater than X'F'), SMF89LPM (bit 1) is on, and SMF89LP3 contains the LPAR ID.
36	24	SMF89SER	3	packed	CPU serial number.
39	27	SMF89LP3	1	binary	LPAR ID.

Offsets		Name	Length	Format	Description
40	28	SMF89RPP	4	binary	CPU relative processing power indicator.
44	2C	SMF89SPN	8	EBCDIC	Sysplex name (from the SYSPLEX parameter in the COUPLExx parmlib member).
52	34	SMF89CPT	6	EBCDIC	CPC type number (blanks if data is not available).
58	3A	SMF89CPM	3	EBCDIC	CPC model number (blanks if data is not available).
61	3D	SMF89CPS	12	EBCDIC	CPC sequence number (blanks if data is not available).
73	49	SMF89SIF	1	binary	**Bit** **Meaning when set** **0** Field SMF89LPN is valid. (SMF89LNV) **1** This is the last record for this usage interval. (SMF89LCR) **2 - 7** Reserved.
74	4A	*	2	binary	Reserved.
76	4C	SMF89MNF	16	EBCDIC	V1-CPC manufacturer.
92	5C	SMF89TID	4	EBCDIC	V1-CPC type.
96	60	SMF89MDL	16	EBCDIC	V1-CPC model.
112	70	SMF89SQC	16	EBCDIC	V1-CPC sequence code.
128	80	SMF89POM	4	EBCDIC	V1-CPC plant of manufacturer.
132	84	SMF89CPC	4	binary	CPU capability.
136	88	SMF89CCC	2	binary	Configured CPU count.
138	8A	SMF89SCC	2	binary	Standby CPU count.
140	8C	SMF89MAF	30	binary	Array of multiprocessing CPU capability adjustment factors. This array contains information for only the first 15 general processors. Obtain additional processor information from RMF records, or issuing the STSI instruction.
170	AA	SMF89LPN	8	EBCDIC	LPAR name when SYSIB 2.2.2 is valid, when returned by the STSI instruction (such as when running under z/VM). Bit SMF89LPV is on when the field is valid. Avoid looking at this field unless SMF89LNV is on.
178	B2	SMF89_Capacity _Change_Cnt	2	binary	The number of processor capacity changes that occurred since the previous interval or event interval. This number is greater than 1 when the number of processor capacity changes exceeded the number specified in the MAXEVENTINTRECS parmlib option.
180	B4	SMF89 _RCTPCPUA _Actual	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on model capacity rating.
184	B8	SMF89 _RCTPCPUA _Nominal	4	binary	Physical CPU adjustment factor (this is the adjustment factor for converting CPU time to equivalent service in basic-mode with all processors online). Based on nominal model capacity rating.
188	BC	SMF89 _RCTPCPUA _scaling_factor	4	binary	Scaling factor for SMF89_RCTPCPUA_Actual and SMF89_RCTPCPUA_Nominal.

Offsets		Name	Length	Format	Description
192	C0	SMF89_Capacity _Adjustment _Ind	1	binary	When: **0** The indication is not reported. **1-99** Some amount of reduction is indicated. **100** The machine is operating in normal capacity. The Primary CPU and all secondary-type CPU are similarly affected.
193	C1	SMF89_Capacity _Change_Rsn	1	binary	Indicates the reason that is associated with the present value contained in SMF89_Capacity_Adjustment_Ind. The bit values of this field correspond to those described in RMCTZ_Capacity_Adjustment_Indication of the IRARMCTZ mapping macro. (See *z/OS MVS Data Areas*.)
194	C2	SMF89_Capacity _Flags	1	binary	Processor capacity flags. **Bit** **Meaning when set** **0** SMF89_Event_Driven_Interval_Rec **Meaning:** When on, indicates that the current record was generated as a result of an event, rather than as a result of a standard interval expiration based on time. **1** SMF89_Capacity_Data_err **Meaning:** When on, indicates that an error occurred while collecting the processor capacity data, therefore the following fields are unreliable: SMF89_RCTPCPUA_Actual SMF89_RCTPCPUA_Nominal SMF89_RCTPCPUA_scaling_factor SMF89_Capacity_Adjustment_Ind SMF89_Capacity_Change_Rsn **2** SMF89_PCD_Rsvd_Exists **Meaning:** When on, indicates records generated on systems running z/OS V1R7 through z/OS V1R9. When off, indicates records generated on systems running z/OS V1R10 and later.
195	C3	*	1	binary	Reserved.
196	C4	SMF89ZNF	4	binary	zAAP normalization factor for zAAP service time.
200	C8	SMF89SNF	4	binary	zIIP Normalization factor for zIIP service time.
204	CC	SMF89SEQ	2	binary	Record sequence number when multiple records are written for the same interval.
206	CE	SMF89SolutionID	64	EBCDIC	The Tailored Fit Pricing solution ID from the SOLUT system parameter; otherwise, binary zeros if the SOLUT parameter was not specified.

Subtype 1 — Usage data section

This section contains the product information (specified on the IFAUSAGE REGISTER request) and the usage data that has been collected for the interval specified by the start and end times (SMF89UST and SMF89UET) for that product.

There is one usage data section for each unique product identification (specified by owner, name, version, qualifier) that is actively registered for any part of that specified interval. The data reported is accumulated for ALL address spaces that had any interaction with the product.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89UDO

Length
SMF89UDL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
0	0	SMF89UPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF89UPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89UPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89UPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89UPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89UCT	8	long floating point	Product TCB time (in hundredths of a second).
64	40	SMF89USR	8	long floating point	Product SRB time (in hundredths of a second).
72	48	SMF89UFG	1	binary	Usage entry flags **Bit** **Meaning when set** **0** Unauthorized register **1** Ineligible for measured usage **2** Unauthorized register with SAF-authorized UNAUTHSERV=LEVEL1 requested **3 - 7** Unused

Offsets		Name	Length	Format	Description
73	49	SMF89UF2	1	binary	**Bit** **Meaning when set** **0** This product has product intersection time sections (SMF89HCS). **1** All ADDRSP registrations of this product are the first registration in the respective address space (SMF89AFS). **2** An ADDRSP registration of this product registered or deregister while active TASK level registrations were present in one or more address spaces (SMF89TSH). **3** All ADDRSP level registrations were at a service level that support product intersection time (SMF89PLV). **4** This intersection has Tenant Resource Group Sections. Check SMF89TCO for the offset to the first TRG Intersection section. Then check each of those in the section for an exact match of the product information to find the corresponding section (SMF89HTR) **5-7** Reserved.
74	4A	SMF89_BoostInfo	1	binary	Boost information **Bit** **Meaning when set** **0** zIIP boost was active at some point within the interval. **1** Speed boost was active at some point within the interval. **5-7** Boost class: 001: IPL 010: Shutdown 011: Recovery process **Note:** The boost class value is valid only when one or more boosts is active; that is, a boost active bit is also on.
75	4B	SMF89URT	1	binary	Data format of value in SMF89URD (specified on the FORMAT option of the IFAUSAGE macro FUNCTIONDATA request). **Bit** **Meaning when set** **0** No data specified **1** CPU time, in long floating point (in hundredths of a second) **2** Binary (64-bit) **3** Long floating point **4 - 7** Reserved
76	4C	SMF89URD	8	various	Product specific resource data (specified by the data option of the IFAUSAGE macro FUNCTIONDATA request). SMF89URT identifies the format of the data in this field.
84	54	SMF89UZT	8	long floating point	Product offload engine time (hundredth of a second).

Offsets		Name	Length	Format	Description
92	5C	SMF89CountAsTrad	4	binary	Count of active address spaces in traditional (non-TRG) sub-capacity workload environment.
96	60	SMF89CountAsTrg	4	binary	Count of active address spaces in TRG workload environment.

Subtype 1 — Product intersection data section

This section contains information about intersections that occur between products registered with the IFAUSAGE service. Intersections are generated when a product registered at the ADDRSP level invokes a program that registers at the TASK level for a task in the current address space. The ADDRSP scope product is known as the containing product and the TASK scope product is known a the intersecting product.

There is one product intersection data section for each intersection detected. The data reported is accumulated for ALL address spaces that had any intersection between two products.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89CNO

Length
SMF89CNL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
0	0	SMF89CPO	16	EBCDIC	Product owner or vendor name (obtained PRODOWNER option of IFAUSAGE macro) of the containing product.
16	10	SMF89CPN	16	EBCDIC	Product Name (obtained PRODNAME option of IFAUSAGE macro) of the containing product.
32	20	SMF89CPV	8	EBCDIC	Product Version (obtained PRODVERS option of IFAUSAGE macro) of the containing product.
40	28	SMF89CPQ	8	EBCDIC	Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro) of the containing product.
48	30	SMF89CPI	8	EBCDIC	Product ID (obtained PRODID option of IFAUSAGE macro) of the containing product.
56	38	SMF89IPO	16	EBCDIC	Product Owner or Vendor Name (obtained PRODOWNER option of IFAUSAGE macro) of the intersecting product.
72	48	SMF89IPN	16	EBCDIC	Product Name (obtained PRODNAME option of IFAUSAGE macro) of the intersecting product.
88	58	SMF89IPV	8	EBCDIC	Product Version (obtained PRODVERS option of IFAUSAGE macro) of the intersecting product.
96	60	SMF89IPQ	8	EBCDIC	Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro) of the intersecting product.
104	68	SMF89IPI	8	EBCDIC	Product ID (obtained PRODID option of IFAUSAGE macro) of the intersecting product.

Offsets		Name	Length	Format	Description
112	70	SMF89CFG	1	binary	**Bit** **Meaning when set** **0** The container product was registered unauthorized (SMF89CUC). **1** The intersecting product was registered unauthorized (SMF89CUP). **2** Some time for the intersection was a result of a SCOPE(FUNCTION) registered product (SMF89CFC). **3** Some time for the intersection was a result of a SCOPE(ALL) registered product (SMF89CTC). **4** Intersection time might be complete for this product. **Note:** Not all products use (SMF89CGO). **5** This intersection has Tenant Resource Group Sections. Check SMF89TCO for the offset to the first TRG Intersection section. Then check each of those in the section for an exact match of the product information to find the corresponding section (SMF89CHTR). **6-7** Reserved.
113	71		7		Reserved
120	78	SMF89CCT	8	long floating point	Product Intersect TCB Time (in hundredths of a second)
128	80	SMF89CZT	8	long floating point	Product Intersect Offload Engine Time (in hundredths of a second)

Subtype 1 — Tenant resource group section

This section contains the product information (specified on the IFAUSAGE REGISTER request), tenant resource group name, and the usage data that has been collected for the interval specified by the start and end times (SMF89UST and SMF89UET) for that product.

There is one Tenant resource group Data Section for each unique product identification (specified by owner, name, version, qualifier) that is actively registered for any part of that specified interval. The data reported is accumulated for ALL address spaces that had any interaction with the product.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TRO

Length
SMF89TRL

Number
SMF89TRN

Offsets		Name	Length	Format	Description
0	0	SMF89TPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).

Offsets		Name	Length	Format	Description
16	10	SMF89TPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89TPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89TPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89TPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89TRG_Name	8	EBCDIC	Tenant resource group.
64	40	SMF89TCT	8	long floating point	Tenant resource group TCB time (hundredths of a second - floating point)
72	48	SMF89TSR	8	long floating point	TRG SRB Time (in hundredths of a second - floating point)
80	50	SMF89TZT	8	long floating point	TRG offload engine time (hundredth of a second).
88	58	SMF89TRGData	8	binary	Product-specific resource data (specified by the DATA option of the FUNCTIONDATA request of the IFAUSAGE macro).
96	60	SMF89TRGDataType	1	binary	Data format of value in SMF89TRGData (specified by the FORMAT option of the FUNCTIONDATA request of the IFAUSAGE macro). **Value** **Meaning when set** **0** No data specified **1** CPU time, in long floating point (in hundredths of a second) **2** Binary (64-bit) **3** Long floating point **4 - 7** Reserved

Subtype 1 — Intersection data for tenant resource groups

This section contains information about intersections that occur between products registered with the IFAUSAGE service while running in a tenant resource group. Intersections are generated when a product registered at the ADDRSP level invokes a program that registers at the TASK level for a task in the current address space. The ADDRSP scope product is known as the containing product and the TASK scope product is known a the intersecting product.

There is one product intersection data section for each intersection detected. The data reported is accumulated for ALL address spaces that had any intersection between two products.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TCO

Length
SMF89TCL

Number
SMF89TCN

Offsets		Name	Length	Format	Description
0	0	SMF89TCPO	16	EBCDIC	Product owner or vendor name (specified on the PRODOWNER option of the IFAUSAGE macro).
16	10	SMF89TCPN	16	EBCDIC	Product name (specified on the PRODNAME option of the IFAUSAGE macro).
32	20	SMF89TCPV	8	EBCDIC	Product version (specified on the PRODVERS option of the IFAUSAGE macro).
40	28	SMF89TCPQ	8	EBCDIC	Product qualifier (specified on the PRODQUAL option of the IFAUSAGE macro).
48	30	SMF89TCPI	8	EBCDIC	Product ID number (specified on the PRODID option of the IFAUSAGE macro).
56	38	SMF89TIPO	16	EBCDIC	Intersecting Product Owner or Vendor Name (obtained PRODOWNER option of IFAUSAGE macro).
72	48	SMF89TIPN	16	EBCDIC	Intersecting Product Name (obtained PRODNAME option of IFAUSAGE macro).
88	58	SMF89TIPV	8	EBCDIC	Intersecting Product Version (obtained PRODVERS option of IFAUSAGE macro).
96	60	SMF89TIPQ	8	EBCDIC	Intersecting Product Qualifier (obtained PRODQUAL option of IFAUSAGE macro).
104	68	SMF89TIPI	8	EBCDIC	Intersecting Product ID (obtained PRODID option of IFAUSAGE macro).
112	70	SMF89T_TRG_Name	8	EBCDIC	Tenant resource group.
120	78	SMF89TCFG	1	binary	Usage Entry Flags **Bit** **Meaning when set** **0** UNAUTHORIZED REGISTER Requested on container product (SMF89TCUC). **1** UNAUTHORIZED REGISTER Requested on intersecting product (SMF89TCUP).
121	79		7		Reserved.
128	80	SMF89TCCT	8	long floating point	Product Intersect TCB time (hundredths of a second - floating point).
136	88	SMF89TCZT	8	long floating point	Product Intersection Offload Engine Time (hundredths of a second - floating point).

Subtype 2 — State tenant resource group data section

This section contains the product information (specified on the MVS register service or in the IFAPRDxx parmlib member), the tenant resource group name, and instance data that has been collected for the interval at the time when the record was collected for that product.

There is one state data section for each unique product identification registered (specified by owner, name, feature, version, release, and modification level) for any part of the interval.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "self-defining" section:

Offset
SMF89TRO

Length
SMF89TRL

Number
SMF89TRN

Offsets		Name	Length	Format	Description
0	0	SMF89T2TRGProdOwner	16	EBCDIC	Product Owner or Vendor Name (from prodowner parameter of IFAEDREG or OWNER option of PRODUCT statement of IFAPRDxx)
16	10	SMF89T2TRGProdName	16	EBCDIC	Product name (from prodname parameter of IFAEDREG or NAME option of PRODUCT statement of IFAPRDxx)
32	20	SMF89T2TRGFeatureName	16	EBCDIC	Feature name (from featurename parameter of IFAEDREG or FEATURENAME option of PRODUCT statement of IFAPRDxx)
48	30	SMF89T2TRGProdVers	2	EBCDIC	Product version (from prodvers parameter of IFAEDREG or VERSION option of PRODUCT statement of IFAPRDxx)
50	32	SMF89T2TRGProdRel	2	EBCDIC	Product release (from prodrel parameter of IFAEDREG or RELEASE option of PRODUCT statement of IFAPRDxx)
52	34	SMF89T2TRGProdMod	2	EBCDIC	Product modification level(from prodmod parameter of IFAEDREG or MOD option of PRODUCT statement of IFAPRDxx)
54	36	SMF89T2TRGProdID	8	EBCDIC	Product ID (from prodowner parameter of IFAEDREG or OWNER option of PRODUCT statement of IFAPRDxx)
62	3E		2		Reserved
64	40	SMF89T2TrgName	8	EBCDIC	Tenant Resource Group Name
72	48	SMF89T2TrgNumInstances	4	binary	Current number of registration of this product currently in this TRG

Record Type 99 (63) — System Resource Manager Decisions

Tailored Fit Pricing updates SMF record type 99. In this section we hit just the sections updated for Tailored Fit Pricing. For complete information about SMF record type 99, see *z/OS MVS System Management Facilities (SMF)*.

For information about how to use type 99, see *z/OS MVS Programming: Workload Management Services*.

Record Type 99 (63) — System Resource Manager Decisions

This record type is written by the SRM component. The records contain:

- Performance data for each service class period
- Trace codes representing the SRM actions
- The data which SRM used to decide which actions to take
- The controls SRM is using to manage work.

Tailored Fit Pricing updates the following subtypes:

Subtype 1
Contains system level data, the trace of SRM actions, and data about resource groups. The SRM actions are recorded in trace codes. All trace codes are described in *z/OS MVS Programming: Workload Management Services*. A subtype 1 record is written every policy interval.

Subtype 2
Contains data for service classes. A subtype 2 record is written every policy interval for each service class if any period in the service class had recent activity.

Subtype 1 - Resource Group Entry Section

Offsets		Name	Length	Format	Description
0		SMF99_RGNAME	8	EBCDIC	Resource group name
8	8	SMF99_MIN_SR	4	binary	Minimum service rate for the resource group in unweighted CPU service units per second. When there is no minimum defined, this field is 0.

Offsets		Name	Length	Format	Description
12	C	SMF99_MAX_SR	4	binary	Maximum service rate for the resource group in unweighted CPU service units per second. When there is no maximum defined, this field is X'7FFFFFFF'.
16	10	SMF99_ACT_SR	4	binary	Service rate received in the last policy adjustment interval on the local system in unweighted CPU service units per second.
20	14	SMF99_SPAS	4	binary	Service per non-capped slice in unweighted CPU service units per second.
24	18	SMF99_SLICES	2	binary	The number of cap slices in which work in this resource group was capped.
26	1A	SMF99_RHELPCNT0	2	binary	A count of the systems that can help special system address spaces (work at importance 0). The count can include any systems in the sysplex running in goal mode other than the local system.
28	1C	SMF99_RHELPCNT1	2	binary	A count of the systems that can help work at importance 1. The count can include any systems in the sysplex running in goal mode other than the local system.
30	1E	SMF99_RHELPCNT2	2	binary	A count of the systems that can help work at importance 2. The count can include any systems in the sysplex running in goal mode other than the local system.
32	20	SMF99_RHELPCNT3	2	binary	A count of the systems that can help work at importance 3. The count can include any systems in the sysplex running in goal mode other than the local system.
34	22	SMF99_RHELPCNT4	2	binary	A count of the systems that can help work at importance 4. The count can include any systems in the sysplex running in goal mode other than the local system.
36	24	SMF99_RHELPCNT5	2	binary	A count of the systems that can help work at importance 5. The count can include any systems in the sysplex running in goal mode other than the local system.
38	26	SMF99_RHELPCNT6	2	binary	A count of the systems that can help discretionary work (work at importance 6). The count can include any systems in the sysplex running in goal mode other than the local system.
40	28	SMF99_LHELP_FLGS	1	binary	Flag indicating whether the local system can help work at each importance level. 1 indicates it can help, 0 indicates it cannot help. **Bit** **Meaning when set** **0** Reserved. **1** Local system can help work at importance 0. **2** Local system can help work at importance 1. **3** Local system can help work at importance 2. **4** Local system can help work at importance 3. **5** Local system can help work at importance 4. **6** Local system can help work at importance 5. **7** Local system can help work at importance 6.

Offsets		Name	Length	Format	Description
41	29	SMF99_RG_FLAGS	1	binary	Resource group flags **Bit** **Meaning when set** **0** Indicates that the resource group is dynamic **1** Indicates that the resource group capacity is specified in percentage of the total LPAR capacity **2** Indicates that the resource group capacity is specified in percentage of a single processor capacity **3** Indicates that the resource group capacity is specified in MSU/h **4** Indicates that the resource group capacity is specified in raw service units **5** Indicates that specialty processor consumption is included in the group consumption **6** Indicates that the resource group is a tenant resource group **7** Reserved.
42	2A	*	2	EBCDIC	Reserved.
44	2C	SMF_RG_PERC_MIN	4	binary	Percentage min value, if min/max are specified in percentages, or MSU min value if min/max are specified in MSU.
48	30	SMF_RG_PERC_MAX	4	binary	Percentage max value, if min/max are specified in percentages, or MSU max value if min/max are specified in MSU.
56	38	SMF99_RG_ MEM_LIMIT	4	binary	Maximum memory limit, in GB.
105	69	*	3	EBCDIC	Reserved.
108	6C	SMF99_RG_LACS	4	binary	Tenant resource group long-term average of CPU service in MSUs per hour. Only valid if Bit 6 of SMF99_RG_FLAGS is ON
112	70	SMF99_RG_SUsIFA	8	binary	Tenant resource group's aggregated IFA service units. Only valid if Bit 6 of SMF99_RG_FLAGS is ON
120	78	SMF99_RG_SUsSUP	8	binary	Tenant resource group's aggregated SUP service units. Only valid if Bit 6 of SMF99_RG_FLAGS is ON
128	80	*	4	binary	Internal use by IBM
132	84	SMF99_RG_MEMSMPCNT	4	binary	Number of times storage frames were sampled in SMF99_RG_FRAMECNT
136	88	SMF99_RG_FRAMECNT	8	binary	Tenant resource group's aggregated amount of storage frames (4K + 1M + 2G, normalized to 4K). Only valid if tenant resource group.

Subtype 2 - Address space expanded storage access policy section

Offsets	Name	Length	Format	Description
0	SMF99_AS_ESP_ANAM	8	EBCDIC	Address space name.

Offsets		Name	Length	Format	Description
8	8	SMF99_AS_ESP_AP	1	binary	Expanded storage access policy for demand pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
9	9	SMF99_AS_ESP_VP	1	binary	Expanded storage access policy for VIO pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
10	A	SMF99_AS_ESP_HP	1	binary	Expanded storage access policy for hiperspace pages. **Value** **Meaning** **1** protected **2** least recently used (LRU) **3** space available
11	B	SMF99_AS_ESP_ASID	2	binary	Address space ID.
13	D	SMF99_AS_ESP_FLAGS	1	binary	Flags. **Bit** **Meaning when set** **0** Storage is protected at this instant. **1** Storage protection assigned to space by classification rule. **2** Address space is currently managed to region's goal rather than transaction server's goal. **3** Address space is non swappable. **4** Address space is currently managed to both region's and transaction server's goal. **5** When on, specialty engine work in this address space is ineligible for “Honor Priority Processing”, i.e., it will not be offloaded to CPs for help processing. **6-7** Reserved.
14	E	*	2	binary	Reserved.
16	10	SMF99_AS_ESP_CS_FMCT	4	binary	Number of central storage frames the address spaces owns.

Offsets		Name	Length	Format	Description
20	14	SMF99_AS_ESP_ES_FMCT	4	binary	Number of expanded storage frames the address spaces own.
24	18	SMF99_AS_ESP_PPS_TAR	4	binary	Address space protective process storage target. See subtype 5 for other targets. This is the only target non-monitor address spaces can have.
28	1C	SMF99_AS _FULL_PREEMPTION	6	EBCDIC	Full Preemption Counts.
28	1C	SMF99_AS _CPSRP_SAMP	2	binary	One sample per IRACPSRP invocation.
30	1E	SMP99_AS _CPSRP_CUR_FP_SAMP	2	binary	Amount of IRACPSRP samples running with full preemption.
32	20	SMP99_AS _CPSRP_PREV_FP_SAMP	2	binary	Previous value of FULL_PRE1.
34	22	SMF99_AS_HealthInd	1	binary	Health indicator.
35	23	*	1	binary	Reserved to align to WORD boundary.
36	24	SMF99_AS_TOTAL_SERVICE	4	binary	Total service units for the address space - OUCBWMS.
40	28	SMF99_AS_CPU_SERVICE	4	binary	Total CPU service units for the address space - OUCBCPU.
44	2C	SMF99_AS_SRB_SERVICE	4	binary	Total SRB service units for the address space - OUCBSRB.
48	30	SMF99_AS_MSO_SERVICE	4	binary	Total MSO service units for the address space - OUCBMSO.
52	34	SMF99_AS_TRN_SERVICE	4	binary	Accumulated transaction service for the address space - OUCBTRS.
56	38	SMF99_AS_IO_SERVICE	4	binary	Total IO service units for the address space - OUCBIOC.
60	3C	SMF99_AS_DISP_COUNT	2	binary	Dispatchable count: the number of times that this address space has been found in subroutine CPUTLCK to be dispatchable yet no CPU time has accumulated for it - OUXBDSCN.
62	3E	*	2	binary	Reserved to align to DWORD boundary.
64	40	SMF99_AS_IFA_SERVICE	8	binary	Total IFA service units for the address space – Oucbx_Time_On_Pro(pro_ifa) descaled.
72	48	SMF99_AS_IFACP_SERVICE	8	binary	Total IFA service units spent on CP for the address space - Oucbx_Time_Pro_On_CP(pro_ifa) descaled.
80	50	SMF99_AS_SUP_SERVICE	8	binary	Total SUP service units for the address space – Oucbx_Time_On_Pro(pro_sup) descaled.
88	58	SMF99_AS_SUPCP_SERVICE	8	binary	Total SUP service units spent on CP for the address space - Oucbx_Time_Pro_On_CP(pro_sup) descaled.
96	60	SMF99_AS_PB_SERVICE	8	binary	Transaction service units on standard CP reported for PBs running in this address space - OucbxPBCP.
104	68	SMF99_AS_PB_OFFLOAD _SERVICE	8	binary	Transaction service units on offload engines reported for PBs running in this address space - OucbxPBOffload.
112	70	SMF99_AS_PB _OFFLOADONCP_SERVICE	8	binary	Transaction service units on standard CP that were offload eligible reported for PBs running in this address space – OucbxPBOffloadOnCP.
120	78	SMF99_AS_ENCLAVE _TIME	4	binary	Accumulate tx active time of completed enclaves owned by this space - OUCBETIM.
124	7C	SMF99_AS_ENCLAVE_CPU _SERVICE	4	binary	Accumulated CPU service of completed enclaves owned by this space – OUCBECPU.
128	80	SMF99_AS_ENCLAVE _IFA_TIME	8	binary	Total IFA time for the enclaves owned by the address space – OucbxEncTimeOnPro(pro_ifs).

Offsets		Name	Length	Format	Description
136	88	SMF99_AS_ENCLAVE _IFACP_TIME	8	binary	Total IFA time spent on CP for the enclaves owned by the address space - OucbxEncTimeProOnCP(pro_ifs).
144	90	SMF99_AS_ENCLAVE _SUP_TIME	8	binary	Total SUP time for the enclaves owned by the address space – OucbxEncTimeOnPro(pro_sup).
152	98	SMF99_AS_ENCLAVE _SUPCP_TIME	8	binary	Total SUP time spent on CP for the enclaves owned by the address space - OucbxEncTimeProOnCP(pro_sup).
160	A0	SMF99_AS_BA_BRKLOCELM	18	character	Location element for each processor type which describes the breakup environment of this address space, or 0.
178	B2	SMF99_AS_BA_MEM_SCORE	24	binary	Memory score of this address space for each processor type, or 0.
202	CA	SMF99_AS_BA_LOCELM	18	character	Location element for each processor type which describes the current processor location of this address space, or 0.
224	E0	SMF99_AS_TRC	8	EBCDIC	Tenant report class of address space.
232	E8	SMF99_AS_TRG	8	EBCDIC	Tenant resource group of address space.
240	F0	*	16	binary	Internal use by IBM

Chapter 7. Using RMF with colocated DevTest and New Application Solutions

IBM z/OS Resource Measurement Facility (RMF) is IBM's product for z/OS performance measurement and management. RMF also allows you to tune and configure your system according to your business needs.

RMF interprets WLM data related to CPU consumption for all work running on the system, and records that data to SMF Type 70, 72, and 79 records. This allows the information to be accessed later for reporting and comparisons, client chargeback purposes and used by SCRT to build a report of data for sub-capacity billing purposes.

In order to use RMF for Tailored Fit Pricing, you must have z/OS V2.2 or later, with the PTFs applied for APAR OA52694.

For Tailored Fit Pricing, the RMF Postprocessor Workload Activity includes WLM information for colocated DevTest and New Application about tenant resource groups and tenant report classes, as shown in Figure 51 on page 133 and Figure 52 on page 134 .

Enhanced Report Class Report showing a tenant report class:

```
------------------------------------------------------------------------------------------------------------------- REPORT CLASS(ES

POLICY=BASEPOL     TENANT=TENANT01      REPORT CLASS=TRC00001       RESOURCE GROUP=TRGROUP1
                                        DESCRIPTION =Tenant report class 1

-TRANSACTIONS--  TRANS-TIME HHH.MM.SS.FFFFFF  TRANS-APPL%-----CP-IIPCP/AAPCP-IIP/AAP  ---ENCLAVES---
AVG        4.00  ACTUAL                    0  TOTAL          N/A         N/A     N/A  AVG ENC   0.00
MPL        4.00  EXECUTION                 0  MOBILE         N/A         N/A     N/A  REM ENC   0.00
ENDED         0  QUEUED                    0  CATEGORYA      N/A         N/A     N/A  MS ENC    0.00
END/S      0.00  R/S AFFIN                 0  CATEGORYB      N/A         N/A
#SWAPS        0  INELIGIBLE                0
EXCTD         0  CONVERSION                0
                 STD DEV                   0
```

Figure 51. RMF report class report showing a tenant report class

```
                                    W O R K L O A D   A C T I V I T Y
                                                                                                    PAGE   2
       z/OS V2R4              SYSPLEX UTCPLXCB          DATE 07/04/2019          INTERVAL 14.59.999   MODE = GOAL
                              RPT VERSION V2R4 RMF      TIME 03.00.00

                                        POLICY ACTIVATION DATE/TIME 07/03/2019 09.00.04
                                                    - SERVICE POLICY PAGE -

SERVICE DEFINITION: CMBSVDEF  WLM BASEPOL COMBAT for WBG             -SERVICE DEFINITION COEFFICIENTS-   -NORM FACTORS-
  INSTALL DATE: 06/21/2019 13.47.34  INSTALLED BY: RDOWNEY               IOC     CPU     SRB     MSO       AAP     IIP
  POLICY: BASEPOL   WLM BASEPOL COMBAT for WBG
  DISCRETIONARY GOAL MANAGEMENT: YES                                     0.1     1.0     1.0  0.0000    1.0000  1.0000
  DYNAMIC ALIAS MANAGEMENT: YES
  I/O PRIORITY MANAGEMENT:  YES

SYSTEMS
  ---ID---  OPT  SU/SEC  CAP% --TIME--  INTERVAL  --BOOST--   ---ID---  OPT  SU/SEC  CAP% --TIME--  INTERVAL  --BOOST--
  CB8E       CB  59259.3  100 03.00.00  00.14.59  Inactive    CB89       CB  68965.5  100 03.00.00  00.14.59  Inactive

RESOURCE GROUPS
  --NAME-- TYPE  ----------DESCRIPTION-----------  -SYSTEM-  ---CPU CONSUMPTION---  --------CPU CAPACITY---------  ----MEMORY----
                                                              #CPS    MSU  SU/SEC     MIN    MAX    DEFINED AS      USAGE   LIMIT
  HWTRG1   TRG   Hardware Container TRG #1                    0.22    27      14K
                                                  CB8E        0.11    14       7K                                      98M
                                                  CB89        0.11    13       8K                                     102M
                 -------REPORT CLASSES   HWTRC1               0.17    21      11K
                                         HWTRC3               0.05     6       3K

  HWTRG2   TRG   Hardware Container TRG #2                    0.21    25      13K
                                                  CB8E        0.11    13       6K                                     111M
                                                  CB89        0.10    12       7K                                     131M
                 -------REPORT CLASSES   HWTRC2               0.21    25      13K

  RGPTYP1  RG    V1R12 LI1370 testing, type 1                 0.00     0       0       5    100     SU/SEC
                                                  CB8E        0.00     0       0                                       0
                                                  CB89        0.00     0       0                                       0
                 ------SERVICE CLASSES   RGRP1                0.00     0       0

  RGPTYP3  RG    v1r12 li1370 testing, type 3                 0.00     0       0    0.01   1.00     NUMBER OF CPs
                                                  CB8E        0.00     0       0                                       0
                                                  CB89        0.00     0       0                                       0
                 ------SERVICE CLASSES   RGRP3                0.00     0       0
                                         RGRP3B               0.00     0       0
                                         RGRP3C               0.00     0       0
```

Figure 52. WLMGL Report - Service Policy Page

For complete information on RMF, see:

- *z/OS RMF User's Guide*

CPU Activity - SMF record type 70-1

The *z/OS RMF User's Guide* describes how to use RMF overview conditions. This section covers only those conditions are included that can be used to generate Overview reports based on SMF type 70 subtype 1.

One of the following qualifiers is possible:

cluster
Name of the sysplex or cluster

coreid
A processor identifier (one or two hexadecimal digits) that either identifies a logical core (when LOADxx PROCVIEW CORE is in effect) or a logical processor (when LOADxx PROCVIEW CPU is in effect).

If the qualifier is omitted, the values represent the average of all logical processors or cores.

cpuid
A processor identifier which must be in the format *cpuid*[.*threadid*]

cpuid is a processor identifier (one or two hexadecimal digits) that either identifies a logical core (when LOADxx PROCVIEW CORE is in effect) or a logical processor (when LOADxx PROCVIEW CPU is in effect).

threadid is an optional thread identifier (0 or 1) that identifies a thread that is executing on the logical core designated by cpuid. It is ignored when LOADxx PROCVIEW CPU is in effect . If LOADxx PROCVIEW CORE is in effect and *threadid* is omitted, the values represent the average of all threads executing on the logical core.

Examples: 0A, 3F.0, A.1

If the qualifier is omitted, the values represent the average of all logical processors or cores.

lpar
Logical partition name

group
Group of logical partitions managed towards a common group capacity limit

trg
Tenant resource group name

Table 6. CPU Activity - Conditions Based on SMF Record Type 70–1

Condition	Condition Name	Qualifier	Source	Algorithm
Long-term average of CPU service (millions of service units) consumed by a tenant resource group	TRGLACS	trg	SMF70_TRG_LAC	Value or comparison
Service units on general purpose processors consumed by a tenant resource group per second	TRGCP	trg	SMF70_TRG_SUCP SMF70INT	TRG_SUCP *1000 / INT
Service units on zAAPs consumed by a tenant resource group per second	TRGAAP	trg	SMF70_TRG_SUIFA SMF70INT	TRG_SUIFA *1000 / INT
Service units on zIIPs consumed by a tenant resource group per second	TRGIIP	trg	SMF70_TRG_SUSUP SMF70INT	TRG_SUSUP *1000 / INT
General purpose processor consumption in terms of 1/100 of a CP	TRGCPN	trg	SMF70_TRG_SUCP SMF70ADJ SMF70INT	(TRG_SUCP *ADJ) / (INT*160000)
zAAP processor consumption in terms of 1/100 of a CP	TRGAAPN	trg	SMF70_TRG_SUIFA SMF70ADJ SMF70INT	(TRG_SUIFA *ADJ) / (INT*160000)
zIIP processor consumption in terms of 1/100 of a CP	TRGIIPN	trg	SMF70_TRG_SUSUP SMF70ADJ SMF70INT	(TRG_SUSUP *ADJ) / (INT*160000)

Appendix A. Accessibility

Accessible publications for this product are offered through IBM Documentation (www.ibm.com/docs/en/zos).

If you experience difficulty with the accessibility of any z/OS information, send a detailed message to the Contact the z/OS team web page (www.ibm.com/systems/campaignmail/z/zos/contact_z) or use the following mailing address.

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Attention: MHVRCFS Reader Comments
Department H6MA, Building 707
2455 South Road
Poughkeepsie, NY 12601-5400
United States

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features in z/OS can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products such as screen readers function with the user interfaces found in z/OS. Consult the product information for the specific assistive technology product that is used to access z/OS interfaces.

Keyboard navigation of the user interface

You can access z/OS user interfaces with TSO/E or ISPF. The following information describes how to use TSO/E and ISPF, including the use of keyboard shortcuts and function keys (PF keys). Each guide includes the default settings for the PF keys.

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS ISPF User's Guide Vol I*

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users who access IBM Documentation with a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line because they are considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that the screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1)

are mutually exclusive alternatives. If you hear the lines `3.1 USERID` and `3.1 SYSTEMID`, your syntax can include either `USERID` or `SYSTEMID`, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The `*` symbol is placed next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element `*FILE` with dotted decimal number 3 is given the format `3 \* FILE`. Format `3* FILE` indicates that syntax element `FILE` repeats. Format `3* \* FILE` indicates that syntax element `* FILE` repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol to provide information about the syntax elements. For example, the lines `5.1*, 5.1 LASTRUN, and 5.1 DELETE` mean that if you use more than one of the `LASTRUN` and `DELETE` syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, it indicates a reference that is defined elsewhere. The string that follows the % symbol is the name of a syntax fragment rather than a literal. For example, the line `2.1 %OP1` means that you must refer to separate syntax fragment `OP1`.

The following symbols are used next to the dotted decimal numbers.

? indicates an optional syntax element
The question mark (?) symbol indicates an optional syntax element. A dotted decimal number followed by the question mark symbol (?) indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example `5? NOTIFY`). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines `5 ?, 5 NOTIFY`, and `5 UPDATE`, you know that the syntax elements `NOTIFY` and `UPDATE` are optional. That is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

! indicates a default syntax element
The exclamation mark (!) symbol indicates a default syntax element. A dotted decimal number followed by the `!` symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the dotted decimal number can specify the ! symbol. For example, if you hear the lines `2? FILE, 2.1! (KEEP), and 2.1 (DELETE)`, you know that `(KEEP)` is the default option for the `FILE` keyword. In the example, if you include the `FILE` keyword, but do not specify an option, the default option KEEP is applied. A default option also applies to the next higher dotted decimal number. In this example, if the `FILE` keyword is omitted, the default `FILE(KEEP)` is used. However, if you hear the lines `2? FILE, 2.1, 2.1.1! (KEEP)`, and `2.1.1 (DELETE)`, the default option KEEP applies only to the next higher dotted decimal number, `2.1` (which does not have an associated keyword), and does not apply to `2? FILE`. Nothing is used if the keyword `FILE` is omitted.

*** indicates an optional syntax element that is repeatable**
The asterisk or glyph (*) symbol indicates a syntax element that can be repeated zero or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line `5.1* data area`, you know that you can include one data area, more than one data area, or no data area. If you hear the lines `3* , 3 HOST, 3 STATE`, you know that you can include `HOST, STATE`, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you can write `HOST STATE`, but you cannot write `HOST HOST`.
3. The * symbol is equivalent to a loopback line in a railroad syntax diagram.

+ indicates a syntax element that must be included

The plus (+) symbol indicates a syntax element that must be included at least once. A dotted decimal number followed by the + symbol indicates that the syntax element must be included one or more times. That is, it must be included at least once and can be repeated. For example, if you hear the line `6.1+ data area`, you must include at least one data area. If you hear the lines `2+, 2 HOST,` and `2 STATE`, you know that you must include `HOST, STATE,` or both. Similar to the * symbol, the + symbol can repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loopback line in a railroad syntax diagram.

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Index

Special Characters

A

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

W

X

Product Number: 5650-ZOS