

# Overload Control User Guide

## Ericsson Service-Aware Policy Controller

### User Guide

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# Contents

<b>1</b>	<b>Configuration Prerequisites</b>	<b>1</b>
<b>2</b>	<b>Overload Control Configuration</b>	<b>2</b>
2.1	Load Regulation Mechanism	2
2.1.1	Check Load Regulation Thresholds	3
2.1.2	Modify CPU Threshold for Load Regulation	4
2.1.3	Modify Memory Threshold for Load Regulation	5
2.2	Massive Reauthorizations Mechanisms	6
2.2.1	Disable Massive Reauthorizations Based on Subscriber Update or Removal	6
2.2.2	Disable Massive Reauthorizations Associated to Time Conditions	6
2.2.3	Disperse Reauthorizations due to Fair Usage Reset on Specific Dates	6
2.3	Overload Configuration Related to Emergency and Multimedia Priority Services	7
<b>3</b>	<b>Overload Control Performance Management</b>	<b>9</b>
<b>4</b>	<b>Reference List</b>	<b>11</b>





# 1 Configuration Prerequisites

Before configuring the SAPC in an operational network, assure that:

- CBA Components are installed.
- The SAPC product software is installed.
- To have a detailed understanding of the function.



## 2 Overload Control Configuration

### 2.1 Load Regulation Mechanism

It is possible to monitor and modify values for CPU and memory load thresholds.

Load regulation thresholds are defined with following parameters:

Table 1 Load Regulation Parameters

Parameter	Description	Range(%)	Memory Default Values(%)	CPU Default Values(%)
utilizationLimit	Utilization limit for a resource (CPU or memory)	[0-100]	80	75
histOnLimit	Load regulation starts when the resource utilization rises above utilizationLimit - histOnLimit.	[0-utilizationLimit]	0	0
histOffLimit	Load regulation stops when the resource utilization falls below utilizationLimit - histOffLimit.	[0-utilizationLimit]	5	5

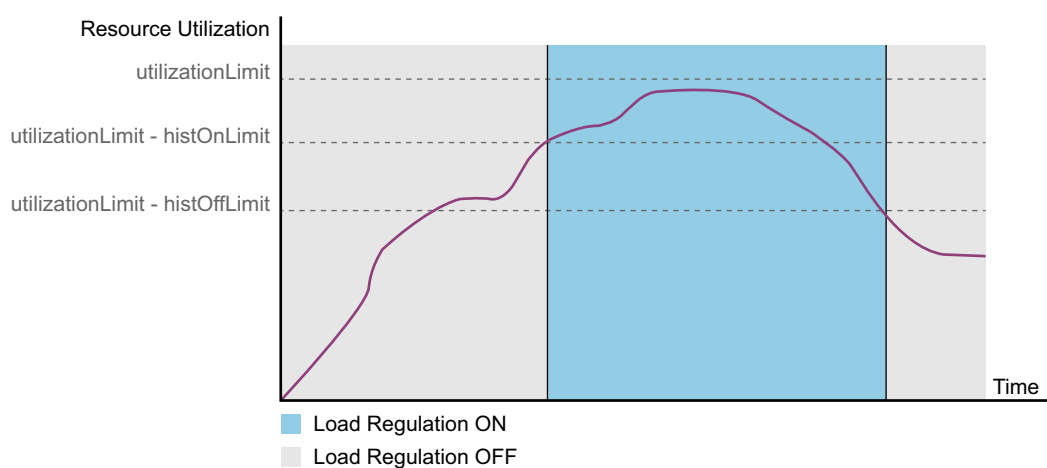


Figure 1 Load Regulation Thresholds Parameters



**Note:** To prevent load regulation incorrect behavior, it is not possible to configure `histOffLimit` and `histOnLimit` in a way that the value for `histOffLimit` is lower than the value for `histOnLimit`.

#### Example 1 Load Regulation Parameters values

```
----- Regulation Constraint for Memory -----
utilizationLimit 75
histOnLimit 5
histOffLimit 10
```

In the previous example, load regulation starts when memory utilization reaches 70% (`utilizationLimit - histOnLimit`) and stops when memory utilization falls below 65% (`utilizationLimit - histOffLimit`).

### 2.1.1 Check Load Regulation Thresholds

To check load regulation thresholds, do the following:

#### Steps

1. Execute following command to access the SAPC:

```
ssh sapcadmin@<OAM_VIP>
```

2. Execute following command to check load regulation thresholds:

```
sapcadmin@SC-X> loadRegulationManager -l

-----

Load Regulation Manager
-----

----- Regulation constraint for CPU -----
utilizationLimit 75
histOnLimit 0
histOffLimit 5

----- Regulation constraint for Memory -----
utilizationLimit 80
histOnLimit 0
histOffLimit 5

Done !
```



- CPU threshold indicates not to use more than 75% of the available resource. The SAPC starts load regulation when CPU utilization is above 75%, and stops load regulation when it is below 70%.
- Memory threshold indicates not to use more than 80% of the available resource. The SAPC starts load regulation when memory utilization is above 80%, and stops load regulation when it is below 75%.

3. Check displayed values for load regulation thresholds parameters.

## 2.1.2

### Modify CPU Threshold for Load Regulation

To modify CPU threshold for load regulation, do the following:

#### Steps

1. Execute following command to access the SAPC:

```
ssh sapcadmin@<OAM_VIP>
```

2. Execute the following command with desired values for CPU threshold parameters:

```
sapcadmin@SC-X> loadRegulationManager --cpu-rc [h0ff <val>]  
[h0n <val>][uLim <val>]
```

**Note:** For details related to the syntax of the command, execute:

```
sapcadmin@SC-X> loadRegulationManager -h
```

3. Check in the console output that the changes have been applied.

See following examples configuring CPU threshold:

**Example 2** For CPU, utilizationLimit is set to 68% without modifying values for histOnLimit and histOffLimit.

```
loadRegulationManager --cpu-rc uLim 68
```

**Example 3** CPU threshold indicates not to use more than 72% of the available resource. The SAPC starts load regulation when CPU utilization is above 64%, and stops load regulation when is below 57%.

```
loadRegulationManager --cpu-rc uLim 72 h0n 8 h0ff 15
```

**Example 4** For CPU, histOnLimit is set to 3% without modifying values for utilizationLimit and histOffLimit.

```
loadRegulationManager --cpu-rc h0n 3
```






---

## Warning!

It is possible to modify `histOnLimit` and `histOffLimit` for CPU resource limit. Ericsson recommends keeping default values.

---

### 2.1.3 Modify Memory Threshold for Load Regulation

To modify memory threshold for load regulation, do the following:

#### Steps

1. Execute following command to access the SAPC:

```
ssh sapcadmin@<OAM_VIP>
```

2. Execute the following command with desired values for memory threshold parameters:

```
sapcadmin@SC-X> loadRegulationManager --mem-rc [h0ff <val>]  
[h0n <val>][uLim <val>]
```

**Note:** For details related to the syntax of the command, execute:

```
sapcadmin@SC-X> loadRegulationManager -h
```

3. Check in the console output that the changes have been applied.

---

## Warning!

Ericsson recommends not to use a value higher than 80% for memory `utilizationLimit`. If the SAPC reaches memory utilization higher than 85%, some processes are restarted.

---

**Example 5** For memory, `utilizationLimit` is set to 74% without modifying values for `histOnLimit` and `histOffLimit`.

```
loadRegulationManager --mem-rc uLim 74
```

**Example 6** Memory threshold indicates not to use more than 71% of the available resource. The SAPC starts load regulation when memory utilization is above 68%, and stops load regulation when is below 65%.

```
loadRegulationManager --mem-rc h0ff 6 uLim 71 h0n 3
```



Example 7 For memory, `histOnLimit` is set to 4% without modifying values for `utilizationLimit` and `histOffLimit`.

```
loadRegulationManager --mem-rc hOn 4
```

---

### Warning!

It is possible to modify `histOnLimit` and `histOffLimit` for memory resource limit. Ericsson recommends keeping default values.

---

## 2.2 Massive Reauthorizations Mechanisms

### 2.2.1 Disable Massive Reauthorizations Based on Subscriber Update or Removal

To prevent the SAPC overload in case of massive reauthorizations messages based on subscriber profile change or removal, set `enableReauthsOnSubsChange` attribute in `class AppConfig` MOC to false. Once the massive provisioning operations are finished, set the attribute to true.

### 2.2.2 Disable Massive Reauthorizations Associated to Time Conditions

To prevent the SAPC overload in case of massive reauthorization messages associated to time conditions, set `enableReauthsOnToD` attribute in `class AppConfig` MOC to false.

### 2.2.3 Disperse Reauthorizations due to Fair Usage Reset on Specific Dates

To avoid a high amount of reauthorization messages at the same `resetPeriod`, configure it using the time `[hh:mm]` part. Messages (reauthorization messages and the corresponding reception of IP session update) are dispersed in following ranges:

Table 2 Configuration for reauthorizations dispersion using time part in `resetPeriod`

Time part	Dispersion range
Do not specify <code>[hh:mm]</code>	Random number from 0 to the number of seconds in 23 hours, 59 minutes, and 59 seconds



Time part	Dispersion range
hh:??	Random number from 0 to the number of seconds in 59 minutes and 59 seconds.

For more details, refer to [Configuration Guide for Fair Usage](#).

## 2.3 Overload Configuration Related to Emergency and Multimedia Priority Services

To prioritize the multimedia priority services in overload situation, configure a list of APNs in the MPS profiles if the MPS profiles are provisioned for the subscriber. For the configuration example, see [Configuration Guide for Emergency and Multimedia Priority Services](#).

In overload situation, the SAPC by default takes multimedia priority services with higher priority than emergency services. Emergency services can be configured with higher priority using class `OverloadConfig` as in [Example 8](#).

### Example 8 Priority Configuration for Overload Control

```
<edit-config>
  <target>
    <running/>
  </target>
  <config>
    <ManagedElement xmlns="urn:com:ericsson:ecim:ComTop">
      <managedElementId>1</managedElementId>
      <PolicyControlFunction xmlns="urn:com:ericsson:ecim:sapcm"
om">
        <policyControlFunctionId>1</policyControlFunctionId>
        <OverloadConfig xmlns="urn:com:ericsson:ecim:overload"
configmom">
          <overloadConfigId>1</overloadConfigId>
          <OverloadPriority xmlns="urn:com:ericsson:ecim:ov"
erloadconfigmom" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
nc:operation="merge">
            <overloadPriorityId>1</overloadPriorityId>
          >
            <priorityOrder>1</priorityOrder>
            <serviceTag>MULTIMEDIA_PRIORITY_SERVI →
CES</serviceTag>
          </OverloadPriority>
          <OverloadPriority xmlns="urn:com:ericsson:ecim:ov"
erloadconfigmom" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
nc:operation="merge">
            <overloadPriorityId>2</overloadPriorityId>
          >
            <priorityOrder>0</priorityOrder>
            <serviceTag>EMERGENCY_SERVICES</servi →
```



```
ceTag>
    </OverloadPriority>
    </OverloadConfig>
  </PolicyControlFunction>
</ManagedElement>
</config>
</edit-config>
```



## 3 Overload Control Performance Management

Following performance measurements are provided related to **Overload Control**:

- The number of Gx CCAs initial sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs initial for emergency services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs initial for multimedia priority services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs update sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs update for emergency services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs update for multimedia priority services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Gx CCAs terminate sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs initial sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs initial for emergency services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs initial for multimedia priority services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs update sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs update for emergency services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx AAAs update for multimedia priority services sent indicating too busy (Result-Code AVP set to 3004).
- The number of Rx STAs sent indicating too busy (Result-Code AVP set to 3004).
- The number of Sd CCAs update sent indicating too busy (Result-Code AVP set to 3004).
- The number of Smp CCAs initial sent indicating too busy (Result-Code AVP set to 3004).



- The number of Sy SNAs update sent indicating too busy (Result-Code AVP set to 3004).
- The number of SOAP notifications not processed due to overload protection.
- The number of REST provisioning messages indicating too busy (HTTP status code set to 503).
- The number of Time of Day reauthorizations not processed due to overload protection.

For more details, refer to [Measurements](#).



## 4 Reference List

### **Ericsson Documents**

1. Configuration Guide for Emergency and Multimedia Priority Services
2. Configuration Guide for Fair Usage
3. Measurements