# IBM Education Assistance for z/OS V2R1

Item: Defined Capacity and Group Capacity Management
Element/Component: Capacity Provisioning

Material is current as of March 2013

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# Agenda

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# Presentation Objectives

- New commands
  - New z/OS Capacity Provisioning Manager commands for manual increase or decrease of Defined Capacity and Group Capacity limits.

- Management of Defined Capacity and Group Capacity
  - Provisioning Manager monitors systems for processor bottlenecks caused by Defined Capacity or Group Capacity
  - New Capacity Provisioning policy allows to define limits within which Defined Capacity of observed systems' LPARs and of specified Capacity Groups should be managed
  - Provisioning Manager can change autonomically or advise to change Defined Capacity and Group Capacity limits based on settings of the Capacity Provisioning policy


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# Overview – New Commands for Defined Capacity and Group Capacity

- **Problem Statement / Need Addressed**
  - The introduction of Defined Capacity Management in z/OS Capacity Provisioning may require fast access for z/OS operators to change Defined Capacity and Group Capacity limits.
  - Limits for Defined Capacity and Group Capacity cannot be changed through normal z/OS operator commands
- **Solution**
  - Capacity Provisioning provides new operator commands to increase or decrease the Defined Capacity and Group Capacity limits.
- **Benefit / Value**
  - Operators don't need to access the SE or HMC for changing the Defined Capacity or Group Capacity limits


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# Overview – Defined Capacity and Group Capacity management 1

- **Problem Statement / Need Addressed**
  - Defined Capacity or Group Capacity could constrain workload
  - Provisioning Manager will not increase physical CP capacity in such situations or take any further action
  - Capacity bottleneck remains without mitigation
- **Example:**

```
Workload is analyzed for 1 system(s)
Workload for system PROD1 of sysplex PRODPLEX on CPC EC12
   CICSHIGH.1 PL/PD/DL/DD/S 1.8 5 1.2 12 System
       PI from 11/16/2012 07:43 is 2.76
           Last limit crossing was 12/16/2012 07:27
       Demand for additional physical zIIPs not recognized
           System zIIP-utilization too low
       Demand for additional physical zAAPs not recognized
           System zAAP-utilization too low
       Demand for additional CP capacity not recognized
           Usage near or above defined capacity limit
```


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# Overview – Defined Capacity and Group Capacity management 2

- **Solution**
  - Customer specifies in Capacity Provisioning policy how Defined Capacity and Group Capacity should be managed
  - Provisioning Manager monitors Defined Capacity and Group Capacity and its effects on suffering workload
  - Provisioning Manager decides or indicates when and how Defined Capacity and Group Capacity need to be changed

- **Benefit / Value**
  - Operators don't need to constantly monitor capacity usage and to change Defined Capacity or Group Capacity limits when needed
  - Provisioning Manager automatically changes or advises to change Defined Capacity and Group Capacity if necessary
  - Customer can monitor when and why capacity changes have been executed. Either at run-time or afterwards.


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# Usage & Invocation – New Commands: ACTIVATE DEFINEDCAPACITY

Command to manually increase the defined capacity limit for an LPAR

- **Invocation:**

  **ACTIVATE DEFINEDCAPACITY SYS=***name* **PLEX=***name* **MSU=***limit*

  **ACTIVATE DEFINEDCAPACITY LPAR=***name* **CPC=***name* **MSU=***limit*

  short command:

  **A DC** …

- **Example:**

```
CPO3027I Defined capacity information for CPC EC12 is available
…
MODIFY CPOSERV,APPL=A DC LPAR=SYS4 CPC=EC12 MSU=55
CPO1289I Defined capacity limit for LPAR SYS4 on CPC EC12 increased to
55 MSU
```


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# Usage & Invocation – New Commands:
## DEACTIVATE DEFINEDCAPACITY

Command to manually decrease the defined capacity limit for an LPAR

- **Invocation:**

  **DEACTIVATE DEFINEDCAPACITY SYS=***name* **PLEX=***name* **MSU=***limit*

  **DEACTIVATE DEFINEDCAPACITY LPAR=***name* **CPC=***name* **MSU=***limit*

  short command:

  **I DC** …

- **Example:**

```
CPO3027I Defined capacity information for CPC EC12 is available
…
MODIFY CPOSERV,APPL=I DC LPAR=SYS4 CPC=EC12 MSU=50
CPO1310I Defined capacity limit for LPAR SYS4 on CPC EC12 decreased to
50 MSU
```


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# Usage & Invocation – New Commands: ACTIVATE GROUPCAPACITY

Command to manually increase the defined capacity limit for a defined capacity group

- **Invocation:**

  **ACTIVATE GROUPCAPACITY SYS=***name* **PLEX=***name* **MSU=***limit*

  **ACTIVATE GROUPCAPACITY GROUP=***name* **CPC=***name* **MSU=***limit*

  short command:

  **A GC** …

- **Example:**

```
CPO3027I Defined capacity information for CPC CPC1 is available
…
MODIFY CPOSERV,APPL=A GC GROUP=GROUP1 CPC=CPC1 MSU=1000
CPO1298I Group capacity limit for group GROUP1 on CPC CPC1 increased
to 1000 MSU
```


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# Usage & Invocation – New Commands:
## DEACTIVATE GROUPCAPACITY

Command to manually decrease the defined capacity limit for a defined capacity group

- **Invocation:**

  **DEACTIVATE GROUPCAPACITY SYS=***name* **PLEX=***name* **MSU=***limit*

  **DEACTIVATE GROUPCAPACITY GROUP=***name* **CPC=***name* **MSU=***limit*

  short command:

  **I GC** …

- **Example:**

```
CPO3027I Defined capacity information for CPC EC12 is available
…
MODIFY CPOSERV,APPL=I GC GROUP=GROUP1 CPC=CPC1 MSU=500
CPO1312I Group capacity limit for group GROUP1 on CPC CPC1 decreased
to 500 MSU
```


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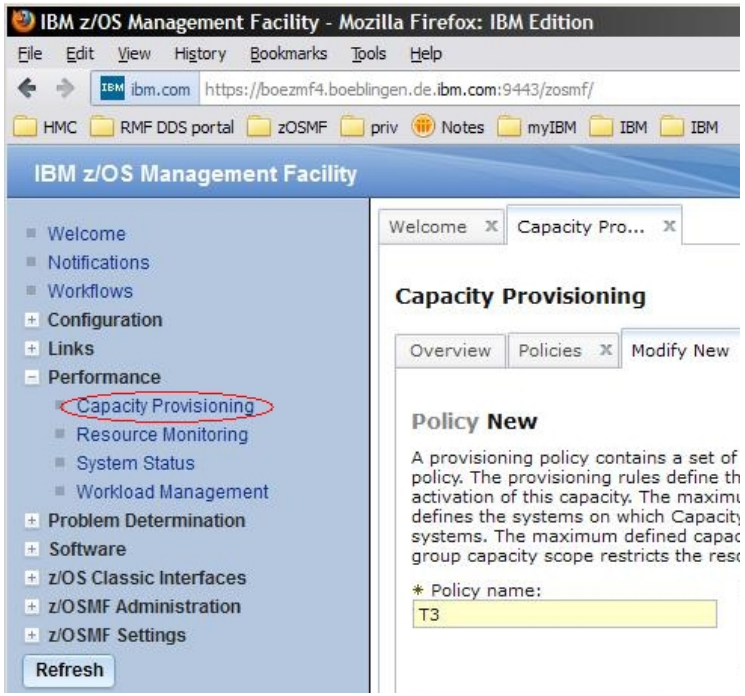
# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Definitions

- Specifications how Provisioning Manager should handle Defined Capacity and Group Capacity require changes in **Capacity Provisioning**
  - **Domain Configuration**
  - **Policy**
- Both can **only** be defined in z/OSMF for z/OS V2R1
- Capacity Provisioning Control Centers shipped with prior releases allow only definitions for physical and logical processor management





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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Definition Steps

- The **Domain Configuration** defines a Capacity Provisioning management domain specifying
  - *CPCs* with LPAR Capacity Groups or LPARs with Defined Capacity
  - *Systems* in those LPARs where workload possibly should be monitored
- The **Policy** defines scopes and rules for changes of Defined Capacity and Group Capacity limits
  - *Provisioning Scopes* define the amount of allowed changes
  - *Time Conditions* define when increases and decreases of capacity should happen either unconditionally or in combination with ...
  - *Workload Conditions* specify when an observed workload is constraint and should initiate a step-by-step increase and decrease of capacity


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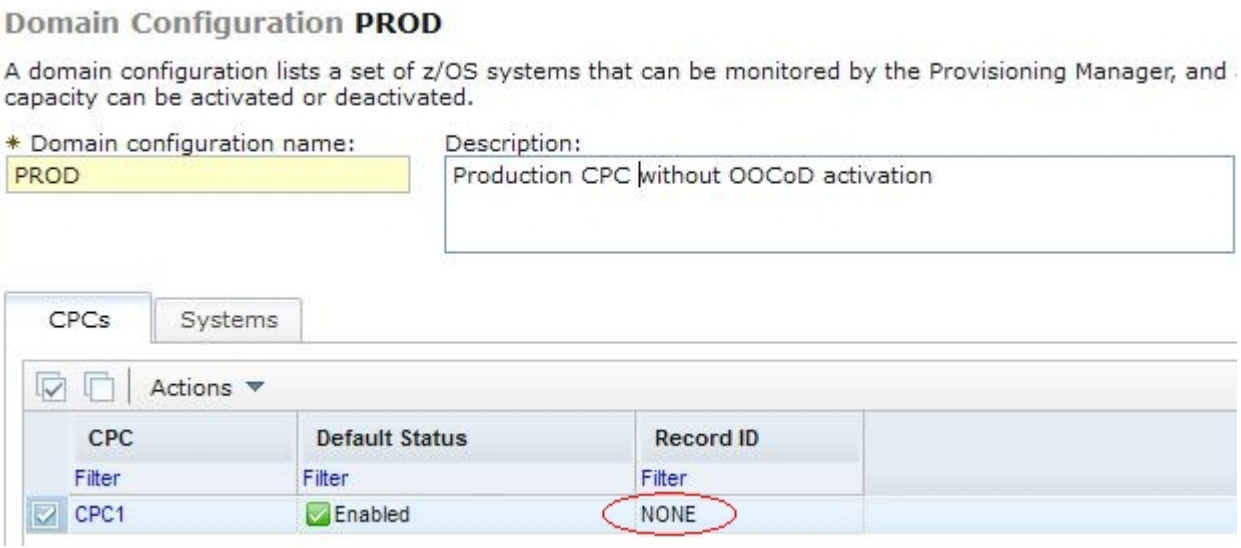
# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Domain Configuration CPCs

- Specification of *CPCs* in the Domain Configuration does no longer require a *Record ID*
- Physical processor (OOCoD) management for CPCs with Record ID "NONE" is not allowed for the Provisioning Manager
- **Example in z/OSMF:**





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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Domain Configuration Systems

- Provisioning Manager initiates capacity changes on behalf of *Systems* whose LPARs have Defined Capacity or belong to a Capacity Group
- Observed systems need to be specified in order to gather necessary metrics for Defined Capacity or Group Capacity
- **Example in z/OSMF:**

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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy

- Definition of ***how much*** additional Defined Capacity and Group Capacity should be managed
  - defining the maximum additional capacity the Provisioning Manager is allowed to manage
  - defining step-by-step increments in case of workload triggered management
- Information ***where*** and ***what kind*** *of* capacity should be managed
  - for Defined Capacity, naming the observed system which is running on the LPAR with that capacity setting
  - for Group Capacity, naming the Capacity Group
- Provisioning Manager will automatically relate managed systems to their hosting LPAR and manage ...
  - its Defined Capacity settings
  - the settings of the Capacity Group to which the system's LPAR belongs


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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 1

Global limits and step-by-step increments for Defined Capacity and Group Capacity are defined in the *Maximum Defined Capacity Scope* in addition or alternatively to the settings for processors

- **Example in z/OSMF:**

**Policy SAMPPOL**

0 Messages | Switch to

A provisioning policy contains a set of provisioning rules and scopes which restrict the resources that may be activated by the rules in the policy. The provisioning rules define the time periods in which additional capacity can be activated and the work which can trigger the activation of this capacity. The maximum processor scope restricts the capacity that may be activated for CPCs. The logical processor scope defines the systems on which Capacity Provisioning manages the number of logical processors and which processor limits apply for these systems. The maximum defined capacity scope restricts the resources that can be activated for LPARs running a z/OS system. The maximum group capacity scope restricts the resources which can be activated for capacity groups.

* Policy name: SAMPPOL

Description: Sample production system policy

Maximum Processor Scope | Logical Processor Scope | Maximum Defined Capacity Scope | Maximum Group Capacity Scope | Rules

Actions

| System Filter | Sysplex Filter | Max. Increase (MSU) Filter | Primary Increment (MSU) Filter | Secondary Increments (MSU) Filter |
|---|---|---|---|---|
| PROD1 | PRODPLEX | 60 | 25 | 10 |



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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 2

- Policy-wide scopes for Defined Capacity define
  - *Max. Increase (MSU)* as the maximum additional MSU the Provisioning Manager is allowed to manage
  - The range of workload based step-by-step increments in *Primary* and *Secondary Increments (MSU)*
    The settings are implicitly associated to the Defined Capacity of the system's LPAR
- **Example in z/OSMF:**

* Policy name: SAMPPOL

Description: Sample production system policy

Maximum Processor Scope | Logical Processor Scope | Maximum Defined Capacity Scope | Maximum Group

Actions

| System Filter | Sysplex Filter | Max. Increase (MSU) Filter | Primary Increment (MSU) Filter | Secondary Increments (MSU) Filter |
|---|---|---|---|---|
| PROD1 | PRODPLEX | 60 | 25 | 10 |


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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 3

- Policy-wide scopes for Group Capacity define
  - *Max. Increase (MSU)* as the maximum additional MSU the Provisioning Manager is allowed to manage
  - The range of workload based step-by-step increments in *Primary* and *Secondary Increments (MSU)*.
- The settings become effective as soon as at least one monitored system's LPAR belongs to the specified Capacity Group
- **Example in z/OSMF:**

* Policy name: SAMPPOL

Description: Sample production system policy

Maximum Processor Scope | Logical Processor Scope | Maximum Defined Capacity Scope | Maximum Group Capacity Scope

Actions

| Group Filter | CPC Filter | Max. Increase (MSU) Filter | Primary Increment (MSU) Filter | Secondary Increments (MSU) Filter |
|---|---|---|---|---|
| TRANSGRP | CPC1 | 100 | 25 | 15 |



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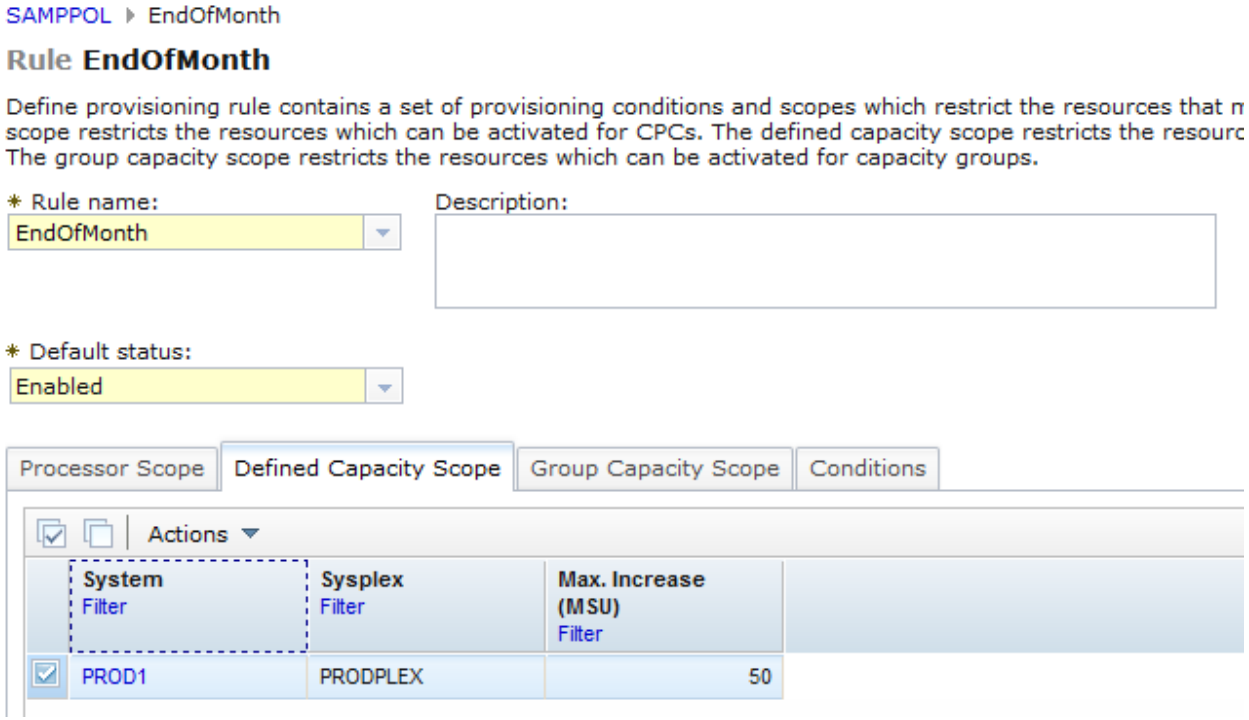
# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 4

Rule-bound scopes for Defined Capacity define *Max. Increase (MSU)* as the maximum additional MSU the Provisioning Manager is allowed to increment on behalf of workloads or scheduled activations of that rule

- **Example in z/OSMF:**





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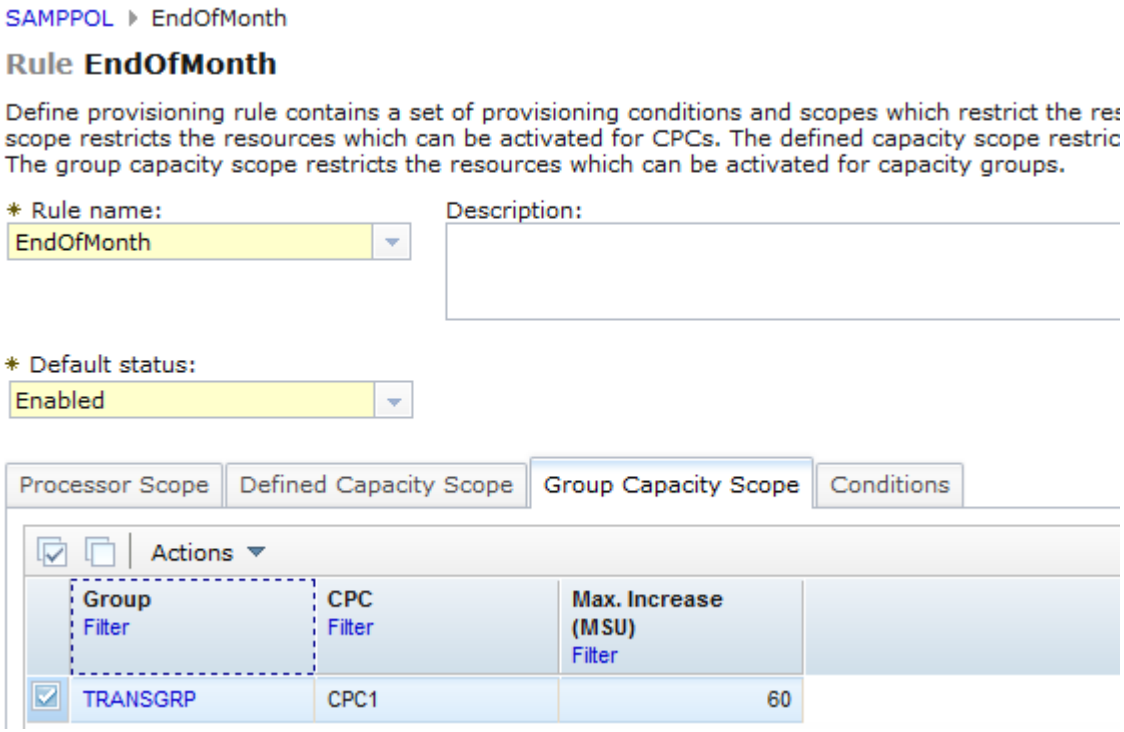
# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 5

Rule-bound scopes for Group Capacity define *Max. Increase (MSU)* as the maximum additional MSU the Provisioning Manager is allowed to increment on behalf of workloads or scheduled activations of that rule

- **Example in z/OSMF:**





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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 6

Rule-bound Time Conditions define the period of time during which capacity changes are authorized, either unconditional or based on Workload Conditions when such are defined in addition.

- **Example in z/OSMF:**

**Condition Weekend**

0 Messages | Switch to

Define a provisioning condition. A provisioning condition contains time conditions that define time periods during which additional capacity can be activated and optionally workload conditions that define the work that is eligible to cause activation of additional capacity.
All timestamps below are shown in GMT.

* Condition name: Weekend

Description: Weekend accounting transactions

* Default status: Enabled

Nonrecurring Time Conditions | Recurring Time Conditions | Workload Conditions

Actions

| Name | Start Date | End Date | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Start Time | Deadline | End Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter |
| SatSunDay | Dec 1, 2012 | Dec 1, 2013 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6:00 AM | 3:00 PM | 6:00 PM |



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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Policy 7

Rule-bound Workload Conditions define when workloads are considered to be suffering and qualify for step-by-step capacity changes

- **Example in z/OSMF:**

**Workload Condition New**

0 Messages | Switch to

Define a workload condition that specifies the work that is eligible to cause activation of additional capacity and the conditions under which that work can trigger this activation. There must be at least one importance filter or one included service class filter for a valid workload condition.

* Name: CICS

Description: CICS TOR

* System:
- Any in sysplex
- Specify a value:

* Sysplex:
- Any
- Specify a value: PRODPLEX

Importance Filters | Included Service Classes | Excluded Service Classes

Actions

| Service Definition | Service Policy | Service Class | Period | Provisioning PI | Provisioning Duration (Minutes) | Deprovisioning PI |
|---|---|---|---|---|---|---|
| Filter | Filter | Filter | Filter | Filter | Filter | Filter |
| PRODDEF | PRODPOL | CICSHIGH | 1 | 1.8 | 5 | 1.2 |



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# Usage & Invocation – Defined Capacity and Group Capacity management – Preparation: Parameters

Provisioning Manager parameters for fine tuning the Defined Capacity and Group Capacity management of the corresponding domain

| Key | Default Value | Description |
|---|---|---|
| DefinedCapacity .BlockingTime | 5 | Number of minutes the Provisioning Manager waits after detection of a defined capacity or group capacity change for the LPAR or Capacity Group before any new defined capacity or group capacity change action is initiated. This time allows the workload to be redistributed after a capacity change. The recommended range is a value of 5 - 15 minutes. |
| DefinedCapacity .ProvisioningRejectTime | 120 | Number of minutes a Defined Capacity or Capacity Group is not considered for Provisioning Manager actions after a provisioning request proposed by the Provisioning Manager has been rejected in processing mode CONFIRMATION. |
| DefinedCapacity .DeprovisioningRejectTime | 120 | Number of minutes a Defined Capacity or Capacity Group is not considered for Provisioning Manager actions after a decrease request proposed by the Provisioning Manager has been rejected in processing mode CONFIRMATION |
| DefinedCapacity .LeadTime | 5 | Advance time in minutes before an imminent Defined Capacity or Group Capacity limit is reached when the Provisioning Manager should consider increasing the limit. |
| DefinedCapacity .MinimumActivationTime | 15 | Number of minutes a Defined Capacity or Group Capacity increase must remain active before it is considered for decrease by the Provisioning Manager. This time interval starts again with any new Defined Capacity or Group Capacity change. When specified, the minimum activation time must be greater than the blocking time. |
| DefinedCapacity .GlobalMinimumDefinedCapacity | 5 | Minimum allowed Defined Capacity for Provisioning Manager. Provisioning Manager will not decrease any Defined Capacity below this value. |
| DefinedCapacity .GlobalMinimumGroupCapacity | 5 | Minimum allowed Group Capacity for Provisioning Manager. Provisioning Manager will not decrease any Group Capacity below this value. |


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# Usage & Invocation – Defined Capacity and Group Capacity management – Scheduled and Workload based activation

Two different patterns of managing Defined Capacity and Group Capacity

- For Rules that contain only Time Conditions **without** Workload Conditions
  - At *Start Time* compelling capacity increase
  - Increase amount as specified in the Rule's scope as *Max. Increase (MSU)*
  - At *End Time* compelling decrease of the amount previously increased
- For Rules that contain Time Conditions **and** Workload Conditions
  - Capacity increase after *Start Time*, if specified workload is suffering
  - Increase steps as specified in the *Maximum Scope* as *Primary* and *Secondary Increment(s) (MSU)*
  - No further increase after *Deadline*
  - Total increase only up the Rule's scope *Max. Increase (MSU)*
  - If acceptable, staged capacity decrease before *End Time*, later all at once


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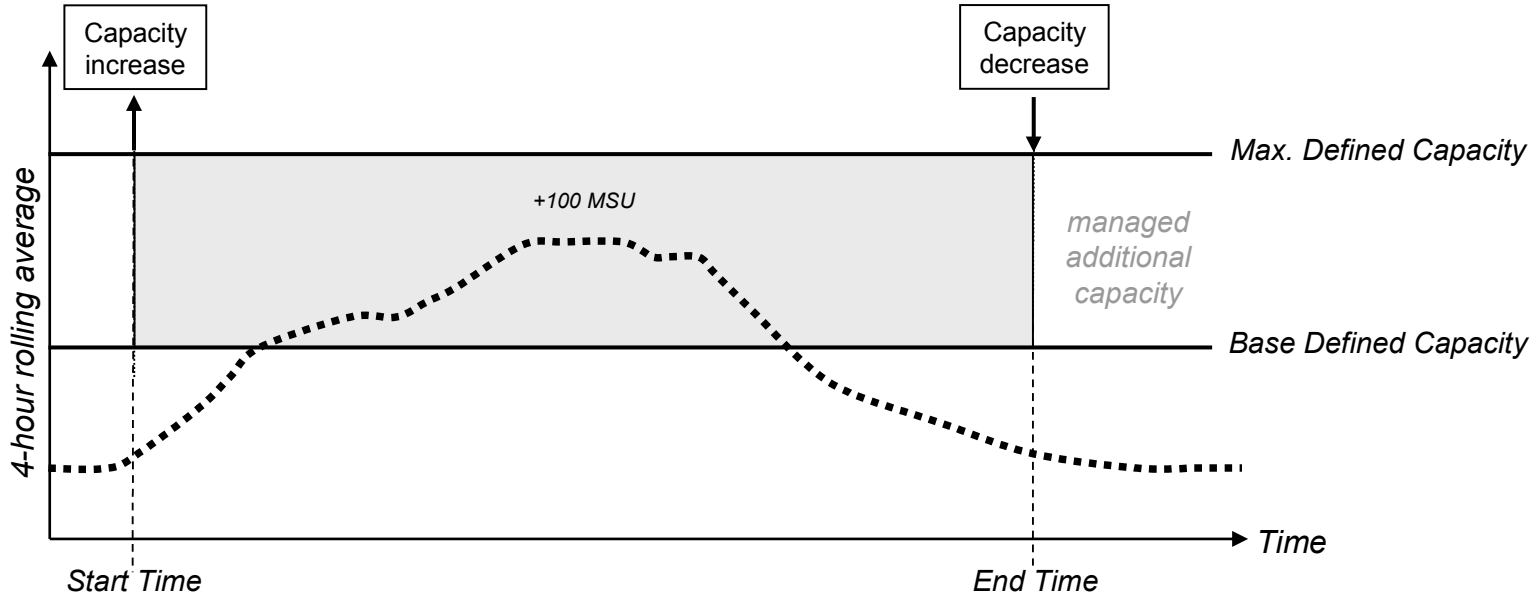
# Usage & Invocation – Defined Capacity and Group Capacity management – Scheduled activation

Example of a scheduled activation and deactivation

- Compelling increase at *Start Time*
  - *Start Time* and *Max. Increase (MSU)* based on customer's experience
- Compelling decrease at *End Time*
  - *End Time* based on customer's experience





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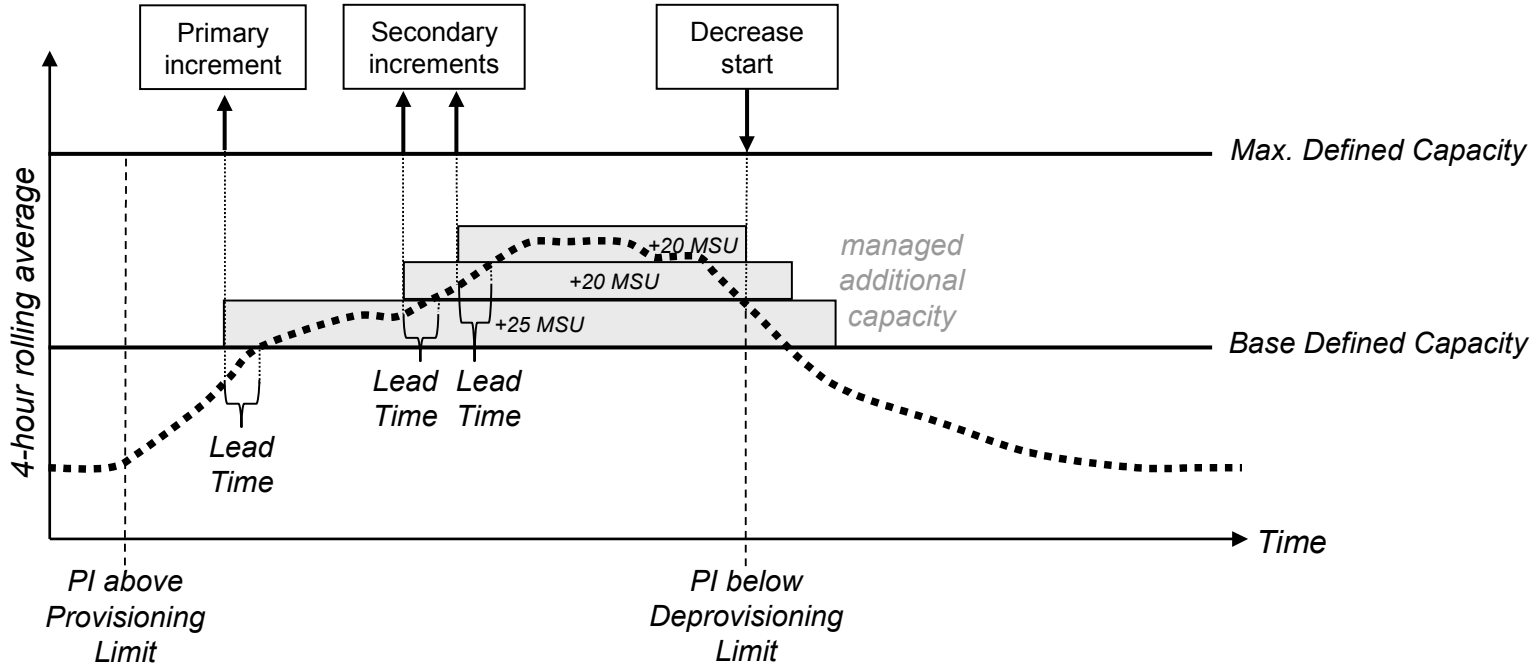
# Usage & Invocation – Defined Capacity and Group Capacity management – Scheduled activation

Example of workload based activations and deactivations

- Staged increase after *Start Time,* as long as specified workload is suffering and the current capacity limit is about to restrict available capacity
- Staged decrease as soon as workload is not suffering anymore





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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Messages and Reports

- Messages tell about ...
  - Current capacity settings and detected (external) changes
  - Management *bases*, marking the starting point and eventually end point of Capacity Provisioning management
  - Provisioning Manager initiated capacity changes or change intentions

- Reports provide information about ...
  - Monitored systems and their relevant capacity data and metrics
  - Current policy with capacity scopes, time frames and condition settings
  - Situations when workload qualifies for step-by-step changes of Defined Capacity or Group Capacity
  - Current capacity and Provisioning Manager status regarding a specific system, LPAR or capacity group
  - Listing of all capacity changes initiated by the Provisioning Manager


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Configuration Report

The Configuration report displays the current Defined Capacity and Group Capacity limits which can potentially slow down workload on an observed system

- **Example in z/OSMF:**

- **Example on console:**

```
MODIFY CPOSERV,APPL=REPORT CONFIGURATION

Domain configuration CPDFCT6 for domain FCTRS is enabled
…
System IRD6 in sysplex IRD4PLEX is enabled (default enabled)
…
 LPAR IRD6 with defined capacity of 50 MSU
 LPAR IRD6 in capacity group MGTEST2 with 999 MSU
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Policy Report

Policy report displays the active policy with its Defined Capacity and Group Capacity specifications

- **Example in z/OSMF:**

Provisioning Manager ▸ Active Policy

**Active Policy for Domain FCTRS**

This page shows information about the active policy.
All timestamps below are shown in local time (GMT +01:00).

Active policy: CHKDC4 Status: Enabled

Actions | Table view: Tree

| Type Filter | Name Filter | Status Filter | Details Filter |
|---|---|---|---|
| Policy | CHKDC4 | Enabled | |
| Maximum processor scope | | | |
| Logical processor scope | | | |
| Maximum defined capacity scope | | | |
| Capacity limit | IRD4PLEX.IRD6 | | MSU Limit: 5000 |
| Maximum group capacity scope | | | |
| Rule | Rule1 | Enabled | Default status: Ena |
| Processor scope | | | |
| Defined capacity scope | | | |
| Capacity limit | IRD4PLEX.IRD6 | | MSU Limit: 200 |
| Group capacity scope | | | |

- **Example on console:**

```
MODIFY CPOSERV,APPL=REPORT POLICY

Policy CHKDC4 is enabled
…
Maximum defined capacity scope:
 System IRD6 sysplex IRD4PLEX limit is 5000 MSU
  activation of 25/15 MSU
…
Rule Rule1 is enabled (default enabled)
 Defined capacity scope:
  System IRD6 sysplex IRD4PLEX limit is 200 MSU
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Messages of current situation

Console messages tell about detected capacity information concerning observed systems and Provisioning Manager management bases

- **Examples:**

```
CPO3027I Defined capacity information for CPC CPC1 is available

CPO3986I Defined capacity observed. Current capacity is 50 MSU
   for LPAR LP1 of CPC CPC1 with system PROD1 in sysplex PRODPLEX

CPO3960I Defined capacity base is 50 MSU for LPAR LP1 of CPC CPC1
   with system PROD1 in sysplex PRODPLEX
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Detailed Workload Report

Detected bottlenecks and recognized demands for increasing Defined Capacity or Group Capacity limits can be queried as they occur

- **Example on console:**

```
MODIFY CPOSERV,APPL=REPORT WORKLOAD TYPE=DETAILED

Workload is analyzed for 1 system(s)
Workload for system PROD1 of sysplex PRODPLEX on CPC CPC1
   CICSHIGH.1 PL/PD/DL/DD/S 1.8 5 1.2 12 System
       PI from 11/16/2012 07:43 is 2.76
           Last limit crossing was 12/16/2012 07:27
       Demand for additional physical zIIPs not recognized
           System zIIP-utilization too low
       Demand for additional physical zAAPs not recognized
           System zAAP-utilization too low
       Demand for additional defined capacity recognized
       Demand for additional physical CPs not recognized
       Demand for capacity level increase not recognized
       Demand for additional logical CPs not recognized
           CPC-wide CP-utilization too low
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Messages of capacity changes

Provisioning Manager informs on console about capacity changes it initiates and of their successful implementation

- **Example on console:**

```
CPO3962I Defined capacity increase initiated to 75 MSU for LPAR LP1
   of CPC CPC1 with system PROD1 in sysplex PRODPLEX

CPO3984I Capacity change detected. Current defined capacity is 75 MSU
   for LPAR LP1 of CPC CPC1 with system PROD1 in sysplex PRODPLEX
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Defined Capacity Report

Defined Capacity or Group Capacity information, related to an observed system's LPAR or to a Capacity Group an observed system's LPAR is currently associated to

- **Example on console:**

```
MODIFY CPOSERV,APPL=REPORT DEFINEDCAPACITY SYS=PROD1 PLEX=PRODPLEX

CPO1095I Defined capacity report generated at 11/16/2012 07:48:01
Defined capacity for system PROD1 in sysplex PRODPLEX
     CPC.LPAR:                          CPC1.PRODLPAR
     Sysplex.System:                    PRODPLEX.PROD1
   Management state:                  ChangeBlocked
   Policy limit:                      50 additional MSU
   Management base:                   50 MSU
   Managed capacity:                  25 additional MSU
   Current capacity:                  75 MSU
   Remaining time until capping:      25 minutes
   4 hour rolling average:            71 MSU
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Defined Capacity Report 2

Syntax of commands to request information about the current capacity management status for

- **Defined Capacity**

  **REPORT DEFINEDCAPACITY SYS=***name* **PLEX=***name*

  **REPORT DEFINEDCAPACITY LPAR=***name* **CPC=***name*

  short command:

  **R DC** …

- **Capacity Group**

  **REPORT GROUPCAPACITY SYS=***name* **PLEX=***name*

  **REPORT GROUPCAPACITY GROUP=***name* **CPC=***name*

  short command:

  **R GC** …


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: External capacity changes

Capacity changes that have not been initiated by the Provisioning Manager are detected and considered by further management

- Amount of additional capacity that is managed by Provisioning Manager remains unchanged
- Management base is adjusted

- **Example on console:**

```
CPO3984I Capacity change detected. Current defined capacity is 90 MSU
   for LPAR LP1 of CPC CPC1 with system PROD1 of sysplex PRODPLEX

CPO3960I Defined capacity base is 65 MSU for LPAR LP1 of CPC CPC1
   with system PROD1 of sysplex PRODPLEX
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – At run time: Activity Report

Display all capacity changes initiated by the Provisioning Manager together with triggering policy elements

- **Example on console:**

```
MODIFY CPOSERV,APPL=REPORT ACTIVITY

CPO1042I Activity report generated at 11/17/2012 07:51:47
Number of activities between 11/15/2012 and 11/17/2012 was 1
Activation for LPAR LP1 on CPC CPC1 at 11/16/2012 07:33:10
   Activation of 25 MSU
   Capacity after activation: 75 MSU
   Capacity before activation: 50 MSU
   Inducing policy element is policy SAMPPOL, rule ENDOFMONTH,
       provisioning condition WEEKEND, time condition SatSunDay
   Inducing system is PROD1 in sysplex PRODPLEX
   Inducing workload is WLM service definition PRODDEF,
       policy PRODPOL, service class period CICSHIGH.1
```


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# Usage & Invocation – Defined Capacity and Group Capacity management – Processing modes

Provisioning Manager can be run in different processing modes

- **AUTONOMIC**
  Demands for capacity changes are recognized and changes are executed automatically
- **CONFIRMATION**
  Demands for capacity changes are recognized but changes are only executed after operator confirmation
- **ANALYSIS**
  Demands for capacity changes are recognized and advice for changes is displayed on console
- **MANUAL**
  No observation or management


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# Usage & Invocation – Defined Capacity and Group Capacity management – Restart after interruption

- Provisioning Manager constantly stores status data into its restart data set
- Interruption might be caused by unintended outage, a restart of the Provisioning Manager on an alternate system or a planned Manager stop
- Provisioning Manager resumes processing after a restart and continues to manage the capacity it had activated previously


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# Usage & Invocation – Defined Capacity and Group Capacity management – Switching Defined/Group Capacity off

- Provisioning Manager stops capacity management if Defined Capacity or Group Capacity is set externally to 0 (turned off)
- All managed capacity is dismissed and will not be managed anymore if Defined Capacity or Group Capacity is switched on again
- **Example on console:**

```
CPO3966I Defined capacity is turned off for LPAR LP1 of CPC CPC1
   with system PROD1 in sysplex PRODPLEX. Defined capacity management
   for this system stops
```


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# Interactions & Dependencies – Defined Capacity commands

- Software Dependencies
  - None
- Hardware Dependencies
  - Activate and Deactivate Group Capacity requires z196 or zEC12
- Exploiters
  - None


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# Interactions & Dependencies – Defined Capacity and Group Capacity management

- Software Dependencies
  - z/OS V2R1 on observed systems
  - z/OS V2R1 RMF or equivalent monitoring tool on observed systems
  - z/OS V2R1 RMF CIM provider or equivalent provider on observed systems
- Hardware Dependencies
  - Management of Group Capacity only for observed systems running on z196 or zEC12
- Exploiters
  - None


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# Migration & Coexistence Considerations

- Capacity Provisioning Domain Configurations prior to z/OS V2R1 are compatible with z/OS V2R1 Provisioning Manager
- z/OS V2R1 Capacity Provisioning Domain Configurations are compatible with Provisioning Managers prior to z/OS V2R1, **unless** they define *NONE* as Record ID for a CPC
- Capacity Provisioning Policies prior to z/OS V2R1 are compatible with z/OS V2R1 Provisioning Manager
- z/OS V2R1 Capacity Provisioning Policies are compatible with Provisioning Managers prior to z/OS V2R1, **unless** they specify Defined Capacity or Group Capacity related settings
- Restart Data of Provisioning Manager prior to z/OS V2R1 is compatible with z/OS V2R1 Provisioning Manager


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# Installation – RACF setup

- Additional RACF authorization is required for BCPii communication between Provisioning Manager and the hardware where Defined Capacity or Group Capacity is to be changed

```
RDEFINE FACILITY HWI.TARGET.IBMNET.CPC1 APPLDATA(...) UACC(NONE)
RDEFINE FACILITY HWI.TARGET.IBMNET.CPC1.* UACC(NONE)
PERMIT HWI.TARGET.IBMNET.CPC1 CLASS(FACILITY) ID(CPOSRV) ACCESS(CONTROL)
PERMIT HWI.TARGET.IBMNET.CPC1.* CLASS(FACILITY) ID(CPOSRV) ACCESS(UPDATE)
```

- Samples are provided in SYS1.SAMPLIB(CPOSEC1) and (CPOSEC2)


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# Presentation Summary

- New commands allow manual increase or decrease of Defined Capacity and Group Capacity
- Provisioning Manager is capable of managing Defined Capacity and Group Capacity based on time-schedules or on behalf of suffering workload on observed systems
- Provisioning Manager can either change capacity autonomically, act after operator confirmation, or give advice for changes
- Specification of management domains and policies is done exclusively in the z/OSMF V2R1 Capacity Provisioning application
- z/OSMF and Provisioning Manager provide various messages and reports about managed Defined Capacity and Group Capacity


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# Appendix

- zEnterprise System – PR/SM Planning Guide (SB10-7155)
- MVS Capacity Provisioning User's Guide (SC34-2661)


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