BMC Intelligent Capping for zEnterprise User Guide

Supporting
Version 2.0 of BMC Intelligent Capping for zEnterprise
June 2016
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Before contacting BMC

Have the following information available so that Customer Support can begin working on your issue immediately:

■ Product information
  — Product name
  — Product version (release number)
  — License number and password (trial or permanent)
■ Operating system and environment information
  — Machine type
  — Operating system type, version, and service pack or other maintenance level such as PUT or PTF
  — System hardware configuration
  — Serial numbers
  — Related software (database, application, and communication) including type, version, and service pack or maintenance level
■ Sequence of events leading to the problem
■ Commands and options that you used
■ Messages received (and the time and date that you received them)
  — Product error messages
  — Messages from the operating system
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About this book

This book contains detailed product information and is intended for system administrators and performance specialists.

Like most BMC documentation, this book is available in printed and online formats. To request printed books or to view online books and notices (such as release notes and technical bulletins), see the support website at http://www.bmc.com/support.

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- View Quick Course videos (short overviews of selected product concepts, tasks, or features), which are available from the following locations:
  - Documentation Center (primary center and secured center)
  - Support Central (at http://www.bmc.com/support/mainframe-demonstrations)
  - BMC Mainframe YouTube channel (https://www.youtube.com/user/BMCSoftwareMainframe)

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**Tip**

If you prefer hardcopy documentation, you can order it from your BMC sales representative or from Support Central. Also, from Support Central you can subscribe to receive proactive e-mail alerts when BMC issues notices.

### Conventions

This document uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.

- Variable text in path names, system messages, or syntax is displayed in italic text: `testsys/instance/fileName`

- Menu sequences use a symbol to convey the sequence. For example, **Actions => Create Test** instructs you to choose the Create Test command from the Actions menu.

### Syntax statements

This topic explains conventions for showing syntax statements.

A sample statement follows:

```
COMMAND KEYWORD1 [KEYWORD2 | KEYWORD3] KEYWORD4={YES | NO} fileName...
```

The following table explains conventions for syntax statements and provides examples:
## Convention

Items in italic type represent variables that you must replace with a name or value. If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Example</th>
</tr>
</thead>
</table>
| Items in italic type represent variables that you must replace with a name or value. If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words. | alias  
databaseDirectory  
serverHostName |
| Brackets indicate optional items. Do not type the brackets when you enter the option. A comma means that you can choose one or more of the listed options. You must use a comma to separate the options if you choose more than one option. | [tableName, columnName, field]  
[-full, -incremental, -level] |
| Braces indicate that at least one of the enclosed items is required. Do not type the braces when you enter the item. | {DBDName | tableName}  
UNLOAD device={disk | tape, fileName | deviceName}  
{-a | -c} |
| A vertical bar means that you can choose only one of the listed items. In the example, you would choose either commit or cancel. | {commit | cancel} |
| An ellipsis indicates that you can repeat the previous item or items as many times as necessary. | columnName… |

## Summary of changes

This topic summarizes product changes and enhancements.

### Version 2.0.00 June 2016- SPE update

This special programming enhancement (SPE) adds support for including subpolicies within your BMC Intelligent Capping for zEnterprise (iCap) policies.

Subpolicies allow you to group LPARs and manage them together within a policy. You can manage similar LPARs in a subpolicy (for example, LPARs running a certain subsystem), and set a Millions of Service Unit (MSU) limit for the subpolicy. For more information, see “Overview of policies” on page 55.

iCap views have been enhanced to support subpolicies. The POLOVER view now contains new rows for each subpolicy and displays subpolicy details, including:

- The combined four-hour rolling average (4HRA) of the LPARs in a subpolicy
- The percentage of a subpolicy's MSU limit that a subpolicy is using
- The percentage of low-importance workload running on the LPARs in a subpolicy

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You can also hyperlink on a subpolicy name to display an overview of the subpolicy in the new SUBPOLO view. New SUBPOLO alarms alert you when critical work is at risk.

The following new views also display subpolicy information:

- **SUBPDEF** displays the definition for a subpolicy. You can access this view by hyperlinking on a subpolicy name from the POLDEF view.
- **SUBPACTV** displays the definition for a subpolicy that is contained in the active policy. You can access this view by hyperlinking on a subpolicy name from the POLACTV view.

In addition, this release incorporates changes that BMC released in December 2015 and January 2016 as PTFs:

- If the coordinating address space (CAS) terminates, the iCap product address space (PAS) that is connected to the CAS also terminates.
- The new DIST parameter lets you control how iCap handles the corresponding MSU entitlements if an LPAR or group in the active policy becomes inactive. For more information, see “iCap PAS started task parameters” on page 35.

**Version 2.0.00 September 2015**

The 2.0.0 release added the following new features:

- iCap can consider the cost of an LPAR or group when distributing Millions of Service Units (MSUs). The following new parameters support this feature:

  — Manage Cost specifies whether to consider the relative cost of managed LPARs and groups (in addition to the MSU limit), when distributing MSUs.

  — MSU Cost specifies the relative cost of an LPAR or group.

For more information, see “Overview of MSU limit and cost limit” on page 18.

New subsystem views (SUBSYS and SUBSYSDE) also display information about the subsystems that are running on each managed LPAR, and the monthly peak four-hour rolling average (4HRA) by subsystem.

- The new Dynamic Entitlement parameter allows iCap to favor LPARs and groups with high importance workloads when the combined 4HRA exceeds 95% of MSU limit. iCap assigns additional MSUs to LPARs and groups that are running high importance workloads by stealing MSUs from LPARs and groups with a large number of low importance workloads. The POLOVER view supports the dynamic entitlement feature. For more information, see “Policy-level and subpolicy-level parameters” on page 86.
New fields on the following views support the Monthly License Charge (MLC) feature.

— POLOVER
— GRPMEM
— GRPLPAR
— LOGRMAST
— LOGRLPAR
— LPARS

iCap provides new alarms that alert you when critical work is at risk. For more information, see “Setting alarms” on page 50.

You can specify how iCap restores defined capacities (DCs) and group capacity limits (GCLs) when the PAS terminates, a new policy is activated, or iCap leaves manage mode. You specify this value by using the RESTORE parameter. For more information, see “iCap PAS started task parameters” on page 35.

You can specify how often to run the assessor based on the number of managed LPARs and groups. When iCap is adjusting defined capacity, the required processing limits access to the IBM Hardware Management Console (HMC). With the new ADJTIME parameter, you can reduce the amount of time that HMC access is limited. For more information, see “iCap PAS started task parameters” on page 35.
Overview of BMC Intelligent Capping for zEnterprise

The BMC Intelligent Capping for zEnterprise (iCap) product helps you optimize capacity on IBM z/OS LPARs to reduce the cost of running workloads. iCap can dynamically reallocate CPU capacity as needed, based on optimization policies that you define.

An iCap policy is a set of rules that establishes your objectives for adjusting:

- Defined capacities (DCs) of LPARs
- Group capacity limits (GCLs)

Based on your policy rules, iCap performs two main actions:

- Manages and prioritizes workloads by selectively distributing Millions of Service Units (MSUs) across the LPARs and capacity groups that your policy defines. For example, iCap can increase MSUs on LPARs that are running high-priority workloads.

- Ensures that the sum of DCs and GCLs in a managed LPAR set never exceeds the MSU limit that you set

**Note**
iCap is a component of the BMC Cost & Performance Optimization for System z suite, which also includes the BMC Cost Analyzer for zEnterprise product and the BMC Subsystem Optimizer for zEnterprise product. Cost Analyzer identifies where you can realize cost savings through managing and optimizing LPAR capacities and workloads. To collect system information for building iCap policies, you can either access the Cost Analyzer reports for iCap or run iCap in observe mode. For more information about Cost Analyzer reports, see “Collecting system information from Cost Analyzer” on page 103.
How iCap works

As a cost-management product, iCap helps you optimize IBM product license costs that are based on a sub-capacity Monthly License Charge (MLC). This topic explains sub-capacity pricing and how iCap affects it.

For more information, view the Quick Course "Intelligent Capping for zEnterprise - Getting Started."

Overview of sub-capacity pricing

IBM bases sub-capacity pricing on the four-hour rolling average (4HRA) utilization of z/OS LPARs recorded during the period of a month. A monthly period runs from 00:00 on the second day of the month through midnight (24:00) on the first day of the next month.

The unit of measurement for LPAR use is Millions of Service Units (MSUs) used per hour.

--- Note ---
MSUs are also called Software MSUs (as opposed to Hardware MSUs).

MSUs are calculated as follows:

\[ \text{MSUs} = \text{CPU seconds per hour} \times \text{Software Service Units coefficient} \]

In this equation, \textit{CPU seconds} refers to those used by general-purpose CPs in a z/OS LPAR. The Software Service Units coefficient is reported in field SMF70CPA of the SMF type 70 record.

The Software Service Units coefficient determines the MSU rating of an IBM mainframe processor. However, IBM uses MSUs \textit{only} to gauge software pricing; consequently, you cannot use MSU ratings as a capacity metric. You can use this information for cost analysis and planning, but \textit{not} for capacity planning or performance reporting.

For more information about IBM sub-capacity pricing, see http://www-03.ibm.com/systems/z/resources/swprice/subcap/zos.html.
How the product optimizes capacity to lower costs

As a component of the BMC Cost & Performance Optimization for System z suite, iCap:

- Monitors the 4HRA
- Actively manages the MSU capacity limits for all z/OS LPARs and capacity groups on the central processor complex (CPC), or for only the z/OS LPARs and capacity groups specified in the active policy
- Optimizes the defined capacity (DC) and group capacity limit (GCL) of managed LPARs and capacity groups on a CPC
- Dynamically aligns MSU allocations based your policy. iCap considers the current CPU utilization of an LPAR and distributes MSUs according to priority, or a combination of priority and high importance workload. For more information, see “Overview of workload prioritization” on page 18.
- Transfers MSUs between:
  - Individual LPARs
  - Capacity groups

Data collection

iCap collects data once every minute across all of the LPARs and capacity groups included in a policy. Or, if there is no active policy, iCap collects data for all of the LPARs and capacity groups on the CPC.

The collected data includes:

- The 4HRA for individual LPARs and capacity groups, and the combined 4HRA for all LPARs and capacity groups
- The actual MSUs consumed per hour
- The DCs of LPARs, and the GCLs of capacity groups
- The percentage of MSU limit that each LPAR and capacity group is using, and the total usage for the entire policy
- The percentage of a subpolicy's MSU limit that each LPAR in the subpolicy consumes
The percentage of low importance work running on an LPAR or capacity group

The subsystems that are running on managed LPARs

Overview of MSU limit and cost limit

iCap controls MSU distribution according to a policy's MSU limit and, optionally, a policy's cost limit.

The MSU limit is the maximum allowable MSUs that can be consumed by all LPARs, capacity groups, and subpolicies that a policy manages. You must specify an MSU limit when creating an iCap policy, and iCap ensures that the sum of DCs and GCLs does not exceed this value. When the combined 4HRA of managed LPARs and capacity groups exceeds the MSU limit, at least one LPAR or group is subject to capping. In addition, if an iCap policy includes one or more subpolicies, you must also specify an MSU limit for each subpolicy.

iCap can also manage the cost of a policy or subpolicy by imposing a cost limit. If a cost limit is imposed, iCap considers the relative cost of an LPAR or group when distributing MSUs. That is, iCap evaluates the cost of one LPAR or group against another LPAR or group. The relative cost of an LPAR or group is calculated in cost units, and the cost limit is the sum of cost units for all of the LPARs and groups that a policy or subpolicy manages. iCap then distributes MSUs according to the cost limit and the MSU limit, and ensures that neither of these values is exceeded.

You can calculate the relative cost of an LPAR or group from SCRT reports and IBM MLC bills, or by using existing knowledge of the software running on an LPAR or group. You can also find the relative cost of an LPAR or group in the iCap report from Cost Analyzer.

Related Information

- “Generating iCap reports in Cost Analyzer” on page 104
- “Cost limit scenarios” on page 124
- “Overview of MSU limits” on page 59

Overview of workload prioritization

When the combined 4HRA for managed LPARs and capacity groups exceeds the specified MSU limit (or cost limit), at least one LPAR or capacity group is subject to
capping. iCap allows LPARs and capacity groups running high importance workloads to gain additional MSUs at the expense of those running low importance workloads.

The order in which managed LPARs and capacity groups receive MSUs can be determined in the following ways:

- A combination of priority and low importance workload
  iCap considers the priority of an LPAR or capacity group and the amount of low importance workload running on the LPAR or capacity group. iCap uses Workload Manager (WLM) Tuning to collect information about low importance work.
  For more information about using the WLM Tuning parameter, see “Scenarios” on page 115.

- Priority only
  iCap considers only the priority of an LPAR or capacity group, without using WLM importance data.

**iCap modes**

iCap can run in the following modes:

- Observe
  Observe mode does not require policies. In this mode, iCap collects data, monitors MSU usage, and displays data in views. If you are new to creating policies, this information can help you build a policy.

- Message
  Message mode is similar to observe mode but *does* require a policy. In this mode, iCap messages display the DC or GCL values that the product would set if it were running in manage mode. You can use message mode to preview the effects of a policy without actually changing anything.

- Manage
  In manage mode, iCap applies the selected policy. That is, the product actively manages DCs and GCLs for LPARs and capacity groups defined in the policy, and ensures that their sum does not exceed the MSU limit.

**Related Information**

- “Changing the iCap mode” on page 96
iCap interface options

iCap gives you the flexibility to select the user interface that you prefer:

- The MainView Explorer graphical user interface (GUI)
- A windows-mode interface based on ISPF

This topic provides an overview of MainView Explorer and the windows-mode interface. For more information, see the MainView User Guide.

MainView Explorer

With MainView Explorer, you can build views from comprehensive menus with the ease of a mouse click. You can display data in enhanced chart types, such as topology diagrams, histograms, and three-dimensional bar charts.

Also, you can format and arrange your data in ways that are unmatched in a standard ISPF session. For example, you can detach a view into a separate window, move columns and fields by clicking and dragging them, and sort columns with the click of a mouse.
Windows-mode ISPF interface

Users who prefer an ISPF interface can use windows mode, in which the data is organized into a tabular view. You can split the screen both vertically and horizontally. Windows mode offers experienced ISPF users a familiar ISPF environment and powerful features for building and formatting views.

Figure 2: Windows-mode ISPF interface sample view

```
22MAY2016 03:29:28 ------ MAINVIEW WINDOW INTERFACE (V6.1.00) ---------------
COMMAND ==> SCROLL ==> PAGE
CURR WIN ==> I ALT WIN ==>
>WI =POLOVER==DYCJ==22MAY2016==03:29:26==ICAP==D=11

Policy Name ALVPOL01 Sum of Cost Entitlement 1137519
MSU LIMIT. 1000 WLM Tuning .................. COMBINED
Mode........ Manage Dynamic Entitlement.... YES
Peak 4HRA. 728 Manage Cost ................. YES
Activated. 21MAY2016 16:55:20 Combined 4HRA........... 159
Peak Time. 12MAY2016 16:13:28 Combined 4HRA%........... 15
DIST....... Yes

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```

Product architecture

iCap is based on the MainView Infrastructure (MVI) architecture.

iCap uses MVI to:
- Manage the overall address space
- Conduct cross LPAR communications
- Provide the user interface
- Maintain history data
- Define alarms

**MainView architecture**

You can run iCap on one of the following MainView interfaces:

- **Windows mode ISPF interface**
  In windows mode, the product runs in the following address spaces:
  - Coordinating address space (CAS)
  - Product address space (PAS)
  - User address space (UAS)

  The Runtime Component System (RTCS) runs alongside these address spaces. It provides programming services to all CASs, PASs, and UAs.

- **MainView Explorer GUI interface**
  MainView Explorer is a desktop GUI that lets you access MainView products through the MainView Explorer console. MainView Explorer consists of the following components:
  - Client
    The client runs under a web browser or by using Java Web Start.
  - Host server
    The host server runs as an address space on an IBM z/OS system.

**Note**
Alarms are available to all products that use the MainView Infrastructure. You can create alarms that trigger an automatic alert or action, and to provide IBM MVS console messages. For more information about iCap alarms, see “Setting alarms” on page 50.
iCap architecture

As illustrated in the following figure, iCap architecture consists of the following components:

- A master PAS and agent PASs
  The iCap master PAS runs on one of the managed LPARs. All other managed LPARs run agent PASs. (For more information about choosing a system to run the iCap master PAS, see “Master PAS guidelines” on page 33.)

- Data collectors
  A data collector on each LPAR collects information about MSU usage, including the 4HRA and Workload Manager (WLM) importance data.
  The data collector sends this information to the master PAS.
  WLM importance data refers to the number of MSUs consumed by low importance work. By default, service class periods with importance values of 5 and below are considered low importance work. For more information about WLM Tuning, see the WLM Tuning parameter description in “Policy-level and subpolicy-level parameters” on page 86.

- An assessor
  The assessor dynamically reallocates CPU capacity based on policy rules.

In addition, iCap uses the IBM Base Control Program internal interface (BCPii) function. iCap uses BCPii to allow z/OS system applications to access the LPAR management facilities on the IBM Hardware Management Console (HMC) system. Specifically, iCap modifies defined capacity (DC) and group capacity limit (GCL) only.
Requirements

This topic lists system requirements. It also specifies requirements for authorizing iCap to work with the IBM BCPii function and the IBM RACF product.

System requirements

iCap requires the following system resources:

- The iCap master PAS requires Version 1.13 or later of the IBM z/OS system.
- The iCap agent PASs require z/OS 1.12 or later.
- The IBM z/OS BCPii component—Version 1.13 (HWIBCPIIISTC) or later—must be running on the system where the master PAS runs.

Note

If you want to run iCap in manage mode, the BCPii address space must be up and running before you begin to use iCap.
By default, the master and agent PASs assign themselves to the SYSSTC WLM service class. BMC recommends that you also assign the CASs to which the PASs are connected to the SYSSTC service class.

---

**Note**

With Version 2.1 z/OS, you should not allow the IBM Capacity Provisioning (CPM) component to manage and modify the defined capacity of an LPAR or the group capacity limit of a capacity group. This will affect the functionality of iCap. Also, iCap does not support IBM z/VM guests.

---

### LPAR requirements

iCap supports only LPARs that are running on z/OS. iCap uses the IBM Base Control Program internal interface (BCPii) service to identify the host operating system for an LPAR. Therefore, LPARs that are not running on z/OS are excluded from iCap views.

In order for iCap to manage a z/OS LPAR, the LPAR must meet the following guidelines:

- Is not hard capped
- Does not use wait completion

---

**Note**

For more information about wait completion, see the *IBM Processor Resource/Systems Manager Planning Guide.*

- Does not use dedicated processors
- Exists on the system

Any LPARs that do not meet the above criteria are excluded from iCap policies. (The POLOVER view lists each excluded LPAR and specifies the reason for exclusion.) iCap still monitors the excluded LPARs but will not modify their DCs.

---

**Related Information**

- “Displaying the excluded reason for an LPAR” on page 81

---

### BCPii and SAF security requirements

This topic lists requirements for authorizing iCap to work with the following resources in the IBM z/OS environment:
To use the BCPii service, you must first set up the necessary authorization for iCap, and define a Simple Network Management Protocol (SNMP) community name in your security product.

## Setting up security authorizations for BCPii

Use the following procedure to set up the security authorizations required by the BCPii application.

1. In the Facility resource class, specify the following authorities in the specified profiles:

<table>
<thead>
<tr>
<th>Authority</th>
<th>In this profile</th>
<th>Profile description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>HWI.APPLNAME.HWISERV</td>
<td>Defines the applications that can use the BCPii services</td>
</tr>
<tr>
<td>Control</td>
<td>HWI.TARGET.netID.nau</td>
<td>Sets values related to the CPC or the activation profile. Granting BCPii access to these resources enables the iCap BCPii Routine to adjust an LPAR's DC or a capacity group's GCL in your Hardware Management Console (HMC) interface.</td>
</tr>
<tr>
<td>Update</td>
<td>HWI.TARGET.netID.nau.imageName</td>
<td>Sets image-related values</td>
</tr>
</tbody>
</table>

Note: iCap requires image-level access to all independently managed LPARs. For groups, iCap requires image-level access to at least one LPAR member of the group. This requirement enables iCap to recognise LPARs that are running on z/OS, and exclude non-z/OS LPARs.

These authorizations apply to the RACLIST Facility class. If you are running a security product other than IBM RACF, you should specify equivalent structures to Class and Facility:

- **netID.nau** represents the 3-17-character SNA name of the CPC where you want to run iCap.
- **imageName** represents the 1-8-character LPAR name.
Note

If you do not complete the setup of the BCPii security authorizations, you cannot execute iCap in manage mode. If you specify iCap to run in manage mode, iCap switches to observe mode and runs with Policy=NO-POLICY.

Examples of RACF security definitions

As the following examples show, you can create RACF security definitions to provide either specific access or general access.

Example

Provides general RACF security authority access to the Facility of HWISERV:

```
RDEFINE FACILITY HWI.APPLNAME.HWISERV UACC(NONE)
PERMIT HWI.APPLNAME.HWISERV CLASS(FACILITY) ID(userID) ACCESS(READ)
SETROPTS RACLIST(FACILITY) REFRESH
```

Example

Provides specific RACF security access to a particular resource, in this case an LPAR image:

```
RDEFINE FACILITY HWI.TARGET.IBM390PS.BRYALS.SJSB UACC(NONE)
PERMIT HWI.TARGET.IBM390PS.BRYALS.SJSB CLASS(FACILITY) ID(DYCSTC) ACCESS(UPDATE)
SETROPTS RACLIST(FACILITY) REFRESH
```

The element IBM390PS.BRYALS.SJSB refers to the netID.nau.imageName of the LPAR that the iCap master PAS is monitoring. In this case, the LPAR name is SJSB. You can find the netID.nau.imageName element in your HMC by accessing the Support Element (SE). If you have trouble finding the netID.nau, run iCap with the XDM=Y start-up parameter with only the general BCPii access (HWI.APPLNAME.HWISERV) and look for the following message in the iCap log:

```
DYCOS503I HWILIST returned netID <IBM390PS.BRYALS >
```

Defining the SNMP community name

BCPii uses an SNMP community name to provide a minimal level of security between the z/OS image executing the BCPii service and the support element itself.

An SNMP community name is associated with a particular CPC. You must define the same community name in the following locations:

- The support element configuration for the CPC
- The security product for each CPC (RACF or other security product) to which communication is required
BCPii extracts the community name from the security product and transfers the name to the support element for the CPC. The support element then validates the community name before proceeding with the request. For more information about defining the SNMP community name, or extracting the predefined SNMP community name, see the IBM manual z/OS V1R13.0 MVS Programming: Callable Services for High Level Languages.

**Note**
You must define an SNMP community definition for at least the local CPC. Otherwise, BCPii cannot continue with initialization of its address space, and BCPii services are not available.

**To define the SNMP community name in RACF**

1. Define the following RACF syntax:

   RALTER FACILITY HWI.TARGET.netID.nau APPLDATA('SNMPCOMMUNITYNAME')
   SETROPTS RACLIST(FACILITY) REFRESH

   **WARNING**
   Due to restrictions with the security products on z/OS, the BCPii SNMP community name must not contain lowercase characters. The APPLDATA field accepts only uppercase letters and numbers.

   **Example**
   The following example assigns the SNMP community name XYZ123 to an existing CPC definition for CPC name NET1.CPC001:

   RALTER FACILITY HWI.TARGET.NET1.CPC001 APPLDATA('XYZ123')
   SETROPTS RACLIST(FACILITY) REFRESH

   If you receive any errors in the iCap master PAS, see the IBM manuals z/OS V1R13.0 MVS Programming: Callable Services for High-Level Languages and z Systems Application Programming Interfaces manuals.

**Where to go from here**

After you finish installing and customizing the product (as instructed in the Installation System documentation), you can proceed as follows:

1. Perform administrative setup tasks to prepare iCap for use (“Setting up iCap” on page 31).
3 Create and manage policies for controlling capacity at your site ("Creating and managing policies" on page 55).
Setting up iCap

You install the iCap product and customize it as instructed in the Installation System documentation. This chapter explains how to prepare the product for use by setting up data collection, starting the iCap master and agent PASs, and installing alarms. This chapter also explains how to access iCap using a windows-mode interface based on ISPF and with the MainView Explorer GUI.

Defining the recording interval for historical data collection

Use the following procedure to specify the recording interval for historical data collection.

1. In BBIPARM member DYCTIR00, define the recording interval and synchronization by using the following syntax:

   `INTERVAL INTVAL="{SMF|n}" SYNCVAL="n" SHORT="{YES|NO}"`

   **WARNING**

   Values must be enclosed in quotation marks.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTVAL=&quot;{SMF</td>
<td>n}&quot;</td>
</tr>
<tr>
<td></td>
<td>Valid values are:</td>
</tr>
<tr>
<td></td>
<td>■ SMF — SMF recording interval</td>
</tr>
<tr>
<td></td>
<td>■ n — a number of minutes between 1 and 60</td>
</tr>
<tr>
<td></td>
<td>This number must be 1 or an integer factor of 60 (1, 2, 3, 4, 5, 6, 10, 12,</td>
</tr>
<tr>
<td></td>
<td>15, 20, 30 or 60). The default is 5 minutes.</td>
</tr>
</tbody>
</table>

Chapter 2  Setting up iCap 31
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYNCVAL=&quot;n&quot;</td>
<td>Defines when to start the first interval, in number of minutes after the hour. Valid values are 0 through the value of INTVAL. If INTVAL=&quot;SMF&quot;, iCap uses SYNCVAL=&quot;0&quot; (the default).</td>
</tr>
<tr>
<td>SHORT=&quot;{YES</td>
<td>NO}&quot;</td>
</tr>
</tbody>
</table>

---

**Example**

To set the interval to 10 minutes, starting at 5 minutes after the hour:

```
INTERVAL INTVAL="10" SYNCVAL="5" SHORT="YES"
```

iCap has six 10-minute intervals every hour, at 5, 15, 25, 35, 45, and 55 minutes after the hour.

---

**Starting the iCap master and agent PASs**

This topic explains how to start and stop the iCap master and agent product address spaces (PASs).

The iCap master PAS collects data from the entire CPC and manages the LPARs and capacity groups that are running on the CPC (and defined in the policy). In most cases, each CPC has only one master PAS. For more information, see "Policy guidelines" on page 56.

An iCap agent PAS is a simplified version of the master PAS. Agent PASs collect data and return it to the master PAS. Multiple agent PASs can run on a CPC. For more information about how the PASs run in the iCap environment, see "MainView architecture" on page 22.

The following restrictions or recommendations apply:

- You can run a version 2.0 master PAS with version 1.1 agent PASs. However, the agent PASs must have PTF BQY0648 applied.
- Capping and subsystem information is unavailable for LPARs or groups that are running on version 1.1 PASs.
- If the CAS terminates, the iCap master PAS that is connected to the CAS also terminates.
After the CAS terminates, the iCap PAS cannot continue to manage DCs and GCLs until the CAS restarts. By terminating the PAS when the CAS terminates, iCap ensures that DCs and GCLs are correctly restored.

BMC recommends that you automate starting and stopping the PASs. You can also specify a PAS START command in the CAS JCL, which automatically restarts the PAS each time the CAS restarts. For more information, see the automated operations documentation for your product.

**Note**

If you start the PAS before the CAS, the PAS waits indefinitely for the CAS to start, and does not terminate.

---

**Master PAS guidelines**

When choosing a system to run the iCap master PAS, choose one that meets the following guidelines:

- Runs IBM z/OS Version 1.13 or later
- Is expected to have the highest level of performance at the peak of the CPC’s CPU utilization
- Rarely requires IPL
- Has the z/OS started task HWIBCPII active
  
  HWIBCPII is required to accept requests from the master PAS to alter DCs and GCLs.

---

**Starting the iCap master PAS**

Use the following procedure to start the master PAS.

**Before you begin**

Before you start the master PAS, take the following actions:

- Start the CAS.

- Verify that you created the JCL for starting the iCap master PAS. You should have created this JCL during customization, as instructed in the *MainView Customization Reference*. For an example of the JCL, see “Example of master PAS JCL” on page 127.
To start the master PAS

1. From the operator console, enter the START command:

   - To start in observe mode (the required mode if you have not yet created a policy), enter:
     ```
     START procName,[SSID=ssid],[PASMODE=OBSERVE],[POLICY=NO-POLICY]
     ```
     `procName` is the name of the master PAS startup procedure. `ssid` is the subsystem ID of the CAS to which the PAS should connect (default BBCS).

   - To start in message or manage mode (these require a policy), enter:
     ```
     START procName,[SSID=ssid],[POLICY=policyName],[PASMODE={MSG | MANAGE}]
     ```

     **Note**

     iCap can run in manage mode if at least one of following conditions exists:

     - An active agent is running on every LPAR defined in the policy.
     - The master PAS has been running for more than four hours.
     - Each managed LPAR that is running without an active agent has had an IPL since the master PAS started.
     - At least one LPAR member of a capacity group is running with an active agent.
     - All LPAR members of capacity groups have had an IPL since the master PAS started.

     If none of these conditions exist, iCap will switch to observe mode. However, iCap will automatically switch back to manage mode if one or more of the conditions is met. For more information, see “Policy guidelines” on page 56.

2. To verify that the PAS started successfully, look for this console message:

   ```
   DYCMN110I Intelligent Capping for zEnterprise vv.rr.mm - PUT level nnnnnnnnn initialized
   ```

Starting the iCap master and agent PASs
Starting the iCap agent PAS

Use the following procedure to start the agent PAS.

**Before you begin**

Verify that you created the JCL for starting the iCap agent PAS. You should have created this JCL during customization, as instructed in the MainView Customization Reference. For an example of the JCL, see “Example of agent PAS JCL” on page 128.

**To start the agent PAS**

1. From the operator console, enter the START command:

   ```
   START procName,[SSID=ssid]
   ```

   *procName* is the name of the agent PAS startup procedure. *ssid* is the subsystem ID of the CAS to which the PAS should connect (default BBCS).

2. To verify that the PAS started successfully, look for this console message:

   ```
   DYCMN110I Intelligent Capping for zEnterprise vv.rr.mm - PUT level nnnnnnnn initialized
   ```

**Related Information**

- “iCap PAS started task parameters” on page 35

---

**iCap PAS started task parameters**

The following table describes the started task parameters for the iCap master and agent PASs.
Specifying an invalid parameter or parameter value will cause the PAS to terminate with an error message. In some cases, specifying an invalid combination of parameters will cause the PAS to issue a warning but continue running as an agent.

\[
\frac{((\text{lparseAndGroups} \times 6) + \text{HMCavailableTimeRequired})}{60} \text{ (seconds)}
\]

**Note**
You must specify values for all of the parameters that have no default value.
Table 1: Started task parameters for iCap

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| ADJTIME=n   | 1             | How often (in minutes) to run the assessor iCap makes changes to the IBM Hardware Management Console (HMC) via the IBM Base Control Program internal interface (BCPii) interface each time that iCap adjusts the defined capacity of an LPAR or GCLs. These changes are time-consuming, and access to the HMC is limited while the changes are being processed. The processing time can also increase based on the number of LPARs and groups that iCap is managing. By using ADJTIME, you can specify the time interval for the assessor to run based on the number of LPARs and groups that iCap is managing, therefore reducing the amount of time that HMC access is limited. **Note:** By default, the master PAS JCL does not include the ADJTIME parameter; and the default ADJTIME=1 automatically applies. *If you want to specify a different value for ADJTIME,* add the parameter to the master PAS JCL. To determine the best value for your site, use the following equation: \[
\frac{((\text{lparsAndGroups} \times 6) + \text{HMCavailableTimeRequired})}{60 \text{ (seconds)}}
\]  
- *lparsAndGroups* is the number of LPARs and groups that you plan to manage with iCap. 
- The value 6 is the approximate time that it takes per LPAR or group for the BCPii interface to access the HMC. 
- *HMCavailableTimeRequired* is the required time (in seconds) needed for HMC availability. **Note:** If the answer is a decimal number, round up to the nearest integer. 

Valid values are 1 through 10. In the following example, iCap is managing 30 LPARs and groups, and the required time is 60 seconds: 
\[
\frac{((30 \times 6) + 60)}{60} = 4
\]  
Therefore, ADJTIME is set to 4, and the assessor runs at 4-minute intervals.
**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| DIST= {Y | N} | N | Whether iCap should distribute the MSUs assigned to inactive LPARs or groups. You can use this parameter if you want active LPARs and groups to use MSUs that are assigned to inactive LPARs. That is, if an LPAR becomes inactive, iCap can distribute the MSUs assigned to the inactive LPAR to other active LPARs and groups. The following values are available:  
  - N does not distribute the inactive LPAR's MSU entitlement to the remaining LPARs or groups in the policy. Instead, iCap reduces the policy's MSU limit by that number of MSUs.  
  - Y distributes the inactive LPAR's MSU entitlement to the remaining LPARs or groups in the policy. The policy's MSU limit does not change.  

**Example:** Assume that your active policy contains LPAR A, LPAR B, and LPAR C. Each one is entitled to 30 MSUs, and the policy's MSU limit is 90. Now, assume that LPAR C becomes inactive:  
  - If DIST=N, the entitlement values for LPARs A and B remain the same, and the MSU limit is reduced to 60.  
  - If DIST=Y, the 30 MSUs to which LPAR C was entitled are distributed to LPARs A and B, and the MSU limit remains at 90.  

**Note:** If an LPAR becomes inactive, its billable MSUs are still charged during the hour that it becomes inactive. If a policy is at or approaching the MSU limit and DIST=Y, the MSUs entitled to the inactive LPAR might be billed twice during the hour that the LPAR became inactive (first by the inactive LPAR, and again by the remaining LPARs or groups). Subsequently, the billable MSUs might exceed MSU limit. You can significantly reduce the chance of exceeding the MSU limit by specifying DIST=N. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASMODE=</td>
<td>OBSERVE</td>
<td>The mode in which you want to run iCap Note: To run the product in message mode, you can specify either MSG or MESSAGE. For more information, see “iCap modes” on page 19.</td>
</tr>
<tr>
<td>POLICY=policyName</td>
<td>NO-POLICY</td>
<td>The name of the policy (up to eight characters long) If running the product in message or manage mode, you must specify a policy name; otherwise, the PAS will terminate. For observe mode, a policy is not required.</td>
</tr>
<tr>
<td>RESTORE=</td>
<td>YES</td>
<td>Whether iCap should restore DCs and GCLs when the PAS terminates Possible values are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ YES restores DCs and GCLs to the values they had when the master PAS initialized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ NO leaves DCs and GCLs as they were when iCap stopped managing the LPAR or group, or the PAS terminated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ ZERO sets DCs to 0 and GCLs to the value they had when the PAS initialized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ ENT sets the DC and GCL values based on entitlement:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— For LPARs, iCap sets the DC according to the LPAR's entitlement level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— For groups, iCap sets the GCL according to the group's entitlement level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— For group members that are being managed individually, iCap sets the GCL to the sum of the individual members' entitlements. Note: The DC of each group member is set to MAXDCGCL, or to 0 if you did not specify MAXDCGCL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For more information, see “Examples of how RESTORE affects DCs and GCLs” on page 98.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Default value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SSID=ssid</td>
<td>BBCS</td>
<td>The subsystem ID of the coordinating address space (CAS) to which the iCap PAS should connect. The maximum length is four characters. The CAS is started as a separate address space from the iCap PAS. For a PAS to connect to a CAS, the SSID values in the CAS and PAS startup procedures must be the same.</td>
</tr>
<tr>
<td>SRVCLASS=</td>
<td>SYSSTC</td>
<td>Whether the service class is set by the WLM policy or SYSSTC. <strong>Note:</strong> BMC recommends that the iCap master PAS use the default value, SYSSTC.</td>
</tr>
<tr>
<td>{SYSSTC</td>
<td>WLM-RULE}</td>
<td></td>
</tr>
<tr>
<td>TYPE={}MASTER</td>
<td>AGENT</td>
<td>Whether the LPAR or capacity group will run as a master or an agent. <strong>Note:</strong> You should have only one master PAS in an iCap environment. For more information, see “Policy guidelines” on page 56.</td>
</tr>
<tr>
<td>XDM= {Y</td>
<td>N}</td>
<td>N</td>
</tr>
</tbody>
</table>

### Stopping an iCap PAS

If you need to stop an iCap PAS for any reason, use the following procedure.

1. Verify the procedure name for the PAS that you want to stop.
2. From the system operator console, enter the STOP (or P) command:

   **P procName**

---

**Best practice**

BMC recommends using the STOP command rather than the CANCEL command to stop the PAS. Also, you should ensure that the PAS is properly shutdown before IPL. If the PAS is not properly shutdown, the defined capacities of LPARs and GCLs remain as they were when the system terminated, and are not correctly restored.
Accessing iCap

This topic explains how to access iCap with either a windows-mode interface based on ISPF or the MainView Explorer GUI.

Note
If you are new to MainView interfaces, see the MainView User Guide for full descriptions of both interfaces.

Accessing iCap (windows-mode interface)

The procedure for accessing iCap in windows mode varies slightly based on whether you are using MainView. Use one of the following procedures.

**To access iCap in windows mode (if using MainView)**

1. On the MainView Selection Menu, select O (Cost Optimization).

2. On the BMC Cost Optimization Selection Menu, select 1 (BMC Intelligent Capping for zEnterprise).

   The EZICAP menu is displayed ("Overview of the EZICAP menu" on page 42).

**To access iCap in windows mode (if not using MainView)**

1. Run the MCO CLIST.

2. On the BMC Cost Optimization Selection Menu, select 1 (BMC Intelligent Capping for zEnterprise).

3. If you are not connected to the CAS, select the CAS SSID for iCap from the displayed list of CAS regions.

   The EZICAP menu is displayed ("Overview of the EZICAP menu" on page 42).

4. If not already connected to the system that is running the iCap master PAS, you can switch to that system in one of the following ways:

   - Type PLEX on the COMMAND line and press Enter. Then select the iCap master PAS from the displayed list.
   - Type CONTEXT PASName on the COMMAND line and press Enter.
Overview of the EZICAP menu

Products that use the windows-mode interface provide easy menus to make it easier to access the information that you need. All easy menu names begin with EZ.

The options on the easy menus are prefixed with either a period (.) or a greater-than sign (>). A period indicates that the option hyperlinks directly to a view. A greater-than sign indicates that the option hyperlinks to another menu.

The EZICAP menu (Figure 4 on page 42) is displayed when you start iCap. From EZICAP, you can access:

- LPAR and capacity group information
- Current and historical information about policies
- Subsystem information
- The Policy Administration user interface (UI)
- iCap logs

Figure 4: EZICAP menu

Intelligent Capping
for zEnterprise

Activity
. Policy Overview
. LPAR Members of Groups

iCap Log Data
. All Log Records
. PAS System Log Records
. LPAR/Group Log Records

Intelligent Capping
for zEnterprise

Policy
. Active Policy
. Policy Admin UI

Utilities
. History Datasets
. Security
. Alarm Management
. About iCap
. Return...

Accessing iCap (MainView Explorer)

Use the following procedure to access iCap by using the BMC MainView Explorer console via Java Web Start.

For more information about running MainView Explorer in a web browser as an applet, and setting a context, see the MainView User Guide.

Before you begin

Before you can use the MainView Explorer console via Java Web Start, PTF BQY1009 must be applied to your host server.
To access iCap through MainView Explorer

1 Launch MainView Explorer.

If this is the first time that you are launching MainView Explorer by using the Java Web Start, complete the following steps. (If you previously launched the web console proceed to Step 2 on page 43.)

a In a web browser, enter the URL http://host:port/mve

For the host variable, use the IP address or name of the system on which the MainView Explorer host server is executing. For port, use the value that was specified for the PORT parameter in the host server procedure. (The distributed procedure name is BBMXPJCL; however, it might have been renamed during installation at your site.)

Example

http://sysa:3940/mve

b On the displayed web page, select one of the following launch buttons:

- MV Explorer
- MVE Viewer

After launching either application, a launch icon is placed on your desktop.

2 In the Logon dialog box, type your TSO user ID and the corresponding password in the User ID and Password boxes.

3 If the Allocate user datasets for personal use check box is available, indicate whether to allocate user data sets to contain your customized views and configurations (instead of saving them to the site-wide data sets):

   Note

   If you do not see this box, your site administrator disabled allocation of user data sets; you can skip to Step 5 on page 44.

   ■ If you do not want to allocate user data sets, clear the Allocate user datasets for personal use box and all boxes below it.

   ■ If you want to allocate user data sets, select the Allocate user datasets for personal use check box.

4 If you selected Allocate user datasets for personal use in Step 3 on page 43, provide the following information:
In the **Template for user datasets** box, specify the template for your data set names.

The template can consist of your TSO prefix (**%UPREFIX**), your user ID (**%USERID**), and the data set name (**%BBDEF**). You can arrange them in any order. Only **%BBDEF** is required, and it resolves to BBVDEF or BBCDEF (BBVDEF for customized views, and BBCDEF for customized configurations). If you do not specify **%BBDEF** in your template, BBVDEF or BBCDEF is added to the data set name as the low-level qualifier.

**Note**

If your site administrator specified a template in the MainView Explorer host server startup procedure, the **Template for user datasets** box and the **Insert token** boxes are grayed out. If you choose to allocate user data sets, they will be named according to the site-defined template.

**Example**

The following examples show valid templates and the user data sets that are allocated if the user ID is **MYID01**:

- **%USERID.TEST.%BBDEF** (or **%USERID.TEST**) allocates **MYID01.TEST.BBVDEF** (and BBCDEF).

- **PROD.U%BBDEF.%USERID** allocates **PROD.UBBVDEF.MYID01** (and UBBCDEF).

- **%USERID.&SYSNAME..%BBDEF** allocates **MYID01.SYSC.BBVDEF** (on SYSC).

Including the system variable **&SYSNAME.**, as shown in the last example, enables you to use the same data set template on different system images.

**b** To insert the **%USERID** token in the template, select the **Insert token for User ID** box.

**c** To insert the **%UPREFIX** token in the template, select the **Insert token for User prefix** box.

**d** If the **Insert token for User prefix** box is checked (either by you or because of the site-wide template), type your TSO user prefix in the **User prefix** field.

5 Click **OK**.

MainView Explorer opens in a separate window. The window that contains the splash screen must remain open during the MainView Explorer session.
Overview of iCap navigation in MainView Explorer

The MainView Explorer console consists of the following frames. Each frame provides specific functions related to viewing or locating data.

- **Navigation**
  This frame consists of the Context tree and the Product tree. Icons or nodes on the tree represent subsystems, system images, MainView products, and views.

- **View**
  This frame displays open views as tabbed pages. Each tab contains the name of the view and an icon that indicates the type of view.

- **Messages**
  This frame displays a log of product messages, including requests to the host server.

When you access iCap in MainView Explorer, you can select the iCap master PAS from a product tab on the Context tree in the Navigation frame. Then, you can access the EZICAP view by expanding the MENU folder in the Product tab, and selecting **EZICAP-iCap Primary Menu**.

**Figure 5: MainView Explorer console**
MainView Explorer charts

From MainView Explorer, you can display view data in various chart types. Charts depict the hierarchical relationships between objects and present their current data.

For example, the following iCap charts were generated from the POLOVER view, using the Current MSU/hr (the X value) and the 4HRA (the Y value).

**Figure 6: 2D line chart**

![2D line chart](image)

**Figure 7: 2D bar chart**

![2D bar chart](image)
View containers

In MainView Explorer, you can use view containers to display multiple views and charts in one tab.

A view container is similar to a screen in windows mode. You can open multiple view containers in separate tabs and add them to the stack of panes or detach them (just like regular views). For more information about view containers, see the MainView User Guide.

iCap provides the following out-of-the-box view containers:

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4HRA and Current MSU/hr vs MSULIMIT</td>
<td>2D line</td>
<td>The policy’s combined 4HRA vs. MSU limit Three lines show the trend over time of:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The combined 4HRA of all policy LPARs and groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The current MSU per hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The MSU limit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This chart is based on the POLOVER view's *Policy row (policy totals row).</td>
</tr>
<tr>
<td>4HRA by LPARs/Groups</td>
<td>Stacked, 2D column</td>
<td>4HRA by all LPARs and groups included in the policy This chart is based on the POLOVER view's LPAR or Group column.</td>
</tr>
<tr>
<td>Service Units by Importance–Policy</td>
<td>Stacked, 2D area</td>
<td>Distribution of MSUs by importance This chart is based on the POLIMP view's *Policy row (policy totals row).</td>
</tr>
</tbody>
</table>
Figure 8: Example of charts based on the POLOVER view

Figure 9: Example of Service Units by Importance–Policy chart
Collecting system information to build iCap policies

Before creating a policy, you need to collect system information that can help you build the most effective policy.

To get started, BMC recommends that you first run iCap in observe mode and do not specify a policy, as discussed in “Running iCap in observe mode to collect data” on page 49.

Note
You can also collect detailed system information by accessing the iCap reports from Cost Analyzer, as discussed in “Collecting system information from Cost Analyzer” on page 103.

Running iCap in observe mode to collect data

You can collect information about the LPARs and groups that are running on your system by starting iCap in observe mode and specifying POLICY=NO-POLICY.

1 Start the iCap master PAS by using the following parameters:

   START procName, [SSID=BBCS], [PASMODE=OBSERVE], [POLICY=NO-POLICY]

   Note
   For more information, see “Starting the iCap master PAS” on page 33.

   Note
   If the master PAS is already running, you can change to observe mode without restarting the master PAS by using a MODIFY command. For more information, see “Changing the iCap mode” on page 96.

2 Access iCap views to collect system information.

   For more information about accessing the EZICAP menu, see “Accessing iCap” on page 41.

   You can collect policy information from the POLOVER view. This view shows information about LPARs and groups. If NO-POLICY is specified, this view lists
all of the z/OS LPARs and groups running on your system. If a policy is specified, this view shows information about only the LPARs and groups that are managed by the active policy. For more information, see “Displaying an overview of the active policy” on page 74.

Setting alarms

iCap ships with product-specific alarms that can alert you when system resources are overused. You use MainView Alarm Manager to set these alarms, or to create your own alarms.

For example, the alarms that iCap distributes can notify you when conditions exist that could negatively impact cost management, such as the combined 4HRA reaching 95% of the MSU limit, or an LPAR or group being soft capped.

Overview of MainView Alarm Manager

MainView Alarm Manager is part of the MainView Infrastructure and runs within the coordinating address space (CAS). MainView Alarm Manager can monitor multiple systems simultaneously: if installed on one system, it keeps track of your entire sysplex.

With MainView Alarm Manager, you can manage your environment by exception. You can create an alarm for a view and specify thresholds for any data element within that view. Subsequently, if the data in the view matches the alarm, an alarm report is generated. You can view alarm definitions and reports from the EZALARMS view.

For more information about MainView Alarm Manager, see the MainView Alarm Management Guide. For more information about alarm customization and reporting, see the MainView Customization Reference manual.

Setting the iCap distributed alarms

iCap ships distributed alarms in HLQ.BBACTDEF. In order to use them, you must add them to the alarm definition file system. Use the following procedure.

1 In iCap, type ALRMDIST on the COMMAND line and press Enter.
The ALRMDIST view lists the iCap distributed alarms (Figure 10 on page 51).

**Figure 10: Example of ALRMDIST view**

<table>
<thead>
<tr>
<th>CMD</th>
<th>Alarm</th>
<th>Library</th>
<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DYC4HR00</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td>The 4HRA for an LPAR or group has exceeded the assigned DC or GCL. This alarm is built using the 4HRA %DCGCL column for the *Policy row of the POLOVER view.</td>
</tr>
<tr>
<td></td>
<td>DYC4HR01</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td>The 4HRA for an LPAR has exceeded the assigned DC or GCL. This alarm is built using the 4HRA %DCGCL column for individual LPARs on the SUBPOLO view.</td>
</tr>
<tr>
<td></td>
<td>DYC4HR02</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DYC4HR03</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DYC4HR04</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DYC4HR05</td>
<td>MVSCXB1</td>
<td>ICAP</td>
<td></td>
</tr>
</tbody>
</table>

The following table describes each alarm.

**Table 2: Distributed alarms in iCap**

<table>
<thead>
<tr>
<th>Alarm name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYC4HR00</td>
<td>The 4HRA for an LPAR or group has exceeded the assigned DC or GCL. This alarm is built using the 4HRA %DCGCL column for the *Policy row of the POLOVER view.</td>
</tr>
<tr>
<td>DYC4HR01</td>
<td>The 4HRA for an LPAR has exceeded the assigned DC or GCL. This alarm is built using the 4HRA %DCGCL column for individual LPARs on the SUBPOLO view.</td>
</tr>
<tr>
<td>DYC4HR02</td>
<td></td>
</tr>
<tr>
<td>DYC4HR03</td>
<td></td>
</tr>
<tr>
<td>DYC4HR04</td>
<td></td>
</tr>
<tr>
<td>DYC4HR05</td>
<td></td>
</tr>
</tbody>
</table>

Chapter 2 Setting up iCap
<table>
<thead>
<tr>
<th>Alarm name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYCLIW02</td>
<td>The low importance workload percent is 5, and the MSU limit percent is 100. This alarm is built using the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the <em>Policy</em> row of the POLOVER view. The alarm is triggered when critical work is at risk for and LPAR or group. When triggered, the values in the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the LPAR or group are highlighted in yellow.</td>
</tr>
<tr>
<td>DYCLIW03</td>
<td>The low importance workload percent is 0, and the MSU limit percent is 100. This alarm is built using the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the <em>Policy</em> row of the POLOVER view. The alarm is triggered when critical work is at risk for an LPAR or group. When the alarm is triggered, the values in the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the LPAR or group are highlighted in red.</td>
</tr>
<tr>
<td>DYCLIW04</td>
<td>The DC or GCL of an LPAR or group reaches MAX DC/GCL. The alarm is built using the **MIN(4HRA, DC</td>
</tr>
<tr>
<td>DYCLIW05</td>
<td>The low importance workload percent is 5. This alarm is built using the <strong>Low-Imp Wkld%</strong> column for individual LPARs on the SUBPOLO view. The alarm is triggered when critical work is at risk for an LPAR. When the alarm is triggered, the values in the <strong>Low-Imp Wkld%</strong> column for the LPAR are highlighted in yellow.</td>
</tr>
<tr>
<td>DYCLIW06</td>
<td>The low importance workload percent is 0. This alarm is built using the <strong>Low-Imp Wkld%</strong> column for individual LPARs on the SUBPOLO view. The alarm is triggered when critical work is at risk for an LPAR. When the alarm is triggered, the value in the <strong>Low-Imp Wkld%</strong> column for the LPAR is highlighted in red.</td>
</tr>
<tr>
<td>DYCLIW07</td>
<td>The low importance workload percent is 5, and the MSU limit percent is 100. This alarm is built using the <strong>Total Low-Imp Wkld%</strong> and <strong>% MSU Limit</strong> columns for the <em>Policy</em> row on the SUBPOLO view. The alarm is triggered when critical work is at risk for an LPAR in the subpolicy. When the alarm is triggered, the values in the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the LPAR are highlighted in yellow.</td>
</tr>
<tr>
<td>Alarm name</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DYCLIW08</td>
<td>The low importance workload percent is 0, and the MSU limit percent is 100. This alarm is built using the <strong>Total Low-Imp Wkld%</strong> and <strong>% MSU Limit</strong> columns for the <em>Policy</em> row on the SUBPOLO view. The alarm is triggered when critical work is at risk for an LPAR in the subpolicy. When the alarm is triggered, the values in the <strong>Low-Imp Wkld%</strong> and the <strong>% MSU Limit</strong> columns for the LPAR are highlighted in yellow.</td>
</tr>
<tr>
<td>DYCLIW09</td>
<td>The DC or GCL of an LPAR reaches MAX DC/GCL. The alarm is built using the <strong>%M4DCGCL MAXDCGCL</strong> column for individual LPARs on the POLOVER view. The alarm is triggered when critical work is at risk for an LPAR. When the alarm is triggered, the value in the <strong>%M4DCGCL MAXDCGCL</strong> column for the LPAR is highlighted in red.</td>
</tr>
<tr>
<td>DYCMSL00</td>
<td>The combined 4HRA equals or exceeds 98% of MSU limit. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the POLOVER view.</td>
</tr>
<tr>
<td>DYCMSL01</td>
<td>The combined 4HRA equals or exceeds 95% of MSU limit. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the POLOVER view.</td>
</tr>
<tr>
<td>DYCMSL02</td>
<td>The combined 4HRA equals or exceeds 85% of MSU limit. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the POLOVER view.</td>
</tr>
<tr>
<td>DYCMSL03</td>
<td>The combined 4HRA equals or exceeds 98% of MSULIMIT. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the SUBPOLO view.</td>
</tr>
<tr>
<td>DYCMSL04</td>
<td>The combined 4HRA equals or exceeds 95% of MSULIMIT. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the SUBPOLO view.</td>
</tr>
<tr>
<td>DYCMSL05</td>
<td>The combined 4HRA equals or exceeds 85% of MSULIMIT. This alarm is built using the <strong>% MSU Limit</strong> column for the <em>Policy</em> row of the SUBPOLO view.</td>
</tr>
</tbody>
</table>

2 Type **A** or **ADD** in the CMD column beside each alarm that you want to add, and press **Enter**.

If needed, you can use MainView Alarm Manager to customize the iCap distributed alarm definitions to meet your specific monitoring needs; you can also create your own alarms by using the MAKEAlarm line command. For more information, see the *MainView Alarm Management Guide*. 
**Note**

Provisions must be made to use the distributed alarms if the iCap master PAS is moved to new system.
Creating and managing policies

This chapter explains how to create iCap policies, display policy details, modify policy definitions, and view the iCap logs.

Overview of policies

An iCap policy is a set of rules that you specify to manage group capacity limits (GCLs) and the defined capacities (DCs) of LPARs.

You can build basic policies by specifying mostly default values, or you can build detailed policies by specifying values that meet your system's needs. If you want to build a detailed policy, you should first collect information about your system.

The following figure shows a sample iCap policy.

The main iCap policy can contain:

- LPARs
- Capacity groups
- Individually managed capacity group members
Overview of subpolicies

Subpolicies allow you to group LPARs and manage them together within a policy. You can manage like LPARs in a subpolicy (for example, LPARs running a certain subsystem), and set an MSU limit for the subpolicy. Subpolicies can include LPARs and capacity group members. However, they cannot include capacity groups.

**Example**

You might use a subpolicy in the following situation:

- The main policy's MSU limit is 1000.
- The policy contains five LPARs.
- Two of the LPARs in the policy run high-cost workloads, and you must limit their collective MSU usage to 300.

You can create a subpolicy containing the LPARs running high-cost workloads, and set the subpolicy's MSU limit to 300. Therefore, the subpolicy LPARs will not exceed 300 MSUs, and the remaining MSUs can be distributed to the LPARs in the main policy.

**Related Information**

- “Overview of MSU limits” on page 59

Policy guidelines

Consider the following guidelines when working with policies:

- Each CPC requires its own iCap master PAS. Typically, you should have one master PAS per CPC.
- BMC does not recommend running multiple iCap environments on the same CPC. This type of configuration would severely limit the product's ability to share...
MSUs across the LPARs and groups, as MSUs cannot be moved across environments.

**Note**

For testing purposes, if you want to run multiple iCap environments on a CPC, note that a particular LPAR or capacity group can be managed by only a single active policy.

Also, if multiple master PASs exist on one CPC, each master PAS must have a unique SSID and a unique CAS with a matching SSID.

- You can define multiple policies and subpolicies for the same set of managed LPARs and capacity groups, but only one of those policies can be active at a time.
- Policies must have a unique name.
- Policies must contain at least two LPARs and/or capacity groups, and subpolicies must contain at least two LPARs (individual or group members).
- iCap does not support IBM z/VM guests, as soft caps are not supported on z/VM guests. iCap supports only LPARs that run on a native IBM z/OS system. Starting an iCap PAS on a z/OS system running as a z/VM guest causes the PAS to terminate immediately.

**Subpolicy guidelines**

Consider the following guidelines when working with subpolicies:

- A policy can contain multiple subpolicies, but each subpolicy must have a unique name.
- Subpolicies do not support capacity groups, but you can include group members in a subpolicy to be managed as individual LPARs.
- The MSU limit for a subpolicy (and the sum of subpolicy MSU limits) cannot exceed the main policy’s MSU limit.
- If a subpolicy requires more than its assigned MSU limit, it cannot take additional MSUs from the main policy or another subpolicy.
  
  Subsequently, the subpolicy LPARs might be capped, even if gray-space MSUs are available in the main policy.
- Nested subpolicies (a subpolicy within a subpolicy) are not supported.

**LPAR and group guidelines**

Consider the following guidelines when working with LPARs and groups:
On any LPAR, only one iCap PAS (master or agent) can be active at any time.

iCap can manage LPARs that are running without active agents, but one of the following conditions must exist:

— The master PAS has been running for at least four hours.
— The LPAR has had an IPL since the master PAS started.

If neither of these conditions exists, iCap can run only in observe mode.

**Note**

WLM importance data is not available for LPARs that are running without active agents. These LPARs are managed by priority, instead.

iCap can also manage groups where the LPAR members are running without active agents, but one of the following conditions must exist:

— At least one LPAR in the group is running with an active agent.
— None of the group members are running with active agents, but one of the following conditions exists:
  — The master PAS has been running for at least four hours.
  — Each LPAR in the group has had an IPL since the master PAS started.

If these conditions do not exist in the iCap environment, iCap can run only in observe mode.

**Note**

WLM importance data is not available for groups that are running without active agents on each LPAR member. These groups are managed by priority, instead.

You can include the members of a capacity group in a policy and subpolicy as individually managed LPARs, but the following restrictions apply:

— You can add group members to a policy, but you must include all of the group members in the policy.
If you add group members to the policy (instead of adding the group itself), iCap manages the LPARs as if they are individual LPARs and not part of the group.

If a subpolicy contains group members, the policy must include all of the members of the group. However, the subpolicy does not need to contain all of the members.

You can use group members as individual LPARs if the CPC has only a few LPARs, and they are contained in a group. (A policy definition requires a minimum of two LPARs and/or groups.) In that case, you could add individual LPAR members to a policy rather than removing the LPARs from the group.

— If you add group members to a policy or subpolicy, you cannot add the group itself.

— If iCap is managing the members of a group and you want to add new LPARs to that group, BMC recommends that you add the LPARs to the policy before you add the members to the group on the hardware management console.

For more information, see “Adding an LPAR to a group in the active policy” on page 95.

Overview of MSU limits

When you create a policy, you assign an MSU limit to the whole policy. In addition, if you include subpolicies in the policy, each subpolicy has its own MSU limit.

The MSU limit is the maximum allowable MSUs to be consumed collectively by all LPARs or capacity groups that the policy or subpolicy manages. The sum of DCs and GCLs cannot exceed this value. When the combined 4HRA of all LPARs and capacity groups exceeds this value, at least one LPAR or group is subject to capping.

— Note —

If the LPARs and groups in the main policy require additional MSUs, any MSUs that are unused by the subpolicies can be passed to the main policy LPARs and groups. However, if a subpolicy exceeds its assigned MSU limit, it cannot take additional MSUs from the main policy LPARs and groups, or another subpolicy. Subsequently, the subpolicy LPARs might be capped even if gray-space MSUs are available in the main policy.

Consider the following guidelines when specifying MSU limits:

- If you are building a policy for the first time, you can set the main policy MSU limit to the sum of combined 4HRAs for all of the managed LPARs.
The combined subpolicy MSU limit must be less than the MSU limit for the main policy.

Each LPAR and capacity group in the main policy requires at least one MSU. That is, if your main policy contains two LPARs and one capacity group, at least three MSUs must be available for the main policy. However, if you manage the capacity group members as individual LPARs, each group member also requires at least one MSU.

Calculating the MSU limit for a subpolicy

You can use the following calculation when specifying the MSU limit for a subpolicy:

\[ \text{msuLimit} \geq \text{combinedSubpolicyMsuLimit} + \frac{\text{numberOfLpars/GroupsInTheMainPolicy}}{} \]

Example

Assume that the following conditions exist:

- You have a policy that contains seven LPARs and has an MSU limit of 450. That is, the highest amount of MSUs that you will see on your SCRT report is 450 MSUs.

- The policy contains the following LPARs and groups:

  - Three LPARs running CICS, batch, and other workloads (LPARs A, B, and C).
  - Two LPARs running high-cost workloads (LPARs D and E).
    Due to licensing reasons, you must limit the collective MSU usage of these LPARs to 300.
  - A capacity group containing two LPAR members running DB2 (LPARs F and G), with a GCL of 100.

- You create a subpolicy containing LPARs D and E (subpolicy A), and set the MSU limit to 300.

- To gain better cost saving and reduce the SLA risk of high importance work, you want to replace the capacity group containing LPARs F and G with a subpolicy (subpolicy B).
  You need to specify a MSU limit for subpolicy B. A good starting point would be the GCL value (in this case 100).

- You manage the remaining LPARs (A, B, and C) in the main policy.

The following figure shows the new policy arrangement.
Before you save your policy, BMC recommends that you review the mix of LPARs and subpolicies, and ensure that you have correctly specified the MSU limits for the main policy and subpolicies.

In this example, the original policy's MSU limit is 450. In addition, subpolicy A has an MSU limit of 300, and subpolicy B has an MSU limit of 100. LPARs A, B, and C in the main policy can use any MSUs that are unused by the subpolicies. However, if both subpolicies are using their full MSU limits at the same time, only 50 MSUs are available for the LPARs in the main policy.

Consider the importance of the work running on all of the managed LPARs, and the likelihood that both subpolicies will use their full MSU limits at the same time. Based on your knowledge of the environment, you can make adjustments to the MSU limit to match your workload expectations. In this example, you might decide that you can lower the MSU limit for subpolicy B to 90 MSUs, due to the expected efficiency gains provided by iCap.

**Getting started with policies**

This topic explains how to create a basic policy by accepting mostly default values, and then activate it for use by iCap.

**Creating a basic policy**

Use the following procedure to build a basic iCap policy, accepting mostly default values.
You can also build detailed policies based on this procedure. To build a detailed policy, you should collect system information before you begin. For more information, see “Collecting system information to build iCap policies” on page 49.

If you are new to building policies, BMC recommends that you start by running iCap in observe or message mode and using test LPARs or groups in the policy. This approach helps you understand how iCap works without affecting your high importance workloads.

This procedure is based on the iCap windows-mode ISPF interface but provides alternative instructions for MainView Explorer.

To create a policy

1. On EZICAP, hyperlink on Policy Admin UI.
2. On the Policy Administration UI, type NEW on the COMMAND line.

   Tip

   Alternatively, you can clone an existing policy by typing CLO in the CMD column next to the policy that you want to clone. (In MainView Explorer, right-click the policy and select Line action => Clone a policy.)

3. In the Create a Policy for iCap dialog box, enter values for the parameters that have no defaults, as follows:

<table>
<thead>
<tr>
<th>Field name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Name</td>
<td>Enter a unique name for the policy.</td>
</tr>
<tr>
<td>Description</td>
<td>Enter up to 32 characters to describe the policy.</td>
</tr>
</tbody>
</table>
| MSU Limit    | Enter the maximum allowable MSUs (any value from 1 through 99999) to be consumed collectively by all LPARs and capacity groups that the policy will manage. If you are building a policy for the first time, you can set this value to the sum of combined 4HRA for all of the managed LPARs.  

   Note: This value should not be greater than the maximum number of MSUs on the CPC. |
### Field name | Action
---|---
CPCID | Enter the last four digits of the serial number of the CPC on which this policy will be executed. By default, iCap inserts the CPC on which the master PAS is running. If you intend to run the policy on a different CPC, edit this field.
Create a subpolicy | Enter Y (yes) to add one or more subpolicies to the policy. Enter N (no) or leave the field blank to continue without adding subpolicies.

For the other parameters, you can accept the default values; you can change them later, if needed. For detailed descriptions, see “Policy-level and subpolicy-level parameters” on page 86.

---

**CREATE A POLICY FOR ICAP**

```
<table>
<thead>
<tr>
<th>COMMAND ===&gt;</th>
<th>SCROLL ===&gt;</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Name</td>
<td>TESTPOL</td>
<td>Member name</td>
</tr>
<tr>
<td>Description</td>
<td>TEST POLICY</td>
<td>Description</td>
</tr>
<tr>
<td>MSU Limit</td>
<td>300</td>
<td>Range 1-99999</td>
</tr>
<tr>
<td>WLM Tuning</td>
<td>COMBINED</td>
<td>Defaults to COMBINED</td>
</tr>
<tr>
<td>CPCID</td>
<td>62E7</td>
<td>Last 4 of CPCID</td>
</tr>
<tr>
<td>AdjFac Priority 1</td>
<td>0.6</td>
<td>Defaults to .6</td>
</tr>
<tr>
<td>AdjFac Priority 2</td>
<td>0.8</td>
<td>Defaults to .8</td>
</tr>
<tr>
<td>AdjFac Priority 3</td>
<td>1.0</td>
<td>Defaults to 1.0</td>
</tr>
<tr>
<td>AdjFac Priority 4</td>
<td>1.2</td>
<td>Defaults to 1.2</td>
</tr>
<tr>
<td>AdjFac Priority 5</td>
<td>1.4</td>
<td>Defaults to 1.4</td>
</tr>
<tr>
<td>Low Importance</td>
<td>5</td>
<td>Defaults to 5</td>
</tr>
<tr>
<td>Manage Cost</td>
<td>NO</td>
<td>Defaults to NO</td>
</tr>
<tr>
<td>Dynamic Entitlement</td>
<td>YES</td>
<td>Defaults to YES</td>
</tr>
</tbody>
</table>

Create a subpolicy Y

END to exit saving changes
CANCEL to exit without saving changes
HELP to view related help
RESET to reset to initial data
```

4 Press F3 to save the changes (or in MainView Explorer, click OK).

5 If you specified Y for Create a subpolicy, complete the displayed Create a Subpolicy for an iCap Policy dialog box as follows. (If you specified N, proceed to Step 6 on page 64.)

   a Enter values for Subpolicy Name, Description, and MSU Limit.

   The remaining fields reflect the values that you specified in the main policy. You can change these fields as required.

   **Note**

   BMC recommends that you specify the same value for Manage Cost for the main policy and the subpolicies.
b (optional) To add another subpolicy, type \textbf{Y} in the \textbf{Create a subpolicy} field and press \textbf{F3} (or in MainView Explorer, click \textbf{OK}).

c Finish creating subpolicies and then type \textbf{N} in the \textbf{Create a subpolicy} field and press \textbf{F3} (or in MainView Explorer, click \textbf{OK}).

The NLPARGRP view lists all of the active z/OS LPARs and capacity groups on the local system.

\begin{verbatim}
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>Type</td>
<td>Name</td>
<td>Policy</td>
<td>SystemName</td>
</tr>
<tr>
<td>BMCA</td>
<td>LPAR</td>
<td>BMCA</td>
<td>N/A</td>
<td>BMCA</td>
</tr>
<tr>
<td>BMCB</td>
<td>LPAR</td>
<td>BMCB</td>
<td>N/A</td>
<td>BMCB</td>
</tr>
<tr>
<td>DB2A</td>
<td>LPAR</td>
<td>DB2A</td>
<td>DB2GROUP</td>
<td>DB2A</td>
</tr>
<tr>
<td>DB2B</td>
<td>LPAR</td>
<td>DB2B</td>
<td>DB2GROUP</td>
<td>DB2B</td>
</tr>
<tr>
<td>DB2GROUP</td>
<td>GROUP</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>DEFAULT</td>
<td>GROUP</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ESAJ</td>
<td>LPAR</td>
<td>ESAJ</td>
<td>DEFAULT</td>
<td>ESAJ</td>
</tr>
<tr>
<td>IMSA</td>
<td>LPAR</td>
<td>IMSA</td>
<td>N/A</td>
<td>IMSA</td>
</tr>
<tr>
<td>IOC2</td>
<td>LPAR</td>
<td>IOC2</td>
<td>SJTEST3</td>
<td>IOC2</td>
</tr>
</tbody>
</table>
\end{verbatim}

6 On NLPARGRP, specify at least two LPARs or groups for the policy and subpolicies to manage:

<table>
<thead>
<tr>
<th>Action</th>
<th>Action to take in windows mode</th>
<th>Action to take in MainView Explorer</th>
</tr>
</thead>
<tbody>
<tr>
<td>To select from the displayed list</td>
<td>Type \textbf{ADD} in the CMD column next to the LPAR or group name and press \textbf{Enter}.</td>
<td>Right-click the LPAR or group that you want and select \textbf{Line action =&gt; Add an LPAR/Group to a policy}.</td>
</tr>
<tr>
<td>To specify an LPAR or group that is not in the list (for example, one that does not yet exist or exists on another CPC),</td>
<td>Type \textbf{ADD} on the COMMAND line and press \textbf{Enter}.</td>
<td>Type \textbf{ADD} on the COMMAND line and press \textbf{Enter}.</td>
</tr>
<tr>
<td>(only if cloning an existing policy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To delete an LPAR or group</td>
<td>Type \textbf{DEL} in the CMD column next to the LPAR or group and press \textbf{Enter}.</td>
<td>Right-click the LPAR or group and select \textbf{Line action =&gt; Delete an LPAR/Group from a policy}.</td>
</tr>
<tr>
<td>(only if cloning an existing policy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To update the attributes for an LPAR or group</td>
<td>Type \textbf{UPD} in the CMD column next to the LPAR or group and press \textbf{Enter}.</td>
<td>Right-click the LPAR or group and select \textbf{Line action =&gt; Update an LPAR/Group in a policy}.</td>
</tr>
</tbody>
</table>
Note

Observe these additional guidelines:

- A policy should contain LPARs or groups (or both) from a single CPC.

- The main policy must contain at least two LPARs, groups, or group members, and each subpolicy must contain at least two LPARs or group members.

- Capacity groups are not supported in subpolicies. You can add individual LPARs, or group members to be managed as individual LPARs. If you are adding group members, all of the group members must be included in the subpolicy and main policy. For more information, see “Policy guidelines” on page 56.

- If you add LPARs or groups from another CPC (and you intend to run the policy on that CPC):
  - All LPARs and groups in the policy must belong to that CPC.
  - In the Create a Policy for iCap dialog box (Step 3 on page 62), the CPCID must reflect the CPC on which you intend to run the policy.

- You can add LPARs, groups, and LPARs that are group members. For more information about managing group members as individual LPARs, see “Policy guidelines” on page 56.

7 In the Add an LPAR or Group to the Policy dialog box, enter values for the following parameters:

<table>
<thead>
<tr>
<th>Field name</th>
<th>Action</th>
</tr>
</thead>
</table>
| Priority   | Enter the relative priority of an LPAR or capacity group. Possible values are 1 through 5. The default is 3.  
**Note:** Before you run iCap in manage mode, BMC strongly recommends that you specify different values for each LPAR and group in the policy. |
| Proportion | Enter the proportion of the MSU limit to which the LPAR or group is entitled.  
**Tip:** The simplest way to calculate proportion is as a percentage of 100. For example, if you are managing two LPARs (LPARAAA and LPARBBB), you might specify a proportion of 30 for LPARAAA and 70 for LPARBBB. |
<table>
<thead>
<tr>
<th>Field name</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subpolicy name</td>
<td>Enter the name of the subpolicy to which you want to add the LPAR.</td>
</tr>
<tr>
<td></td>
<td>Leaving this field blank adds the LPAR only to the main policy.</td>
</tr>
<tr>
<td>Notes:</td>
<td>■ The subpolicy must already exist.</td>
</tr>
<tr>
<td></td>
<td>■ You can add only individual LPARs or group members to a subpolicy.</td>
</tr>
</tbody>
</table>

For the other parameters, you can accept the default values; you can change them later, if needed. For detailed descriptions, see “LPAR and group level parameters” on page 90.

8 Press F3 to save the changes (or in MainView Explorer, click OK).

9 Finish adding LPARs and groups to the policy, and then confirm that the policy is valid by typing VALIDATE on the COMMAND line.

The VALIDATE command also confirms that you have the correct security access to manage the LPARs and groups specified in the policy.
**Note**

If there are errors in the policy, take one of the following actions:

- If the errors relate to the policy definition, save the policy, then update the policy to correct the errors.
  
  For more information, see “Fixing policy errors” on page 67.

- If the errors relate to RACF security authorization, save the policy and contact your product administrator to gain the necessary security access.
  
  Then, confirm security authorization for the policy, as instructed in “Confirming security authorization” on page 69.

10 Type **SAVE** on the **COMMAND** line (or in MainView Explorer, click the save icon).

**Where to go from here**

After you have built a basic policy, you can proceed as follows:

- Activate the policy (“Activating a policy” on page 69).
- Display policy details (“Displaying policy details” on page 70).
- *(if required)* Update policy parameters (“Modifying a policy” on page 83).

**Fixing policy errors**

Before you can activate a policy, you must check that the policy’s definition is valid. Use the following procedure to correct any errors.

**To fix policy errors**

1. On the Policy Administration UI, check the value in the **Validated** column.

   Possible values are:

<table>
<thead>
<tr>
<th>Policy status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>The policy is valid.</td>
</tr>
<tr>
<td>Warning</td>
<td>The policy has some errors, but they will not prevent you from activating the policy. For example, the policy definition might include an LPAR or group that does not exist on the CPC, or the MSU limit might exceed the CPC maximum. Because the related conditions on the CPC might change in the future (making the policy valid then), the policy can be activated.</td>
</tr>
<tr>
<td>Policy status</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Error</td>
<td>The policy has errors and cannot be activated, but you can fix the errors via the Policy Administration UI.</td>
</tr>
<tr>
<td>No</td>
<td>The policy is not valid, cannot be activated, and cannot be fixed via the Policy Administration UI. Because you created the policy by using XML in ISPF, you must fix the errors in XML.</td>
</tr>
</tbody>
</table>

2. If the **Policy Valid?** value is *Yes*, skip to “Confirming security authorization” on page 69. Otherwise, hyperlink on the **Warning**, **Error**, or **No** value to see error messages in the POLDEF view that explain why the definition is invalid.

   **Note**
   The POLDEF view might not display all of the policy errors the first time that it is displayed. When you have corrected the listed policy errors, check the **Policy Valid?** value again to ensure that the policy is valid before moving to the next step. You might need to access the POLDEF view multiple times to view all of the policy errors.

3. Return to the Policy Administration UI and update the policy:
   - In windows mode, type **UPD** in the **CMD** column next to the invalid policy's name.
   - In MainView Explorer, right-click the policy and select **Line action => Update a policy**.

4. Make changes to the policy definition to solve the issues that were highlighted in the error messages in the POLDEF view.

   For more information about updating a policy definition, see “Updating a policy definition” on page 84.

5. To confirm that you have corrected the policy errors, on NLPARGRP type **VALIDATE** on the **COMMAND** line.

   **Note**
   The **VALIDATE** command also confirms that you have the correct security access to manage the LPARs and groups specified in the policy.
   If there are errors in the security authorization, save the policy and contact your product administrator to gain the necessary security access. Then, confirm security authorization for the policy, as instructed in “Confirming security authorization” on page 69.

6. Save the policy and return to the Policy Administration UI:
- In windows mode, type `SAVE` on the `COMMAND` line.

- In MainView Explorer, click the save icon.

Now that the policy is valid, activate it as instructed in “Activating a policy” on page 69.

## Confirming security authorization

Before you can activate a policy, you must check that you have the correct security access to manage the LPARs and groups specified in the policy.

**To confirm a policy’s security authorization**

1. On the Policy Administration UI, type `SEC` in the `CMD` column next to the policy name.

   If the policy does not pass security authorization, contact your product administrator to gain the necessary security access.

## Activating a policy

In general, starting the iCap master PAS activates the specified policy. Use the following procedure to activate a policy by starting (or restarting) the PAS; alternatively, you can issue a MODIFY command or use the Policy Administration UI if the PAS is already running.

### Before you begin

Ensure that the value in the `Policy Valid?` column is `Yes`, and that the policy passes security validation as instructed in “Confirming security authorization” on page 69.

### To activate a policy by starting or restarting the master PAS

1. Issue the following command:

   ```
   START masterPAS,POLICY= policyName
   ```

### To activate a policy if the master PAS is running and you want to activate an alternate policy

1. Use one of the following methods:
Managing policies

This topic explains how to display policy details and modify policy definitions.

Displaying policy details

This topic explains how to access views that display:

- A list of all defined policies ("Displaying all defined policies" on page 70)
- An overview of the active policy ("Displaying an overview of the active policy" on page 74)
- A policy definition ("Displaying policy and subpolicy definitions" on page 72)
- The individual LPAR members in a capacity group ("Displaying LPAR members of a capacity group" on page 80)
- The reason that an LPAR is excluded from a policy ("Displaying the excluded reason for an LPAR" on page 81)
- The four-hour MSU usage for an LPAR or group ("Displaying the 48 5-minute buckets that comprise the 4HRA for an LPAR or capacity group" on page 81)
- The monthly peak 4HRA by subsystem ("Displaying the monthly peak 4HRA by subsystem" on page 82)

Displaying all defined policies

Use the following procedure to see all defined policies on the Policy Administration UI. You can also view details about each policy, including:

- The MSU limit
- Whether the policy is valid
The ID of the CPC on which the policy will run
- The defined Workload Manager (WLM) tuning value
- Whether the policy will consider the cost of LPARs and groups when distributing MSUs
- Whether the policy is using dynamic entitlement
- The defined low-importance value
- The number of LPARs and groups defined in the policy

To display all defined policies

1. Use one of the following methods:
   - On EZICAP, hyperlink on Policy Admin UI.
   - Type POLICIES on the COMMAND line.

   **Note**

   The policy name for the active policy is highlighted in green.

   **Figure 11: The Policy Administration UI**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Validated</th>
<th>CPCID</th>
<th>WLM Tuning</th>
<th>MSU Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEWDEVUS</td>
<td>iCap LPARs and Groups Define Cap Warning</td>
<td>F037</td>
<td>YES</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>NEWSPE1</td>
<td>Only LPARs of Groups</td>
<td>Yes</td>
<td>F037</td>
<td>YES</td>
<td>95</td>
</tr>
<tr>
<td>NEWSPE2</td>
<td>iCap LPARs and Groups BMCPLEX</td>
<td>Yes</td>
<td>F037</td>
<td>COMBINED</td>
<td>95</td>
</tr>
<tr>
<td>NEWSPE3</td>
<td>iCap LPARs and Groups Define Cap Warning</td>
<td>F037</td>
<td>YES</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>NEWSPE4</td>
<td>SYSP with No HWI Security</td>
<td>Yes</td>
<td>F037</td>
<td>YES</td>
<td>95</td>
</tr>
<tr>
<td>NEWSPE5</td>
<td>All LPARs w-MAXDCGCL wo-MAXDCGCL</td>
<td>Yes</td>
<td>F037</td>
<td>NO</td>
<td>95</td>
</tr>
<tr>
<td>NEWSPE6</td>
<td>iCap LPAR GROUP with MAXDCGCL 0</td>
<td>Warning</td>
<td>F037</td>
<td>NO</td>
<td>95</td>
</tr>
<tr>
<td>NEWSPE7</td>
<td>MSULIMIT 690 Extracted from SCRT</td>
<td>Warning</td>
<td>F037</td>
<td>YES</td>
<td>69</td>
</tr>
<tr>
<td>NEWSPE8</td>
<td>Only LPARs of Groups</td>
<td>Yes</td>
<td>F037</td>
<td>COMBINED</td>
<td>95</td>
</tr>
<tr>
<td>R4BOOT</td>
<td>Policy for R4 Bootcamp</td>
<td>Error</td>
<td>F037</td>
<td>YES</td>
<td>40</td>
</tr>
<tr>
<td>SPEWLMID</td>
<td>CAzE iCap Configuration Tool</td>
<td>Warning</td>
<td>F037</td>
<td>COMBINED</td>
<td>50</td>
</tr>
</tbody>
</table>

   **Note**

   You can view the full policy definition for a specific policy in the POLDEF view. For more information, see “Displaying policy and subpolicy definitions” on page 72.

From the Policy Administration UI, you can also:
- Create a new policy, either from scratch or by cloning an existing policy
- View a policy definition
- Update a policy definition
- Delete a policy
- Activate a policy
- Confirm the security validation for a policy
Displaying policy and subpolicy definitions

Use the following procedure to display the definition for a specific policy, and definitions for any subpolicies defined in the policy.

For the active policy, you can also display additional details, such as the mode in which the policy is running and the policy's activation time and date.

To display a policy definition

1. Perform one of the following actions:
   - From any view:
     - Type `POLDEF policyName` on the COMMAND line.
   - From the Policy Administration UI:
     - Hyperlink on the Validated column for the policy.
     - In windows mode, enter `BRO` or `S` in the CMD column next to the policy's name.
     - In MainView Explorer, right-click the policy name and select Line action => Browse Policy Definition.
The POLDEF view displays information about the policy definition.

**Figure 12: POLDEF view**

<table>
<thead>
<tr>
<th>15MAY2016</th>
<th>07:06:05</th>
<th>---</th>
<th>MAINVIEW WINDOW INTERFACE (V6.1.00)</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMAND</td>
<td></td>
<td></td>
<td>SCROLL ====&gt;</td>
<td>PAGE</td>
</tr>
<tr>
<td>CURR WIN</td>
<td></td>
<td></td>
<td>W1 =POLDEF==DYCJ==15MAY2016==07:06:05==ICAP==D==10</td>
<td></td>
</tr>
<tr>
<td>ALT WIN</td>
<td></td>
<td></td>
<td>W1 =POLDEF==DYCJ==15MAY2016==07:06:05==ICAP==D==10</td>
<td></td>
</tr>
</tbody>
</table>

- Policy Name ALVPOL0N Description........ Similar to ALVPOL0G
- WLM Tuning. Combined CPC Id.................. 62E7
- MSU Limit.. 400 Low Imp..................... 5
- Validated.. OK Adjust 1 ..................... 0.60
- Adjust 2 ... 0.80 Adjust 3 ..................... 1.00
- Adjust 4 ... 1.20 Adjust 5 ..................... 1.40
- Adjust 6 ... 1.20 Manage Cost No Dynamic Entitlement Yes

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Priority</th>
<th>Proportion</th>
<th>Max DC</th>
<th>MSU</th>
<th>GCL Cost</th>
<th>Cost</th>
<th>Defined Entitlement Entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALVSUBP4</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALVSUBP6</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSA</td>
<td>LPAR</td>
<td>2</td>
<td>69</td>
<td>300</td>
<td></td>
<td></td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>QACGROUP</td>
<td>Group</td>
<td>4</td>
<td>79</td>
<td>1000</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QAC1</td>
<td>LPAR</td>
<td>3</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>SJSC</td>
<td>LPAR</td>
<td>2</td>
<td>76</td>
<td>300</td>
<td></td>
<td></td>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>

2 (optional if the policy contains any subpolicies) Hyperlink on a subpolicy name.

---

**Tip**

Subpolicies are identified by P in the Type field.

---

The SUBPDEF view is displayed.

**To display a detailed definition of the active policy**

1 Use one of the following methods:

- On EZICAP, hyperlink on Active Policy.
- Type POLACTV on the COMMAND line.

**Figure 13: POLACTV view**

<table>
<thead>
<tr>
<th>04MAY2016</th>
<th>06:51:18</th>
<th>---</th>
<th>MAINVIEW WINDOW INTERFACE (V6.1.00)</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMAND</td>
<td></td>
<td></td>
<td>SCROLL ====&gt;</td>
<td>PAGE</td>
</tr>
<tr>
<td>CURR WIN</td>
<td></td>
<td></td>
<td>W1 =POLACTV==DYCJ==04MAY2016==06:51:18==ICAP==D==10</td>
<td></td>
</tr>
<tr>
<td>ALT WIN</td>
<td></td>
<td></td>
<td>W1 =POLACTV==DYCJ==04MAY2016==06:51:18==ICAP==D==10</td>
<td></td>
</tr>
</tbody>
</table>

- Policy Name ALVPOL0L Description........ Similar to ALVPOL0I
- WLM Tuning. Yes CPC Id..................... 62E7
- MSU Limit.. 1000 Activated.............. 03MAY2016 18:23:23
- Mode....... Manage Adjust 1 ..................... 0.60
- Adjust 2 ... 0.80 Adjust 3 ..................... 1.00
- Adjust 4 ... 1.20 Adjust 5 ..................... 1.40
- Low Imp.... 6 Manage Cost No Dynamic Entitlement NO

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Priority</th>
<th>Cost Entrance</th>
<th>Proportion</th>
<th>Current Max DC Entitlement</th>
<th>GCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALVSUBP4</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALVSUBP6</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSA</td>
<td>LPAR</td>
<td>2</td>
<td>46421</td>
<td>69</td>
<td>61</td>
<td>300</td>
</tr>
<tr>
<td>QACGROUP</td>
<td>Group</td>
<td>4</td>
<td>53544</td>
<td>79</td>
<td>69</td>
<td>1000</td>
</tr>
<tr>
<td>QAC1</td>
<td>LPAR</td>
<td>3</td>
<td>17328</td>
<td>55</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>
Note

The tabular section of the view has one row for each LPAR, capacity group, and subpolicy specified in the policy. If you changed the definition of the policy after activating the policy (as described in “Updating a policy definition” on page 84), the definition shown here differs from the policy's stored definition.

The displayed MSULIMIT value might also differ from the value in the stored definition if you have used a MODIFY command to change it.

2 (optional if the policy contains one or more subpolicies) Hyperlink on a subpolicy name.

The SUBPACTV view is displayed.

Displaying an overview of the active policy

Use the following procedure to display an overview of the active policy in the POLOVER view. You can access the POLOVER view to assess how the active policy is managing the specified LPARs and capacity groups. From the POLOVER view, you can also access the SUBPOLO view, which shows details about the subpolicies in your active policy.

On this view, you can also see:

- The 4HRA
- The DCs of LPARs and GCLs
- The percentage of MSU limit that each LPAR and capacity group is using, and the total usage for the entire policy
- Whether the policy is using dynamic entitlement
- The specified cost limit
- The percentage of cost limit used by each LPAR and group, and the total usage for the policy
- The subsystems that are running on an LPAR or group
- Percentage of elapsed time during the current sample period that the LPAR or group was capped
- Subpolicy details
To display an overview of the active policy

1 Use one of the following methods:
   ■ On EZICAP, hyperlink on **Policy Overview**.
   ■ Type **POLOVER** on the **COMMAND** line.

Figure 14: POLOVER view

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Name</td>
<td>Name of the active policy</td>
</tr>
<tr>
<td>MSU Limit</td>
<td>MSU limit for the active policy</td>
</tr>
<tr>
<td>Mode</td>
<td>Mode in which iCap is running</td>
</tr>
<tr>
<td>Peak 4HRA</td>
<td>Peak 4HRA for the active policy</td>
</tr>
<tr>
<td>Activated</td>
<td>Date and time that the policy was activated</td>
</tr>
<tr>
<td>Peak Time</td>
<td>Date and time that the peak 4HRA occurred</td>
</tr>
<tr>
<td>T Prio Cap%</td>
<td>T Prio Cap%</td>
</tr>
<tr>
<td>Low-Imp</td>
<td>Low-Imp</td>
</tr>
<tr>
<td>Adj Low 4HRA DefCap</td>
<td>Adj Low 4HRA DefCap</td>
</tr>
<tr>
<td>Min(4HRA, % MSU Curren Exc)</td>
<td>Min(4HRA, % MSU Curren Exc)</td>
</tr>
</tbody>
</table>

2 (optional if the policy contains any subpolicies) Hyperlink on a subpolicy name.

Tip

Subpolicies are identified by **P** in the **Type** field.

The SUBPOLO view is displayed.

The following table describes the fields on the POLOVER view.
<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIST</td>
<td>Whether iCap will distribute the MSUs assigned to inactive LPARs or groups</td>
</tr>
<tr>
<td>Sum of Cost Entitlement</td>
<td>Cost limit for the policy</td>
</tr>
<tr>
<td>WLM Tuning</td>
<td>Whether WLM Tuning is being used</td>
</tr>
<tr>
<td>Dynamic Entitlement</td>
<td>Whether dynamic entitlement is being used</td>
</tr>
<tr>
<td>Manage Cost</td>
<td>Whether iCap is considering the cost limit when distributing MSUs</td>
</tr>
<tr>
<td>Combined 4HRA</td>
<td>Combined 4HRA for all of the managed LPARs and groups</td>
</tr>
<tr>
<td>Combined 4HRA%</td>
<td>Percentage of MSU limit used by the combined 4HRA for the policy</td>
</tr>
<tr>
<td>Name</td>
<td>Name of the managed LPAR, group, or subpolicy</td>
</tr>
<tr>
<td>T</td>
<td>Type</td>
</tr>
<tr>
<td></td>
<td>Possible values are:</td>
</tr>
<tr>
<td></td>
<td>■ P — subpolicy</td>
</tr>
<tr>
<td></td>
<td>■ G — group</td>
</tr>
<tr>
<td></td>
<td>■ L — LPAR</td>
</tr>
<tr>
<td></td>
<td>■ I — group member (also known as individual LPAR)</td>
</tr>
<tr>
<td></td>
<td>Individual LPARs are members of capacity groups and are being individually managed by iCap. That is, iCap manages the LPARs individually instead of as a group. The Group Name field shows the group to which the LPAR belongs.</td>
</tr>
<tr>
<td>Priority</td>
<td>Specified priority for an LPAR or group</td>
</tr>
<tr>
<td>Cap%</td>
<td>During the recent sample, the percentage of elapsed time that the LPAR or group was capped</td>
</tr>
<tr>
<td>Low-Imp Wkld%</td>
<td>Percentage of low importance work running on an LPAR or group Alarms alert you when the value in this field reaches 5% and 0%.</td>
</tr>
<tr>
<td>Adj Low Imp Wkld%</td>
<td>Adjusted Low-Importance Workload Percentage If WLM Tuning is specified as YES or COMBINED, iCap considers the Adjusted Low-Importance Workload Percentage to determine the order that LPARs and groups will receive MSUs when they are competing for MSUs when the MSU limit is approaching. The Adjusted Low-Importance Workload Percentage is calculated as follows: LowImportanceWorkloadPercentage × adjustmentFactors</td>
</tr>
<tr>
<td>Field name</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4HRA</td>
<td>Current 4HRA for the LPAR or group A hyperlink on this field links to the LPAR48BK or GRP48BK view that displays the four-hour MSU usage for an LPAR or capacity group. For more information, see “Displaying the 48 5-minute buckets that comprise the 4HRA for an LPAR or capacity group” on page 81.</td>
</tr>
<tr>
<td>DefCap or GCL</td>
<td>Defined capacity for an LPAR, or group capacity limit</td>
</tr>
<tr>
<td>Min(4HRA, DC</td>
<td>GCL)</td>
</tr>
<tr>
<td>% MSU Limit</td>
<td>Percentage of MSU limit used by an LPAR or group Alarms on this field alert you when the combined 4HRA reaches 85%, 95%, and 98% of MSU limit.</td>
</tr>
<tr>
<td>Current MSU/hr</td>
<td>Current MSU usage per hour</td>
</tr>
<tr>
<td>Excluded Reason</td>
<td>Reason that iCap cannot manage an LPAR or group</td>
</tr>
<tr>
<td>#Members</td>
<td>Number of LPAR members in a group</td>
</tr>
<tr>
<td># of Agents</td>
<td>Number of agents running on the LPAR or group</td>
</tr>
<tr>
<td>Field name</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the LPAR or group</td>
</tr>
<tr>
<td></td>
<td>Possible values are:</td>
</tr>
<tr>
<td></td>
<td>■ OK</td>
</tr>
<tr>
<td></td>
<td>■ Warn</td>
</tr>
<tr>
<td></td>
<td>A warning status indicates that one of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td>— The LPAR or group is missing (is not found in the DIAGNOSE buffer).</td>
</tr>
<tr>
<td></td>
<td>— The LPAR is not active, or at least one LPAR member of a group is not active.</td>
</tr>
<tr>
<td></td>
<td>■ Error</td>
</tr>
<tr>
<td></td>
<td>An error status indicates that one of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td>— The LPAR is running without an agent, or at least one LPAR member of a group is running without an agent.</td>
</tr>
<tr>
<td></td>
<td>Note: For an LPAR, the value of the # of Agents field is 0. For a group, the value is less than the # Members. To view information about the LPAR members in the group, hyperlink on the # Members field for a group to access the GRPMEM view. Use the Status column on GRPMEM to identify any LPARs that are running without agents.</td>
</tr>
<tr>
<td></td>
<td>— The LPAR or group is hard capped.</td>
</tr>
<tr>
<td></td>
<td>— Wait completion is enabled on the LPAR.</td>
</tr>
<tr>
<td></td>
<td>— The LPAR uses dedicated processors.</td>
</tr>
<tr>
<td>Max DcGcl</td>
<td>The maximum DC or GCL that an LPAR or group is allowed at any time</td>
</tr>
<tr>
<td></td>
<td>An LPAR or group will never receive DCs or GCLs above this limit, even if the MSUs are available. For more information, see the Max DC/GCL parameter description in “LPAR and group level parameters” on page 90.</td>
</tr>
<tr>
<td>System Name</td>
<td>Name of the system that is running on the LPAR</td>
</tr>
<tr>
<td>Sysplex</td>
<td>Name of the sysplex where an LPAR or group is running</td>
</tr>
<tr>
<td></td>
<td>Note: If this field displays <em>unkwn</em>, there is no agent running on the LPAR or group. Therefore, the sysplex is unknown.</td>
</tr>
<tr>
<td>Field name</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4HRA %DCGCL</td>
<td>Percentage of assigned DC/GCL compared to the 4HRA for an LPAR or group&lt;br&gt;An alarm on this field alerts you when the 4HRA exceeds the assigned DC or GCL.</td>
</tr>
<tr>
<td>Group Name</td>
<td>Name of the group to which an individual LPAR belongs&lt;br&gt;Note: This field applies only to LPARs that are group members (that is, an LPAR that is a member of a group, but has been specified as an individual LPAR). An individual LPAR is identified by I in the Type field.</td>
</tr>
<tr>
<td>MSU Cost</td>
<td>Relative cost of one MSU on an LPAR or group&lt;br&gt;This value is shown in cost units. A cost unit can represent any monetary value, or it can be a relative value. For more information, see the MSU Cost parameter description in “LPAR and group level parameters” on page 90.</td>
</tr>
<tr>
<td>Cost Entitlement</td>
<td>Number of cost units to which an LPAR or group is entitled&lt;br&gt;For more information, see “Calculating cost limit” on page 125.</td>
</tr>
<tr>
<td>Cost Limit%</td>
<td>Percentage of the cost limit that an LPAR or group is using</td>
</tr>
<tr>
<td>Entitlement</td>
<td>Number of MSUs to which an LPAR or group is currently entitled&lt;br&gt;When dynamic entitlement is enabled this field displays the adjusted entitlement for an LPAR or group, or the lesser of entitlement and adjusted entitlement. That is, if the calculated adjusted entitlement value is less than current entitlement, this field displays the adjusted entitlement value.&lt;br&gt;For more information, see the Dynamic Entitlement parameter description in “Policy-level and subpolicy-level parameters” on page 86.&lt;br&gt;Note: The DU column indicates whether the policy is using dynamic entitlement.</td>
</tr>
<tr>
<td>DU</td>
<td>Whether the policy is using dynamic entitlement</td>
</tr>
<tr>
<td>%M4DCGCL MAXDCGCL</td>
<td>Percentage of DC or GCL compared to the Max DC/GCL&lt;br&gt;An alarm on this field alerts you when the DC or GCL reaches Max DC/GCL.</td>
</tr>
<tr>
<td>Proportion</td>
<td>Specified proportion for an LPAR or group</td>
</tr>
</tbody>
</table>
### Field name | Description
--- | ---
Subsys Map | The subsystems that are running on an LPAR or group

Possible values are:
- D—DB2
- C—CICS
- W—WebSphere Transaction Manager
- I—IMS
- M—IBM MQ (formerly called IBM WebSphere MQ)

**Note:** If more than one subsystem is running on the LPAR or group, multiple values are displayed.

---

**Displaying LPAR members of a capacity group**

Use the following procedures to display the LPAR members of a capacity group in the GRPMEM view. On the GRPMEM view, you can see details of the LPARs in a group, including:
- The current 4HRA
- The current MSU usage per hour
- The Low Importance Workload percentage
- The sysplex on which an LPAR is running
- The subsystems that are running on an LPAR
- Percentage of elapsed time during the current sample period that the LPAR or group was capped

**To view the LPAR members of capacity groups for the active policy**

1. Use one of the following methods:
   - On EZICAP, select **LPAR Members of Groups**.
   - Type **GRPMEM** on the **COMMAND** line.

**To view the LPAR members of a specific capacity group**

1. On the POLOVER view, hyperlink on the **Members** column for a capacity group.
The LPAR members of the capacity group are displayed.

**Figure 15: GRPMEM view**

<table>
<thead>
<tr>
<th>17AUG2015 07:30:50</th>
<th>MAINVIEW WINDOW INTERFACE (V6.1.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMAND ====&gt;</td>
<td>SCROLL ====&gt; CSR</td>
</tr>
<tr>
<td>CURR WIN ====&gt; 1</td>
<td>ALT WIN ===&gt;</td>
</tr>
<tr>
<td>&gt;W1 =GRPMEM=</td>
<td>17AUG2015==07:30:50==ICAP=D==</td>
</tr>
</tbody>
</table>

C Group | LPAR | 4HRA Cap% | Low-Imp Current Excluded Status Sysplex System | SS Map | Name | Name | Wkld% MSU/hr | Reason | Name | Name |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2GROUP</td>
<td>DB2A</td>
<td>29</td>
<td>73</td>
<td>28</td>
<td>OK</td>
<td>BMCPLEX1</td>
<td>DB2A</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2GROUP</td>
<td>DB2B</td>
<td>46</td>
<td>56</td>
<td>45</td>
<td>OK</td>
<td>BMCPLEX1</td>
<td>DB2B</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2GROUP</td>
<td>SYSN</td>
<td>53</td>
<td>75</td>
<td>35</td>
<td>OK</td>
<td>BMCPLEX1</td>
<td>SYSN</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SJTEST2</td>
<td>SJSD</td>
<td>6</td>
<td>60</td>
<td>32</td>
<td>OK</td>
<td>BBPLEX01</td>
<td>SJSD</td>
<td>DC M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**
The GRPMEM view lists only LPARs that are members of a capacity group.
For a list of all of the LPARs, capacity groups, and group members in a policy, access the GRPLPAR view by typing the view name on the COMMAND line.

**Displaying the excluded reason for an LPAR**

An LPAR that does not meet a policy’s specified criteria is excluded from the policy, iCap does not manage the LPAR, and the LPAR’s 4HRA is not included in the MSU limit. Use the following procedure to see why a particular LPAR was excluded.

1. On the POLOVER view, look at the Excluded Reason column for an LPAR.

The following table explains the values shown in the Excluded Reason column:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>The LPAR is hard capped.</td>
</tr>
<tr>
<td>W</td>
<td>Wait completion is enabled on the LPAR.</td>
</tr>
<tr>
<td>D</td>
<td>The LPAR uses dedicated processors.</td>
</tr>
<tr>
<td>M</td>
<td>The LPAR is missing (does not exist on the system).</td>
</tr>
<tr>
<td>N</td>
<td>The LPAR is not active.</td>
</tr>
<tr>
<td>U</td>
<td>iCap is not authorized to modify the defined capacity for the LPAR.</td>
</tr>
</tbody>
</table>

**Displaying the 48 5-minute buckets that comprise the 4HRA for an LPAR or capacity group**

Use the following procedure to display the 5-minute buckets that comprise the 4HRA for an LPAR or capacity group.

1. Use one of the following methods:
- On the POLOVER view, hyperlink on the 4HRA column for an LPAR or capacity group.

- Type LPAR48BK \textit{iparName} or GRP48BK \textit{groupName} on the COMMAND line.

The resulting view (LPAR48BK or GRP48BK) displays the 48 5-minute buckets of MSU usage over the last four hours, for either a specific LPAR (LPAR48BK) or a specific capacity group (GRP48BK). The buckets appear in reverse chronological order, with the most recent bucket at the top.

\textbf{Figure 16: LPAR48BK view}

\begin{verbatim}
30MAR2014  08:56:40 ------ MAINVIEW WINDOW INTERFACE (V6.1.00) ---------------
COMMAND ===> SCROLL ===> PAGE
CURR WIN ===> 1        ALT WIN ===>
>W1 =LPAR48BK==========DYCJ=====*========30MAR2014==08:56:40====ICAP=====D====1
LPAR SYSM                           4HRA     42
## End Time  Duration      MSU/hr
-- --------  --------      -----
01 08:56:16  00:03:30        48.3
02 08:52:45  00:05:00        37.5
03 08:47:44  00:05:00        43.3
04 08:42:44  00:05:00        48.2
05 08:37:43  00:05:00        40.1
06 08:32:42  00:05:00        43.6
07 08:27:41  00:05:00        38.5
\end{verbatim}

\textbf{Figure 17: GRP48BK view}

\begin{verbatim}
30MAR2014  08:58:31 ------ MAINVIEW WINDOW INTERFACE (V6.1.00) ---------------
COMMAND ===> SCROLL ===> PAGE
CURR WIN ===> 1        ALT WIN ===>
>W1 =GRP48BK===========DYCJ=====*========30MAR2014==08:58:31====ICAP=====D====1
Group SJTEST2                        4HRA    148
## End Time  Duration      MSU/hr
-- --------  --------      -----
01 08:58:16  00:03:20       175.7
02 08:54:55  00:05:00       146.1
03 08:49:55  00:05:00       137.3
04 08:44:54  00:05:00       143.1
05 08:39:54  00:05:00       154.3
06 08:34:53  00:05:00       138.3
07 08:29:53  00:05:00       147.3
\end{verbatim}

\textbf{Note}

For LPARs within a capacity group, WLM does not attempt to synchronize; as a result, the 48 buckets on different LPAR members do not cover the same 5-minute time frame.

\section*{Displaying the monthly peak 4HRA by subsystem}

Use the following procedure to display the monthly peak 4HRA by subsystem.

1. Use one of the following methods:
On EZICAP, select **Subsystem Activity**.

Type **SUBSYS** on the **COMMAND** line.

The Subsystem view (SUBSYS) displays information about the subsystems that are running on managed LPARs, including the peak 4HRA for each subsystem and the number of LPARs that are currently running each subsystem.

**Figure 18: Subsystem view (SUBSYS)**

<table>
<thead>
<tr>
<th>NAME</th>
<th>4HRA LPARs</th>
<th>4HRA Peak</th>
<th>Peak 4HRA</th>
<th>Peak 4HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOS</td>
<td>108</td>
<td>3</td>
<td>226</td>
<td>07/20/2015 13:08:15</td>
</tr>
<tr>
<td>WEBSP</td>
<td>31</td>
<td>1</td>
<td>55</td>
<td>07/20/2015 13:08:15</td>
</tr>
<tr>
<td>IMS</td>
<td>98</td>
<td>2</td>
<td>125</td>
<td>07/30/2015 15:45:15</td>
</tr>
<tr>
<td>DB2</td>
<td>108</td>
<td>3</td>
<td>161</td>
<td>07/20/2015 15:42:15</td>
</tr>
<tr>
<td>CICS</td>
<td>98</td>
<td>2</td>
<td>144</td>
<td>07/20/2015 16:57:20</td>
</tr>
</tbody>
</table>

2. To view details about a specific subsystem, hyperlink on a subsystem name in the **SUBSY NAME** column.

Subsystem detail view (SUBSYSDE) displays details about the peak 4HRA, per LPAR, and the current 4HRA for an LPAR.

**Figure 19: Subsystem detail view (SUBSYSDE)**

<table>
<thead>
<tr>
<th>NAME</th>
<th>4HRA LPAR</th>
<th>4HRA Peak</th>
<th>Peak 4HRA</th>
<th>Peak 4HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOS</td>
<td>'<em>'ALL</em>'</td>
<td>108</td>
<td>3</td>
<td>226</td>
</tr>
<tr>
<td>ZOS</td>
<td>SJSB</td>
<td>10</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>ZOS</td>
<td>SJSN</td>
<td>31</td>
<td>1</td>
<td>56</td>
</tr>
<tr>
<td>ZOS</td>
<td>SJS0</td>
<td>67</td>
<td>1</td>
<td>110</td>
</tr>
</tbody>
</table>

**Modifying a policy**

Use the following procedures either to change the policy temporarily (without changing the saved policy definition), or to make lasting changes to the policy definition itself:

- “Updating a policy definition” on page 84
Updating a policy definition

Use the following procedure to update a policy definition.

1. On the Policy Administration UI, complete one of the following actions:
   - In windows mode, enter `UPD` in the `CMD` column next to the policy that you want to update.
   - In MainView Explorer, right-click the policy that you want to update and select `Line action => Update a policy`.

2. (optional) In the Update a Policy in iCap dialog box, edit the policy parameters.
   
   **Note**
   
   You can add a new subpolicy to the main policy by specifying `Y` in the Create a subpolicy field.

   For a list of policy parameters and their descriptions, see “Policy-level and subpolicy-level parameters” on page 86.

   **Tip**
   
   You can discard your changes at any time by typing `REFRESH` on the `COMMAND` line.

3. Save your changes and move to the next stage:
   - In windows mode, type `END` on the `COMMAND` line or press `F3`.
   - In MainView Explorer, press `OK`.

4. If you specified `Y` for Create a subpolicy, complete the displayed Create a Subpolicy for an iCap Policy dialog box as follows. (If you specified `N`, proceed to Step 5 on page 85.

   a. Enter values for the parameters that have no defaults

   **Note**
   
   The displayed default values reflect the values that you specified in the main policy.
To add another subpolicy, type **Y** in the **Create a subpolicy** field and press **F3** (or in MainView Explorer, click **OK**).

Finish creating subpolicies and then type **N** in the **Create a subpolicy** field and press **F3** (or in MainView Explorer, click **OK**).

The NLPARGRP view lists all of the LPARs and capacity groups on the local system. LPAR and group names that are highlighted in green are already included in the policy.

5  *(optional)* Edit the LPARs and groups as needed.

Table 4 on page 85 lists the actions that are available from the NLPARGRP view.

<table>
<thead>
<tr>
<th>Action</th>
<th>In windows mode</th>
<th>In MainView Explorer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update the attributes for an</td>
<td>Type <strong>UPD</strong> in the <strong>CMD</strong> column next to the</td>
<td>Right-click the LPAR or group name and select <strong>Line action =&gt; Update an LPAR/Group in a policy.</strong></td>
</tr>
<tr>
<td>LPAR or group</td>
<td>LPAR or group name</td>
<td></td>
</tr>
<tr>
<td>Add an LPAR or group to the</td>
<td>■ If the LPAR or group appears in the list, type <strong>ADD</strong> in the <strong>CMD</strong> column next to the LPAR or group name.</td>
<td></td>
</tr>
<tr>
<td>policy</td>
<td>■ If the LPAR or group does not yet exist, or it exists on another CPC, type <strong>ADD</strong> on the <strong>COMMAND</strong> line and press <strong>Enter</strong>.</td>
<td></td>
</tr>
<tr>
<td>Delete an LPAR or group from</td>
<td>Type <strong>DEL</strong> in the <strong>CMD</strong> column next to the LPAR or group name.</td>
<td>Right-click the LPAR or group name and select <strong>Line action =&gt; Delete an LPAR/Group from a policy.</strong></td>
</tr>
<tr>
<td>the policy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6  Confirm that the policy is valid by typing **VALIDATE** on the **COMMAND** line.

The VALIDATE command also confirms that you have the correct security access to manage the LPARs and groups specified in the policy.
**Note**

If there are errors in the policy, take one of the following actions:

- If the errors relate to the policy definition, save the policy, then update the policy to correct the errors.
  For more information, see “Fixing policy errors” on page 67.

- If the errors relate to RACF security authorization, save the policy and contact your product administrator to gain the necessary security access.
  Then, confirm security authorization for the policy, as instructed in “Confirming security authorization” on page 69.

7 Save the policy and return to the Policy Administration UI:

- In windows mode type **SAVE** on the **COMMAND** line.
- In MainView Explorer, click the save icon.

**Note**

If you update the policy definition for the currently active policy, the changes will not take effect until you reactivate the policy. For more information about activating iCap policies, see “Activating a policy” on page 69.

---

### Policy-level and subpolicy-level parameters

The following table lists iCap policy-level and subpolicy-level parameters.

**Note**

You must specify values for all of the parameters that have no default value.
Also, if you are using iCap reports from Cost Analyzer, you can input values directly from the report into the policy. For more information, see “Using iCap reports from Cost Analyzer to build a policy” on page 109.

<table>
<thead>
<tr>
<th>Table 5: Policy and subpolicy parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>Policy/Subpolicy Name</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>MSU Limit</td>
</tr>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>--------------</td>
</tr>
</tbody>
</table>
| WLM Tuning   | COMBINED      | Whether to use Workload Manager (WLM) tuning to determine the order that LPARs and groups will receive MSUs when they compete for MSUs when the MSU limit is approaching.  
The order of LPARs and groups is set by the values defined for LPARs and capacity groups in the Low Importance parameter.  
For more information, see the description of the Low Importance parameter in this table.  
Possible values are:  
  - YES  
    MSUs are distributed according to low-importance values and priority.  
    Consider this option when the WLM policies that are managing the workloads are sufficiently different. That is, an importance value of \( n \) on one sysplex is not comparable to an importance value of \( n \) on another sysplex. For more information, see “Using WLMTUNING=YES” on page 122.  
  - COMBINED  
    MSUs are distributed according to low importance values.  
    Consider this option when the WLM policies that are managing the workloads are sufficiently similar. That is, an importance value of \( n \) must be comparable on each sysplex.  
iCap includes low importance values from different sysplexes, as though all systems in the policy belong to a single sysplex. For more information, see “Using WLMTUNING=COMBINED” on page 120.  
  - NO  
    This option distributes MSUs according to the priority values assigned to LPARs and capacity groups (defined in the Priority parameter), ignoring the low importance values. For more information, see “Using WLMTUNING=No” on page 117. |
| CPCID        | CPCID         | The last four digits of the serial number of the CPC on which this policy will be executed.  
By default, the CPC on which the master PAS is running is displayed. If you intend to run the main policy on a different CPC, edit this field.  
This parameter corresponds to the ID parameter in the iCap reports. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| AdjFac Priority 1  | 0.6, 0.8, 1, 1.2, 1.4 | Adjustment factors that iCap uses to determine the Adjusted Low Importance Workload Percentage for an LPAR or capacity group. That percentage determines the order in which LPARs or capacity groups receive MSUs when the MSU limit is approaching (if WLMTUNING= YES or COMBINED). iCap uses the values specified for Adjustment Factors for Priority to calculate the Adjusted Low Importance Workload Percentage as follows: $\text{lowImportanceWorkloadPercentage} \times \text{adjustmentFactors}$  

*adjustmentFactors* refers to the adjustment values that you set with this parameter. $\text{lowImportanceWorkloadPercentage}$ refers to a value that iCap calculates as follows:

$$\left[ \frac{\text{lowImportanceMSUs}}{\text{totalMSUs}} \right] \times 100$$

$\text{lowImportanceMSUs}$ refers to any MSUs consumed at the specified importance level. That is, if Low Importance = 4, $\text{lowImportanceMSUs}$ is the number of MSUs consumed by any jobs with a workload importance of 4 or lower.

The values must increase from priority 1 through 5.

**Note:** You must specify all of these parameters, or none.

For LPARs running very high-priority workloads, you can specify an adjustment factor of zero for priority 1. In this case, LPARs or groups with priority 1 have an Adjusted Low Importance Workload Percentage of zero and are favored over all other LPARs and groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdjFac Priority 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AdjFac Priority 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AdjFac Priority 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AdjFac Priority 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| Low Importance | 5             | The workload importance level at which to begin delays if the jobs of that workload surpass the maximum allowed MSUs. Service class periods that are running in a workload (on an LPAR) have predefined importance values. For example, if you specify 4 for the Low Importance value, all service class periods with an importance value of 4 and below are considered to be low importance. Therefore, if the workload surpasses its maximum allowed MSUs, any jobs with a workload importance of 4, 5, and Discretionary importance might be delayed. Possible values are 2, 3, 4, 5, and D (discretionary workloads). The default value is 5.

**Tip:** On the POLIMP view, you can see the amount of importance work (in MSUs) per importance level that was consumed in the last 5 minutes for each LPAR and group on the CPC.

This parameter corresponds to the Low-Importance Level to Delay parameter in the iCap reports.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Cost</td>
<td>NO</td>
<td>Whether to consider the cost limit when distributing MSUs. If you specify YES, iCap ensures that the MLC costs incurred by the policy do not exceed the cost limit. This parameter is linked to the MSU Cost parameter, which is specified at the LPAR/group level. For more information, see “LPAR and group level parameters” on page 90. The cost limit for a policy is equal to the sum of cost entitlements for all managed LPARs and groups. <strong>Note:</strong> If a policy contains subpolicies, BMC recommends that you specify the same value for the main policy and the subpolicies. For more information, see “Calculating cost limit” on page 125.</td>
</tr>
</tbody>
</table>
| Dynamic Entitlement      | YES           | Whether to favor LPARs and groups with high importance workloads when the combined 4HRA exceeds 95% of MSU limit. This parameter enables iCap to assign additional MSUs to LPARs and groups that are running high importance workloads by stealing MSUs from LPARs and groups with a large number of low importance workloads. iCap distributes MSUs as follows:  
  - All LPARs and groups receive enough MSUs to cover their high importance workloads. Although iCap might still cap LPARs or groups, enough MSUs will be given to every LPAR to run high importance workloads, provided enough MSUs are available.  
  - Any remaining MSUs are distributed according to the low importance percentage. **Note:** This parameter is available only if WLM Tuning = Combined. |
| Create a subpolicy       | N             | Whether you want to create a subpolicy within the main policy. Possible values are:  
  - Y (yes) adds one or more subpolicies to the policy.  
  - N (no) or blank allows you to continue without adding subpolicies. |

**LPAR and group level parameters**

The following table lists iCap LPAR and group level parameters.
You must specify values for all of the parameters that have no default value.

If you are using iCap reports from Cost Analyzer, you can input values directly from the report into the policy. For more information, see “Using iCap reports from Cost Analyzer to build a policy” on page 109.

Table 6: LPAR/group parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPAR/Group Name</td>
<td>No default</td>
<td>Name of the LPAR or capacity group that you want to add to the policy or subpolicy. This value must match the LPAR or capacity group name as defined to PR/SM. Note: Capacity groups are not supported in subpolicies. However, you can include group members in a subpolicy to be managed as individual LPARs. For more information, see “Policy guidelines” on page 56. Note: If you are using values from iCap reports to build the policy, ensure that you include the same managed objects (LPARs, groups, or group members) that you selected in the report.</td>
</tr>
<tr>
<td>Type</td>
<td>L or G</td>
<td>Whether the name specified in the LPAR/Group Name parameter refers to an LPAR or capacity group. Possible values are L (LPAR) and G (group). This parameter corresponds to the Type (Type) column in the iCap reports.</td>
</tr>
<tr>
<td>LPAR/group priority</td>
<td>5</td>
<td>Relative priority of an LPAR or capacity group. Possible values are 1 through 5. iCap uses this parameter to determine recipient and donor LPARs when LPARs and capacity groups compete for MSUs.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Default value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Proportion | No default    | Proportion of the MSU limit to which an LPAR or capacity group is entitled. iCap uses proportion to calculate the number of MSUs to which an LPAR or capacity group is entitled when the combined 4HRA of all LPARs and groups is approaching the MSU limit. The simplest way to calculate proportion is as a percentage of 100. For example, assume that there are three LPARs running on the system. Proportion is specified as follows:  
- **LPARAAA** = 30  
- **LPARBBB** = 50  
- **LPARCCC** = 20  
- **Total** = 100  
You can also calculate proportion as a percentage of MSU Limit, or you can use LPAR weights.  
**Note:** If you set proportion based on MSU limit and you change the MSU limit, the entitlement for an LPAR or group will change.  
The iCap reports from Cost Analyzer also calculate a value for proportion that is 0.1% of Peak MSU. For more information, see “iCap report parameter descriptions” on page 106.  
**Note:** The value for Proportion must be an integer. For more information about how entitlement is calculated, see “Overview of entitlement” on page 115. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| Max DC/GCL      | 0             | The maximum DC or GCL that an LPAR or group is allowed at any time. An LPAR or group will never receive DCs or GCL above this limit. That is, if the LPAR or group requires MSUs above Max DC/GCL, iCap cannot assign additional MSUs even if the MSUs are available. Therefore, the LPAR or group might be capped even though MSU usage for the policy is below MSU limit. You might want to use this parameter in the following circumstances:  
- A test LPAR is being used by an application group that has a tendency to write loops.  
- An LPAR is running software that must be limited to a specific number of MSUs for contractual purposes.  
- You want to limit the cost of a particular subsystem that runs on an LPAR, and ensure that the DC never goes over MAXDCGCL. Therefore, you can use this parameter to make the MSU costs for that LPAR more predictable.  
This parameter corresponds to the **Current DC | GCL (Max DC or GCL)** column in the iCap reports. |
| Subpolicy name  | No default    | Name of the subpolicy to which you want to add the LPAR  
**Note:** The subpolicy must already exist.  
Leaving this field blank adds the LPAR only to the main policy. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default value</th>
<th>Description</th>
</tr>
</thead>
</table>
| MSU Cost   | 0             | Relative cost of the LPAR or group. The MSU Cost for each LPAR or group contributes to the cost limit for the iCap policy. If you specified YES for Manage Cost, you must specify a value for this parameter. This value can represent the actual cost of one MSU on an LPAR or group, or you can specify a relative value:

- If you know the exact cost of one MSU on an LPAR, you can specify the value in any currency (such as dollars, pounds, or euros).

  **Example:** On LPAR A one MSU costs $752, so MSU Cost is 752.

- If you do not know the exact cost of one MSU on an LPAR, you can specify a relative value.

  **Example:** The cost of an MSU on LPAR A is double the cost of an MSU on LPAR B, and the cost on LPAR C is half the cost of an MSU on LPAR A. Specify as follows:
  - LPAR A: MSU Cost = 2
  - LPAR B: MSU Cost = 4
  - LPAR C: MSU Cost = 1

You can determine MSU cost for an LPAR or group in one of the following ways:

- Access the iCap report from Cost Analyzer. For more information, see “iCap report parameter descriptions” on page 106.

- Use the SCRT report and the IBM MLC bill for an LPAR or group.

- Calculate a value based on your knowledge of the software running on the LPAR.

---

**Temporarily changing the MSU limit for an active policy**

Use the following procedure to change the MSU limit for the active policy without modifying the saved policy definition.

1. From the master console, issue the following command:
Consider the following command to adjust the MSU limit:

```
/F masterPas,MSULIMIT=nnn
```

Where `nnn` represents a number from 1 to 99999. For instance:

```
Example
/F ICAPMAST,MSULIMIT=850
```

**Note**

iCap disregards the MODIFY command if you issue it to a PAS other than the master PAS.

---

### Adding an LPAR to a group in the active policy

If iCap is managing the members of a group (rather than the group itself), use the following procedure to add an LPAR to the group.

To avoid disrupting the execution of the policy, you should include the LPAR in the policy definition before making changes to the group in the Hardware Management Console (HMC).

**To add an LPAR to a group in the active policy**

1. Add the LPAR to the policy definition:
   - If iCap is already managing the LPAR (individually, or as a member of a different group), review the LPAR's current attributes relative to the policy and skip to Step 3 on page 35.
   - If the LPAR exists on the CPC, add it to the policy and review the LPAR's current attributes.
   - If the LPAR does not yet exist on the CPC, add it to the policy by typing `ADD` on the COMMAND line on the NLPARGRP view.

   For more information about adding LPARs to a policy, see “Updating a policy definition” on page 84.

2. Activate the updated policy.

   **Note**

   If the LPAR does not yet exist on the CPC, iCap ignores the LPAR until you make changes to the HMC. iCap sends out the following message:

   `Specified LPAR xxxxxxxx does not exist.`
3 Access the HMC and add the LPAR to the group.

iCap starts managing the new LPAR immediately.

Deleting a policy

Use the following procedure to delete a policy.

1 On the Policy Administration UI view, complete one of the following actions:

   ■ In windows mode, enter DEL in the CMD column next to the policy.
   ■ In MainView Explorer, right-click the policy and select Line action => Delete a Policy.

2 In the Policy Delete Confirmation dialog, type Y to confirm the deletion and press F3.

Note
If you delete the active policy, the following warning message will appear:
You are about to DELETE the active policy!
If you continue with the deletion, iCap will continue to use the deleted policy until you activate an alternate policy or you stop the iCap master PAS. If you stop the master PAS, you must specify an alternate policy the next time you start the PAS; otherwise iCap will default to policy= NO-POLICY and run in observe mode.

Changing the iCap mode

Use the following procedure to change the mode in which iCap is running without restarting the master PAS.

1 From the master console, issue the following command:

   /F masterPas,MODE=mode

Possible values for mode are:

   ■ OBSERVE
   ■ MESSAGE | MSG
   ■ MANAGE
Note
After the master PAS terminates, the iCap mode will revert back to the mode that is specified in the master PAS JCL.
Also, note that for iCap to run in manage mode, certain conditions must exist in the iCap environment. To verify that the correct conditions exist, see “Starting the iCap master PAS” on page 33.

Related Information

■ “iCap modes” on page 19
■ “iCap PAS started task parameters” on page 35
■ “Policy guidelines” on page 56

Changing the RESTORE parameter

Use the following procedure to change the RESTORE parameter.

1. From the master console, issue the following command:

   /F masterPas,RESTORE=option

   Possible values for option are:

   ■ YES (the default) restores DCs and GCLs to the values they had when the master PAS initialized.

   ■ NO leaves DCs and GCLs as they were when iCap stopped managing the LPAR or group, or the PAS terminated.

   ■ ZERO sets DCs to 0 and GCLs to the value they had when the PAS initialized.

   ■ ENT sets the DC and GCL values based on entitlement:

      — For LPARs, iCap sets the DC according to the LPAR's entitlement level.

      — For groups, iCap sets the GCL according to the group's entitlement level.

      — For group members that are being managed individually, iCap sets the GCL to the sum of the individual members' entitlements.
Changing the RESTORE parameter

**Note**

The DC of each group member is set to MAXDCGCL, or to 0 if you did not specify MAXDCGCL.

**Note**

Issuing a MODIFY command does not automatically restore DCs and GCLs. The change will take effect only if any of the following conditions exist:

- You activate a new policy.
- The master PAS terminates.
- You switch from manage mode to message or observe mode.

Also, after the master PAS terminates, RESTORE will revert back to the mode that is specified in the master PAS JCL.

**Related Information**

- “iCap PAS started task parameters” on page 35

**Examples of how RESTORE affects DCs and GCLs**

To understand how iCap responds to the RESTORE parameter options, assume that the following conditions exist:

- Policy A (the active policy) contains SYSA, SYSB, and SYSC.
- Policy B contains SYSA and SYSB.
- RESTORE=YES is set in the master PAS JCL.

**Example**

Switching the active policy from Policy A to Policy B produces the following results:

- iCap restores only groups or LPARs that existed in Policy A but not in Policy B. Consequently, switching the policy causes iCap to restore only SYSC.

- SYSA and SYSB (common to both the old policy and the new) remain at their current value. They are not restored until iCap stops managing them, or the master PAS terminates.
Example

As another example, assume that the same initial conditions exist regarding Policy A, Policy B, and RESTORE=YES; however, you use a MODIFY command to change the RESTORE parameter to NO while the master PAS is running. Switching the active policy from Policy A to Policy B produces the following results:

- SYSC is not restored (meaning the DCs and GCLs do not change).

If the master PAS terminates or iCap switches from manage mode, results are as follows:

- If RESTORE=NO, SYSA and SYSB are not restored. When you restart the master PAS, iCap uses the DC and GCL values that existed when the PAS terminated; the original values for SYSA and SYSB are lost.

- If you change back to RESTORE=YES (before the PAS terminates), SYSA and SYSB are restored, but SYSC does not change.

Viewing the iCap logs

You can use the iCap log function to see how LPARs and groups are being managed, and to better understand any changes that are made to the iCap master PAS.

The iCap log function records changes in the iCap environment. iCap creates an interval record each time an important event occurs (such as initializing a PAS, changing a policy, changing defined capacities, or changing the MSU limit).

To view the iCap logs

1. From EZICAP, select one of the following options:

   - **All Log Records** (LOGRALL) displays all events (except the events where no action was taken).

   - **PAS System Log Records** (LOGRMIST) displays events that affect the master PAS, such as an MSU limit change, policy change, or mode change.
- **LPAR/Group Log Records (LOGRLPAR)** displays events for a specific LPAR or capacity group (Figure 20 on page 100).

**Figure 20: LPAR/Group Log Records (LOGRLPAR)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>DC Changed LPAR/Grp SJSC would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>DC Changed LPAR/Grp SJSD would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>DC Changed LPAR/Grp SJTEST would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Entitlement or 4HRA SJSC would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Entitlement or 4HRA SJSD would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Entitlement or 4HRA SJTEST would have be</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Processing entry SJSC, Priority</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Processing entry SJSD, Priority</td>
</tr>
<tr>
<td>07/31/2015</td>
<td>14:29:36</td>
<td>Processing entry SJTEST, Priority</td>
</tr>
</tbody>
</table>

The most recent event is listed at the top. You can view further details for an LPAR or group by clicking an entry in the **LPARGrou Name** column.

**Figure 21: LOGRLPAR—scrolled (1)**

<table>
<thead>
<tr>
<th>Name</th>
<th>L MSULIMIT</th>
<th>Cost Limit</th>
<th>Combined Current Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJSC</td>
<td>L</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>I</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSC</td>
<td>G</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>G</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>I</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSC</td>
<td>L</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>G</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>I</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSC</td>
<td>G</td>
<td>920</td>
<td>2000</td>
</tr>
<tr>
<td>SJSD</td>
<td>I</td>
<td>920</td>
<td>2000</td>
</tr>
</tbody>
</table>

Managing to Costs: 07/31/2015 14:29:36 PAS managing costs, calculated COS...
### Figure 22: LOGRLPAR—scrolled (2)

<table>
<thead>
<tr>
<th>Description</th>
<th>4HRA</th>
<th>Defined</th>
<th>Adjusted</th>
<th>LowImpWo</th>
<th>U Entitlem</th>
<th>Cost</th>
<th>Entitlement</th>
<th>MSU</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Changed LPAR/Grp</td>
<td>39</td>
<td>160</td>
<td>67 N</td>
<td>160</td>
<td>320</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement or 4HRA</td>
<td>81</td>
<td>460</td>
<td>N</td>
<td>460</td>
<td>320</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Changed LPAR/Grp</td>
<td>16</td>
<td>300</td>
<td>55 N</td>
<td>300</td>
<td>300</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement or 4HRA</td>
<td>39</td>
<td>900</td>
<td>67 N</td>
<td>160</td>
<td>160</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement or 4HRA</td>
<td>39</td>
<td>900</td>
<td>67 N</td>
<td>160</td>
<td>160</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement or 4HRA</td>
<td>39</td>
<td>900</td>
<td>67 N</td>
<td>160</td>
<td>160</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entitlement or 4HRA</td>
<td>81</td>
<td>302</td>
<td>N</td>
<td>460</td>
<td>300</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing entry</td>
<td>39</td>
<td>900</td>
<td>67 N</td>
<td>N/A</td>
<td>N/A</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing entry</td>
<td>16</td>
<td>900</td>
<td>55 N</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing entry</td>
<td>81</td>
<td>302</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy Entries</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A U</td>
<td>N/A U</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy processing</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A U</td>
<td>N/A U</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing to Costs</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A U</td>
<td>N/A U</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Viewing the iCap logs
Viewing the iCap logs
Collecting system information from Cost Analyzer

Before creating a policy, you need to collect system information that can help you build the most effective policy. Using the BMC Cost Analyzer for zEnterprise product, you can generate reports that provide input values for iCap policies.

This topic explains how to access, generate, and print iCap reports in Cost Analyzer. It also explains how to use the information from these reports to build a policy, and provides sample reports.

Accessing the iCap Configuration dialog in Cost Analyzer

Access the iCap Configuration dialog in the Cost Analyzer product to generate an iCap report.

**Note**
Before you can access the iCap Configuration dialog, the administrator for the Cost Analyzer product must assign you as a member of the iCap user group for Cost Analyzer. For more information, see the section about user groups in the *Cost Analyzer for zEnterprise User Guide*.

1. On the toolbar, click the **iCap Configuration** button.

   The iCap Configuration dialog is displayed.

   To generate a report, see “Generating iCap reports in Cost Analyzer” on page 104.
Generating iCap reports in Cost Analyzer

This topic explains how to generate an iCap report in Cost Analyzer. iCap reports provide metrics about a particular CPC during a specific month. You can set report parameters to determine the effects of adjusting the DC and delaying workloads of low importance.

You can generate these reports for individual LPARs, a group of LPARs, or any subset of LPARs. Cost Analyzer then uses the MSU utilizations from the cost models of the specified month to generate a report similar to the following sample.

Figure 23: Sample iCap report

For a list of parameters and their descriptions, see “iCap report parameter descriptions” on page 106. For more examples, see “Examples of iCap reports from Cost Analyzer” on page 109.

You can change the report parameters to determine the combined effect of reducing the DC for any set of LPARs or delaying low importance workloads. The resulting report shows the contribution of low-importance workloads to the 4HRA—for the entire set of LPARs and for each individual LPAR. Using this data, you can set input parameters for iCap policies. It is expected that you will generate numerous reports before you achieve the desired results.
In some cases, only partial monthly data is available (for example, for a report based on the current month). Partial data might compromise the report’s accuracy, or fail to generate the expected results.

**To generate a report**

1. In the **Description** field, enter a description to be displayed at the top of the report.
   
   Use a description that will sufficiently distinguish this report from others.

2. In the **Select Usage Month** field, use the calendar to select the month and year that you want to use as the source of the report data.

3. In the **Select CPC** field, select the CPC for which you want to generate the report.
   
   You can select only one CPC at a time.

4. In the **Select Managed Objects** field, select the managed objects for which the report should collect data.
   
   The dialog lists the managed objects that correspond to the selected CPC. You can select LPARs, groups, and group members from the list of managed objects. Hover the mouse over any group in the list to display the LPARs that are contained in that group.

   If you select a capacity group from the list, all LPARs that are members of that group are automatically selected. You can also select the group members to be managed as individual LPARs by selecting the **Members** check box instead of the **groupName** checkbox.

   For more information about using individual group members in a policy, see “Policy guidelines” on page 56.

5. In the **Low-Importance Level to Delay** field, select the workload importance level at which to begin delays if the jobs of that workload surpass the maximum allowed MSUs.

   For example, if you select level 3, any jobs with a workload importance of 3, 4, 5, and Discretionary importance will be delayed if they surpass the maximum allowed MSUs.

   In the generated report, this value determines the Low-Importance Contribution %. If you specify 4, the Low-Importance Contribution % will probably be higher than if you specify 5. If you want to increase the amount of low importance work on your managed objects, specify a higher value for this field.
**Note**
If an LPAR or group has no low importance work, or does not provide type 72 records (based on Workloads by Importance), the low importance percentage is set to 0.

**Tip**
On the POLIMP view, you can see the amount of importance work (in MSUs) per importance level for each LPAR and group on the CPC. This view shows the amount that was consumed in the last 5 minutes.

6 In the % to Reduce from Peak MSUs field, enter the percentage by which you want to decrease the peak MSU utilizations of the usage month.

For example, if your peak was 210 MSUs and you want to decrease it by 5 percent for the specified usage month, enter 5. If you set % to Reduce from Peak MSUs to 0, the report displays the total peak 4HRA for the managed LPARs and groups.

The value that you set for % to Reduce from Peak MSUs should not be higher than the Low-Importance Contribution %. For example, if you want to decrease the maximum allowed MSUs by 5 percent, adjustment can take place only if the Low-Importance Contribution % is 5 or higher.

If the Low-Importance Contribution % is too low (less than the value specified for % to Reduce from Peak MSUs), you can increase the percentage of low-importance work on the CPC by specifying a higher value for Low-Importance Level to Delay. For more information about the Low-Importance Contribution %, see Step 5 on page 105.

7 Select Click to generate report.

Cost Analyzer displays the generated report.

8 *(optional)* To convert the report to a PDF, complete this step:

   a Click Generate PDF Report.

   b Click Open if you want to view the PDF now, or Save As to save it to your local computer.

**iCap report parameter descriptions**

You can use the values generated in iCap reports from Cost Analyzer to set input parameters for iCap policies.
Table 7 on page 107 describes the parameters of the iCap report.

### Table 7: iCap report parameters

<table>
<thead>
<tr>
<th>Report parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPC Name</td>
<td>Name of the CPC</td>
</tr>
<tr>
<td>ID</td>
<td>The last four digits of the serial number of the CPC</td>
</tr>
<tr>
<td>Billing Year/Month</td>
<td>Usage month you selected for the report</td>
</tr>
<tr>
<td>Peak Interval</td>
<td>The date and time the Peak Interval occurred during the usage month for the managed objects you selected in the report</td>
</tr>
<tr>
<td>Low-Importance Level to Delay</td>
<td>Specified low-importance level to delay Workloads with the specified importance level will be delayed if the 4HRA MSU usage surpasses the Maximum MSUs Allowed. That is, if 4 is specified, workloads with an importance value of 4 and below are considered to be low importance. These workloads will be delayed if the MSU usage exceeds the Maximum MSUs Allowed. This parameter corresponds to the Low Importance parameter in iCap policies. For more information, see “Policy-level and subpolicy-level parameters” on page 86.</td>
</tr>
<tr>
<td>% to Reduce from Peak MSUs</td>
<td>Specified percentage by which you want to decrease the peak MSU utilizations of the usage month.</td>
</tr>
<tr>
<td>Recommended % to Reduce from Peak MSUs</td>
<td>Actual percentage by which the MSU limit was reduced If there is a discrepancy between the % to Reduce from Peak MSUs and the Recommended % to Reduce from Peak MSUs values, this means that there was not enough low-importance work to decrease the peak MSU utilizations of the usage month for the selected percentage amount. For example, if you selected an adjustment of 10% and there was not enough low-importance work to reduce the Peak Interval by 10%, Cost Analyzer calculates the actual percentage that was adjusted. The percentage of low-importance work is shown under Low-Importance Contribution %. The percentage value that you set for % to Reduce from Peak MSUs should not be higher than the value for Low-Importance Contribution %.</td>
</tr>
<tr>
<td>Low-Importance Contribution %</td>
<td>Percentage of low importance work that contributed to the Peak Interval</td>
</tr>
<tr>
<td>Maximum MSUs Allowed</td>
<td>Maximum allowed 4HRA of combined activity for the managed objects</td>
</tr>
</tbody>
</table>

The table at the bottom of the report contains a row of data for each managed object selected for the report. Table 8 on page 108 describes the table columns in the iCap report.
The column name includes the corresponding iCap policy parameter in parentheses. For example, Current DC|GCL (Max DC or GCL) corresponds to the Max DC/GCL parameter.

Table 8: iCap report table columns

<table>
<thead>
<tr>
<th>Table column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (Name)</td>
<td>Name of the managed object</td>
</tr>
<tr>
<td>Type (Type)</td>
<td>Whether the managed object is an LPAR or a group</td>
</tr>
<tr>
<td>Proportion of Peak MSUs, in .1% (Proportion)</td>
<td>Percentage that the managed object contributed to the peak 4HRA. This parameter corresponds to the Proportion parameter in iCap policies. For more information, see “LPAR and group level parameters” on page 90.</td>
</tr>
<tr>
<td>Actual Maximum 4HRA (None)</td>
<td>On the managed object, percentage of low-importance work that contributed to the peak 4HRA</td>
</tr>
<tr>
<td>Low-Importance Contribution% (None)</td>
<td>Percentage of low importance work on the managed object that contributed to the peak 4HRA</td>
</tr>
</tbody>
</table>
| Current DC|GCL (Max DC or GCL) | Maximum DC or GCL of the managed object. A value of 0 means the managed object did not have a limit. A value greater than 0 indicates:
- The DC for an individual LPAR
- The GCL for a group, or the highest DC for an LPAR member within a group |
| Relative Cost Factor | The cost of a single additional MSU for a managed object. Consider the following points:
- If you add one MSU to a group, the MSU can be added to only one LPAR in the group. Therefore, the incremental cost of the MSU is counted only once, and included in the relative cost of the group.
- If you are managing LPAR members individually and you add one MSU, each of the LPARs can be incremented. Therefore, the incremental cost of the MSU is counted in the relative cost of each individual LPAR member. Consequently, the relative cost of a group will always be lower than the sum of relative cost for the LPAR members. **Note:** If you are using more than one version of the same MLC product and you have a Single Version Charge agreement with IBM (in accordance with the IBM SVC rules), the cost of only the newer version of the product is included in the relative cost. |
Using iCap reports from Cost Analyzer to build a policy

After producing an iCap report, you can use the generated values to build a policy.

The following table lists the iCap report fields and the corresponding iCap policy parameters. You can input the values from the report straight into the policy.

### Table 9: iCap report fields and corresponding policy parameters

<table>
<thead>
<tr>
<th>Parameter level</th>
<th>iCap report fields</th>
<th>iCap policy parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>ID</td>
<td>CPCID</td>
</tr>
<tr>
<td></td>
<td>Low-Importance Level to Delay</td>
<td>Low Importance</td>
</tr>
<tr>
<td></td>
<td>Maximum MSUs Allowed</td>
<td>MSU Limit</td>
</tr>
<tr>
<td>LPAR/group</td>
<td>Name (LPAR or Group Name)</td>
<td>LPAR/Group Name</td>
</tr>
<tr>
<td></td>
<td>Type (Type)</td>
<td>Type</td>
</tr>
<tr>
<td></td>
<td>Proportion of Peak MSUs, in .1%</td>
<td>Proportion</td>
</tr>
<tr>
<td></td>
<td>(Proportion)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current DC|GCL (Max DC or GCL)</td>
<td>Max DC/GCL</td>
</tr>
<tr>
<td></td>
<td>Relative Cost Factor</td>
<td>MSU Cost</td>
</tr>
</tbody>
</table>

---

**Related Information**

- "Creating a basic policy" on page 61
- “Policy-level and subpolicy-level parameters” on page 86
- “LPAR and group level parameters” on page 90

---

**Examples of iCap reports from Cost Analyzer**

This topic provides specific examples of iCap reports from the BMC Cost Analyzer for zEnterprise product.
For more information about the iCap report parameters, see “iCap report parameter descriptions” on page 106.

Example iCap report (where adjustment is possible)

The following example shows a report where adjustment is possible and the maximum allowed MSUs is reduced by 5%:

- The user requested an adjustment percentage of 5% (shown in the % to Reduce from Peak MSUs field).

- The amount of low-importance work running on the LPARs is 60.37% (shown in the Low-Importance Contribution % field).

  The Low-Importance Contribution % field shows the maximum adjustment percentage possible. The adjustment percentage must be an integer, so the maximum adjustment percentage possible is 60%.

  **Note**
  
  For adjustment to occur, the Low-Importance Contribution % must be higher than the % to Reduce from Peak MSUs.

- The actual adjustment percentage is 5% (shown in the Recommended % to Reduce from Peak MSUs field).

  Adjustment is possible because the Low-Importance Contribution % (60.37%) is higher than the requested % to Reduce from Peak MSUs (5%). So, the maximum allowed MSUs is reduced by 5%.
Tip

If you want to see the total peak 4HRA for the managed LPARs and groups before adjustment, set the % to Reduce from Peak MSUs value to 0.

Figure 24: Example iCap report (where adjustment is possible)

Example iCap report (where adjustment is possible but the requested adjustment percentage cannot be applied)

The following example shows a report where the requested adjustment percentage cannot be applied due to insufficient low-importance activity, so the adjustment percentage is decreased:

- The user requested an adjustment percentage of 5% (shown in the % to Reduce from Peak MSUs field).
- The amount of low-importance work running on the LPARs is 1.66% (shown in the **Low-Importance Contribution %** field).

  The **Low-Importance Contribution %** shows the maximum adjustment percentage possible. The adjustment percentage must be an integer, so the maximum adjustment percentage possible is 1%.

  **Note**
  
  For adjustment to occur, the **Low-Importance Contribution %** must be higher than the % **to Reduce from Peak MSUs**.

- The actual adjustment percentage is 1% (shown in the **Recommended % to Reduce from Peak MSUs** field).

  The adjustment percentage is decreased because the **Low-Importance Contribution %** (1.66%) is lower than the requested % **to Reduce from Peak MSUs** (5%). So, the maximum allowed MSUs is reduced by 1%.
Tip

If you want to increase the Low-Importance Contribution %, try changing the value for Low-Importance Level to Delay. For example, changing that value from 5 to 4 would probably make the Low-Importance Contribution % value higher.

Figure 25: Example iCap report (where the requested adjustment percentage cannot be applied)

The following example shows a report where the requested adjustment percentage cannot be applied due to insufficient low importance activity:

Example iCap report (where adjustment is not possible)

The following example shows a report where the requested adjustment percentage cannot be applied due to insufficient low importance activity:
The user requested an adjustment percentage of 5% (shown in the % to Reduce from Peak MSUs field).

The amount of low-importance work running on the LPARs is 0.24% (shown in the Low-Importance Contribution % field).

The Low-Importance Contribution % field shows the maximum adjustment percentage possible. The adjustment percentage must be an integer, so the maximum adjustment percentage possible is 0%. Because the Low-Importance Contribution % is less than 1, adjustment is not possible.

The actual adjustment percentage is 0% (shown in the Recommended % to Reduce from Peak MSUs field).

**Tip**

If you want to increase the Low-Importance Contribution %, try changing the value for Low-Importance Level to Delay. For example, changing that value from 5 to 4 would probably make the Low-Importance Contribution % value higher.

Figure 26: Example iCap report (where adjustment is not possible)
Scenarios

The scenarios in this appendix illustrate the entitlement-based rules and how cost limit is calculated.

Entitlement scenarios

The scenarios in this section illustrate the entitlement-based rules that determine how gray-space MSUs are distributed when you use the WLMTUNING policy parameter.

Overview of entitlement

When the combined 4HRA of all LPARs and groups exceeds MSU limit, typically:

- Some LPARs and groups have 4HRAs below their entitlement
- Other LPARs and groups have 4HRAs above their entitlement

LPARs and groups with a 4HRA below entitlement are assigned the MSUs to which they are entitled, and their DCs or GCLs are set slightly above the 4HRA. These additional MSUs ensure that LPARs or groups are not accidentally capped if their 4HRA increases in the time between samples.

Then, the leftover (unused) MSUs are distributed to other LPARs or groups in need of MSUs. The unused MSUs are called *gray-space MSUs*.

To avoid being soft capped (temporarily capped), LPARs and groups with a 4HRA above entitlement require additional MSUs. These LPARs and groups can compete for gray-space MSUs and are ranked according to one of the following items:

- Priority
- Adjusted Low Importance Workload Percentage
- Ratio 4HRA/entitlement
If you specified DIST=Y and a managed LPAR becomes inactive, the entitlement for that LPAR is assigned to other LPARs or groups. When the LPAR starts running again, it regains its assigned entitlement.

**How iCap calculates the entitlement of an LPAR or group**

Using the *Proportion* parameter (explained in “LPAR and group level parameters” on page 90), iCap calculates the entitlement of an LPAR or group as follows:

\[ \text{PROPORTION} \div \text{SUM(ALL PROPORTIONS)} \times \text{MSULIMIT} \]

**Note**

If Max DC/GCL is specified, an LPAR or group cannot receive DCs or GCL above the Max DC/GCL value. That is, if Max DC/GCL is lower than entitlement, an LPAR or group will not receive its full entitlement, and left over DCs or GCLs are assigned to other LPARs or groups.

**Example**

In this example, the value of MSU limit is 500.

<table>
<thead>
<tr>
<th>LPAR/group</th>
<th>Proportion</th>
<th>Entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUPGGG</td>
<td>35</td>
<td>175</td>
</tr>
<tr>
<td>LPARAAA</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>LPARBBB</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>GROUPHHH</td>
<td>25</td>
<td>125</td>
</tr>
<tr>
<td>LPARCCC</td>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

iCap calculates the entitlement as follows:

- **GROUPGGG** — \((35 \div 100) \times 500 = 175\)
- **LPARAAA** — \((20 \div 100) \times 500 = 100\)
- **LPARBBB** — \((15 \div 100) \times 500 = 75\)
- **GROUPHHH** — \((25 \div 100) \times 500 = 125\)
- **LPARCCC** — \((5 \div 100) \times 500 = 25\)

**How WLM Tuning works**

When the combined 4HRA of LPARs and groups is approaching MSU limit, iCap determines the order that LPARs and groups will receive MSUs according to the specified WLM Tuning option. The following figure describes how the order is determined.
Using WLMTUNING=No

For this scenario, assume that you have mission-critical LPARs and groups that must be favored over other LPARs and groups.

Also, assume that you want to set the order in which LPARs and groups receive MSUs based on:

1 Priority

2 Ratio (4HRA + entitlement)
Rules

If WLMTUNING=NO, the following rules apply when LPARs or groups have 4HRAs above entitlement:

- The LPAR or group with the highest priority is favored.
- If LPARs or groups have equal priority, the LPAR or group with the lowest ratio 4HRA/entitlement is favored.

Scenario

As the following view shows, both GROUPGGG and LPARCCC have 4HRAs that are below their entitlement values. Therefore, GROUPGGG and LPARCCC receive the MSUs to which they are entitled, and their DC or GCL is set slightly above the 4HRA.

Figure 27: POLOVER view (WLMTUNING=NO)

| LPAR/group | Proportion | Entitlement | Priority | 4HRA | DC|GCL |
|------------|------------|-------------|----------|------|-----|
| GROUPGGG   | 350        | 175         | 1        | 150  | 152 |
| LPARAAA    | 200        | 100         | 2        | 119  | 119 |
| LPARBBB    | 150        | 75          | 3        | 100  | 79  |
| GROUPHHH   | 250        | 125         | 3        | 129  | 129 |
| LPARCCC    | 50         | 25          | 4        | 20   | 21  |

Table 10: Sample calculation of gray-space MSUs

<table>
<thead>
<tr>
<th>LPAR or group</th>
<th>Entitlement</th>
<th>DC or GCL</th>
<th>Gray-space MSUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUPGGG</td>
<td>175</td>
<td>152</td>
<td>23</td>
</tr>
<tr>
<td>LPARCCC</td>
<td>25</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because the remaining LPARs and groups (LPARAAA, LPARBBB, and GROUPHHH) have 4HRAs above their entitlement, they must compete for the remaining 27 gray-space MSUs. iCap distributes the gray-space MSUs as follows:
Of the three competitors, LPARAAA has the higher priority value (2). iCap determines that LPARAAA requires 19 of the gray-space MSUs:

\[
119 \text{ (4HRA)} - 100 \text{ (entitlement)} = 19
\]

This distribution leaves 8 remaining gray-space MSUs:

\[
27 \text{ (available gray-space MSUs)} - 19 \text{ (MSUs required by LPARAAA)} = 8
\]

LPARBBB and GROUPHHH have an equal priority value of 3, so iCap will distribute the remaining gray-space MSUs based on entitlement (or proportion). Because GROUPHHH has the lowest ratio of 4HRA/entitlement (as shown in the following table), GROUPHHH will receive the next distribution:

<table>
<thead>
<tr>
<th>LPAR or group</th>
<th>4HRA</th>
<th>Entitlement</th>
<th>Ratio 4HRA/entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPARBBB</td>
<td>100</td>
<td>75</td>
<td>1.33</td>
</tr>
<tr>
<td>GROUPHHH</td>
<td>129</td>
<td>125</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Based on the following formula, iCap calculates that GROUPHHH is allowed to take 5 of the remaining 8 gray-space MSUs:

**Formula:**

\[
\frac{(\text{remainingGraySpaceMSUs} \times \text{entitlement})}{\text{totalEntitlementForCompetingLPARsOrGroups}}
\]

**Calculation:**

\[
\frac{(8 \times 125)}{(125 + 75)} = 5
\]

However, GROUPHHH needs only 4 MSUs (GCL (129) - entitlement (125)), which leaves 4 gray-space MSUs still available.

iCap distributes the 4 remaining gray-space MSUs to LPARBBB, but that is not enough to meet its 4HRA (100). Consequently, LPARBBB is soft capped.

**Recommendation**

BMC recommends assigning a generous proportion value and a priority value of 1 to mission-critical LPARs and capacity groups:

- Awarding generous proportions to mission-critical LPARs and groups increases the possibility of the 4HRA remaining below entitlement. Consequently, the mission-critical LPARs and groups receive the MSUs that they require.

- In the event that the 4HRA exceeds the entitlement, having a priority value of 1 increases the probability that the mission-critical LPARs or groups will receive first choice of gray-space MSUs.
Using WLMTUNING=COMBINED

For this scenario, assume that the following conditions exist in your environment:

- The workloads are governed by different WLM policies.
- The WLM policies managing the workloads are sufficiently similar. That is, an importance value of \( n \) must be comparable on each sysplex.

Also, assume that you want to set the order in which LPARs and groups receive MSUs based on:

1. Adjusted Low-Importance Workload Percentage
2. Ratio \((4\text{HRA} \div \text{entitlement})\)

Rules

If WLMTUNING=COMBINED, the following rules apply when LPARs or groups have a 4HRA above entitlement

- The LPAR or group with the lowest Adjusted Low-Importance Workload Percentage is favored.
- If LPARs or groups have equal Adjusted Low-Importance Workload Percentage, the LPAR or group with the lowest ratio of 4HRA/entitlement is favored.

Calculating the Adjusted Low-Importance Workload Percentage

iCap calculates the Adjusted-Low Importance Workload Percentage as follows:

\[
\text{lowImportanceWorkloadPercentage} \times \text{adjustmentFactor}
\]

\(\text{adjustmentFactor}\) refers to the values that you set for the Adjustment Factors for Priority parameter. The \(\text{adjustmentFactor}\) value corresponds to priority. The higher the priority is, the lower the adjustment factor is. That is, for two LPARs with an equal Low-Importance Workload Percentage, the LPAR with the highest priority (and lower adjustment factor) will have lower Adjusted Low-Importance Workload Percentage. \(\text{lowImportanceWorkloadPercentage}\) refers to a value that iCap calculates as follows:

\[
\left[\%\text{OfStandardCPCConsumption} \times \text{adjustmentFactor}\right] \div \text{consumptionOfAllWorkloads}
\]
You can specify the level of importance values that are considered to be of low importance with the Low Importance parameter. The default value is 5.

For more information about the Low Importance parameter, see “Policy-level and subpolicy-level parameters” on page 86.

**Scenario**

As the following view shows, both GROUPGGG and LPARCCC have 4HRAs that are below their entitlement values. Therefore, GROUPGGG and LPARCCC receive the MSUs to which they are entitled, and their DC or GCL is set slightly above the 4HRA. In contrast, LPARAAA, LPARBBB, and GROUPHHH have 4HRAs above their entitlements and must compete for the remaining 27 gray-space MSUs from GROUPGGG and LPARCCC. For an explanation of how to calculate gray-space MSUs, see “Using WLMTUNING=No” on page 117.

**Figure 28: POLOVER view (WLMTUNING=COMBINED)**

iCap distributes the gray-space MSUs as follows:

- LPARAAA has an Adjusted Low Importance Workload Percentage of 9 (the lowest of the remaining LPARs and groups).

  **Note**
  The Low-Importance Workload Percentage for LPARAAA is 11, the highest among the remaining LPARs and groups. Due to LPARAAA’s priority value of 2 (and lower Adjustment Factor for its priority), its Adjusted Low-Importance Workload Percentage is the lowest, as shown in the Adj Low-Imp Wkld% column in Figure 28 on page 121.

iCap determines that LPARAAA requires 19 of the gray-space MSUs:

\[
119 \text{ (4HRA)} - 100 \text{ (entitlement)} = 19
\]

This distribution leaves 8 remaining gray-space MSUs:

\[
27 \text{ (available gray-space MSUs)} - 19 \text{ (MSUs required by LPARAAA)} = 8
\]

- LPARBBB and GROUPHHH have an equal Adjusted Low-Importance Workload Percentage of 10, so iCap will distribute the remaining gray-space MSUs based on entitlement (or proportion). Because GROUPHHH has the lowest ratio of 4HRA/
entitlement (as shown in the following table), GROUPHHH will receive the next distribution:

<table>
<thead>
<tr>
<th>LPAR or group</th>
<th>4HRA</th>
<th>Entitlement</th>
<th>Ratio 4HRA/entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPARBBB:</td>
<td>83</td>
<td>75</td>
<td>1.11</td>
</tr>
<tr>
<td>GROUPHHH:</td>
<td>135</td>
<td>125</td>
<td>1.08</td>
</tr>
</tbody>
</table>

— iCap calculates that GROUPHHH is allowed to take the remaining 8 gray-space MSUs. However, GROUPHHH does not receive enough MSUs to meet the 4HRA (135). Consequently GROUPHHH is soft-capped.

— As there are no remaining gray-space MSUs, iCap sets the DC of LPARBBB to 75 (equal to entitlement). Consequently, LPARBBB is also soft-capped.

**Using WLMTUNING=YES**

For this scenario, assume that the following conditions exist in your environment:

- The workloads are governed by different WLM policies.
- The WLM policies managing the workloads are sufficiently different. That is, an importance value of \( n \) on one sysplex is not comparable to an importance value of \( n \) on another sysplex.

Also, assume that you want to set the order in which LPARs and groups receive MSUs based on:

1 Adjusted Low-Importance Workload Percentage
2 Priority
3 Ratio \((4HRA \div \text{entitlement})\)

**Rules**

If WLMTUNING=YES, the following rules apply when LPARs or groups have 4HRAs above entitlement:

- If LPARs or groups belong to the same sysplex, the LPAR or group with the lowest Adjusted Low-Importance Workload Percentage is favored.
  
  If the LPARs or groups have equal Adjusted Low-Importance Workload Percentage, the LPAR or group with the lowest ratio 4HRA/entitlement is favored.
If LPARs or groups belong to separate sysplexes, the LPAR or group with the highest priority is favored.

If the LPARs or groups have equal priority, the LPAR or group with the lowest ratio of 4HRA/entitlement is favored.

**Note**

LPARs or groups that have 4HRAs below entitlement receive the MSUs to which they are entitled, and additional MSUs to ensure that they are not accidentally capped. For more information, see “Overview of entitlement” on page 115.

**Scenario**

As the following view shows, GROUPGGG has a 4HRA below entitlement. Therefore, it receives the MSUs to which it is entitled, and the GCL is set slightly above the 4HRA.

**Figure 29: POLOVER view (WLMTUNING=YES)**

<table>
<thead>
<tr>
<th>LPAR/Group</th>
<th>Proportion</th>
<th>Entitlement</th>
<th>Priority</th>
<th>4HRA</th>
<th>Low-Importance Wkld%</th>
<th>Adj Factor</th>
<th>Adj Low-Importance Wkld%</th>
<th>Sysplex</th>
<th>DC</th>
<th>GCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUPGGG</td>
<td>350</td>
<td>175</td>
<td>1</td>
<td>150</td>
<td>10</td>
<td>0.6</td>
<td>6</td>
<td>SYSPLXII</td>
<td>152</td>
<td></td>
</tr>
<tr>
<td>LPARAAA</td>
<td>200</td>
<td>100</td>
<td>2</td>
<td>110</td>
<td>10</td>
<td>0.8</td>
<td>8</td>
<td>SYSPLXII</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>LPARBBB</td>
<td>150</td>
<td>75</td>
<td>3</td>
<td>100</td>
<td>10</td>
<td>1</td>
<td>10</td>
<td>SYSPLXII</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>GROUPHHH</td>
<td>250</td>
<td>125</td>
<td>3</td>
<td>150</td>
<td>10</td>
<td>1</td>
<td>10</td>
<td>SYSPLXOO</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>LPARCCC</td>
<td>50</td>
<td>25</td>
<td>4</td>
<td>30</td>
<td>10</td>
<td>1.2</td>
<td>12</td>
<td>SYSPLXOO</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

In contrast, LPARAAA, LPARBBB, LPARCCC and GROUPHHH have 4HRAs above their entitlement and must compete for the remaining 23 gray-space MSUs from GROUPGGG. (For an explanation of how to calculate gray-space MSUs, see “Using WLMTUNING=No” on page 117.)

- From each sysplex, a sysplex winner is selected.
- Among the sysplex winners, a winner is selected.

For more information about how sysplexes are favoured, see “Rules” on page 122.

The sysplex-winners are determined as follows:

**Table 11: Determining sysplex winners**

<table>
<thead>
<tr>
<th>Sysplex</th>
<th>LPAR/group</th>
<th>Adjusted Low-Importance Workload Percentage</th>
<th>Sysplex winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSPLXII</td>
<td>LPARAAA</td>
<td>8</td>
<td>LPARAAA</td>
</tr>
<tr>
<td></td>
<td>LPARBBB</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Among the sysplex-winners, LPARAAA wins over GROUPHHH because it has the higher priority value of 2.

The gray-space MSUs are distributed as follows:

- LPARAAA has the highest priority of the sysplex-winners. iCap determines that LPARAAA requires 10 of the gray-space MSUs:
  \[110 \text{ (4HRA)} - 100 \text{ (entitlement)} = 10\]
  This distribution leaves 13 remaining gray-space MSUs:
  \[23 \text{ (gray-space MSUs)} - 10 \text{ (MSUs required by LPARAAA)} = 13\]

- LPARBBB (the remaining LPAR on SYSPLXII) and GROUPHHH (the sysplex winner on SYSPLXOO) compete for gray-space MSUs. LPARBBB and GROUPHHH have an equal priority value of 3, and an equal Adjusted Low-importance Workload Percentage of 10, so iCap will distribute the remaining gray-space MSUs based on entitlement (or proportion). Because GROUPHHH has the lowest ratio of 4HRA/entitlement (as shown in the following table), GROUPHHH will receive the next distribution:

<table>
<thead>
<tr>
<th>LPAR or group</th>
<th>4HRA</th>
<th>Entitlement</th>
<th>Ratio 4HRA/entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPARBBB</td>
<td>100</td>
<td>75</td>
<td>1.33</td>
</tr>
<tr>
<td>GROUPHHH</td>
<td>150</td>
<td>125</td>
<td>1.2</td>
</tr>
</tbody>
</table>

- iCap calculates that GROUPHHH is allowed to take the remaining 13 gray-space MSUs. However, GROUPHHH does not receive enough MSUs to meet the 4HRA (150). Consequently GROUPHHH is soft-capped.

- As there are no remaining gray-space MSUs, iCap sets the DC of LPARBBB to 75 and the DC of LPARCCC to 25 (equal to entitlement). That is, LPARBBB and LPARCCC are soft-capped.

**Cost limit scenarios**

The scenarios in this section illustrate the difference between MSU limit and cost limit. The scenarios also explain how iCap considers the cost limit when distributing MSUs.
Calculating cost limit

iCap considers the MSU limit when distributing MSUs. In addition, if you specify the following parameters, iCap also considers the cost limit:

- Manage Cost=YES (policy parameter)
- MSU Cost=nnnn (LPAR/group parameters)

When the cost limit is considered, iCap calculates the relative cost of MSU on an LPAR or group. iCap evaluates the cost of one LPAR or group against another LPAR or group. The relative cost of an LPAR or group is calculated in cost units, and the cost limit is the sum of cost units for all of the LPARs and groups that a policy manages.

How iCap calculates the cost limit

This scenario explains how iCap calculates the cost limit for a policy. Assume that the following conditions are true:

- iCap is managing three LPARs (SYSA, SYSB, and SYSC).
- The MSU limit is 300.
- MSU cost is based on an approximation of the cost in dollars. That is, one MSU on SYSA costs approximately $1200.

---

**Note**

When distributing MSUs according to cost, it is very important that you specify accurate proportion values for each LPAR. If you do not specify proportions correctly, an LPAR might not receive enough entitlement (regardless of the MSU cost specified). This might cause the LPAR to be capped.

For more information about specifying proportion and MSU cost, see “LPAR and group level parameters” on page 90.

---

### Table 12: LPAR properties

<table>
<thead>
<tr>
<th>LPAR name</th>
<th>Proportion</th>
<th>MSU cost</th>
<th>Entitlement (MSU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSA</td>
<td>20</td>
<td>1200</td>
<td>60</td>
</tr>
<tr>
<td>SYSB</td>
<td>30</td>
<td>900</td>
<td>90</td>
</tr>
<tr>
<td>SYSC</td>
<td>50</td>
<td>600</td>
<td>150</td>
</tr>
</tbody>
</table>

MSU limit 300 (Total)
iCap uses the LPAR properties to calculate the entitled cost units for an LPAR. Entitled cost units are equivalent to the entitlement for an LPAR. The number of entitled cost units for an LPAR are calculated as follows:

\[ \text{entitlement} \times \text{MSUcost} = \text{entitledCostUnits} \]

**Table 13: Entitled cost unit calculation**

<table>
<thead>
<tr>
<th>LPAR name</th>
<th>Calculation</th>
<th>Entitled cost units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSA</td>
<td>60 x 1200</td>
<td>72000</td>
</tr>
<tr>
<td>SYSB</td>
<td>90 x 900</td>
<td>81000</td>
</tr>
<tr>
<td>SYSC</td>
<td>150 x 600</td>
<td>90000</td>
</tr>
</tbody>
</table>

Cost limit 243000 (Total)

Therefore, iCap can allocate a maximum of 243000 cost units or 300 MSUs to all managed LPAR and groups collectively, whichever value is less.

**Understanding cost limit versus MSU limit**

This scenario explains how MSUs are distributed when the cost limit is considered. Assume that the following conditions are true:

- MSU cost for SYSA is 1200.
- MSU cost for SYSC is 600.
- MSU limit is 300.
- Cost limit is 243000.

The MSU cost for SYSA is double the MSU cost for SYSC, which means that MSU on SYSA is worth double the amount of MSU on SYSC.

- If iCap assigns all available CPU to SYSA, SYSA will receive only 202 MSUs (MSU must be a whole number).
  \[ \text{Calculation: } \frac{\text{costLimit}}{\text{MSUcost}} (243000 \div 1200 = 202.5) \]

- If iCap assigns all available CPU to SYSC, SYSC will receive 300 MSUs.
  \[ \text{Calculation: } \frac{\text{costLimit}}{\text{MSUcost}} (243000 \div 600 = 405) \]

Because 405 is higher than the MSU limit (300), iCap can allocate a maximum of 300 MSUs.
Generated JCL examples

This topic contains examples of JCL for starting the iCap master and agent PASs. This JCL is generated during customization, as instructed in the MainView Customization Reference.

Example of master PAS JCL

The following figure is an example of iCap master PAS JCL that is generated during customization.

**Figure 30: Example of master PAS JCL**

```
//DYCPASM PROC XDM=N,
//  SSID=BBCS,
//  PREFIX=DYCQA.COZE.V2380.PUT1401B,
//  VSPREFIX=DYCQA.COZE.PUT1401B,
//  PRDPREFIX=DYCQA.COZE.PUT1401B,
//  POLICY=,
//  PASMODE=OBSERVE,
//  RGN=0
/*/ 
** /*  BMC Intelligent Capping for zEnterprise (iCap) Master PAS STC */ 
** Change logs: 
** ------------------------------------------------------------- 
** /*-------------------------------------------------------------------- */ 
** /* Start PAS */ 
** /*-------------------------------------------------------------------- */ 
//PAS EXEC PGM=DYC9XZ00, 
//  PARM=('SSID=&SSID,XDM=&XDM, 
//  POLICY=&POLICY,MODE=&PASMODE.TYPE=MASTER'), 
//  REGION=&RGN.M, 
//  TIME=1440 
/*/ 
** /* STEPLIB DD DISP=SHR,DSN=&PREFIX..BBLINK */ 
** /* BBIPARM DD DISP=SHR,DSN=&PRDPREFIX..SO&SYSCLONE..UBBPARM */ 
** /* POLICIES DD DISP=SHR,DSN=&PRDPREFIX..POLICIES */ 
** /* BBSECURE DD DISP=SHR,DSN=&PRDPREFIX..SO&SYSCLONE..BBSECURE */ 
** /* BMCPSWD DD DISP=SHR,DSN=&PRDPREFIX..BMCPSWD */ 
** /* BBACTDEF DD DISP=SHR,DSN=&PRDPREFIX..BBACTDEF */ 
** /* ** HISTORY DATA SETS */ 
** /* ** HISTDS01 DD DISP=SHR,DSN=&VSPREFIX..S0SE.HISTDS01 */ 
```
Example of agent PAS JCL

The following figure is an example of iCap agent PAS JCL that is generated during customization.

Figure 31: Example of agent PAS JCL

```
//HISTDS02   DD   DISP=SHR,DSN=&VSPREFIX..S0SE.HISTDS02

USE OF PARAMETERS IN THIS JCL

SSID=PASS SSI, this is a four character value that determines what CAS it connects too. The default is BBCS.

XDM = Y,N - Extended diagnostic mode, the default is N.

Policy = The name of your policy, it can be up to 8 characters in length. If it is not specified for a MASTER PAS, then NO-POLICY will be used as a policy and you will be switched to observe mode, if you specified manage or message mode.

PASmode = Manage,Observe,Msg (default is observe), this is not required for an AGENT PAS.

Manage, means actively manage the CPC

Observe means just collect data do not do anything

Msg means observe + write WTO's saying what you would have done if you were managing

Type = master, agent (the default is agent)

Srvclass = srvclass, default SYSSTC, WLM-RULE (rule means let WLM tell us what it is). The only two valid options are SYSSTC or WLM-RULE.
```

128  BMC Intelligent Capping for zEnterprise User Guide
SSID=PAS SSID, this is a four character value that determines what CAS it connects to. The default is BBCS.

XDM = Y,N - Extended diagnostic mode, the default is N.

Policy = The name of your policy, it can be up to 8 characters in length. If it is not specified for a MASTER PAS, then NO-POLICY will be used as a policy and you will be switched to observe mode, if you specified manage or message mode.

Mode = Manage,Observe,Msg (default is observe), this is not required for an AGENT PAS.

Manage means actively manage the CPC
Observe means just collect data do not do anything
Msg means observe + write WTO's saying what you would have done if you were managing

Type = master, agent (the default is agent)

Srvclass = srvclass, default SYSSTC, WLM-RULE (rule means let WLM tell us what it is). The only two valid options are SYSSTC or WLM-RULE.
Example of agent PAS JCL
Glossary

GCL

Group capacity limit. The maximum value for the average consumption of MSUs by a capacity group. If the 4HRA reaches a value that is greater than or equal to the GCL, the capacity group is capped. This is a control value defined in the Hardware Management Console (HMC).

4HRA

Four-hour rolling average. The CPU consumption, measured in MSUs.

4HRA is calculated by the RMF using the last 48 5-minute buckets and written into the type 70 record of the z/OS image in which the RMF is running.

While the RMF in each z/OS image records the CPU consumption of all LPARs on the same CPC, the 4HRA metric is available only for the host LPAR (the LPAR in which this record is created).

The four-hour rolling average or 4HRA is sometimes called R4HA.

A

AEWLC

Advanced Entry Workload License Charges

AWLC

Advanced Workload License Charges
cost limit

The maximum allowable cost units to be consumed collectively by all LPARs and capacity groups that the policy manages.

The sum of cost units that are consumed by the policy cannot exceed this value. When the combined 4HRA of all LPARs and capacity groups exceeds this value, at least one LPAR or group is subject to capping.

For iCap to consider cost limit (in addition to MSU limit), you must specify the policy parameter Manage Cost= YES and MSU cost values for all managed LPARs and groups.

CPC

Central processor complex. This complex is a physical collection of hardware that includes main storage, one or more central processors, timers, and channels.


DC

Defined capacity. The maximum value for the average consumption of MSUs by an LPAR. If the 4HRA reaches a value that is greater than or equal to the DC, the LPAR is capped. This is a control value defined in the Hardware Management Console (HMC).

entitlement

The amount of MSUs that an LPAR or group is allowed to take. The entitlement can be calculated by:

\[
\left[ \text{PROPORTION} \div \text{SUM(ALL PROPORTIONS)} \right] \times \text{MSULIMIT}
\]

For more information, see “Overview of entitlementWhen the combined 4HRA of all LPARs and groups exceeds MSU limit, typically: ”.
EWLC

Entry Workload License Charges

FWLC

Flat Workload License Charges

G

gray-space MSUs

When an LPAR or group has 4HRA below entitlement, the remaining (unused) MSUs are called gray-space MSUs. These gray-space MSUs can be given to other LPARs or groups in need of MSUs.

iCap calculates gray-space MSUs as follows:

\[ \text{entitlement} = (DC|GCL} \]

L

LPAR

Logical partition. A subset of a single system that contains resources (processors, memory, and input/output devices).

An LPAR operates as an independent system and can contain different operating systems such as:

- z/OS
- Integrated Coupling Facility
- Linux (from Linus Torvalds)
- IBM z/VM

An LPAR can also be inactive.
M

managed object

An LPAR or capacity group that is managed by an iCap policy.

MLC Product

An IBM System z software product using MLC pricing.

MLCs

Monthly License Charges. One of the methods that IBM is using to charge for software products.

This method is used for the operating system itself and for the most important (and expensive) transaction processing subsystems (for example, CICS, DB2, IMS, and Web Sphere MQ).

For more information, see http://www-03.ibm.com/systems/z/resources/swprice/mlc/index.html.

MSU limit

The maximum allowable MSUs to be consumed collectively by all LPARs and capacity groups that the policy manages.

The sum of DCs and GCLs cannot exceed this value. When the combined 4HRA of all LPARs and capacity groups exceeds this value, at least one LPAR or group is subject to capping.

MSUs

Millions of Service Units. A measure of CPU time consumption, calculated as number of CPU seconds used per hour, multiplied by the service units per seconds (SU/sec) coefficient.

The SU/sec coefficient depends on the CPC type and model and normally is the same for all LPARs on a CPC.
SCRT

Sub-Capacity Reporting Tool. An IBM tool that processes the RMF and SMF records (in particular type 70 and type 89) and produces the Sub-Capacity report.

This report is used by IBM to calculate the monthly license charge. IBM customers using Sub-Capacity licenses must use SCRT to process data from all LPARs on a CPC for the complete billing month (from 00:00 of day 2 of the calendar month to 24:00 of day 1 of the next calendar month) and send it to IBM.

For more information see, http://www-03.ibm.com/systems/z/resources/swprice/.

soft capping

If the 4HRA for a managed LPAR or group exceeds the DC or GCL, the LPAR or group might be temporarily capped.

See also MSU limit on page 134.

sub-capacity

A group of licensing rules, terms, and conditions for software licenses based on actual CPU resource usage.

For more information see, http://www-03.ibm.com/systems/z/resources/swprice/.

UIE

Universal Information Exchange. A BMC component that runs on your mainframe system to read and process SMF/RMF and subsystem data collected from target z/OS images.

UIE can produce two types of output:

- XML data files
- Visualizer files

For more information, see the Universal Information Exchange User Guide.
V

VWLC

Variable Workload License Charges

W

WLM

Workload Manager. A component that controls access to system resources based on performance goals set by the system administrator.

workload

A group of work to be tracked, managed, and reported as a unit.

A workload consumes system resources such as CPU time and I/O operations.

Z

z/OS

A 64-bit operating system for IBM mainframe computers.

z/OS image

An instance of z/OS running in an LPAR or as VM guest.

z/OS images can run in an LPAR or inside an instance of the z/VM operating system as a guest.

z/VM

An IBM Virtual Machine operating system for mainframe computers.

zNALC
IBM System z New Application License Charges.
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