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**IBM Z**

**Introduction**

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# **z/OS Capacity Provisioning**

Frequently Asked Questions

Worldwide



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## Overview

## What's New

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# Understanding Capacity Provisioning

### What are the benefits?

Capacity Provisioning ensures that the business has the processing capacity it needs. It allows managing central processor, zAAP and zIIP capacity more reliably, more easily, and faster by providing a new flexible and automated way to control activation of On/Off Capacity on Demand and changes to defined capacity or group capacity. Eventually, Capacity Provisioning can reduce your software costs.

### I do not use OOCOD. Does CPM make sense for me?

Capacity Provisioning for z/OS® V2.1 introduces management of defined capacity and group capacity. If you limit your capacity via soft-capping, Capacity Provisioning can help you to adapt those limits to the capacity your business needs. Even if you do not have a OOCOD record or do not make use of Defined Capacity, you can still use Capacity Provisioning in Analysis mode to monitor your workload. This will inform you as soon as your workload does not fulfill its goals and additional capacity is needed. Additionally, Capacity Provisioning can be used to provide advises on logical processor configuration, and perform power save changes on your IBM zEnterprise® 196 (z196) machines.

### How much does it cost?

Capacity Provisioning is a non-priced component of your z/OS operating system. Nevertheless, normal cost associated with your monitoring product, such as RMF™, and OOCOD capacity apply.

### Can I use it to control LPAR weights or Defined Capacity?

Capacity Provisioning can manage additional temporary capacity and concurrently adjust defined capacity or group capacity. Capacity Provisioning does not adjust LPAR weights after activation of additional temporary capacity or changed defined capacity. Nevertheless, you may automate such changes based on the messages issued by Capacity Provisioning.

### I can not identify suitable WLM service classes for workload based provisioning.

### How can Capacity Provisioning react to unexpected processor capacity shortages?

Capacity Provisioning for z/OS V2.2 introduces management of General Purpose, zIIP or zAAP Processor Capacity based on CPC-wide CPU consumption, tracking potential processor bottlenecks.

## Can I continue to manually change capacity while Capacity Provisioning is managing the same processor resources?

If you plan to perform manual capacity changes while the Capacity Provisioning Manager is managing your processor capacity, it is important to understand how the CPM deals with such manual action.

Every capacity change that is not initiated through the CPM policy is treated as a "manual change". That includes changes through the HMC user interface, through other automation products, and through CPM (DE)ACTIVATE RESOURCE, DEFINEDCAPACITY or GROUPCAPACITY

commands. The CPM attempts to honor manual capacity changes by separating them from its own management. The base capacity\* from which the CPM manages will be adjusted by the amount of recognized manually added or removed capacity. Consequently, the CPM will only manage the resources considered CPM-managed. The management base cannot be lower than the permanent capacity of the server. For example, if you manually activate a physical processor, the CPM will not attempt to deactivate it, unless you explicitly request that capacity to be taken over via the `MANAGE RESOURCE` command. Likewise, manual changes to the `DEFINED CAPACITY` and `GROUP CAPACITY` shift the management base but the CPM will not attempt to revert such changes.

\* For OoCoD capacity the current base capacity is displayed as the highest hardware capacity model marked as "Manually Managed" within `REPORT RECORD`. For Defined Capacity it is displayed as "Management Base" within `REPORT DEFINEDCAPACITY/GROUPCAPACITY`.

## Preparing for Capacity Provisioning

### How much setup is really needed? CIM setup:

At least on the runtime systems, CIM is needed for the communication from the z/OSMF Capacity Provisioning task to the Provisioning Manager. If you need workload based provisioning of OOCOD, defined capacity or group capacity resources, then CIM setup is also needed on all observed systems.

### Performance monitor product setup:

A performance monitoring product such as RMF is needed if you need workload based provisioning of OOCOD, defined capacity or group capacity resources. The product needs to be setup on all observed systems.

### HMC setup:

The definitions to access the hardware information is always needed, even if you do not run in confirmation or autonomic mode.

### CP security setup:

depending on your requirements, you need to define at least security on the runtime systems. For workload based provisioning, also the setup for the observed systems is needed.

### CP domain and policy definition:

For pure manual mode operations, only a domain configuration with the managed CPCs is needed. A policy is only needed if you want to perform scheduled or workload based provisioning of OOCOD, defined capacity or group capacity resources.

### Who can help me?

IBM Implementation Services for IBM Z® Capacity Provisioning can support you when preparing and implementing Capacity Provisioning on your systems.

### What setup tasks can I eliminate when I only want to use the command-line interface to manually change the activation levels?

This configuration requires an installed Capacity Provisioning Manager with a configuration file that specifies the address of the HMC or SE that should execute the submitted activations or deactivations. Additionally you need a domain configuration containing the CPCs that you want to manage.

## Implementing and Testing Capacity Provisioning Manager

### What is wrong if I receive the following CPM messages?

CPO3860E CIM\_ERR\_ACCESS\_DENIED at CIM server at http://[hostname:port]. Error is "HTTP 401 – Unauthorized".

CPO3802W The system at address [hostname] is unavailable.

### There is an authorization problem between the Capacity Provisioning Manager (CPM) and the CIM Server running on system [hostname].

The CPM uses passtickets to connect to the CIM Server. If there is not a general lack of authorization for the CPM started task user, most probably these messages indicate an error with the passticket setup.

Check the z/OS console on system [hostname] for further CFZ\* and ICH\* messages to get a hint on the cause of the problem. In addition check if you have followed all the steps described in chapter "Securing the runtime system" of the Capacity Provisioning Users Guide, with a special focus on the setup of the secured signon function, aka passtickets.

### CPO3815W Insufficient information for retrieving metric values from the system at address [hostname].

### The Capacity Provisioning Manager was not able to retrieve all required performance metrics from system [hostname].

Most probably this is because RMF or a comparable performance monitor product was not active or properly configured on that system.

### CPO3850E Unable to connect to CIM server at http://[hostname:port].. CPO3802W The system at address [hostname] is unavailable.

The Capacity Provisioning Manager retrieves performance metrics from the observed system through the z/OS CIM Server.

### A CPO3850E message indicates that the CIM Server is not currently running on that system [hostname] or was configured with a different port than [port].

Check the CIM Server setup on system [hostname] to solve the problem.

### CPO3834E Error retrieving instances of class IBMzOS\_WLMServiceDefinition from CIM server at address http://[hostname:port]..

### CPO3861E CIM\_ERR\_NOT\_SUPPORTED at CIM server at http://[hostname:port]. Error is "CIM\_ERR\_NOT\_SUPPORTED: GPMSERVE is not active or registered"

### CPO3866E CIM\_ERR\_FAILED at CIM server at http://[hostname:port].. Error is "CIM\_ERR\_FAILED: GPMSERVE is not active or registered".

The RMF Distributed Data Server (GPMSERVE) was not started in the sysplex.

Information on how to set up the RMF Distributed Data Server can be found in the RMF User's Guide.

**CPO3850ECPO3861E CIM\_ERR\_NOT\_SUPPORTED at CIM server at http://[hostname:port].. Error is "CIM\_ERR\_NOT\_SUPPORTED: Unable to obtain a PassTicket".**

**CPO3834E Error retrieving instances of class IBMzOS\_WLMServiceDefinition from CIM server at address http://[hostname:port].**

**CPO3866E CIM\_ERR\_FAILED at CIM server at http://[hostname:port].. Error is "CIM\_ERR\_FAILED: Unable to obtain a PassTicket".**

A passticket setup problem for the RMF CIM Provider to the RMF Distributed Data Server.

The CIM metric classes implemented by RMF retrieve data from the RMF Distributed Data Server (DDS). If the RMF DDS is configured to require authentication, the following additional setup steps are required:

- Define the application GPMSEVERE to your security product.
- Grant the CIM server UPDATE access to the generic profile IRRPTAUTH.GPMSEVERE.\* in class PTKTDATA.

Details on the Passticket setup for the RMF Distributed Data Server can be found in the RMF Programmers Guide and in the CIM Users Guide.

**CPO3022W Record ID id for CPC name not available**

You can see the record on your HMC or SE but the Provisioning Manager does not see it. This can happen if you are using BCPII as communication protocol to the hardware, but the Provisioning Manager user does not have sufficient authorization to access this record information. For a record, a FACILITY class profile HWI.CAPREC.net id.nau.record id is needed.

**CPO3811W Cannot correlate system at address [hostname] to a CPC with serial number [number].**

**CPO3002W Connection problem for connection to HMC or SE at address [hostname].**

A connectivity problem with the CPC, HMC or SE that can have multiple reasons:

**TCP/IP Name Resolution does not work properly for the given [hostname].**

For a failing CPC correlation, replace the hostname by the valid IP-address in the active CPM policy.

For a failing HMC or SE connection, replace its hostname by the valid IP-address in the CPM configuration file.

What is wrong if I receive the following messages in the z/OSMF Capacity Provisioning task? CPO8053E No connection established to domain [domain name].

CPO8041E Unable to connect to Capacity Provisioning CIM provider.

- On systems running z/OS V1R11 or later these messages usually indicate a problem with file `/etc/cpoprovider.properties`. This file is read by the Capacity Provisioning CIM Provider. For this purpose it should have the access rights set to `"rw-r--r--"` and needs to be properly tagged with EBCDIC code page IBM-1047. To verify the tagging run command `"chtag -p /etc/cpoprovider.properties"` in the UNIX System Services shell. The output should be:  
t IBM-1047 T=on /etc/cpoprovider.properties.  
To set the correct tag you may run command `"chtag -t -c IBM-1047 /etc/cpoprovider.properties"`.

On system prior to z/OS V1R11, in addition to the above mentioned error, the CIM Provider for the Capacity Provisioning Manager may not be set up correctly. To check and solve this refer to the Capacity Provisioning Users Guide "Chapter 3. Setting up a Capacity Provisioning domain" - "Preparing the connection to the Provisioning Manager".



## Using Capacity Provisioning Manager and z/OSMFCapacity Provisioning task

### How can I define a policy with just times and not dates?

Capacity Provisioning always needs to know in which periods of time it should consider activations, hence begin date and end date are mandatory.

Nevertheless the CP policy allows to define Recurring Time Conditions of daily periods for activations. For this purpose you can specify times of (potential) activations and deactivations as well as the weekdays on which these (de)activations should apply.

Finally you need to specify a start date and end date between which this repeating periods should take place.

### What is a fast and simple way to detect processor bottlenecks and to trigger activation of temporary capacity?

You can set up a utilization condition in your Capacity Provisioning policy. This will get the Provisioning Manager to monitor the CPC-wide processor utilization and to activate temporary capacity if it exceeds certain levels. Be aware that also (business) unimportant workload can cause high processor utilization, and that in connection with an Utilization Condition it also could trigger activations.

### How can I enable or disable Time Conditions?

You can either enable or disable:

- the complete Provisioning Condition that contains the specific Time Condition or
- the Rule that contains the Provisioning Condition and the Time Condition in question.

This can be done either:

- when defining the Policyz/OSMF Capacity Provisioning task, or at runtime, issuing the commands:
- `enable policy r=[rule] pc=[provisioning_condition]` `disable policy r=[rule] pc=[provisioning_condition]`

### Why did CPM activate resources?

After an activation of temporary capacity, defined capacity or group capacity resources you can issue a report activity command, which displays all previous activations and deactivations together with the workloads and policy rules that triggered them.

### Why did CPM not activate resources, when I expected to do it?

Additionally to the PI limits specified in your active policy, CPM observes other metrics relevant for recognizing whether a bottleneck is actually caused by a processor shortage and whether activating additional capacity would really help the suffering workload before activating resources.

You can issue a  
report workload type=detailed

command at any time in order to check which bottlenecks and what kind of processor demands have been recognized by CPM at that particular time. This report will also show for what reason CPM might not have recognized the need for additional resources despite of a CPU shortage.

### **Why is my OOCoD capacity, defined capacity or group capacity not deactivated when the time condition ends**

The end time in a policy's time condition specifies when previously activated capacity should be deactivated even if the workload that caused the activation is still suffering.

If the resource is not deactivated until then, this might have several reasons:

- Your CPM configuration file can define a `Planner.MinimumActivationTime` and `DefinedCapacity.MinimumActivationTime` specifying the minimum time of an resource activation by CPM, which exceeds the duration between activation of the resource and the end time. CPM will wait until this time has expired before deactivating the resource. The default minimum activation time is 4 hours for temporary capacity and 15 minutes for defined capacity and group capacity.
- Another workload defined in a different provisioning condition or rule also depends on the additional resources. The resources will be deactivated as soon as the last depending workload is no longer in need.



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