z/OS
2.5

System Recovery Boost

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 75.

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.

Last updated: 2022-08-23

Contents

Tables

About the System Recovery Boost Content Solution

Purpose of this information

This is a collection of all of the information that you need to understand and use System Recovery Boost. Some of this information also appears elsewhere in the z/OS library.

Who should read this information

This collection of documentation is intended for the systems programmer, or persons responsible for planned system outages, and system recovery during an unplanned outage. This collection also provides information for someone who wants to minimize their system down time and decrease the time it takes to shutdown, restart, and process backlog.

Related information

For an interactive starting point, and access to a variety of resources related to System Recovery Boost, see System Recovery Boost.

How to send your comments to IBM

We invite you to submit comments about the z/OS product documentation. Your valuable feedback helps to ensure accurate and high-quality information.

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

Submit your feedback by using the appropriate method for your type of comment or question:

Feedback on z/OS function
If your comment or question is about z/OS itself, submit a request through the IBM RFE Community (www.ibm.com/developerworks/rfe/).

Feedback on IBM® Documentation function
If your comment or question is about the IBM Documentation functionality, for example search capabilities or how to arrange the browser view, send a detailed email to IBM Documentation Support at ibmdocs@us.ibm.com.

Feedback on the z/OS product documentation and content
If your comment is about the information that is provided in the z/OS product documentation library, send a detailed email to mhvrcfs@us.ibm.com. We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.

To help us better process your submission, include the following information:

- Your name, company/university/institution name, and email address
- The section title of the specific information to which your comment relates
- The comprehensive content collection title:
- The text of your comment.

When you send comments to IBM, you grant IBM a nonexclusive authority to use or distribute the comments in any way appropriate without incurring any obligation to you.

IBM or any other organizations use the personal information that you supply to contact you only about the issues that you submit.

If you have a technical problem

If you have a technical problem or question, do not use the feedback methods that are provided for sending documentation comments. Instead, take one or more of the following actions:

- Go to the IBM Support Portal (support.ibm.com).
- Contact your IBM service representative.
- Call IBM technical support.

Summary of changes

This information includes terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations for the current edition are indicated by a vertical line to the left of the change.

Note: IBM z/OS policy for the integration of service information into the z/OS product documentation library is documented on the z/OS Internet Library under IBM z/OS Product Documentation Update Policy (www-01.ibm.com/servers/resourcelink/svc00100.nsf/pages/ibm-zos-doc-update-policy?OpenDocument).

Summary of changes for Version 2 Release 5 (V2R5)

z/OS V2R5 updates (5/26/22)

Updates for enhancements that are available with the PTFs for APAR OA60660 (which also applies to z/OS V2R4), to expand and improve updates that were added on 4/5/2022.

- New descriptions of procs in Chapter 6, "Procs," on page 21
- Editorial changes to the description of message IEE258I, which replaces IEE257I as the response to the D IPLINFO,BOOST,STATE command, with additional information about recovery process boost, in Chapter 7, "Messages," on page 25.

z/OS V2R5 updates (4/5/22)

Updates for enhancements that are available with the PTFs for APAR OA60660 (which also applies to z/OS V2R4). Some require the IBM z16; this is indicated in the topics that describe them.

- Introduction of new recovery process boost use cases, in Chapter 1, "Overview of System Recovery Boost," on page 1
- Prerequisites for new recovery process boost use cases, in "Prerequisites" on page 7
- Planning for the new IEASRB proc to enable or disable recovery process boost, in "What do I need to do?" on page 7
- New descriptions of procs in Chapter 6, "Procs," on page 21
- Enabling new recovery process boost use cases, in "Turning on System Recovery Boost" on page 8
- Boosting SVC dumps, middleware region startup, and loading HyperSwap configuration information, in "Recovery process boost" on page 11
- Commands and other controls for recovery process boosts, in "Managing recovery process boost" on page 13
- Messages related to the new recovery process boost use cases in "Automation Considerations" on page 15
- "WLM changes" on page 17
- "WLM changes for middleware region startup recovery process boost" on page 17
- A Boost attribute in SMF record type 79 subtype 1 (address space state data) and subtype 2 (address space resource data) in "SMF changes" on page 18
- A Boost value in z/OS Data Gatherer Monitor III Address space identification table (ERBASIG3), in "z/OS Data Gatherer changes" on page 18
- An address space's Boost attribute in the SYSEVENTs REQASD and REQFASD, in "Other system changes" on page 18
- New messages IEA688I and IEA689I, in Chapter 7, "Messages," on page 25

- Message IEE258I, which replaces IEE257I as the response to the D IPLINFO,BOOST,STATE command, with additional information about recovery process boost, in Chapter 7, "Messages," on page 25
- Message IEE857I, which now shows the value for the minimum dump size for boosting SVC dumps, and new message IEE863I, which is displayed in response to a ISPLAY DUMP,INFO command, in Chapter 7, "Messages," on page 25
- Boost attributes in IWMSVDCR and IWMWRQAA in Chapter 8, "MVS Data Areas," on page 41
- Details for z/OS Data Gatherer, SMF. and WLM in "z/OS Data Gatherer details" on page 53, "SMF details" on page 54 and "WLM details" on page 67

Summary of changes for Version 2 Release 4 (V2R4)

z/OS V2R4 updates (10/29/20)

- Updates for recovery process boost, including to Chapter 1, "Overview of System Recovery Boost," on page 1, "Turning on System Recovery Boost" on page 8, Chapter 4, "Using System Recovery Boost," on page 11, and Chapter 7, "Messages," on page 25. This support is also available with z/OS V2R3.

Chapter 1. Overview of System Recovery Boost

What is System Recovery Boost?

System Recovery Boost is a feature introduced with the IBM z15™ and enhanced with the IBM z16 that provides capabilities to reduce the time it takes to shut down and restart (IPL) a system, by providing additional processor capacity and throughput for the boosted image.

In addition to shutdown boost and IPL boost, the recovery process boost class can help accelerate system recovery and diagnostic capture events. Recovery process boost provides short-term acceleration for specific recovery events in z/OS.

How does System Recovery Boost work?

Starting with IBM z15, System Recovery Boost can deliver higher processor capacity for a limited time after an IPL, while shutting down a system, or during specific, short-term sysplex recovery events. The increased capacity can be provided in one or more of the following ways:

- In an LPAR on a sub-capacity machine, by utilizing the full speed for the general purpose processors of the boosted partition (speed boost)
- Dispatching some work on z Integrated Information Processors (zIIP), even if the work is not eligible for zIIP (zIIP boost)
- Configure online zIIPs that are in the standby state for the duration of the boost period (zIIP boost)

Starting with IBM z16, System Recovery Boost is extended with recovery process boost cases for SVC dumps, loading HyperSwap configuration information, and customer-selected middleware region starts and restarts.

System Recovery Boost is controlled by the BOOST system parameter (enabled by default), and can be manually enabled during shutdown once you have indicated that a shutdown is in progress. You can dynamically enable or disable all recovery process boosts with the IEASRB crop, end an IPL or shutdown boost with the IEABE proc and start a shutdown boost with the IEASDBS proc. You determine whether to boost SVC dumps based on dump size, with the CHNGDUMP command, and control middleware region startup boosts with your WLM service definition.

Boost periods are specific to an image, meaning only boosted images experience boost processing, not entire machines. System Recovery Boost Upgrade (described in "System Recovery Boost Upgrade" on page 4) applies additional physical zIIP capacity to an entire machine; this additional capacity is shared across all images on the machine according to LPAR weights, regardless of whether those images are in a boost period at the time.

In addition to speed boost and zIIP boost, GDPS performance and parallelism enhancements increase the speed with which GDPS drives hardware actions, along with enhancing the speed of the underlying hardware services.

For related information on System Recovery Boost read the white paper: System Recovery Boost for the IBM z15 and IBM z16 (ibm.biz/z15SRBWhitePaper).

Chapter 2. System Recovery Boost basics

This topic describes some basic concepts that you need to understand and use System Recovery Boost as well as GDPS performance and parallelism enhancements.

Processing units

An IBM Z CPC has a large number of processing units, or PUs, that can be configured to perform various tasks. For z/OS, there are two types of PUs that matter to System Recovery Boost:

- Central Processors, or CPs, that can run any type of work
- z Integrated Information Processors, or zIIPs, that run work that has been marked as zIIP-eligible.

For higher-end machines such as the z15 T01, the processing capacity of the CPC is denoted by its model number, which is of the form *XYY*, such as 755, where:

X

denotes the speed of the CPs; model 7 denotes full speed CPs, while lower numbers denote a CP running at a reduced speed. CPCs with reduced speed CPs are known as subcapacity CPCs.

YY

is the number of entitled CPs available to the CPC (in the example, 55).

You can see your model number on the Product Information tab in the System Details task on the support element (SE). The number of processors configured to the CPC are known as physical CPs or zIIPs.

The number of CPs and zIIPs that an image will use is configured in the Image Activation Profile task on the Hardware Management Console (HMC). The CPs and zIIPs that you define here are known as logical CPs and logical zIIPs. You can have more logical CPs and zIIPs than you have physical CPs and zIIPs. The two noteworthy fields here are Initial zIIPs and Reserved zIIPs. Initial zIIPs are brought online during IPL. Reserved zIIPs are defined to the image, but are not brought online at IPL time. There are two types of reserved zIIPs, ones that are backed by hardware, and therefore could be brought online, and ones that are defined to the image, but not backed by real hardware, and cannot be brought online without acquiring additional physical zIIPs.

Speed boost

What is speed boost?

Speed boost is a capability of System Recovery Boost that improves the recovery time of exploiting operating systems when running on a subcapacity CPC.

How does speed boost work?

If you are running on a subcapacity CPC, then while System Recovery Boost is active, z/OS requests that the CPC firmware increase the speed of CPs being used by the image to full capacity model speed for the duration of the boost. After the boost ends, the CPs being used by the image return to the subcapacity model speed. Since zIIPs always run at full speed, zIIP work will see no benefit from speed boost.

This increase applies only to the image being boosted; all other images not being boosted run at subcapacity model speed, and the CPC itself remains a subcapacity CPC. The capacity model number of the machine (described in Chapter 2, "System Recovery Boost basics ," on page 3) does not change because one or more of the images on the machine is experiencing a speed boost. If you are running on a subcapacity machine, IBM recommends activating Speed Boost, as all CP processes benefit.

zIIP boost

What is zIIP boost?

zIIP boost is a capability of System Recovery Boost that can improve z/OS recovery time, assuming zIIP capacity is available to the boosting image.

How does zIIP boost work?

z/OS is the only operating system that can exploit the zIIP boost capability, as it is the only OS that can natively exploit zIIPs. While zIIP boost is active, z/OS makes non-zIIP-eligible work zIIP-eligible, thus allowing most work to run on zIIPs. This provides additional capacity and parallelism to accelerate processing during the boost periods. IBM refers to this as blurring the CPs and zIIPs together.

There are variations of zIIP boost, depending on how the CPC is configured. If you have no zIIPs, you will of course see no benefit from zIIP boost. There is also the priced System Recovery Boost Upgrade feature that allows you to take additional advantage of zIIP boost.

The most basic type of zIIP boost is when you have defined Initial zIIPs and no Reserved zIIPs that could be backed by physical processors. In this case, the zIIP blurring happens for the duration of the boost, on your defined, entitled zIIPs. At the end of the boost period, normally non-zIIP eligible work stops running on zIIPs.

For the duration of the boost period, CP work is eligible to run onto any online zIIP. This additional capacity for CP work provides additional processing capacity and parallelism.

zIIP boost with reserved zIIPs

In this case, you have some zIIPs that are defined as reserved, and some number of those can be backed by physical zIIPs. Those reserved zIIPs that can be backed by physical zIIP are brought online by the system at the beginning of the boost period and then taken offline when the boost period ends.

Any zIIPs brought online provide even more capacity and parallelism during the boost period. During recovery process boosts, at most 2 additional logical zIIPs may be brought online to the boosting image in this way.

System Recovery Boost Upgrade

What is System Recovery Boost Upgrade?

System Recovery Boost Upgrade supports activating temporary zIIPs in conjunction with a zIIP boost during an image IPL boost period or a shutdown boost period. It is a priced feature for the z15 and requires you to have purchased an annual subscription for the boost feature for your CPC and allows you to bring up to 20 additional physical zIIPs online to the CPC for the duration of the capacity record activation, limited by the number of unused "dark core" processors you have in your CPC. You can bring this additional zIIP capacity online to your CPC when it is needed for recovery purposes. These zIIPs then behave just like any other physical zIIPs, in that the processors are shared across the CPC based on their LPAR weights, and additional reserved zIIPs can be brought online at the beginning of a boost due to the additional physical capacity being made available.

After the temporary capacity record expires or is deactivated, the additional zIIPs are removed from the CPC's pool of physical processors. Any zIIP processors you want managed by z/OS as part of System Recovery Boost (that is, automatically brought on and offline) have to be available to the CPC when the boost is started. Physical processors that are made available after the boost has started are not automatically brought online by z/OS.

System Recovery Boost Upgrade is eligible for use during one or more image-level IPL or shutdown boost periods. It does not change the time limits of IPL boost periods (60 minutes) or shutdown boost periods (30 minutes). It cannot be used with recovery process boosts.

How does System Recovery Boost Upgrade work?

As an example, consider a CPC with five shared physical zIIPs and three LPARs, another with no initial zIIPs, another with three initial zIIPs and another with five initial zIIPs.

With no initial zIIPs, z/OS is not able to take advantage of zIIP boost unless the image has 1 or more reserved zIIPs defined. If there are one or more reserved zIIPs defined, during the boost period, up to five reserved zIIPs will be configured online by z/OS, and then configured offline once the boost period is

over. If you have a temporary capacity record, then more zIIPs could be configured online during a boost period, up to the maximum allowed by the system definition or the physical number of zIIPs available.

With three initial zIIPs, z/OS can take advantage of zIIP boost. If one or more reserved zIIPs is defined, up to two reserved zIIPs are configured online by z/OS at the beginning of the boost period, and then configured offline once the boost period is over. If you have a temporary capacity record, then more could be configured online during a boost period, up to the maximum allowed by the activation profile or the physical number of zIIPs available.

With five initial zIIPs, z/OS is able to take advantage of zIIP boost. However, unless you have a temporary capacity record, no more zIIPs are able to be configured online by z/OS at the beginning of a boost period. If you have a temporary capacity record, then more could be configured online during a boost period, up to the maximum allowed by the activation profile or the physical number of zIIPs available.

GDPS performance and parallelism

What is GDPS performance and parallelism?

GDPS® performance and parallelism increases the speed with which GDPS drives hardware actions, along with enhancing the speed of the underlying hardware services.

The GDPS enhancements are a combination of changes to GDPS processing/scripting itself, and GDPS taking advantage of new function offered by the z15 Support Element (SE). APIs used by GDPS on the SE are streamlined and improved, while GDPS does more in parallel when possible. In addition, enhancements to the GDPS scripting language allow multiple systems to be addressed in parallel by some commands and improve the efficiency of some control flows.

How do the GDPS enhancements work?

The GDPS enhancements are available in GDPS 4.2 and above running on a z15 or higher CPC.

With GDPS 4.2 the system infrastructure management has been improved, allowing a reduction in the observed recovery time objective (RTO) when there is a need for the IT infrastructure to be reconfigured, such as with on-site system restart, planned site or region switch, or a disaster recovery process. This improvement is achieved by optimizing GDPS and CPC interactions and by providing the possibility for customers to perform actions against a group of system/LPARs rather than against each one individually.

Before this change, all actions were done sequentially, repeating in each step the required handshaking between GDPS and the CPCs hosting the systems. Grouping the actions eliminates the duplicate handshaking processes and reduces substantially the overall time needed to manage multiple systems.

Note: GDPS scripting changes are needed to take full advantage of these GDPS performance and parallelism enhancements, through exploitation of the SYSPLEX scripting statement.

The following GDPS manuals describe how to implement these RTO improvements:

- *GDPS Metro Planning and Implementation Guide (ZG24-6755), section 4.7.2, SYSPLEX script statement.*
- *GDPS Global - GM Installation and Customization Guide (ZG24-6757), section 4.5.7, SYSPLEX script statement.*
- *GDPS Global - XRC Installation and Customization Guide (ZG24-6759), section 4.6.9, SYSPLEX script statement.*

Chapter 3. Planning and Setup

This chapter covers information on prerequisites and what you need to do for planning and setup of System Recovery Boost.

Prerequisites

System Recovery Boost requires a z15 or higher processor and is supported on z/OS V2R3 and later.

The following System Recovery Boost functions require z/OS V2R4 or higher:

- Using the IEASRB proc to enable or disable recovery process boosts
- Enhancements to the output of the D IPLINFO,BOOST,STATE command with message IEE258I. Note that with a z16 processor, message IEE258I shows additional information.
- Accounting enhancements related to actual and potential boost time reporting by SMF.

The following System Recovery Boost functions require a z16 processor and z/OS V2R4 or later:

- Boosting SVC dumps, loading HyperSwap configuration information, and middleware region startup
- Enhancements to the output of the D IPLINFO,BOOST,STATE command with message IEE258I that show usage of the pool of recovery process boost time and time until refresh of the pool.

For zIIP boost, you also need to have one or more zIIPs defined in the Image Activation Profile, either as initial or reserved processors, have physical zIIPs online in the CPC, have HiperDispatch enabled (the default), and be running with shared, not dedicated processors.

Speed boost is applicable only on a sub-capacity machine.

What do I need to do?

In addition to the requirements described in "Prerequisites" on page 7, System Recovery Boost requires PTFs. Refer to the FIXCAT, IBM.Function.SystemRecoveryBoost. Make sure you aren't disabling the support in your IEASYSxx member of parmlib, which is described in "Turning on System Recovery Boost" on page 8. With no additional work, you have:

- IPL boost
- Partial GDPS support
- Several recovery process boosts: HyperSwap, Coupling Facility data-sharing member recovery, Coupling Facility structure recovery, sysplex partitioning, and, with the z16, HyperSwap configuration load.

To get additional benefits, consider doing the following:

- If you use GDPS, update your GDPS SYSPLEX script with the new GDPS verbs that allow you to act against multiple images simultaneously.
- With the IBM z16, enable SVC dump boosts by setting a minimum dump size threshold, and middleware region startup boosts through your WLM service definition, as described in "Control boosts for recovery events" on page 13.
- Update your shutdown automation to automatically use the START IEASDBS system command during your shutdown process. If your shutdown takes 30 minutes or less, you should invoke it at the beginning; if it takes more than 30 minutes, you'll need to figure out at what point it will provide the most benefit to your shutdown. In general, the period with the highest CPU utilization will have the most benefit for activating shutdown boost.
- Update your startup and shutdown automation in general, to take advantage of the additional parallelism or capacity that System Recovery Boost provides. Note, the terms "startup" and "IPL" are used interchangeably when referring to boost processing.
- Automate on the System Recovery Boost messages.

- Define reserved zIIPs to some or all of your images to be able to access additional zIIP capacity for zIIP boost, so they can be configured online during IPL and shutdown boosts.
- Review your zIIP weights to see if they still match the usage by your images. If you find zIIPs are using significant vertical low capacity during IPL or shutdown boost, you might want to adjust zIIP weights during startup and shutdown to optimize performance. If significant expansion into vertical lows happens consistently independent of boost, consider making permanent zIIP weight changes. When significant expansion into vertical lows happens primarily during boost, consider transiently adjusting zIIP weights only during the boost period.
- Copy procs IEASRB (enable or disable recovery process boosts), IEASDBS (start shutdown boost) and IEABE (end boost) from SYS1.PROCLIB to an appropriate proclib on your system. Any ID with the authority to run those procs can enable or disable recovery process boosts, start a boost, or end a boost; no permission is required beyond that. For more information, see Chapter 6, "Procs," on page 21.

You may also want to consider doing the following:

- Define more additional reserved zIIPs for images that are expected to use the additional recovery capacity.
- Update your automation to activate the Boost Capacity Record activation and deactivation.
- Automate changing zIIP weights during the period of time the Boost Capacity Record is active, to ensure the systems that are recovering have access to the additional capacity.
- For information on how to configure a LPAR for best performance, see Number of Logical CPs Defined for an LPAR (www.ibm.com/support/pages/number-logical-cps-defined-lpar).

Turning on System Recovery Boost

System Recovery Boost is enabled by default, and is controlled by the BOOST= parameter in your IEASYSxx member of parmlib. The default, BOOST=SYSTEM, means that z/OS takes advantage of whatever boosts are available to it, given the system configuration. BOOST=ZIIP allows only zIIP boosting, while BOOST=SPEED allows only speed boost. BOOST=NONE disables all types of boosting.

The system command DISPLAY IPLINFO,BOOST shows the value of the BOOST system parameter. The system command DISPLAY IPLINFO,BOOST,STATE displays information about System Recovery Boost use, whether or not boosts are currently active, whether or not recovery process boosts are enabled for use, recovery boost time since IPL, and, with the z16, additional details about recovery process boost time use: available, used, remaining and time until refresh. For details, see message IEE258I in Chapter 7, "Messages," on page 25.

There are also indicators on the HMC that can show if an image is currently boosting or not. With the z16, the HMC also shows current usage of recovery process boost time. The Image Detail panel indicates if an image is boosting, and columns in the Systems Management list and Custom Groups list indicate if a boost is active and which types are active.

Startup and shutdown boost

For each image, System Recovery Boost can be used once during IPL and once while shutting down the system, as follows:

- IPL boost is activated automatically during IPL and lasts for one hour.
- You start shutdown boost by using the START IEASDBS command.

For more information, see "IPL boost" on page 11, and "Shutdown boost" on page 11.

Recovery process boost

Recovery process boosts can be used many times during an IPL. They are based on recovery events, including HyperSwap processing, coupling facility structure recovery, sysplex partitioning recovery, and, with the z16, SVC dumps, middleware region startup as well as loading HyperSwap configuration

information. You can dynamically enable or disable all recovery process boosts with the IEASRB proc. For more information, see .

BOOST parameter in IEASYSxx

Two boosts are possible: zIIP boost and speed boost. These boosts are available when running z/OS on a machine with IBM z15™capabilities only.

The zIIP boost configures online zIIPs in the standby state in accordance with the zIIP configuration of the LPARs. The zIIP boost will "blur" work between standard CPs and zIIPs. (That is, work that is normally eligible only for a standard CP may be run on a zIIP.) zIIP boost only applies to an LPAR that, at the time of boost activation, meets all of the following criteria:

- Has at least one online or standby zIIP
- Is not a dedicated partition
- Is running with HIPERDISPATCH=YES

In order for zIIPs to be configured online during boost processing, the zIIPs must be defined to the LPAR. They may be defined before IPL or they may be dynamically added to the configuration after IPL, depending on the LOADxx DYNCPADD parameter value in effect. zIIPs dynamically added after IPL do not apply to IPL boost but could be used by shutdown boost.

The speed boost makes a sub-capacity standard CP run at the speed of a (full-speed) zIIP. Speed boost only applies to an LPAR that, at the time of boost activation, does not have its standard CP(s) already running at the (full-capacity) speed of a zIIP.

SYSTEM
Apply system rules. If the machine does not support boosts, treat as NONE. If the system does support boosts, activate all boosts that the machine supports.

ZIIP
Activate only the zIIP boost. Do not activate the other (speed) boost.

SPEED
Activate only the speed boost. Do not activate the other (zIIP) boost.

NONE | NO
Do not activate either of the boosts.

Chapter 4. Using System Recovery Boost

This chapter contains information on using System Recovery Boost.

IPL boost

IPL boost is controlled by BOOST= in the IEASYSxx member of parmlib. If you haven't disabled System Recovery Boost in parmlib, IPL boost is automatically activated during IPL, and lasts for 1 hour. If you want to stop the IPL boost prior to the 1-hour time limit, you can issue system command START IEABE (IEA Boost End) to do so. The invoked module will likely complete before the (asynchronous) stopping of the boost completes.

During IPL boost, WLM routing services specifies the correct, boosted capacity for most of the duration of the boost. A few minutes before the scheduled end of the boost, WLM begins reducing the routing weight, so that by the end of the boost, the routing weight matches the regular capacity of the image. The interval of time this decrease in routing weight happens over can be influenced by the RTBELEADTIME option in the IEAOPTxx member of parmlib.

For more information about the BOOST parameter of IEASYSxx, see "Turning on System Recovery Boost" on page 8.

Shutdown boost

Shutdown boost is controlled by BOOST= in the IEASYSxx member of parmlib, just as IPL boost is. System automation starts IEASDBS when it takes a system down. You might need to update your automation, or invoke IEADSBS manually, if you do not use System automation to shut down the system. So if you have disabled one or more varieties of System Recovery Boost in IEASYSxx, you won't be able to use it for shutdown boost, either.

Shutdown boost lasts for 30 minutes, or until the system stops. So if the system stops 15 minutes after you start shutdown boost, the remaining 15 minutes doesn't carry over to the following IPL.

To use System Recovery Boost to speed up shutdown, you start the proc IEASDBS (IEA Shut Down Boost Start) to tell z/OS that a shutdown is in progress and to begin the shutdown boost; note that once you have indicated that a shutdown is starting, WLM will essentially stop directing new work to that image, and will stop performing weight balancing activity for the image. If for some reason you want to stop a shutdown boost prior to the 30-minute time limit, you can run proc IEABE to do so. However, stopping shutdown boost using the IEABE proc does not cause WLM to resume normal behavior, nor does it allow you to use any remaining boost time in the future. IEASDBS and IEABE run very quickly and stop as soon as they are finished. For more information, see Chapter 6, "Procs," on page 21.

Recovery process boost

In addition to shutdown boost and IPL boost, the recovery process boost class can help accelerate system recovery and diagnostic capture events. Recovery process boost provides short-term acceleration for specific recovery events in z/OS.

Recovery process boost is available beginning with z15 (LPAR MCL P46602.005 for z15 Driver 41C, bundle S29 or higher). Additional use cases are available with the z16. Recovery process boost periods are restricted to durations of 5 minutes or less and are limited to 30 total minutes per partition in a 24-hour period.

The recovery events for recovery process boosts include the following.

- **HyperSwap®**

  Boost all systems participating in a Hyperswap process. HyperSwap processing is a coordinated, sysplex-wide recovery process that restores access to DASD devices following the failure of a storage

controller. Its recovery time is sometimes limited by slow processing on one or more participating systems.

- **Coupling Facility data-sharing member recovery**

  Boost all systems participating in recovery from termination of a coupling facility (CF) data-sharing member that terminates with lock resources held. When a data-sharing member fails, the other surviving members have to do a lot of recovery/cleanup processing to free up locks and other data-sharing resources held by the failed member.

- **Coupling Facility structure recovery**

  Boost all systems participating in CF structure recovery processing, such as CF structure rebuild, duplexing failover, and re-duplexing. Recovering failed CF structures and their data can be a process that requires the participation of all systems that were using those CF structures, and can apply to many structures in cases like loss of a CF image.

- **Sysplex partitioning**

  Boost all surviving systems in the sysplex as they take on the additional workload of sysplex-partitioning-related recovery, after planned or unplanned removal of a system from the sysplex. When a system in the sysplex is removed, the surviving systems have to do more recovery processing to clean up after the failed system and free up resources that were held on the failed system.

With the z16, boosts for these additional recovery events are available.

- **SVC dump**

  Boost the system on which an SVC dump is being taken, to accelerate diagnostic capture and reduce the impact of dumping on the system while the dump is being taken. During the dump capture process, the entire system, and particular address spaces that are being dumped, are non-dispatchable for limited time periods as their memory is captured. The requirement for additional system memory resources during the dump capture and write processes can cause paging, page-stealing, and memory-shortage issues for other areas of the system.

  SVC dumps are not boosted by default. Use the CHNGDUMP command to set a minimum size threshold for boosting an SVC dump. For more information, see "Managing recovery process boost" on page 13.

- **Middleware region startup**

  Boost the system on which a middleware instance is being started or restarted, to expedite its startup and resource recovery processing. The boost applies to:

  – Any start or restart of an address space, including manual starts and starts initiated by automation or automatic restart manager (ARM)

  – Restart-in-place on the same system, or cross-system restarts on a different system. In the case of a cross-system restart of a middleware region, it is the boost configuration (that is, the WLM service definition classification rules) of the system where the restart is taking place that controls whether or not the restarted middleware gets a boost.

  – Planned recycle or failure restarts.

  An initial start of a middleware region is not boosted by recovery process boost if there is an IPL boost already active.

  In the case of a multi-step startup proc, only the first step is boosted.

  Middleware region startup is not boosted by default. Use classification rules in your WLM service definition to control that. For more information, see "Managing recovery process boost" on page 13.

- **HyperSwap configuration load**

  Boost to accelerate the process of loading or reloading HyperSwap configuration and policy information, and to reduce the system impact while the load is in progress. This is active by default.

Recovery events can overlap when a second recovery process boost occurs before a first one has used its entire boost period. If this happens, then the overlapping boosts are merged and z/OS extends the boost period to allow the full boost period duration for the overlapping recovery process. During a recovery

process boost period, WLM neither routes work away from the system (as it does during shutdown boost) nor routes work towards the system (as it does during IPL boost). Instead, WLM essentially ignores short-duration recovery boosts for workload routing purposes, because they are too short-term.

A boost class for recovery process boost appears in various system messages, SMF fields, ENF signals, z/OS Data Gatherer tables, and other z/OS APIs. For more information, see:

- "Messages" on page 25
- "SMF changes" on page 18
- "z/OS Data Gatherer changes" on page 18
- "Other system changes" on page 18

Managing recovery process boost

Recovery process boosts are managed internally by z/OS, with the operating system initiating the boosts as these recovery events take place, and only on the images that are actually participating in or affected by these events. Recovery process boost periods are started and ended by events controlled by the z/OS operating system. When initiating the recovery process boost, z/OS initiates whichever boost types (speed boost, zIIP boost, or both) are identified by the BOOST= parameter in IEASYSxx currently in effect for the image. During recovery process boost periods, any available program within the boosting partition may be executed on a zIIP when zIIP boost is active.

Dynamically enable or disable all recovery process boosts

You can dynamically enable or disable all recovery process boosts with the IEASRB proc, as follows:

- S IEASRB,[CLASS=RP,]REQ={DISABLE|D} to dynamically disable recovery process boosts
- S IEASRB,[CLASS=RP,]REQ={ENABLE|E} to dynamically enable recovery process boosts.

You can end an IPL or shutdown boost with the IEABE proc and start a shutdown boost with the IEASDBS proc. For more information, see Chapter 6, "Procs," on page 21.

Control boosts for recovery events

You can control boosts for recovery events as follows.

- **SVC dump**

  Whether or not to boost an SVC dump is determined by dump size. You set a minimum dump size threshold for boosting with the RPBMINSZ option of the CHNGDUMP SET,SDUMP command, as described below.

  SDUMP,RPBMINSZ=nnnnn|nnnnnG|NA
  Specifies the minimum estimated dump size in gigabytes for which a recovery process boost will be requested.

  – RPBMINSZ of 0 requests recovery process boost for all SVC dumps regardless of estimated dump size.
  – NA, for "not applicable", means the installation does not wish to request recovery process boost for SVC dumps.
  – RPBMINSZ is not supported on either CHNGDUMP RESET or CHNGDUMP DELETE.

  NA is the default.

  The following are examples of the CHNGDUMP command.

  – CHNGDUMP SET,SDUMP,RPBMINSZ=20G. This causes SVC dumps of 20GB or larger to be boosted.
  – CHNGDUMP SET,SDUMP,RPBMINSZ=0. This causes all SVC dumps to be boosted, regardless of size.
  – CHNGDUMP SET,SDUMP,RPBMINSZ=NA. This disables boosting of SVC dumps.

Use the DISPLAY DUMP,OPTIONS command to view information about the settings for RPBMINSZ in message IEE857I.

For more information, see CHNGDUMP command in *z/OS MVS System Commands* and Displaying dump options in *z/OS MVS System Commands*.

- **Middleware region startup**

Use your WLM service definition to control boosts for middleware instances that are being started or restarted. The default is that no address spaces are boosted – that is, no boosts are initiated for images on behalf of address spaces being started.

To control boosts for middleware region start and restart, you define a classification rule for subsystem type STC, specifying a value for the Boost attribute with the Boost field on the Modify Rules for the Subsystem Type panel. The following example illustrates the process for updating the service definition with ISPF.

```
  Subsystem-Type  Xref  Notes  Options  Help
 -----------------------------------------------------------------------
             Modify Rules for the Subsystem Type      Row 1 to 5 of
 Command ===> _____  SCROLL ===> CSR

 Subsystem Type . : STC        Fold qualifier names?   Y  (Y or N)
 Description  . . . IBM-defined subsystem type

 Action codes:  A=After     C=Copy        M=Move     I=Insert rule
                B=Before    D=Delete row  R=Repeat   IS=Insert Sub-rule
                                                      <=== More
         -------Qualifier--------        Boost
 Action   Type      Name     Start
 ____     1 TN      TV1*     ___         YES
 ____     1 TN      TV2*     ___         NO
 ____     1 TN      TOR      ___         YES
 ____     1 TN      AOR1     ___         NO
 ____     1 TN      AOR2     ___         NO
```

For STC work only, you can specify the following values:

NO
> The region does not initiate a recovery process boost when started or restarted. This is the default.

YES
> The region initiates a recovery process boost when started or restarted.

For all other subsystem types except STC, the **Boost** field is not applicable and contains N/A.

If an address space that matches a classification rule in the active policy with Boost=YES is started or restarted, a recovery process boost is initiated that provides short-term acceleration for the process. This boost follows the same rules as recovery process boosts provided by z/OS for sysplex recovery processes.

For more information, see Working with classification rules in *z/OS MVS Planning: Workload Management*.

Displaying information about recovery process boost usage

Use the DISPLAY IPLINFO,BOOST,STATE command to display information about the boosts. The output is message IEE258I. It includes information about which boosts are active. For recovery process boosts, it shows the requestor and the following additional information:

- Which boost(s) are active, time used and remaining, and, for recovery process boost, the identity of the requestor.
- Whether recovery process boosts are currently enabled or disabled.
- The time at which the most recent state change for this state occurred.
- The total allowed recovery process boost time per 24 hours (for zIIP boost).
- The amount of recovery process boost time that has been used within that 24 hour period (for zIIP boost).

- The total remaining recovery process boost time for the 24 hour period (for zIIP boost).
- The time until the recovery process boost amount will be refreshed to the total.

It also displays information about the recovery process boost total actual, potential, and potential-while-enabled usage (as if there had been no limit).

Note: With z/OS V2R3, a subset of this information is displayed, with message IEE257I.

Automation Considerations

The following messages support the Sysplex Recovery Boost enhancements:

- IEA682I Recovery process zIIP boost is active
- IEA683I Unable to complete activation of recovery process boosts
- IEA684I Recovery process boost(s) have ended due to error
- IEA685I Recovery process boost(s) not {started | extended}. Duration limit has been reached
- IEA686I Recovery process boost(s) have been extended
- IEA687I Recovery process boost requestor: <string>
- IEA688I *n* recovery process boost(s) ignored. Recovery process boosts are|were not enabled
- IEA689I Recovery process boosts are {enabled | disabled}
- IEE258I Boost State Boost class: {IPL | Shutdown | Recovery process | N/A} [Requestor: <string>] zIIP boost: {active with n transient zIIP cores | inactive} speed boost: {active | inactive} {Recovery Process Boosts: <recovery-process-boost-information>}
- IEE863I hh.mm.ss DUMP INFO [idr] text

The following changed messages have updates specific to Sysplex Recovery Boost enhancements:

- IEA671I Could not fully configure online <m>of the <n> intended {IPL | shutdown | recovery process} zIIP boost cores
- IEA672I {IPL | Shutdown | Recovery process} {zIIP | Speed} boost is not activated –rsn
- IEA674I Could not configure offline <m> of the <n> {IPL | Shutdown | recoveryprocess} zIIP boost cores
- IEA675I {IPL | Shutdown | Recovery process} zIIP boost is active with <n> transient zIIP cor
- IEA678I All {IPL | Shutdown | Recovery process} boosts have ended
- IEA681I {IPL | Shutdown | Recovery process} speed boost is active
- IEE174I (form 35 of 35) hh.mm.ss DISPLAY M [idr] PROCESSOR STATUS text
- IEE857I hh.mm.ss DUMP OPTIONS [idr] dt mode opt

Messages introduced with this functionality:

- IEA676I No IPL boosts will be activated
- IEA677I {IPL | Shutdown} {zIIP | speed} boost has ended due to error
- IEA680I {zIIP | speed} boost is not available
- IWM063I WLM POLICY WAS REFRESHED

IWM064I reasons:

- IWM064I BOOST ACTIVATED

  WLM processing on behalf of boost activation has completed.
- IWM064I BOOST ENDED

  WLM processing on behalf of boost end has completed.

If you want to automate something after all IPL boosts have ended, you can automate on the messages IEA676I and IEA678I, each of which indicates one of the two cases of "no boosts are still active". Note that these might have been issued before the automation program has started, in which case the

automation program would need to be configured to look for earlier messages. Of course, any time after the IPL boost ends, a recovery process boost might start for some reason, or a system shutdown boost might occur.

Some types of automation you might wish to consider:

- Activating the Temporary Capacity Record prior to shutdown, and then deactivating it after the recovery is complete.
- Dynamically changing LPAR weights as required during a shutdown or IPL boost, to better align guaranteed capacity and consumed capacity to mitigate boosted image(s) from expanding into white space capacity by using vertical lows.
- Using the IEASRB proc to dynamically enable or disable recovery process boosts at different times or in different workload conditions.
- Adding the starting of the IEASDBS proc to your existing shutdown automation.
- Changing the level of parallelism present in the workload at IPL (such as starting middleware regions during IPL) and shutdown (such as doing orderly shutdown of middleware). Automation may pace/throttle these activities to varying degrees; with Boost, less pacing / more parallelism may be desirable.
- Automating on the z/OS messages that are issued at start/end of boost periods to take whatever actions are appropriate.

IBM Z® System Automation or any ISV vendor automation product can be used to provide these automation capabilities.

For more information, see Chapter 6, "Procs," on page 21 and Chapter 7, "Messages," on page 25.

Chapter 5. Performance Considerations

For speed boost alone, the increase in processor speed is visible only to the LPAR being boosted, so there's no direct impact to other images on the CPC.

However, if you are taking advantage of zIIP boost, either by itself or in conjunction with speed boost, you may need to think about the impact zIIP boost will have on other LPARs in the CPC.

Configuring Processors During a Boost Period

Do not bring a processor offline or online during a boost, as you might not the get expected results. If you bring a processor offline during a boost, you might inadvertently bring processors offline that are part of the boost. If you bring a processor online, your intent will not persist beyond the boost, because any processor that boost processing brings online is considered transient and is brought offline at the end of the boost, regardless of whether there were configuration requests for that processor while the boost was active. Automation that brings a processor online or offline should wait until after an IPL boost has ended.

WLM changes

While the boost is in effect, any defined capacity and group capacity limits remain in effect. However, WLM can manage the system slightly differently than at regular non-boosted periods:

- Overachieving non-discretionary work will not be capped to allow for higher throughput of discretionary work; that is, during the boost periods the system behaves as if Deactivate Discretionary Goal Management had been defined as Yes in the service definition.
- Resource groups and tenant resource groups will not be capped on boosted systems. For resource groups with a sysplex-wide limit, the non-boosted systems will cap the resource group as if no consumption had taken place on the boosted systems.
- The system long-term average consumption is based on the general purpose processor consumption assuming standard processor rating. Consequently, both zIIP boost and speed boost will not directly contribute to the four-hour rolling average MSU consumption.
- CPU protection is assigned to critical work. That is, any single-period service class of importance 1 or 2 is implicitly set to CPU Critical which ensures that less important work will have a lower dispatching priority. When the boost periods ends, the CPU Critical option is reset to the state as defined in the currently active WLM policy.
- Intelligent Resource Director (IRD) will not take weight management actions for LPARs that are being boosted.

For IPL boost, the WLM Sysplex Routing services may start reducing the routing weight as the end of the IPL boost period approaches and before the system returns to its regular capacity. When required, the lead time can be influenced via the RTBELEADTIME parameter in the IEAOPTxx member. When shutdown boost begins, the boosted system may be eliminated from the routing recommendations, or a very small weight may be assigned.

During a recovery process boost period, WLM neither routes work away from the system (as it does during shutdown boost) nor towards the system (as it does during IPL boost). Instead, WLM essentially ignores short-duration recovery boosts for workload routing purposes, because they are too short-term.

WLM changes for middleware region startup recovery process boost

Use your WLM service definition to control boosts for middleware instances that are being started or restarted, as described in "Managing recovery process boost" on page 13.

With this function, the level of the WLM ISPF application changes from LEVEL035 to LEVEL038. See "WLM details" on page 67.

Other changes include:

- IWMDEXTR (Extract WLM service definition) includes a Boost field. See IWMDEXTR — Extract WLM service definition in *z/OS MVS Programming: Workload Management Services*.
- The IWMRQRY service is enhanced to provide an address space's Boost attribute. The address space related information being returned in the RQAE entry of IWMWRQAA is updated accordingly. See "IWMWRQAA information" on page 51.

For more information, see "Recovery process boost" on page 11.

SMF changes

A new SMF interval is started whenever a boost starts or ends. SMF 90-40 is generated when a boost event occurs (starting/stopping boost), and contains information about the boost.

SMF types 30, 70-1, 72-3, 89-1, 89-2, and 99-1 all include a boost information byte that tells you whether a boost is active, and if so, which type. During the boost, SMF records that contain capacity information, such as 30, 70-1, 72-3, and 89, reflect the unboosted capacity of the image, not the effective boosted capacity.

SMF type 79 includes the boost attribute for the address space.

z/OS also writes SMF type 90-40 records at the end of every 24-hour period, containing current aggregate boost time since IPL and internalized boost time over the previous 24 hours.

For details, see "SMF details" on page 54.

For more information on SMF see *z/OS MVS System Management Facilities (SMF)*.

z/OS Data Gatherer changes

z/OS Data Gatherer Monitor III includes a Boost value in the address space identification table (ERBASIG3).

For details, see "z/OS Data Gatherer details" on page 53.

Other system changes

ENF 84 signals when a boost is beginning or ending, along with the boost type. ENF 37 signals that a new SMF interval is happening due to a boost starting or stopping.

The SYSEVENTs REQASD and REQFASD are enhanced to provide an address space's Boost attribute. For more information, see Obtain address space related information (REQASD and REQFASD) in *z/OS MVS Programming: Authorized Assembler Services Reference SET-WTO*.

Interaction of shutdown boost and PRESCPU

By default, during IPL, z/OS configures the logical processors to match what is in the activation profile, so active CPs/zIIPs are online, while any reserved CPs/zIIPs are offline.

PRESCPU is an IEASYSxx option that allows you to persist any logical processor changes you've made to an image across IPL boundaries. With PRESCPU enabled, z/OS won't make any changes to the online or offline CPs/zIIPs during IPL, so they match whatever was configured when the system went down. However, this means there's a potential interaction with a zIIP shutdown boost. If you start a shutdown boost, have not disabled zIIP boost, and you have reserved zIIPs that have physical backing, those zIIP are brought online to assist with shutdown processing. If the system is then stopped prior to the end of the shutdown boost, those zIIPs are still configured online.

So when the system is then IPLed, if PRESCPU is configured, those zIIPs are online from the beginning, not brought online by zIIP boost. Therefore, once the boost ends, they won't automatically be brought offline. So you may end up with more zIIPs online than you'd prefer.

If you are currently using PRESCPU, you should determine if it is something you wish to continue using in light of the above behavior. If you do decide to continue using it, you may wish to update your automation to end boosts by issuing the START IEABE system command to end the boosts before shutdown completes.

Software License Charge and Chargeback Implications

System Recovery Boost is designed to cause no impact to your IBM software licensing charges. During the boost period, WLM and SRM will record the unboosted capacity of the image in all billing-related records. For clients who are using subcapacity licensing, the pricing records will not record an increase in the available capacity, and thus will not increase your 4-hour rolling average. For clients paying for MSU consumption pricing, consumption on GP processors accrues as normal, but there is no net increase in consumption, as any work being done during boost would have been done before, just more slowly. For clients paying for full capacity, the total recorded capacity of the CEC doesn't change, and thus the bill will remain the same.

Stand-alone dump

Stand-alone dump is single-threaded and unable to use zIIP engines. As a result, it uses only the speed boost functionality. How much of an improvement you see is difficult to predict; a lot of the work stand-alone dump does involves writing data to DASD or tape, and that isn't impacted by the speed of the CPU.

Note that in production, stand-alone dump takes advantage of speed boost by default, once PTF OA57849 is installed and the stand-alone dump program (SADMP) is regenerated.

The best way to accelerate stand-alone dumps is to use parallel output to multiple I/O devices, a capability unrelated to System Recovery Boost that is described in Planning a multivolume stand-alone dump data set in *z/OS Problem Management*.

Chapter 6. Procs

This chapter describes procs that you can use with System Recovery Boost.

For more information, see START command in *z/OS MVS System Commands*.

Stopping IPL and shutdown boosts (IEABE)

Use the START IEABE command to end IPL and shutdown boosts. IEABE does not stop a recovery process boost. When an IPL or a shutdown boost is stopped, the boost ends and cannot be restarted. When a shutdown boost is stopped using IEABE, the system continues shutting down, and WLM continues recommending to route sysplex workload away from this system.

Syntax

The command syntax is:

```
S IEABE
```

Return codes

The return codes from the IEABE procedure are:

0
> Success

4
> No IPL or shutdown boosts were active.

6
> Recovery process boost is active. IEABE does not apply.

Starting the shutdown boosts (IEASDBS)

Use the START IEASDBS command to start the shutdown boost. IEASDBS can only be used once per IPL, and is used as part of a system shutdown process. Once IEASDBS has been invoked, WLM workload routing will recommend routing sysplex workload away from this system permanently. IEASDBS will stop any recovery process boost in progress, before starting the shutdown boost.

Syntax

The command syntax is:

```
S IEASDBS[,CHECKHD={YES|NO}]
```

Parameters

The parameters are:

CHECKHD=YES
> If zIIP boost is expected but the system is not HiperDispatch=YES, then no boosts will start.

CHECKHD=NO

Boost processing starts regardless of HiperDispatch state. The zIIP boost will be activated only when HiperDispatch=YES.

Return codes

The return codes from the IEASDBS procedure are:

0

Success

4

No shutdown boost was done. Neither zIIP boost nor speed boost applies.

16

IEASDBS may only be successfully invoked once per IPL, and it has previously been invoked on this IPL.

20

Bad parameter (not CHECKHD=YES/NO)

24

CHECKHD=YES, and zIIP boost is requested, however, the system is not HiperDispatch=YES.

32

The command is being used before IPL boost started.

Enabling and disabling recovery process boosts (IEASRB)

Use the START IEASRB command to enable and disable recovery process boosts. Enabling recovery process boosts does not start a recovery process boost, it just enables them to be started when triggering events occur. Disabling recovery process boosts does not stop an active recovery process boost, it just prevents new ones from being started or the current one from being extended.

Syntax

The command syntax is:

```
S IEASRB[,CLASS=RP],REQ={ENABLE|E|DISABLE|D}
```

Parameters

The parameters are:

CLASS=RP

Specifies that this command enables/disables recovery process boosts. This is the default.

REQ=ENABLE|E

Enable recovery process boosts. When RP boosts are enabled, any new recovery process boost request will activate boost(s) according to the BOOST parameter.

REQ=DISABLE|D

Disable recovery process boosts. When recovery process boosts are disabled, no new recovery process boosts will be started and an active recovery process boost will not be extended. A currently active recovery process boost will be allowed to complete.

Return codes

The return codes from the IEASRB procedure are:

0

CLASS/REQ operand is accepted.

4

For CLASS=RP,REQ=ENABLE/E recovery process boosts are already enabled. For CLASS=RP,REQ=DISABLE/D recovery process boosts are already disabled.

8

CLASS/REQ operand is not valid.

12

Recovery process boosts are not available

Chapter 7. Messages

This chapter describes the messages that are affected by System Recovery Boost.

Messages

IEA671I **Could not fully configure online *m* of the *n* intended {IPL | shutdown | recovery process} zIIP boost cores**

Explanation

The system intended to configure online *n* zIIP boost cores but was unable to do so. One or more cores either was not configured online at all or did not have the intended number of threads configured online.

System action

The system continues processing. The zIIP boost might not be as effective as intended.

Operator response

None.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA672I **{IPL | Shutdown | Recovery process} {zIIP | SPEED} boost is not activated - *rsn***

Explanation

Via the BOOST=ZIIP or BOOST=SPEED system parameter, the customer asked for a specific boost, but the machine does not support this boost. Within the message text, *rsn* is one of the following:

unable to identify zIIPs
For the zIIP boost, the system was unable to determine which zIIPs to configure online for the zIIP boost.

on a dedicated logical partition
The zIIP boost requires a shared logical partition.

no zIIPs
For the zIIP boost, there are no zIIPs configured online or available to be configured online.

not HIPERDISPATCH=YES
The zIIP boost requires HIPERDISPATCH=YES (via the IEAOPT*xx* parmlib member).

unable to complete activation
The process used to activate the boost did not complete successfully.

processor is already full speed
For the speed boost, the standard CP is already full speed.

System action

The system continues, with the specified boost not active.

Operator response

None.

Source

Supervisor Control.

Module

IEAVNP09, IEAVEMMT

Routing code

2, 10

Descriptor code

12 (IEAVNP09)

IEA674I **Could not configure offline *m* of the *n* {IPL | shutdown | recovery process} zIIP boost cores**

Explanation

Could not configure offline *m* of the *n* {IPL | Shutdown} zIIP boost cores.

m
    The number of processors that could not be configured offline.

n
    The system intended to configure offline *n* zIIP boost cores but was unable to do so. One or more cores was not configured offline.

System action

The system continues.

Operator response

None.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA675I	**{IPL	shutdown	Recovery process} zIIP boost is active with *n* transient zIIP cores**

Explanation

The zIIP boost has been activated. 0 or more zIIP cores (indicated by the fill-in *n*) were configured online as part of the boost processing and will be configured offline once the boost ends.

System action

The system continues.

Operator response

None needed. If the customer is using the PRESCPU option and their previous IPL ended while the boost was active, their next IPL would consider these cores to be part of the normal configuration. Thus, the customer might choose to configure offline this

number of zIIPs at completion of the next IPL to get back to the desired configuration.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2

Descriptor code

None.

IEA676I	**No IPL boosts will be activated**

Explanation

Either the machine does not have the capability to support a boost or the customer has requested via the BOOST=NONE system parameter not to activate any boost or no IPL boost could be activated.

System action

The system continues.

Operator response

None needed. This message, along with message IEA678I, can be automated upon if there is a need to delay processing until there cannot be any IPL boosts still active.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2

Descriptor code

None.

IEA677I	**{IPL	shutdown} {zIIP	speed} boost has ended due to error**

Explanation

An error occurred and the system needed to end the identified boost.

System action

The boost ends and the system continues.

Operator response

None.

System programmer response

Report the problem to IBM.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA678I　　　　**All {IPL | shutdown | recovery process} boosts have ended**

Explanation

All boosts that were active have ended.

System action

The system continues.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2

Descriptor code

None.

IEA680I　　　　**{zIIP | Speed} boost is not available**

Explanation

Via the BOOST=ZIIP or BOOST=SPEED system parameter, the customer asked for a specific boost, but the machine dos not support this boost.

System action

The system prompts for a re-specification of the BOOST system parameter.

Operator response

None.

Source

Supervisor Control.

Module

IEAVNP09

Routing code

2, 10

Descriptor code

12

IEA681I　　　　**{IPL | shutdown | Recovery process} speed boost is active**

Explanation

The speed boost is now active.

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVNP09, IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA682I	Recovery process zIIP boost is active

Explanation

The recovery process zIIP boost is now active.

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2

Descriptor code

None.

IEA683I	Unable to complete activation of recovery process boosts

Explanation

Could not activate recovery process boost cores.

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA684I	Recovery process boost(s) have ended due to error

Explanation

An error occurred and the system needed to end the identified boost(s).

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA685I	Recovery process boost(s) not {started | extended}. Duration limit has been reached

Explanation

The duration limit for recovery process boosts has been exceeded. No further recovery process boosts will be started or extended until the pool of recovery boost time is replenished.

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA686I **Recovery process boost(s) have been extended**

Explanation

A new recovery process boost request was received while recovery process boost was already active. The boost end time is extended by an amount specific to the requestor.

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA687I **Recovery process boost requestor: *<string>***

Explanation

Displayed after recovery process boost start (IEA675I and/or IEA681I) and recovery process boost extend (IEA686I).

In the message text:

<string>
  The requestor shown is the requestor associated with the "stop ETOD" for the boost event (so could be the requestor for "start" or the requestor for "extend"). The potential values for *<string>* are:

  - Not identified
  - Sysplex Partitioning
  - CF Structure Recovery
  - CF Datasharing Member Recovery
  - Hyperswap
  - SVC Dump
  - Middleware Region Startup
  - Hyperswap Config Load

System action

The system continues processing.

Operator response

None needed.

Source

Supervisor Control.

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA688I ***n* recovery process boost(s) ignored. Recovery process boosts {are | were} not enabled**

Explanation

Recovery process boosts had been disabled by the use of START IEASRB,CLASS=RP,REQ=DISABLE. *n* recovery process boost requests were received and ignored. The message is issued upon the first not-processed recovery process boost request after disablement, upon subsequent recovery process boost request(s) when not within an hour of a previous issuance of the IEA688I message, and upon re-enablement if there were interim not-processed recovery process boost requests not yet reported upon. Within the message text:

n

  The number of recovery process boost requests not honored since recovery process boosts were disabled or since the last time IEA688I was issued.

System action

The system continues processing.

Operator response

If recovery process boosts should not be disabled, use START IEASRB,CLASS=RP,REQ=ENABLE to enable recovery process boosts.

Source

Supervisor Control

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEA689I	Recovery process boosts are {enabled | disabled}

Explanation

Recovery process boosts have been enabled or disabled by the use of START IEASRB with (for enable) CLASS=RP,REQ=ENABLE or (for disable) CLASS=RP,REQ=DISABLE. When disabled, no further recovery process boosts will be started or extended for this IPL until recovery process boosts are re-enabled.

The display for D IPLINFO,BOOST,STATE will show the current enablement/disablement state for recovery process boosts, and the time at which that state was set.

System action

The system continues processing.

Operator response

If recovery process boosts should not be disabled, use START IEASRB,CLASS=RP,REQ=ENABLE to enable recovery process boosts.

Source

Supervisor Control

Module

IEAVEMMT

Routing code

2, 10

Descriptor code

None.

IEE174I (form 22 of 35)	*hh.mm.ss* DISPLAY M [*idr*] PROCESSOR STATUS *text*

Explanation

Where *text* is:

```
ID          CPU      SERIAL
cpuid     wst       ser_no
cpuid     wst       ser_no

CPC ND = tttttt.nnn.mmm.pp.sssssssss
CPC SI =
tttt.nnnnnnnnnnnnnnnn.mmmmmmmmmmmmmmmm.pppp.ssss
ssssssssssss
        Model: oooooooooooooooo
CPC ID = ii
CPC NAME = cpc_name
CPC IS RUNNING AT dd% OF NORMAL EFFECTIVENESS
LP NAME = lp_na      LP ID = jj
CSS ID = cc
MIF ID = m

+ ONLINE    - OFFLINE    W WLM-MANAGED
N NOT AVAILABLE

[A APPLICATION ASSIST PROCESSOR]
[I INTEGRATED INFORMATION PROCESSOR]
[B BOOST (TRANSIENT) zIIP]
CPC ND CENTRAL PROCESSING COMPLEX NODE
DESCRIPTOR
CPC SI SYSTEM INFORMATION FROM STSI INSTRUCTION
CPC ID CENTRAL PROCESSING COMPLEX IDENTIFIER
CPC NAME CENTRAL PROCESSING COMPLEX NAME
LP  NAME LOGICAL PARTITION NAME
LP  ID LOGICAL PARTITION IDENTIFIER
CSS ID CHANNEL SUBSYSTEM IDENTIFIER
MIF ID MULTIPLE IMAGE FACILITY IMAGE IDENTIFIER
```

A reconfiguration display request (a DISPLAY M=CPU command or an internal request) asked the system to display the status of selected central processors. When you issue the DISPLAY M=CPU command from a PR/SM partition, the system displays the status for the logical processors defined to the partition.

The system information presented on the CPC SI line reflects any dynamic upgrades that have been performed. The information presented on the CPC ND and CPC ID lines remain unchanged across any such upgrades.

In the message text:

cpuid
　　The processor identifier.

wst
　　The state of the processor, with each letter representing a different state:

　　w
　　　　When the processor is being managed by WLM, this will be "w", otherwise it will be blank.

　　s
　　　　The status of the processor, which can be one of the following:

　　　　+
　　　　　　The processor is online.

　　　　-
　　　　　　The processor is offline.

　　　　N
　　　　　　The processor is neither online nor able to be configured online.

　　t
　　　　The type of the processor, which can be one of the following:

　　　　(a blank)
　　　　　　The processor is a standard CP.

　　　　A
　　　　　　The processor is an IBM Z Application Assist Processor.

　　　　I
　　　　　　The processor is an IBM Z Integrated Information Processor.

　　　　B
　　　　　　This is a zIIP added due to boost processing.

CPC ND = *tttttt.nnn.mmm.pp.sssssssss*
　　The central processing complex node descriptor, in EBCDIC, where:

　　tttttt
　　　　The type number.

nnn
　　The model number of the processor at the last IML/POR.

　　Note: If the processor is concurrently upgraded to a new model, this number will not reflect the new model until the next processor IML/POR.

mmm
　　The manufacturer of the processor.

pp
　　The plant of manufacture.

sssssssssss
　　The sequence number.

dd
　　The approximate percentage, in decimal, of the actual effectiveness compared to the normal effectiveness of the CPC. A reduction in the current capability of the central processing complex (CPC) has been detected.

CPC SI = *text02*
　　text02 is

```
tttt.nnnnnnnnnnnnnnnn.mmmmmmmmmmmmmmmm.pppp.s
sssssssssssssss
Model: oooooooooooooooo
```

The system information from the STSI instruction, in EBCDIC, where

tttt
　　The type number.

nnnnnnnnnnnnnnnn
　　The model-capacity identifier.

　　Note: The model-capacity identifier is updated after a concurrent upgrade.

mmmmmmmmmmmmmmmm
　　The manufacturer of the processor.

pppp
　　The plant of manufacture.

ssssssssssssssss
　　The sequence code.

oooooooooooooooo
　　The model number of the processor.

　　Note: If the processor is concurrently upgraded to a new model, the model number in field oooooooooooooooo will reflect the new model without a processor IML/POR.

　　Note: The line that begins "Model:" will only be displayed if model number oooooooooooooooo differs from model number/model-capacity identifier nnnnnnnnnnnnnnnn.

CPC ID = *ii*
 The central processing complex node identifier, in binary.

CPC NAME = *cpc_name*
 The central processing complex name, in EBCDIC.

LP NAME = *lp_na*
 The logical partition name, in EBCDIC.

LP ID = *jj*
 The logical partition identifier, in binary.

CSS ID = *cc*
 The logical channel subsystem identifier, in binary.

MIF ID = *m*
 The multiple image facility identifier, in binary. The MIF ID will only appear if you are running in LPAR mode.

Operator response

None.

System programmer response

None.

Routing code

-

Descriptor code

4

IEE174I (form 35 of 35)	*hh.mm.ss* DISPLAY M [*idr*] PROCESSOR STATUS *text*

Explanation

Where text is:

```
CORE STATUS: HD=h  MT=mm  [MODE: CP=cn
zIIP=zin]

ID    ST    ID RANGE   VP ISCM  CPU THREAD
STATUS
cId   wst   tIdL-tIdH  vp xxxx  tt
cId   wst   tIdL-tIdH  vp xxxx  tt
cId   wst   tIdL-tIdH  vp xxxx  tt
CPC ND = tttttt.nnn.mmm.pp.ssssssssss

CPC SI =
tttt.nnnnnnnnnnnnnnnn.mmmmmmmmmmmmmmmm.pppp.ssss
ssssssssssss
        Model: oooooooooooooooo
CPC ID = ii
CPC NAME = cpc_name
CPC IS RUNNING AT dd% OF NORMAL EFFECTIVENESS
LP NAME = lp_na     LP ID = jj
CSS ID = cc
MIF ID = m


+ ONLINE    - OFFLINE    W WLM-MANAGED
N NOT AVAILABLE          / MIXED STATE
```

```
[A APPLICATION ASSIST PROCESSOR]
[I       INTEGRATED INFORMATION PROCESSOR
(zIIP)]
[B       BOOST (TRANSIENT) zIIP]
CPC ND CENTRAL PROCESSING COMPLEX NODE
DESCRIPTOR
CPC SI SYSTEM INFORMATION FROM STSI INSTRUCTION
CPC ID CENTRAL PROCESSING COMPLEX IDENTIFIER
CPC NAME CENTRAL PROCESSING COMPLEX NAME
LP  NAME LOGICAL PARTITION NAME
LP  ID LOGICAL PARTITION IDENTIFIER
CSS ID CHANNEL SUBSYSTEM IDENTIFIER
MIF ID MULTIPLE IMAGE FACILITY IMAGE IDENTIFIER
```

A reconfiguration display request (a DISPLAY M=CORE command or an internal request) asked the system to display the status of selected cores. When you issue the DISPLAY M=CORE command from a PR/SM partition, the system displays the status for the logical cores. The system information presented on the CPC SI line reflects any dynamic upgrades that have been performed. The information presented on the CPC ND and CPC ID lines remain unchanged across any such upgrades.

In the message text:

h
 Indicates whether the system is enabled for HIPERDISPATCH (Y) or not (N).

mm
 The maximum MT mode that can be supported by both the hardware and this IPL of z/OS.

cn
 The MT mode for standard CP cores. This can be modified by using the MT_CP_MODE parameter in the IEAOPTxx member. For more information, see IEAOPTxx MT_CP_MODE in *z/OS MVS Initialization and Tuning Reference*.

zin
 The MT mode for IBM Z Integrated Information Processors. This can be modified by using the MT_ZIIP_MODE parameter in the IEAOPTxx member. For more information, see IEAOPTxx MT_ZIIP_MODE in *z/OS MVS Initialization and Tuning Reference*.

cId
 The core identifier.

wst
 The state of the core, with each letter representing a different state:

 w
  When the core is being managed by WLM, this will be "W", otherwise it will be blank.

 s
  The status of the core, which can be one of the following:

  • + indicates the core is online.

- - indicates the core is offline.
- / indicates the core is in a mixed state, because the core is online but the threads currently online are unexpected with the MT mode for this core type. This state can occur in certain system abnormal conditions. You can generally get out of this state by reconfiguring the core to its desired state. For more information, see IEAOPTxx MT_xxxx_MODE in *z/OS MVS Initialization and Tuning Reference*.
- N indicates the core is neither online nor able to be configured online.

t

The type of the core, which can be one of the following:

- (a blank) – the core is a standard CP.
- A – The core is an IBM Z Application Assist Processor.
- I – The core is an IBM Z Integrated Information Processor.
- B – This is a zIIP added due to boost processing.

tIdL

The lowest CPU address of a thread that belongs to this core.

tIdH

The highest CPU address of a thread that belongs to this core.

v

The HIPERDISPATCH vertical-ness of the core:

- H – The core is classified as a vertical high core.
- M – The core is classified as a vertical medium core.
- L – The core is classified as a vertical low core.

p

Indicates whether the core is parked (P) or unparked (blank).

xxxx

The interrupt subclass mask for the core.

t

The state of each thread that belongs to this core. There are *n* visible thread states, where *n* = (*tIdH-tIdL*)+1 and is OS and model dependent. The CPU ID for the first thread is *tIdL*. The state can be one of the following:

- + indicates the thread is online due to the current MT mode for this core type.
- - indicates the thread is offline due to the current MT mode for this core type.

- N indicates the thread is offline and expected to be offline due to the current MT mode for this core type. For more information, see IEAOPTxx MT_xxxx_MODE in *z/OS MVS Initialization and Tuning Reference*.

CPC ND = *tttttt.nnn.mmm.pp.sssssssss*

The central processing complex node descriptor, in EBCDIC, where:

tttttt

The type number.

nnn

The model number of the processor at the last IML/POR.

Note: If the processor is concurrently upgraded to a new model, this number will not reflect the new model until the next processor IML/POR.

mmm

The manufacturer.

pp

The plant of manufacture.

sssssssssss

The sequence number.

dd

The approximate percentage, in decimal, of the actual effectiveness compared to the normal effectiveness of the CPC.

Indicates that a reduction in the current capability of the central processing complex (CPC) has been detected.

CPC SI = *text02*

Where *text02* is:

```
tttt.nnnnnnnnnnnnnnnn.mmmmmmmmmmmmmmmm.pppp.s
ssssssssssssssss
        Model: oooooooooooooooo
```

This is the system information from the STSI instruction, in EBCDIC, where:

tttt

The type number.

nnnnnnnnnnnnnnnn

The model-capacity identifier.

Note: The model-capacity identifier is updated after a concurrent upgrade.

mmmmmmmmmmmmmmmm

The manufacturer.

pppp

The plant of manufacture.

ssssssssssssssss

The sequence code.

oooooooooooooooo
> The model number.

Note: If the core is concurrently upgraded to a new model, the model number in field *oooooooooooooooo* will reflect the new model without a core IML/POR.

Note: The "Model:" line is displayed only if the model number *oooooooooooooooo* differs from the model number/model-capacity identifier *nnnnnnnnnnnnnnnn*.

CPC ID = *ii*
> The central processing complex node identifier, in binary.

CPC NAME = *cpc_name*
> The central processing complex name, in EBCDIC.

LP NAME = *lp_na*
> The logical partition name, in EBCDIC.

LP ID = *jj*
> The logical partition identifier, in binary.

CSS ID = *cc*
> The logical channel subsystem identifier, in binary.

MIF ID = *m*
> The multiple image facility identifier, in binary. The MIF ID appears only if you are running in LPAR mode.

System action

None.

Operator response

None.

System programmer response

None.

Module

IEEMPDM

Routing code

-

Descriptor code

4

IEE257I   **Boost State**
          Boost class: {IPL | Shutdown | Recovery process | *N/A*}
           [Requestor: *<string>*]

---

                zIIP   **boost: {active with *n* transient zIIP cores | inactive}**
                speed boost: {active | inactive}

Explanation

In response to DISPLAY IPLINFO,BOOST,STATE, this shows the state of the boosts.

Note: With the PTFs for APAR OA60660, this message is superseded by IEE258I.

In the message text:

***N/A* for Not Applicable**
> This is shown for the boost class when no boost is active.

<string>
> **Requestor: *<string>*** is displayed only for Recovery Process boost. The requestor shown is the requestor associated with the "stop ETOD" for the boost event (so could be the requestor for "start" or the requestor for "extend"). The potential values for *<string>* are:
> - Not identified
> - Sysplex Partitioning
> - CF Structure Recovery
> - CF Data-sharing Member Recovery
> - Hyperswap

n
> Within "with *n* transient zIIP cores", *n* is the number of cores.

System action

The system continues processing.

Source

Master scheduler

Module

IEECB985

Routing code

*

Descriptor code

5

IEE258I   *hh.mm.ss* **Boost State**

Explanation

```
IEE258I hh.mm.ss Boost State
 Boost class: {IPL | Shutdown | Recovery
process | N/A}
  [Requestor: string]
 zIIP boost: {active with n transient zIIP
cores | inactive}
 Speed boost: {active | inactive}

[Recovery Process Boosts: {Enabled|Disabled} at
xx.yy.zz on mm/dd/yyyy]

[Recovery Process Boost Usage Information is
not available]
[zIIP  boost:  Total Available: mmmm:ss  Used:
mmmm:ss  Remaining: mmmm:ss
 Speed boost:  Total Available: mmmm:ss  Used:
mmmm:ss  Remaining: mmmm:ss

 Total Available time will be refreshed in
hh:mm:ss]

[Recovery Process Boost Usage Since IPL
  Actual: hhhhh:mm:ss Potential_E: hhhhh:mm:ss
Potential: hhhhh:mm:ss]
```

This message is issued in response to a DISPLAY IPLINFO,BOOST,STATE command, and displays information about System Recovery Boost.

In the message output:

hh.mm.ss
The time in hours (00-23), minutes (00-59), and seconds (00-59) of the DISPLAY IPLINFO,BOOST,STATE command .

N/A
Indicating not applicable, this is shown for the boost class when no boost is active.

Requestor: string
The requestor associated with the time the boost will end (so could be the requestor for "start" or the requestor for "extend"). Displayed only for recovery process boost. The potential values for string are:

- Not identified
- Sysplex Partitioning
- CF Structure Recovery
- CF Datasharing Member Recovery
- Hyperswap
- SVC Dump
- Middleware Region Startup
- Hyperswap Config Load

n
Within "with *n* transient zIIP cores", *n* is the number of cores.

Recovery Process Boosts {Enabled|Disabled} at xx.yy.zz on mm/dd/yyyy
This shows whether recovery process boosts are enabled or disabled overall, and when that status

became effective. Since already-active recovery process boosts remain active upon a disablement request, you might see recovery process boosts being active but the overall state of recovery process boosts being disabled. *xx.yy.zz* are the hours, minutes, and seconds and *mm/dd/yyyy* are the month, day, and year.

Note: The format of the time and date is configurable based on location or preference. For example, "xx.yy.zz" can be changed to "xx:yy:zz" and, similarly, "mm/dd/yyyy" can be changed to "yyyy/mm/dd" or "dd/mm/yyyy."

Recovery Process Boost Usage Information
This area is not available with a z15 or lower machine.

Total Available: mmmm:ss
Total allowed recovery process boost time per 24 hours, *mmmm* is the number of minutes, *ss* is the number of seconds. The first one or two leading digits can be displayed as blanks if zero.

Used: mmmm:ss
The amount of recovery process boost time that has been used within that 24 hour period, *mmmm* is the number of minutes, *ss* is the number of seconds. The first one or two leading digits can be displayed as blanks if zero.

Remaining: mmmm:ss
The total remaining recovery process boost time for the 24 hour period, *mmmm* is the number of minutes, *ss* is the number of seconds. The first one or two leading digits can be displayed as blanks if zero.

in: hh:mm:ss
The hours, minutes, seconds until the recovery process boost amount remaining will be refreshed to equal the "total available", and the "amount used" will be reset to zero.

Recovery Process Boost Usage Since IPL
This area displays information about the active recovery process boost since the beginning of the IPL. This area is available only when recovery process boosts are supported.

Actual: hhhh:mm:ss
The hours, minutes, seconds of active recovery process boost, since the beginning of the IPL (the value is not reset every 24 hours). The first digits can be displayed as zero. At least two digits are always displayed.

Potential_E: hhhh:mm:ss

The hours, minutes, seconds of recovery process boost that would have been active

if there were no duration limit per 24 hours, while recovery process boosts are Enabled, and the value counts from the beginning of the IPL (the value is not reset every 24 hours). The evaluation of whether or not to add to this accumulated value is made at the time that a boost extends or ends. The first digits can be displayed as blanks if zero. At least two digits are always displayed.

Potential: *hhhh:mm:ss*
The hours, minutes, seconds of recovery process boost that would have been active if there were no duration limit per 24 hours (whether recovery process boosts are Enabled or Disabled), since the beginning of the IPL (the value is not reset every 24 hours). The first digits can be displayed as blanks if zero. At least two digits are always displayed.

System action

The system continues processing.

Source

Master scheduler

Module

IEECB985

Routing code

*

Descriptor code

5

IEE857I   *hh.mm.ss* **DUMP OPTIONS [***idr***]** *dt mode opt*

Explanation

The system issues this message in response to a DISPLAY DUMP,OPTIONS command. It is useful after you enter a CHNGDUMP command, to show the current system dump options and how they will be used.

In the message text:

hh.mm.ss
The time when the dump was written, in hours (00 through 23), in minutes (00 through 59), and in seconds (00 through 59).

idr
A 3-digit decimal identifier used with the CONTROL C,D command to cancel status displays either:

- Written on typewriter or printer consoles
- Displayed in-line (not in a display area) on display (CRT) consoles

This identifier does not appear when the display is presented in a display area on a display console.

dt
The dump type, which is one of the following:

SYSABEND-

SYSMDUMP-

SYSUDUMP-

SDUMP-

ABDUMP-

The message lists each dump type on a separate line with its corresponding options.

mode
The dump mode, which describes how the system options are applied to each dump request of this dump type:

ADD OPTIONS
Add options.

ADD PARMLIB OPTIONS
The same as ADD OPTIONS except that it also indicates that the option list is the same as at initial program load (IPL).

OVERRIDE WITH
Override with.

ADD NO OPTIONS
There are no system dump options to be added to the dump request.

IGNORE DUMP REQUESTS
The NODUMP keyword was specified on a previous CHNGDUMP command. No options are listed following the last two modes.

opt
List of the current dump options, which the system will add to, or use to override the options on each dump request for the dump type.

Here is an example of a response to the **DISPLAY DUMP,OPTIONS** command. Note that the dump type **SDUMP-** now includes the recovery process boost minimum SVC dump size information in **RBPMINSZ**:

```
IEE857I hh.mm.ss DUMP
OPTION
  SYSABEND- ADD PARMLIB OPTIONS
SDATA=(LSQA,TRT,CB,ENQ,DM,IO,ERR,SUM),

PDATA=(SA,REGS,LPA,JPA,PSW,SPLS)

  SYSUDUMP- ADD PARMLIB OPTIONS SDATA=(SUM), NO
```

```
PDATA OPTIONS
  SYSMDUMP- ADD PARMLIB OPTIONS
(NUC,SQA,LSQA,SWA,TRT,RGN,SUM)
  SDUMP- ADD OPTIONS
(LSQA,TRT,XESDATA),TYPE=(XMEMT),


BUFFERS=00000000K,MAXSPACE=00002000M,

                          MSGTIME=99999
MINUTES,MAXSNDSP=015 SECONDS,

AUXMGMT=ON ,DEFERTND=NO ,OPTIMIZE=NO ,

                          RPBMINSZ=NA|
nnnnnG,MAXTNDSP=(,,)
SECONDS
        SYSFAIL NO STRLIST
OPTIONS
  ABDUMP- TIMEENQ=0240 SECONDS
```

In the sample output, the **SDUMP-** options are:

SDUMP,BUFFERS=*nnnn*K or *nnn*M
Provides a **target value** of real storage frames to be reserved for the exclusive use of SVC dump processing. The value can be expressed in kilobytes (0K to 9999K) or in megabytes (0M to 999M). The default is 0K. Depending on real storage utilization, the target value might be different from the actual number of frames available by the time an SVC dump occurs. The value is limited to 25% of the real storage frames available on the system. Check the value established using the DISPLAY DUMP,OPTIONS operator command.

A large BUFFERS value can improve the performance of collecting SVC dump data; however, it tends to negatively impact the general system performance, because it might reduce the number of real storage frames available to other applications.

SDUMP,MSGTIME=*yyyyy*
Specifies how long message IEA793A appears on the console, where *yyyyy* is a number of minutes from 0 — 99999. The default is 99999. When the system deletes the message, it also deletes the captured dump.

You cannot delete this option with CHNGDUMP DEL. To change the value of MSGTIME, issue the CHNGDUMP command in the SET mode with a new value. If you change the MSGTIME value after the message IEA793A appears, the new value will be in affect immediately. If you set the MSGTIME value to 0, the system will not issue the message and it deletes the captured dump.

SDUMP,AUXMGMT=<u>ON</u> or OFF
Specifies when SDUMP data captures should stop.

<u>ON</u>
No new dumps are allowed when auxiliary storage usage reaches 50%. New dumps are allowed again only after the auxiliary storage

usage drops below 35%. Current SDUMP data capture stops when auxiliary storage usage exceeds 68%, generating a partial dump.

For systems where large SVC dumps are typically generated, it is suggested to set MAXSPACE as 8000 megabytes.

OFF
SVC dump virtual storage management is under control of the MAXSPACE limitations. Dumps in progress are stopped when MAXSPACE is exceeded, or when auxiliary storage utilization exceeds 85%. See the "Obtaining SVC dumps" topic in *z/OS MVS Diagnosis: Tools and Service Aids* for more discussion about using the AUXMGMT and MAXSPACE keywords.

Notes:

1. The system always IPLs with the default of AUXMGMT=ON. This increases the availability prospects of a system. To change this default, the installation must use the CHNGDUMP SET , SDUMP , AUXMGMT=OFF command after the system IPLs (for example, using a COMMNDxx parmlib member).

2. Once SVC dump processing has detected a shortage, the auxiliary storage utilization must drop below 35% before new SVC dump requests will be honored. The condition cannot be removed by simply changing the setting of AUXMGMT from ON to OFF.

SDUMP,RPBMINSZ=nnnnn | nnnnnG | NA
The **RPBMINSZ=nnnnn | nnnnnG | NA** option allows installations to set a minimum dump size to trigger a recovery process boost request for SVC dumps.

nnnnn|nnnnnG are gigabyte values from 1 to 99999 (the "G" suffix is optional). No request will be made for dumps with an estimated size smaller than that value. A value of 0 (zero) results in the recovery process boost request being made for all SVC dump sizes. **NA** (the default) means that no request will be made.

Note: RPBMINSZ is not supported on **CHNGDUMP RESET** or **CHNGDUMP DELETE**.

System action

The system continues processing.

Operator response

Compare the options displayed with those desired. Use the CHNGDUMP command to make any changes needed.

Source

Recovery termination manager (RTM)

Module

IEECB912

Routing code

#

Descriptor code

5,8,9

IEE863I *hh.mm.ss* **DUMP INFO [***idr***]**

Explanation

```
 IEE863I hh.mm.ss DUMP INFO [idr]
  DMP# DATE      TIME
EST.SZ(G)CAP.SZ(G)DURATION #A/S
  nnn mm/dd/ccyy hh:mm:ss ggggg.gg ggggg.gg
hh.mm.ss nn [type]
  nnn mm/dd/ccyy hh:mm:ss ggggg.gg ggggg.gg
hh.mm.ss nn [type]
  …,
  [THE LONGEST DUMP IS ALSO THE LARGEST]
```

This message is issued in response to a DISPLAY DUMP,INFO command (D D,I command). The message lists information about the most recent 254 SVC dumps taken on the system since IPL. Two additional entries may be included: one for the captured dump with the longest Duration (with a "LONGEST" tag), and for written dumps, an entry for the dump with the largest CAP.SZ value (with a "LARGEST" tag). These "LARGEST" and" LONGEST" dumps apply to the entire duration of the IPL, not just the most-recent 254 dumps. A special notation is made if the same dump is both longest and largest: "THE LONGEST DUMP IS ALSO THE LARGEST."

When there are no SVC dumps taken on the system since IPL, the following single line is issued with the message id:

```
NO SVC DUMPS HAVE BEEN CAPTURED ON THIS SYSTEM
SINCE IPL
```

In the message output:

idr
    A 3-digit decimal identifier used with the CONTROL C,D command to cancel status displays:

- That are written on typewriter or display consoles

- That are displayed in-line (not in display area) on display (CRT) consoles

This identifier does not appear when the display is presented in a display area on a display console.

DMP#
    The three digit dump identifier. There is also a partial dump indicator, **-P**, that can accompany this.

DATE
    The date that the system wrote the captured dump, in months (01 through 12), in days of the months (01 through 31), and in years (using the 4-digit year number, such as 1996 or 2001). It is displayed in the format *mm/dd/yyyy*.

TIME
    The local time when the system wrote the captured dump, in hours (00 through 23), minutes (00 through 59), and seconds (00 through 59). It is displayed in the format *hh:mm:ss*.

EST.SZ(G)
    Estimated dump size in GB, a rough calculation of the number of GB to be captured for the dump. It sums all areas within the requested address spaces, including data-space storage. It does not account for specified dump parameters (like LSQA versus RGN).

CAP.SZ(G)
    Approximate size in GB of the virtual storage which SDUMP used for the dump's capture phase. It will differ from the dump size calculated in the write phase, the size displayed after the dump is written and from any dump sizes seen in IPCS.

    Note: For both EST.SZ and CAP.SZ, when the value is less than 10MB, the display will show "< 10MB". Similarly, if the size is larger than 99000 GB, the display will show "> 99TB". If there is no data for the field then the display will show "N/A", to indicate non-availability.

DURATION
    Approximate time taken to capture the CAP.SZ value data into virtual storage, displayed in the format *hh.mm.ss*. When *hh*, *mm* and *ss* are all zero, the display will indicate "< 1 SEC" If the duration is longer than a day, the display will indicate "> 24 HRS."

A/S#
    Number of address spaces dumped.

type
    Additional notes on entries which might be tagged where type means:

- LONGEST – One for the captured dump with the longest duration

- LARGEST – One for the dump with the largest written size

"THE LONGEST DUMP IS ALSO THE LARGEST" is a special notation made if the same dump is both longest and largest.

Here is an example

```
DMP# DATE       TIME    EST.SZ(G) CAP.SZ(G)
DURATION #A/S
002 09/07/2021 09.34.29   1.17     1.27
00:00:08 02 LONGEST
002 09/07/2021 09.34.29   1.17     1.27
00:00:08 02 LARGEST
001 09/07/2021 09.30.00   0.28     0.37  < 1
SEC  01
002 09/07/2021 09.34.29   1.17     1.27
00:00:08 02
```

In this output, dump with DumpID 002 was taken at local time 9.34.29 on 09/07/2021. The initial estimated size was 1.17GB and the dump size at the end of Capture phase was 1.27GB. The dump took 8 seconds to capture and included two address spaces. It was both the largest and the longest dump taken so far. Dump with DumpID 001 was taken at 9.30.00 local time on 09/07/2021. It took less than a second to capture, had an initial estimated size of 0.28GB, a Capture-time size of 0.37GB and dumped only one address space.

Note: The "LARGEST" line is only associated with written SVC dumps. Also, the "LONGEST" and "LARGEST" entries will **not** be displayed when there is information on only one dump.

System action

The system continues processing.

Source

SVC dump

Module

IEECB910

Routing code

-

Descriptor code

5,8,9

IRA867I   HIPERDISPATCH=NO CURRENTLY NOT ALLOWED

Explanation:
HIPERDISPATCH=NO because HiperDispatch mode is not allowed while zIIP Boost is active.

System action:

The system switched out of the HiperDispatch mode or no longer continues to run in HiperDispatch mode because zIIP Boost is active.

Operator response:
None.

System programmer response:
None.

Source:
System resources manager (SRM)

Module:
IRABAINI

IWM063I   WLM POLICY WAS REFRESHED.

Explanation

WLM refreshed the active policy because of processor speed change, MT mode change, or boost status change.

The change might be expected, as in the case of a dynamic CPU capacity change or MT mode change for a processor class, or unexpected in the case where a processor goes into cycle steering mode. Beginning with z196, message IWM063I is accompanied by message IWM064I that explains the reason for the policy refresh. Reporting products may close their reporting interval.

System action

Processing continues. Performance monitors may end their current and start new reporting interval.

Operator response

None, if this is because of a capacity or MT mode change. When the change is unexpected, contact hardware support and refer to the HMC for additional information.

System programmer response

None.

Source

Workload Manager (WLM)

Module

IWMP2RAC

Routing code

2,10

Descriptor code

4

IWM064I   *text*

Explanation

This message follows message IWM063I whenever SRM is notified of a processor speed change. Beginning with the IBM z13®, this message also follows message IWM063I whenever SRM is notified of an MT mode change for a processor class. Message IWM064I explains the reason for the change reported by message IWM063I. Message IWM064I will also be issued when the system is IPLed at reduced speed on z196, or follow-on machines.

In the message text: *text* indicates the reason for the change. Possible reasons are:

- `THERE WAS A CHANGE OF THE MT MODE FOR A PROCESSOR CLASS.`

  This message is preceded by message IWM066I, which shows the affected processor class and the change in MT mode.
- `THE SYSTEM IS RUNNING AT NOMINAL CAPACITY.`

  For example, a cooling problem has been resolved and the system is running at nominal capacity again.
- `THE SYSTEM IS RUNNING AT NOMINAL CAPACITY; MODEL CONVERSION OCCURRED.`

  For example, the user may have upgraded or downgraded the capacity and the system is now running at the new nominal capacity.
- `AN MSU TABLE UPDATE OCCURRED.`

  For example, the system's MSU table was updated. In this case, a second IWM064I message follows to report the actual state.
- `THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A MANUAL CONTROL SETTING.`

  For example, the user may have initiated Power® Saving Mode.
- `THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A MACHINE EXCEPTION CONDITION.`

  For example, there may have been a cooling problem.
- `THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF A NON-EXCEPTION MACHINE CONDITION.`

  For example, there may have been a firmware update.
- `THE SYSTEM IS RUNNING WITH REDUCED CAPACITY BECAUSE OF AN EXCEPTION CONDITION EXTERNAL TO THE MACHINE.`

  For example, the ambient temperature may have exceeded the maximum value.
- `BOOST ACTIVATED.`

  WLM processing on behalf of boost activation has completed.
- `BOOST ENDED.`

  WLM processing on behalf of boost end has completed.

As long as the system is running at reduced capacity, IWM068I is repeated every hour. When IWM064I has been issued at IPL and the system is running at reduced capacity, the first IWM068I message follows after 15 minutes. This gives automation enough time to initialize and react to the message when IWM064I is issued during IPL.

System action

Processing continues.

Operator response

None.

System programmer response

None.

Source

Workload Manager (WLM)

Module

IWMP2RAC, IWMI2JST

Routing code

2,10

Descriptor code

4

Chapter 8. MVS Data Areas

This chapter contains information on the data areas: CVT, ECVT, IHAENF84, IHAIPA, IRALPDAT, IRAQVS, and IRARMCTZ. Note: Each of these areas only contains the relevant portions of each data area that are affected by the APAR, and the complete content for each of these data areas is much larger.

CVT information

CVT mapping

Table 1. Structure CVTFIX

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
1272	(4F8)	BITSTRING	1	CVTOSLV8	BYTE 8 OF CVTOSLVL
		.... .1..		CVTBOOST	"X'04'" Support for BOOST system parameter is available

ECVT information

ECVT mapping

Table 2. Structure ECVT

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
992	(3E0)	BITSTRING	24	ECVT_BOOSTINFO(0)	Valid only when CVTBoost is on
992	(3E0)	BITSTRING	1	ECVT_BOOSTINFO_FLAGS0	
		1...		ECVT_ZIIPBOOST_ACTIVE	"X'80'"
		.1..		ECVT_SPEEDBOOST_ACTIVE	"X'40'"
		..1.		ECVT_IPLBOOSTS_ACTIVATED	"X'20'" All IPL boosts to be activated have been activated.
		...1		ECVT_SDBOOSTS_ACTIVATED	"X'10'" All Shutdown boosts to be activated have been activated.
		.... 1...		ECVT_RPBOOSTS_ACTIVATED	"X'08'" All RP boosts to be activated have been activated. This bit will be turned off once the boost ends.
		.... .111		ECVT_BOOSTCLASS	"X'07'" See Ecvt_BoostClass_xxx equates. Valid only when one of the boosts is active
993	(3E1)	BITSTRING	1	ECVT_BOOSTINFO_SYSPARM_FLAGS	
		1...		ECVT_SYSPARM_ZIIPBOOST	"X'80'" According to the availability and the BOOST system parameter, we want to do zIIP boost. This gets turned off if it could never be right to activate, such as for the case of a non-dedicated partition
		.1..		ECVT_SYSPARM_SPEEDBOOST	"X'40'" According to the availability and the BOOST system parameter, we want to do speed boost.
994	(3E2)	BITSTRING	1	ECVT_BOOSTINFO_FLAGS1	
		1...		ECVT_IPLZIIPBOOST_ENDEDBYERROR	"X'80'"
		.1..		ECVT_IPLSPEEDBOOST_ENDEDBYERROR	"X'40'"
		.... 1...		ECVT_IPLBOOSTS_ENDEDBYTIMER	

Table 2. Structure ECVT (continued)

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
					"X'08'"
		.... .1..		ECVT_IPLBOOSTS_ENDEDBYPGM	"X'04'"
		.... ..1.		ECVT_IPLBOOSTS_ENDEDBYSHUTDOWN	
					"X'02'"
		1		ECVT_IPLBOOSTS_ENDEDBYERROR	
					"X'01'"
995	(3E3)	BITSTRING	1	ECVT_BOOSTINFO_SD_FLAGS1	
		1...		ECVT_SDZIIPBOOST_ENDEDBYERROR	
					"X'80'"
		.1..		ECVT_SDSPEEDBOOST_ENDEDBYERROR	
					"X'40'"
		.... 1...		ECVT_SDBOOSTS_ENDEDBYTIMER	"X'08'"
		.... .1..		ECVT_SDBOOSTS_ENDEDBYPGM	"X'04'"
		1		ECVT_SDBOOSTS_ENDEDBYERROR	"X'01'"
996	(3E4)	SIGNED	2	ECVT_BOOSTINFO_TRANSIENTZIIPCORES	
					Number of zIIP cores configured online for the zIIP boost. Those cores will be configured offline at the end of the zIIP boost. Valid only when the zIIP boost active bit is on.
998	(3E6)	BITSTRING	1	ECVT_BOOSTINFO_FLAGS2	
		1...		ECVT_RPB_DISABLED	"X'80'" When on, RP boosts are disabled When off, RP boosts are enabled
999	(3E7)	BITSTRING	1	ECVT_BOOSTLEVEL	0: initial deliverable >0: In addition to initial deliverable data, Ecvt_BoostInfo_V1 may be examined >1: In addition to V0 and V1 data, Ecvt_BoostInfo_V2 may be examined
999	(3E7)	X'0'	0	ECVT_BOOSTLEVEL_V0	"0" Initial deliverable
999	(3E7)	X'1'	0	ECVT_BOOSTLEVEL_V1	"1" Ecvt_BoostInfo_V1 may also be examined
999	(3E7)	X'2'	0	ECVT_BOOSTLEVEL_V2	"2" Ecvt_BoostInfo_V2 may also be examined
999	(3E7)	X'2'	0	ECVT_BOOSTLEVEL_MAX	"2" Maximum level of support. This may change in the future.
1000	(3E8)	CHARACTER	16	ECVT_BOOSTINFO_EXPECTED_ENDETOD	
					Time (STCKE format) when boost(s) will end. It is valid when the following is true: -- one of the "Boost Active" bits is on, and -- if the boost class is IPL, bit Ecvt_IplBoosts_Activated is on, and -- if the boost class is shutdown, bit Ecvt_SDBoosts_Activated is on, and -- if the boost class is RP, bit Ecvt_RPBoosts_Activated is on The zIIP boost might end early due to unexpected error. Boosts might end early due to customer action.
1016	(3F8)	BITSTRING	32	ECVT_BOOSTINFO_V1(0)	Recovery process boost support. Valid when Ecvt_BoostLevel is at least Ecvt_BoostLevel_V1
1016	(3F8)	SIGNED	4	ECVT_RPBOOSTS_NUM	Number of recovery-process boost start requests received across the life of the IPL that were not during IPL boost or shutdown boost

Table 2. Structure ECVT (continued)

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
1020	(3FC)	SIGNED	4	ECVT_RPBOOSTS_NUM_IGNORED	Number of recovery-process boost start requests received across the life of the IPL that were ignored because the duration limit had been exceeded
1024	(400)	BITSTRING	8	ECVT_RPB_DURATION(0)	Total duration for the life of the IPL of recovery process boosts. Updated when RP boost is extended or ends. In STCK format.
1024	(400)	BITSTRING	8	ECVT_RP_DURATION	Same as Ecvt_RPB_Duration
1032	(408)	BITSTRING	1	ECVT_RPB_BOOSTINFO_FLAGS1(0)	
1032	(408)	BITSTRING	1	ECVT_RP_BOOSTINFO_FLAGS1	Same as Ecvt_RPB_BoostInfo_Flags1
		.... 1...		ECVT_RPBOOSTS_LAST_ENDEDBYTIMER	
					"X'08'" The last RPBoost(s) ended by timer. Valid only when RPBoost inactive.
		.... ..1.		ECVT_RPBOOSTS_LAST_ENDEDBYSHUTDOWN	
					"X'02'" The last RPBoost(s) ended due to shutdown. Valid only when RPBoost inactive.
		1		ECVT_RPBOOSTS_LAST_ENDEDBYERROR	
					"X'01'" The last RPBoost(s) ended due to error. Valid only when RPBoost inactive.
1033	(409)	BITSTRING	1	ECVT_RPBOOSTS_REQUESTOR_ID	The requestor ID associated with the start or extend. Updated when the boost is extended. Valid only when RP boost(s) are active. See equates ECVT_RPBReq_xxx
1034	(40A)	BITSTRING	2	ECVTR40A	
1036	(40C)	ADDRESS	4	ECVT_RPBOOSTS_NUMBYREQUESTOR_ADDR	
					Address of an area that has the number of RP boost requests by each requestor. The format of the area is: 1st word - number of entries. 2nd word - number of requests by unidentified requestors. Nth word when N > 2 - number of requests by requestor N-2. The requestors are described by ID (the "N-2" value). See equates ECVT_RPBReq_xxx
1040	(410)	SIGNED	4	ECVT_RPBOOSTS_NUM_WHILEDIS	Number of recovery-process boost start requests received across the life of the IPL while RP boosts were disabled
1044	(414)	BITSTRING	4	ECVTR414	
1048	(418)	DBL WORD	8	ECVT_BOOSTINFO_V2(0)	
1048	(418)	BITSTRING	8	ECVT_RPB_DURATION_POTENTIAL	
					Total duration for the life of the IPL of recovery process boosts. Includes time that would have been boosted except for having reached the duration limit. Includes time regardless of whether or not RP boosts were enabled. Updated when RP boost would be extended or end. In STCK format.
1056	(420)	BITSTRING	8	ECVT_RPB_DURATION_POTENTIAL_E	
					Same as preceding field, but only while RP Boosts are enabled
1064	(428)	BITSTRING	8	ECVT_RPB_EN_DIS_LOCAL_TIMESTAMP	

Table 2. Structure ECVT (continued)

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
					Local time when RP boosts were last enabled or disabled. In STCK format.
1072	(430)	BITSTRING	8	ECVTR430	Reserved
1080	(438)	DBL WORD	8	ECVTEND(0)	End of the ECVT.

Boost Class equates. "AND" the byte with this mask and compare the result to the equate if you want to check the class

		.... .111		ECVT_BOOSTCLASS_MASK	"X'07'"
		1		ECVT_BOOSTCLASS_IPL	"X'01'"
		.... ..1.		ECVT_BOOSTCLASS_SHUTDOWN	"X'02'"
		11		ECVT_BOOSTCLASS_RP	"X'03'"

Recovery Process Boost requestor equates

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
1080	(438)	X'0'	0	ECVT_RPBREQ_NOT_IDENTIFIED	"0"
1080	(438)	X'1'	0	ECVT_RPBREQ_SYSPLEX_PARTITIONING	"1"
1080	(438)	X'2'	0	ECVT_RPBREQ_CF_STRUCTURE_RECOV	"2"
1080	(438)	X'3'	0	ECVT_RPBREQ_CF_DATASHARING_MEMBER_RECOV	"3"
1080	(438)	X'4'	0	ECVT_RPBREQ_HYPERSWAP	"4"

IHAENF84 information

IHAENF84 programming interface information

IHAENF84 is a programming interface.

IHAENF84 heading information

Common name: Boost Event ENF mapping (event code 84)

Macro ID: IHAENF84

DSECT name: ENF84

Owning component: Supervisor (SC1C5)

Eye-catcher ID: None

Storage attributes: Subpool: 247 for ENF signal
Key: 0
Residency: Above 16M

Size: ENF84 -- X'0008' bytes

Created by: Boost processing, provided to ENF listeners for event 084.

Pointed to by: R1 on entry to ENF listening routine

Serialization: None required

Function: Maps the data provided for ENF event 084.

IHAENF84 mapping

Table 3. Structure ENF84

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
0	(0)	STRUCTURE	0	ENF84	Boost event ENF signal parameter list
0	(0)	BITSTRING	1	ENF84_VERSION	Initial version=0
1	(1)	BITSTRING	1	ENF84_FLAGS	Flags
Bit definitions:					
		1...		ENF84_ZIIPBOOSTACTIVE	"X'80'" For the "boosts end" events, the boost was active. For the "boost start" events, the boost was activated. For the "RP boost extend" event, the boost is active.
		.1..		ENF84_SPEEDBOOSTACTIVE	"X'40'" For the "boosts end" events, the boost was active. For the "boost start" events, the boost was activated. For the "RP boost extend" event, the boost is active.
		...1		ENF84_BOOSTEND_SDBOOSTSREQUESTED	
					"X'10'" For the "boosts end" events other than "shutdown boost end", shutdown boost has been requested.
		.... 1...		ENF84_RPB_DISABLED	"X'08'" When 1, RP boosts are disabled. When 0, RP boosts are enabled
		.... .111		ENF84_BOOSTCLASS	"X'07'" See ENF84_BoostClass_xxx. Not valid for the RPBoosts_EnabDisab event.
2	(2)	BITSTRING	1	ENF84_RPBOOSTS_REQUESTOR_ID	
					For the "RPBoosts Start" and "RPBoosts Extend" events only. See equates ENF84_RPBReq_xxx.
3	(3)	CHARACTER	1		Reserved
4	(4)	SIGNED	4	ENF84_EVENT	The boost event. See equates beginning ENF84_Event
4	(4)	X'1'	0	ENF84_EVENT_IPLBOOSTS_START	
					"1" Application code might not be able to be started early enough to listen for, and receive, this event. Such code should examine the boost information in the ECVT
4	(4)	X'2'	0	ENF84_EVENT_IPLBOOSTS_END	"2"
4	(4)	X'3'	0	ENF84_EVENT_SHUTDOWNBOOSTS_START	
					"3"
4	(4)	X'4'	0	ENF84_EVENT_SHUTDOWNBOOSTS_END	
					"4"
4	(4)	X'5'	0	ENF84_EVENT_RPBOOSTS_START	"5"
4	(4)	X'6'	0	ENF84_EVENT_RPBOOSTS_EXTEND	
					"6"
4	(4)	X'7'	0	ENF84_EVENT_RPBOOSTS_END	"7"
4	(4)	X'8'	0	ENF84_EVENT_RPBOOSTS_ENABDISAB	
					"8" Besides the event, the only valid field is the bit ENF84_RPB_Disabled
4	(4)	X'9'	0	ENF84_EVENT_RPBOOSTS_INFO	"9" This event is for SMF's usage. The only valid field is ENF84_Event.

Table 3. Structure ENF84 (continued)

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
		Boost Class equates. "AND" the byte with this mask and compare the result to the equate if you want to check the class			
		.... .111		ENF84_BOOSTCLASS_MASK	"X'07'"
		1		ENF84_BOOSTCLASS_IPL	"B'00000001'"
		.... ..1.		ENF84_BOOSTCLASS_SHUTDOWN	"B'00000010'"
		11		ENF84_BOOSTCLASS_RP	"B'00000011'"
		Recovery Process Boost requestor constants			
4	(4)	X'0'	0	ENF84_RPBREQ_NOT_IDENTIFIED	
					"0"
4	(4)	X'1'	0	ENF84_RPBREQ_SYSPLEX_PARTITIONING	
					"1"
4	(4)	X'2'	0	ENF84_RPBREQ_CF_STRUCTURE_RECOV	
					"2"
4	(4)	X'3'	0	ENF84_RPBREQ_CF_DATASHARING_MEMBER_RECOV	
					"3"
4	(4)	X'4'	0	ENF84_RPBREQ_HYPERSWAP	"4"
4	(4)	X'5'	0	ENF84_RPBREQ_SVCDUMP	"5"
4	(4)	X'6'	0	ENF84_RPBREQ_MIDDLEWARE_REGION_RECYCLE	
					"6"
4	(4)	X'7'	0	ENF84_RPBREQ_HYPERSWAP_CONFIG_LOAD	
					"7"
4	(4)	X'8'	0	ENF84_LEN	"*-ENF84"

Table 4. Cross Reference for IHAENF84

Name	Offset	Hex Tag
ENF84	0	
ENF84_BOOSTCLASS	1	7
ENF84_BOOSTCLASS_IPL	4	1
ENF84_BOOSTCLASS_MASK	4	7
ENF84_BOOSTCLASS_RP	4	3
ENF84_BOOSTCLASS_SHUTDOWN	4	2
ENF84_BOOSTEND_SDBOOSTSREQUESTED	1	10
ENF84_EVENT	4	
ENF84_EVENT_IPLBOOSTS_END	4	2
ENF84_EVENT_IPLBOOSTS_START	4	1
ENF84_EVENT_RPBOOSTS_ENABDISAB	4	8
ENF84_EVENT_RPBOOSTS_END	4	7
ENF84_EVENT_RPBOOSTS_EXTEND	4	6
ENF84_EVENT_RPBOOSTS_INFO	4	9
ENF84_EVENT_RPBOOSTS_START	4	5
ENF84_EVENT_SHUTDOWNBOOSTS_END	4	4
ENF84_EVENT_SHUTDOWNBOOSTS_START	4	3
ENF84_FLAGS	1	
ENF84_LEN	4	8

Table 4. Cross Reference for IHAENF84 (continued)

Name	Offset	Hex Tag
ENF84_RPB_DISABLED	1	8
ENF84_RPBOOSTS_REQUESTOR_ID	2	
ENF84_RPBREQ_CF_DATASHARING_MEMBER_RECOV	4	3
ENF84_RPBREQ_CF_STRUCTURE_RECOV	4	2
ENF84_RPBREQ_HYPERSWAP	4	4
ENF84_RPBREQ_HYPERSWAP_CONFIG_LOAD	4	7
ENF84_RPBREQ_MIDDLEWARE_REGION_RECYCLE	4	6
ENF84_RPBREQ_NOT_IDENTIFIED	4	0
ENF84_RPBREQ_SVCDUMP	4	5
ENF84_RPBREQ_SYSPLEX_PARTITIONING	4	1
ENF84_SPEEDBOOSTACTIVE	1	40
ENF84_VERSION	0	
ENF84_ZIIPBOOSTACTIVE	1	80

IHAIPA information

IHAIPA mapping

Table 5. Structure IPA

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
3032	(BD8)	CHARACTER	8	IPABOOST	
PDE for BOOST					

IRALPDAT information

IRALPDAT mapping

Table 6. Structure LPDATMAP

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
173	(AD)	BITSTRING	1	LPDATBOOSTINFO	IRALPDAT.409: same as RMCTZ_BoostInfo

IRAQVS information

IRAQVS mapping

Table 7. Structure QVS

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
6	(6)	BITSTRING	1	QVSBOOSTINFO	IRAQVS.265: same as RMCTZ_BoostInfo

IRARASD information

IRARASD mapping

Table 8. Structure RASD

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
101	(65)	BITSTRING	1	RASDFLG2(0)	Second flag byte
		.... .1..		RASDHWCONTAINER	...
		.... ..1.		RASDASBOOST	Address space matched a classification rule in the active policy which enables for recovery process boost.

Table 9. Cross Reference for IRARASD

Name	Offset	Hex Tag
RASDASBOOST	65	02

IRARMCTZ information

IRARMCTZ mapping

Table 10. Structure RMCTZ

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
44	(2C)	SIGNED	4	RMCTZ_ADJC_CEC	CPU rate adjustment factor based on the number of physical CPUs available for the logical partitions to share, excluding speed boost
48	(30)	SIGNED	4	RMCTZ_CEC_CAPACITY	Total CEC capacity derivated from rmctz_adjc_CEC service units per 10 seconds. The value is based on the number of physical CPUs available for the logical partitions to share and does not include boost capacity
53	(35)	CHARACTER	3		Reserved
1261	(4ED)	BITSTRING	1	RMCTZ_BOOSTINFO	WLM view of boost information
	Bit definitions:				
		1...		RMCTZ_ZIIPBOOST_ACTIVE	"X'80'"
		.1..		RMCTZ_SPEEDBOOST_ACTIVE	"X'40'"
		..1.		RMCTZ_IPLBOOST_ACTIVATED	"X'20'" IPL boost has been activated. Once set, this flag never gets reset
		...1		RMCTZ_SDBOOST_ACTIVATED	"X'10'" Shutdown boost has been activated. Once set, this flag never gets reset
		.... 1...		RMCTZ_RPBOOST_ACTIVATED	"X'08'" Recovery Process Boost has been activated. This bit will be turned off once the boost ends
		.... .111		RMCTZ_BOOSTCLASS	"X'07'" See RMCTZ_BoostClass_xxx equates. Valid only when one of the boosts is active
	Boost Class equates. "AND" the byte with this mask and compare the result to the equate if you want to check the class				
		.... .111		RMCTZ_BOOSTCLASS_MASK	"X'07'"
		1		RMCTZ_BOOSTCLASS_IPL	"X'01'"

Table 10. Structure RMCTZ (continued)

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
		.... ..1.		RMCTZ_BOOSTCLASS_SHUTDOWN	"X'02'"
		11		RMCTZ_BOOSTCLASS_RP	"X'03'"

IWMSVAEA information

IWMSVAEA mapping

Table 11. Structure SVAEAEXT - Constants

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
Functionality level introduced for System Recovery Boost stage 3					
44	(2C)	X'26'	0	SVAEA_LEVEL038	"38"
...					
44	(2C)	X'26'	0	SVAEA_CURRENT_VER	"38"

Table 12. Cross Reference for IWMSVAEA

Name	Offset	Hex Tag
SVAEA_LEVEL038	2C	26

IWMSVDCR information

IWMSVDCR mapping

Table 13. Structure SVDCRRUL

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
18	(12)	CHARACTER	1	SVDCRRF3(0)	Classification rule flags byte 3. Currently, this byte contains bits that are going to be used in both SVPOL and SVDEF
...					
		...1		SVDCR_SPECRPT2	"X'10'" Reporting Flag2
		.... 1...		SVDCR_BOOST	"X'08'" Boost enabled

Table 14. Structure SVDCREXT - Constants

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
20	(14)	X'26'	0	SVDCR_LEVEL038	"38" Functionality level introduced for System Recovery Boost stage 3
...					
20	(14)	X'26'	0	SVDCR_CURRENT_VER	"38" Current version level used when checking functionality within WLM product.

Table 15. Cross Reference for IWMSVDCR

Name	Offset	Hex Tag
SVDCR_BOOST	12	08
...		
SVDCR_LEVEL038	14	26

IWMSVDEF information

IWMSVDEF mapping

Table 16. Structure SVDEFEXT - Constants

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
28	(1C)	X'26'	0	SVDEF_LEVEL038	"38" Functionality level introduced for System Recovery Boost stage 3
...					
28	(1C)	X'26'	0	SVDEF_CURRENT_VER	"38" Current version level used when checking functionality within WLM product.

Table 17. Cross Reference for IWMSVDEF

Name	Offset	Hex Tag
SVDEF_LEVEL038	1C	26

IWMSVNPA information

IWMSVNPA mapping

Table 18. Structure SVNPADAT - Constants

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
0	(0)	X'26'	0	SVNPA_LEVEL038	"38" Functionality level introduced for System Recovery Boost stage 3
...					
0	(0)	X'26'	0	SVNPA_CURRENT_VER	"38" Current version level used when checking functionality within WLM product.

Table 19. Cross Reference for IWMSVNPA

Name	Offset	Hex Tag
SVNPA_LEVEL038	0	26

IWMSVPOL information

IWMSVPOL mapping

Table 20. Structure SVPOLSN - Constants

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
0	(0)	X'26'	0	SVPOL_LEVEL038	"38" Functionality level introduced for System Recovery Boost stage 3
...					
0	(0)	X'26'	0	SVPOL_CURRENT_VER	"38" Current version level used when checking functionality within WLM product.

Table 21. Cross Reference for IWMSVPOL

Name	Offset	Hex Tag
SVPOL_LEVEL038	0	26

IWMWRCAA information

IWMWRCAA mapping

Table 22. Structure RCAEIHDR

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
72	(48)	BITSTRING	1	RCAEIFLG	Period flags.
		1...		RCAECCIMP	"X'80'" 1: Service class period implicitly designated CPU critical

Table 23. Structure RCAAGDDE

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
6	(6)	X'19'	0	RCAEVRID	"25" Current version level

IWMWRQAA information

IWMWRQAA mapping

Table 24. Structure RQAE

Offset Dec	Offset Hex	Type	Len	Name(Dim)	Description
148	(94)	BITSTRING	2	RQAEFLG3(0)	Additional flags
...					
		..1.		RQAEHWCONTAINER	...
		...1		RQAEASBOOST	Same as RasdAsBoost

Table 25. Cross Reference for IWMWRQAA

Name	Offset	Hex Tag
RQAEASBOOST	94	10

Appendix A. z/OS Data Gatherer, SMF and WLM details

z/OS Data Gatherer details

This topic contains details for changes to z/OS Data Gatherer Monitor III.

ERBASIG3 - Address space identification table

This topic contains details for changes to ERBASIG3, address space identification table of z/OS Data Gatherer Monitor III.

Dec Offset	Hex Offset	Name	Length	Format	Description
324	144	ASIMSTS	4	binary	Miscellaneous states.
					Bit
					Meaning When Set
					0
					Address space is OMVS related
					1
					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
					2
					CPU protection was assigned either to the address space or to transaction service classes being served by the space, and SRM is honoring the protection
					3
					Storage protection was assigned either to the address space or to transaction service classes being served by the space, and SRM is honoring the protection
					4
					This address space provides service to transactions classified to a different class than the address space itself
					5
					WLM is managing this address space to meet the goals of work in other service classes
					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
					I/O priority group HIGH was assigned either to the address space or to transaction service classes served by the address space
					8
					Address space is currently associated with a tenant resource group.
					9
					Reserved.
					10
					Address space matched a classification rule in the active policy which enables for recovery process boost.
					11 - 31
					Reserved.

SMF details

This topic contains details for changes to SMF.

Record type 30 (X'1E') — Common address space work

This topic contains details for changes to SMF record type 30. It contains only sections that were changed. For the complete record type 30, see *z/OS MVS System Management Facilities (SMF)*.

Processor Accounting Section

This section contains various Processor times for the address space for the period that the record represents.

Triplet information

This section is located on the record using the following triplet fields, which are located in the "header/self-defining" section:

Offset
> SMF30COF

Length
> SMF30CLN

Number
> SMF30CON - Reports the number of processor accounting sections on the current record. Because only one processor accounting section can appear on the record, this field is "1" (if the section exists) or "0" (if it does not exist).

Offsets		Name	Length	Format	Description
87	57	SMF30_BoostInfo	1	binary	Boost Information
					Bit
					Meaning when set
					0
					zIIP boost was active at some point within the interval. An SMF30 step-end record will have the "active" bit on if the bit was on in any interval record created for the step. An SMF30 job record will have the "active" bit on if the bit was on in any interval record created for the job.
					1
					Speed boost was active at some point within the interval. An SMF30 step-end record will have the "active" bit on if the bit was on in any interval record created for the step. An SMF30 job record will have the "active" bit on if the bit was on in any interval record created for the job.
					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.

Record type 70 (X'46') — RMF Processor Activity

This topic contains details for changes to SMF record type 70. It contains only sections that were changed. For the complete record type 70, see *z/OS MVS System Management Facilities (SMF)*.

RMF Product Section

Offsets		Name	Length	Format	Description
30	1E	SMF70FLA	2	binary	Flags

Bit
Meaning when set

0
Reserved.

1
Samples have been skipped.

2
Record was written by RMF Monitor III.

3
Interval was synchronized with SMF.

4
SMF record converted to lower service level.

5
SMF record converted to higher release or service level.

6
Running under an alternate virtual machine.

7 - 8
Reserved.

9
zIIP boost was active during entire interval.

10
Speed boost was active during entire interval.

11 - 12
Reserved.

13 - 15
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.

PR/SM Partition Data Section

This section contains a configured logical partition. There is one for each logical partition. The measurements are on a per logical processor basis when multithreading is disabled and on a per logical core basis when multithreading is enabled for the reporting interval. In the latter case, the terms logical processor and logical CPU refer to a logical core.

Offsets		Name	Length	Format	Description
80	50	SMF70_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.

2-7
Reserved.

Record type 72 (X'48') — Workload Activity, Storage Data, and Serialization Delay

This topic contains details for changes to SMF record type 72. It contains only sections that were changed. For the complete record type 72, see *z/OS MVS System Management Facilities (SMF)*.

RMF Product Section

Offsets		Name	Length	Format	Description
30	1E	SMF72FLA	2	binary	Flags

Bit	**Meaning when set**
0	Reserved.
1	Samples have been skipped.
2	Record was written by RMF Monitor III.
3	Interval was synchronized with SMF.
4	SMF record converted to lower service level.
5	SMF record converted to higher release or service level.
6	Running under an alternate virtual machine.
7 - 8	Reserved.
9	zIIP boost was active during entire interval.
10	Speed boost was active during entire interval.
11 - 12	Reserved.
13 - 15	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.

Record type 79 (X'4F') — RMF Monitor II activity

This topic contains details for changes to SMF record type 79. It contains only sections that were changed. For the complete record type 79, see *z/OS MVS System Management Facilities (SMF)*.

RMF Product Section

Offsets		Name	Length	Format	Description
30	1E	SMF79FLA	2	binary	Flags

Bit	Meaning when set
0	Reserved.
1	Samples have been skipped.
2	Record was written by RMF Monitor III.
3	Interval was synchronized with SMF.
4	SMF record converted to lower service level.
5	SMF record converted to higher release or service level.
6 - 8	Reserved.
9	zIIP boost was active during entire interval.
10	Speed boost was active during entire interval.
11 - 12	Reserved.
13 - 15	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.

Subtype 1 — Address Space State Data

ASD and ASDJ data section

Offsets	Name	Length	Format	Description
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

Reserved.

5

If On: Boost attribute can be defined on WLM classification rules for started tasks.

6

Address space matched a classification rule in the active policy which enables for recovery process boost. Only valid if bit 5 of R791FLG3 is set.

7

Reserved.

Subtype 2 — Address Space Resource Data

ARD and ARDJ data section

Offsets		Name	Length	Format	Description
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	Reserved.
5	If On: Boost attribute can be defined on WLM classification rules for started tasks.
6	Address space matched a classification rule in the active policy which enables for recovery process boost. Only valid if bit 5 of R792FLG3 is set.
7	Reserved.

Record type 89 (X'59') — Usage Data

This topic contains details for changes to SMF record type 89. It contains only sections that were changed. For the complete record type 89, see *z/OS MVS System Management Facilities (SMF)*.

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
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.

Subtype 2 — State data section

This section contains the product information (specified on the MVS™ register service or in the IFAPRDxx parmlib member) and the state 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
SMF89UDO

Length
SMF89UDL

Number
SMF89UDN

Offsets		Name	Length	Format	Description
63	3F	SMF89T2_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.

Record type 90 (X'5A') — System status

This topic contains details for changes to SMF record type 90. It contains only sections that were changed. For the complete record type 90, see *z/OS MVS System Management Facilities (SMF)*.

Subtype 40 — Boost information

A subtype 40 record is created when boosts start and end.

- No SMF record is created if the IPL boost was never activated.
- There is no SMF record produced when recovery process boosts are extended, only when they are started or ended.
- A recovery process boosts end record can occur after multiple recovery process boosts, if there was overlap.
- If a record spans events of multiple boost classes, the earliest boost class (IPL or recovery process) is used.

Boost information section

Offsets	Name	Length	Format	Description
0	SMF90T40_ETOD	16	binary	Time of boosts end, in STCKE format.

Offsets		Name	Length	Format	Description
16	10	SMF90T40_Event	4	binary	The boost event. Valid values are:
					1 IPL boosts start
					2 IPL boosts end
					3 Shutdown boosts start
					4 Shutdown boosts end
					5 Recovery process boosts start
					6 Recovery process boosts end
					7 (SMF90T40_Event_RPB_EnabDisab) Recovery process boosts have either been enabled or disabled. In addition to SMF90T40_Event and SMF90T40_BoostLevel, bit SMF90T40_RPB_Disabled is valid.
					8 (SMF90T40_Event_RPBoosts_Info) Recovery process boosts updated usage information. In addition to SMF90T40_Event and SMF90T40_BoostLevel, the fields with names beginning SMF90T40_RPB_Duration are the valid ones. The record for this event is written approximately every 24 hours when on a machine that supports recovery process boosts, unless BOOST=NONE is in effect. It provides information about how much recovery process boost time was used since the last writing of the record, and how much could have been used if not for the duration limit per 24-hour period. When being written, the first record is written approximately at the time that the pool of boost time is replenished (if that can be determined) or 24 hours after the end of IPL boost or 24 hours after determining that there were no IPL boosts.
20	14	SMF90T40_NUMTransientzIIPCores	76	binary	Number of zIIP cores configured online due to zIIP boost (and configured offline upon boost end).

Offsets		Name	Length	Format	Description

22	16	SMF90T40_Flags0	1	binary	Flags:
					
					Bit
					  Meaning when set
					
					0 (SMF90T40_zIIPBoost_Active)
					  For the "boosts end" events, the zIIP boost was active. For the "boosts start" event, the zIIP boost is active.
					
					1 (SMF90T40_SpeedBoost_Active)
					  For the "boosts end" events, the speed boost was active. For the "boosts start" event, the speed boost is active.
					
					2 (SMF90T40_zIIP_Boost_EndedByError)
					  The system encountered an error and had to end the zIIP boost (the speed boost was not affected by the error). Applies only to the "boosts end" events.
					
					3 (SMF90T40_SpeedBoost_EndedByError)
					  The system encountered an error and had to end the speed boost. Applies only to the "boosts end" events.
					
					4 (SMF90T40_RPBoosts_Last_EndedByError)
					  The system encountered an error and had to end the last (most recent) recovery process boosts. Applies only to the "boosts end" events.
					
					5 - 7 (SMF90T40_BoostClass)
					  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.

23	17	SMF90T40_Flags1	1	binary	Flags:
					
					Bit
					  Meaning when set
					
					0 (SMF90T40_Boosts_EndedByTimer)
					  All IPL boosts were ended. The time limit was reached. Applies only to the "boosts end" events.
					
					1 (SMF90T40_Boosts_EndedByPgm)
					  The customer activated a program to end the IPL boost (the normal method to activate this program is using the IEABE PROC). The system ends whichever boosts were active. Applies only to the "boosts end" events.
					
					2 (SMF90T40_Boosts_EndedBySD)
					  The IPL or recovery process boosts were ended because shutdown began. Applies only to the "IPL boosts end" and "recovery process boosts end" events.
					
					3 (SMF90T40_Boosts_EndedByError)
					  The system encountered an error and ended whichever boosts were active. Applies only to the "boosts end" events.
					
					4 - 6
					  Reserved.
					
					7 (SMF90T40_RPB_Disabled)
					  When 1, recovery process boosts are disabled. When 0, recovery process boosts are enabled. Valid when SMF90T40_BoostLevel ≥ 2. Provided for all SMF90T40 events.

Offsets		Name	Length	Format	Description

24	18	SMF90T40_RP_Start_Requestor_ID	1	binary	The ID of the requestor for which the boost was started. Applies only to "recovery process boosts start" events. Possible values are:
					
					0
					    Not identified
					1
					    Sysplex partitioning
					2
					    Coupling facility structure recovery
					3
					    Coupling facility datasharing member recovery
					4
					    Hyperswap
					5
					    SVC dump
					6
					    Middleware region startup
					7
					    Hyperswap config load

25	19	SMF90T40_BoostLevel	1	binary	Value from ECVT_BoostLevel. Valid when not 0.
26	1A	*	6	binary	Reserved.
32	1A	SMF90T40_RPB_Duration	8	binary	Total duration of recovery process boosts for the life of the IPL, in STCK format. Updated when a recovery process boost is extended or ends. Provided for all events when SMF90T40_BoostLevel ≥ 2.
40	28	SMF90T40_RPB_Duration_Delta	8	binary	Delta of RPB_Duration since the last SMF90T40 RPBoosts_Info record, in STCK format. Provided only for RPBoosts_Info event. Valid when SMF90T40_BoostLevel ≥ 2.
48	30	SMF90T40_RPB_Duration_Potential	8	binary	This is analogous to SMF90T40_RPB_Duration but also includes time that would have been boosted except for the duration limit having been reached, in STCK format. Valid when SMF90T40_BoostLevel ≥ 2. Provided for all SMF90T40 events. Note that no SMF record is written for a boost that is not activated because the duration limit has been reached.
56	38	SMF90T40_RPB_Duration_Potential_Delta	8	binary	Delta of RPB_Duration_Potential since the last SMF90T40 RPBoosts_Info record, in STCK format. Provided only for RPBoosts_Info event. Valid when SMF90T40_BoostLevel ≥ 2.
64	40	SMF90T40_RPB_Duration_Potential_E	8	binary	This is analogous to SMF90T40_RPB_Duration but also includes time that would have been boosted except for the duration limit having been reached while recovery process boosts are enabled, in STCK format. Valid when SMF90T40_BoostLevel ≥ 2. Provided for all SMF90T40 events. Note that no SMF record is written for a boost that is not activated because the duration limit has been reached.
72	48	SMF90T40_RPB_Duration_Potential_E_Delta	8	binary	Delta of RPB_Duration_Potential_E since the last SMF90T40 RPBoosts_Info record, in STCK format. Provided only for RPBoosts_Info event. Valid when SMF90T40_BoostLevel ≥ 2.

Record Type 99 (63) — System Resource Manager Decisions

This topic contains details for changes to SMF record type 99. It contains only sections that were changed. For the complete record type 99, see *z/OS MVS System Management Facilities (SMF)*.

System State Information Section

Offsets		Name	Length	Format	Description
644	284	SMF99_BOOSTINFO	1	binary	WLM view of 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.
2	IPL boost has been activated. Once set, this flag never gets reset.
3	Shutdown boost has been activated. Once set, this flag never gets reset.
4	Reserved.
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.

Address space expanded storage access policy section

Offsets		Name	Length	Format	Description
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	Address space matched a classification rule in the active policy which enables for recovery process boost.
7	Reserved.

WLM details

This topic contains details for changes to WLM, in addition to those described in "WLM changes for middleware region startup recovery process boost" on page 17.

Service definition functionality levels, CDS format levels, and WLM application levels

A service definition has a *functionality level* for each release as shown in Table 26 on page 67:

Table 26. Functionality levels for service definition

Release	Functionality level
OS/390® R4/R5	LEVEL004
OS/390 R6	LEVEL006 or LEVEL007 (LEVEL007 available only with APAR OW33509 installed)
OS/390 R7	LEVEL007 or LEVEL008 (LEVEL008 available only with APAR OW39854 installed)
OS/390 R8	LEVEL007 or LEVEL008 (LEVEL008 available only with APAR OW39854 installed)
OS/390 R9	LEVEL008
OS/390 V1R10 and z/OS V1R1	LEVEL011
z/OS V1R2, V1R3, V1R4, and V1R5	LEVEL013
z/OS V1R6 and V1R7	LEVEL013, LEVEL017 (LEVEL017 available only with APAR OA12784 installed)
z/OS V1R8 and V1R9	LEVEL019
z/OS V1R10	LEVEL021
z/OS V1R11	LEVEL023
z/OS V1R12 and z/OSV1R13	LEVEL025
z/OS V2R1	LEVEL029, LEVEL030 (LEVEL030 available only with APAR OA47042 installed), LEVEL031 (LEVEL031 available only with APAR OA50845 installed)
z/OS V2R2	LEVEL029, LEVEL030 (LEVEL030 available only with APAR OA47042 installed), LEVEL031 (LEVEL031 available only with APAR OA50845 installed), LEVEL032 (LEVEL032 available only with APAR OA52312 installed)
z/OS V2R3	LEVEL032 (LEVEL032 available only with APAR OA52312 installed), LEVEL035
z/OS V2R4	LEVEL035, LEVEL038 (LEVEL038 available only with APAR OA60841 installed)
z/OS V2R5	LEVEL035, LEVEL038 (LEVEL038 available only with APAR OA60841 installed)

Note: LEVEL005, LEVEL009, LEVEL010, LEVEL012, LEVEL014-016, LEVEL018, LEVEL020, LEVEL022, LEVEL024, LEVEL026, LEVEL027, and LEVEL028, LEVEL033, LEVEL034, LEVEL036, and LEVEL037 are reserved.

If you do not use any of the new functions for a new release, then the functionality level does not change, even if you are using the service definition on a new release. When you install the service definition, the system checks whether you have used any of the new functions, and sets the functionality level. For example, if you created your service definition on z/OS V1R8, then its functionality level is LEVEL017. If you installed this service definition from a z/OS V1R7 system but did not use any of the new functions, then its functionality level remains LEVEL013.

You should use the new functions when you are comfortable running the new release on your sysplex. Once you use the new functions and increase the functionality level, then you may not be able to use the service definition on a lower level system. For example, you cannot extract a LEVEL017 service definition from a z/OS V1R5 system. You also cannot activate a policy in a LEVEL017 service definition from a z/OS V1R5 system.

The following function, available on z/OS V1R11, increases the service definition level to LEVEL023:

• The number of report classes in the service definition exceeds 999

The following function, available on z/OS V1R12, increases the service definition level to LEVEL025:

- The service definition contains guest platform management provider (GPMP) configuration settings

The following function, available on z/OS V2R1, increases the service definition level to LEVEL029:

- The service definition contains service class(es) assigned to the I/O priority group or I/O priority groups are enabled
- The number of application environments in the service definition exceeds 999
- The service definition contains new qualifier types Client Accounting Information, Client IP Address, Client Transaction Name, Client User ID, or Client Workstation Name in classification rules for subsystem types DB2 or DDF
- The service definition contains groups of the new group types Accounting Information, Correlation Information, Client Accounting Information, Client IP Address, Collection Name, Client Transaction Name, Client Userid, Client Workstation Name, Process Name, Procedure Name, Sysplex Name, Scheduling Environment, Subsystem Parameter, or Subsystem Collection
- The service definition uses a start position for qualifier type Package Name, either in classification rules or group members
- The service definition uses a start position exploiting the new length of 128 bytes for qualifier type Procedure Name, either in classification rules or group members
- The notepad contains more than 500 lines of information.

  Note that if you plan to add more than 500 lines of notepad information, you need to re-allocate the WLM couple data set before installing this definition.

The following function, available on z/OS V2R1 with APAR OA47042 installed, increases the service definition level to LEVEL030:

- A non-default value is specified for the Reporting Attribute for classification rules.

The following function, available on z/OS V2R1 with APAR OA50845 installed, increases the service definition level to LEVEL031:

- NO is specified for the Honor Priority attribute for any service class on the service class definition panel, or service class override panel.
- A memory limit is specified for any resource group on the resource group definition panel or resource group override panel.

The following function, available on z/OS V2R2 with APAR OA52312 installed, and z/OS V2R3 with APAR OA52312 installed, increases the service definition level to LEVEL032:

- A service definition has tenant resource groups defined
- A resource group is defined with capacity type 2 (as percentage of the LPAR share) and minimum or maximum capacity is greater than 99
- A resource group is defined with capacity type 4 (accounted workload MSU)
- A resource group is defined with option *Include specialty processor consumption*
- The service definition is defined with option *Deactivate discretionary goal management*

The following function, available on z/OS V2R3, increases the service definition level to LEVEL035:

- A service class has a period with a percentile or average response time goal defined and the goal value is below 0.015 seconds.

The following function, available with z/OS V2R4 with APAR OA60841 installed, increases the service definition level to LEVEL038:

- YES is specified for the **Boost** attribute in any classification rule.

Table 27. The current WLM couple data set format level

Current CDS format level	Description
3	Format updated in OS/390 Release 4, with addition of scheduling environments. This is the format level for OS/390 Release 4 or higher.

Return codes for the IWMINSTL sample job

This information describes the return codes issued by the IWMINSTL sample job. The Install Definition Utility is shipped as member IWMINSTL in SYS1.SAMPLIB. You can use the IWMINSTL job to install a WLM service definition or to activate a WLM policy without having to use the ISPF WLM application.

describes the return codes that are issued by IWMINSTL. An accompanying message text is written to the job output listing.

Table 28. Return codes from IWMINSTL

Return code	Message text and explanation
| 0 | ```
Successful execution.
``` |
| 104 | ```
The service definition was not processed due
to a mismatch between the WLM address space
level (current.wlm.level) and the level of this
utility (IWMARIDU.level).
Use the correct level of the IWMARIDU utility.
``` |
| 204 | ```
GetServiceDefinition
Unable to use (your.definition.dataset) for service
definition data. A table has an unrecognized format.
``` |
| 208 | ```
GetServiceDefinition
Unable to use (your.definition.dataset),
data set is in use.
``` |
| 212 | ```
GetServiceDefinition
The service definition was not read due to a
mismatch between the service definition PDS
and the WLM Install Definition Utility.
```<br><br>The service definition PDS has a higher functionality level than the current version of the WLM Install Definition Utility. Once a service definition was updated by a WLM instance with a higher functionality level it can no longer be updated by a WLM instance with lower functionality level. |
| 216 | ```
GetServiceDefinition
The service definition was not opened due to an ISPF dialog
error.
``` |
| 220 | ```
GetServiceDefinition
The service definition is passed in XML format, and the
XML is invalid. See preceding message for details.
``` |
| 304 | ```
InstallServiceDefinition
Install failed, service definition has no name.
```<br><br>No service definition name was specified. To fix the error, do the following:<br><br>• Specify a valid service definition name for IWMINSTL parameter SVDEFPDS.<br><br>• Verify in the IWMINSTL JCL, whether the SVDEF DD statement exists. |

Table 28. Return codes from IWMINSTL (continued)

Return code	Message text and explanation
| 308 | ```
InstallServiceDefinition
Install failed, no workloads are defined.
``` |
| 312 | ```
InstallServiceDefinition
Install failed, no service classes are defined.
``` |
| 316 | ```
InstallServiceDefinition
Install failed, no service policies are defined.
``` |
| 320 | ```
InstallServiceDefinition
Install failed, access was denied to the WLM couple data set.
The user ID does not have update authority to the RACF resource
MVSADMIN.WLM.POLICY in the FACILITY class.
``` |
| 324 | ```
InstallServiceDefinition
InstallServiceDefinition Install failed, service definition
was modified
```<br><br>Every WLM service definition contains a service definition ID. An attempt was made to install a service definition with a different ID than the service definition ID that is installed. A WLM service definition ID consists of the following:<br><br>• The name of the service definition<br>• A timestamp when the service definition was installed<br>• A user ID that installed the service definition<br>• The system name from which the installation was done<br><br>Use the FORCE=Y parameter for the WLM install definition utility to install a service definition with a different ID. The default is FORCE=N. |
| 336 | ```
InstallServiceDefinition
Install failed, failure in WLM bridge layer.
Additional messages regarding this error might
be written to the job output listing.
``` |
| 404 | ```
ActivateServicePolicy
The service policy was not activated due to an ISPF dialog
error.
``` |
| 408 | ```
ActivateServicePolicy
Activate failed, activation in progress on another system.
``` |
| 412 | ```
ActivateServicePolicy Activate failed, one or more
systems were unable to activate the policy.
``` |
| 416 | ```
ActivateServicePolicy
Activate failed, (POLNAME) was not found on the
WLM couple data set.
``` |
| 420 | ```
ActivateServicePolicy
Activate failed, failure in WLM bridge layer.
Additional messages regarding this error might
be written to the job output listing.
``` |

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?, Boost?, ClassificationRule* ) >

<!ELEMENT QualifierValue ( #PCDATA ) >
<!ELEMENT Start ( #PCDATA ) >
<!ELEMENT ReportClassName ( #PCDATA ) >
<!ELEMENT RegionGoal ( #PCDATA ) >
<!ELEMENT StorageCritical ( #PCDATA ) >
<!ELEMENT Boost ( #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 29 on page 74 lists the valid name spaces and the corresponding functionality levels:

Table 29. 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
http://www.ibm.com/xmlns/prod/zwlm/2022/05/ServiceDefinition.xsd	038

Notices

This information was developed for products and services that are offered in the USA or elsewhere.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
United States of America

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

This information could include missing, incorrect, or broken hyperlinks. Hyperlinks are maintained in only the HTML plug-in output for IBM Documentation. Use of hyperlinks in other output formats of this information is at your own risk.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Site Counsel
2455 South Road

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions.

Applicability

These terms and conditions are in addition to any terms of use for the IBM website.

Personal use

You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM.

Commercial use

You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or

reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

IBM Online Privacy Statement

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user, or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

Depending upon the configurations deployed, this Software Offering may use session cookies that collect each user's name, email address, phone number, or other personally identifiable information for purposes of enhanced user usability and single sign-on configuration. These cookies can be disabled, but disabling them will also eliminate the functionality they enable.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at ibm.com®/privacy and IBM's Online Privacy Statement at ibm.com/privacy/details in the section entitled "Cookies, Web Beacons and Other Technologies," and the "IBM Software Products and Software-as-a-Service Privacy Statement" at ibm.com/software/info/product-privacy.

Policy for unsupported hardware

Various z/OS elements, such as DFSMSdfp, JES2, JES3, and MVS, contain code that supports specific hardware servers or devices. In some cases, this device-related element support remains in the product even after the hardware devices pass their announced End of Service date. z/OS may continue to service element code; however, it will not provide service related to unsupported hardware devices. Software problems related to these devices will not be accepted for service, and current service activity will cease if a problem is determined to be associated with out-of-support devices. In such cases, fixes will not be issued.

Minimum supported hardware

The minimum supported hardware for z/OS releases identified in z/OS announcements can subsequently change when service for particular servers or devices is withdrawn. Likewise, the levels of other software products supported on a particular release of z/OS are subject to the service support lifecycle of those

products. Therefore, z/OS and its product publications (for example, panels, samples, messages, and product documentation) can include references to hardware and software that is no longer supported.

- For information about software support lifecycle, see: IBM Lifecycle Support for z/OS (www.ibm.com/software/support/systemsz/lifecycle)
- For information about currently-supported IBM hardware, contact your IBM representative.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at Copyright and Trademark information (www.ibm.com/legal/copytrade.shtml).

Index

A

address space resource data
    RMF - record type 79-2 60
address space state data
    RMF - record type 79-1 59

C

configuring processors 17

D

DTD - XML service definition 71

E

ERBASIG3 53

F

feedback xi
functionality level 67
functionality levels, XML 74

I

IPL boost 11
IWMINSTL, return codes 69

L

layout - XML service definition 71

M

mixed-release sysplex 67

N

name spaces, XML 74

P

processors, configuring 17
procs 21

R

return codes
    sample job IWMINSTL 69
RMF (Resource Measurement Facility)
    Type 79 - Monitor II snapshot data
        Type 79-1 - address space state data 59
        Type 79-2 - address space resource data 60

S

sending to IBM
    reader comments xi
START command
    starting and stopping the recovery process boosts. (IEASRB) 22
    starting the shutdown boosts (IEASDBS) 21
    stopping IPL and shutdown boosts (IEABE) 21
startup boost
    middleware 11
System Recovery Boost Upgrade 4

T

trademarks 78

U

Upgrade 4

X

XML name spaces and functionality levels 74
XML output of IWMDEXTR 71
XML service definition (DTD) 71

Z

z/OS Data Gatherer 18, 53