

License Management

DESCRIPTION

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1 Introduction

This document provides an overview of the management model and concepts associated with the License Management (LM) managed area.

A managed area is represented by a group of Managed Object Classes (MOCs) within the Managed Object Model (MOM).





2 Functions and Concepts

LM provides a management interface for the Managed Element (ME) license keys.

License keys grant the use of purchased functionality or capacity. License keys are ordered from the Ericsson software supply organization and are delivered as license key files.

A license key is locked to a specific ME based on a fingerprint value, which is an operator-defined unique logical name or an ME predefined value. The fingerprint value is usually set at ME deployment time and can no longer be changed once the first license key file has been successfully installed on the ME. The ME fingerprint value must always be provided when ordering a new license key from the Ericsson software supply organization.

The ME licenses have the following categories:

- Feature licenses
Control access to the optional features in a managed function.
- Capacity licenses
Control the number of licensed objects that can be active or used at the same time.
- Throughput capacity licenses
Control the rate that licensed objects can be used.

Perpetual license keys have no expiration date or an expiry date that is far into the future (for example, 2099-12-31). All other license keys have an expiry date.

A licensed feature or capacity can no longer be used or granted after the license key expiry. Before the expiry date, the license keys enter a license expiry warning period. The start of this period and the license key expiry are notified as alarms to the user. The ME raises the alarms `License Management, License Key Not Available` and `License Management, Capacity Usage Threshold Reached` to indicate these conditions.

2.1 Modes of Operation

LM operates in the following modes:

- Integration Unlock mode
- Normal mode



- Emergency Unlock mode
- Autonomous mode
- Locked mode

2.1.1 Integration Unlock Mode

LM runs in Integration Unlock mode after installation. While in this mode, LM can function without access to official licenses. This mode allows use of the system when access to a valid license key file is unavailable.

LM can enter Emergency Unlock mode during the Integration Unlock window, as shown in Figure 1.

LM automatically transitions to Normal mode when the Integration Unlock window has expired, recorded by attribute *expiration*. Any license that was used during Integration Unlock mode for which no valid license key was found expires.

2.1.2 Normal Mode

Normal mode is the default operational state of LM. During normal operation, the system authorizes only those feature sets and capacity levels that have a valid license from a license key file.

From Normal mode, LM can transition to other modes, as shown in Figure 1.

2.1.3 Emergency Unlock Mode

Emergency Unlock mode authorizes access to all licensed features and objects independent of official license keys. The ME raises the alarm `License Management, Emergency Unlock Reset Key Required` to indicate this mode.

The Emergency Unlock mode window cannot exceed seven days. During this seven-day window, all managed function license requests are authorized. All licenses used during Emergency Unlock mode are set to expire at the end of the Emergency Unlock window.

When the Emergency Unlock mode ends, LM automatically tries to synchronize the used licenses with the available license key files. If all used licenses are included in these files, LM begins operating in Normal mode. If at least one used license is not present in the available license files, LM returns to the previous operating mode, as shown in Figure 1.



2.1.4 Autonomous Mode

LM automatically transitions from Normal mode to Autonomous mode when any installed license key file is missing or corrupted. The ME raises the alarm `License Management, Autonomous Mode Activated` to indicate this mode. During Autonomous mode, licenses that were in use continue to function normally. However, new licenses cannot be requested.

LM can function in Autonomous mode for a maximum of 24 hours. If the license key file cannot be re-established within the 24 hour window, LM enters Locked mode.

While operating in Autonomous mode, LM tries to access the license key files at regular intervals. As soon as LM can access all of the installed license key files it automatically reverts to Normal mode.

LM does not transition into Autonomous mode if a license key file has never been installed.

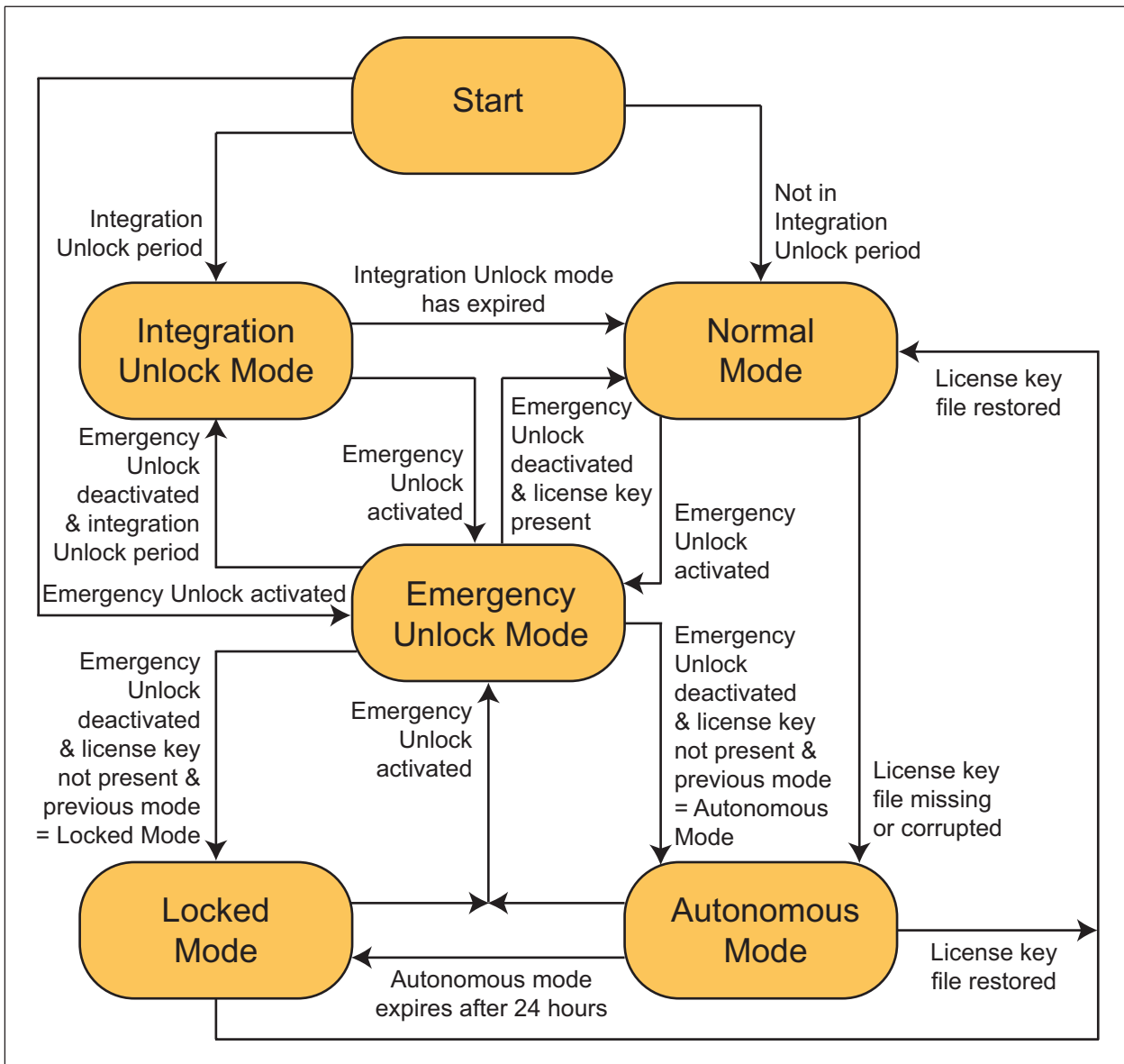


Figure 1 License Management State Transitions

2.1.5 Locked Mode

LM transitions from Autonomous mode to Locked mode if valid license key files are not available by the end of the 24-hour Autonomous mode window. The ME raises the alarm License Management, Key File Fault to indicate this mode.

While in Locked mode, licensed features cannot be used on the ME and features with licensed capacity are no longer granted the required capacity. This leads to service downtime and degraded service performance. During locked mode, LM attempts to access the license key files at regular intervals.



As soon as all of the installed license key files are detected, LM automatically reverts to Normal mode.

2.2 Types of Operation

LM supports the following operations:

- Installation of license key files

Once received from the Ericsson software supply organization, a license key file must be installed before it can be used. The procedure in *Install License Key File* provides further details on how to perform this operation.

- Update of license information

The information about the available licenses and their use is published to the Management Information Base (MIB) and is automatically updated every 30 minutes. The procedure in *View License Information* provides further details on how to perform this operation.

However, after a license key file has been installed, it is recommended to ensure that the latest information is reflected in the MIB. It is done by triggering an immediate update of the license information. The procedure in *Update License Information* provides further details on how to perform this operation.

- View license information

Before ordering a new license key, the user can verify the fingerprint value on the ME to ensure that the correct information is provided in the order request.

The user can check the list of license keys available on the ME and their validity information for preventive maintenance purpose and in the problem resolution situations. The procedure in *View License Information* provides further details on how to perform this operation.

- Activation/deactivation of Emergency Unlock mode

Emergency Unlock mode is activated by the user to restore system functionality temporarily in extraordinary situations. The user can deactivate the Emergency Unlock mode before it automatically ends to check that the ME transitions to the expected LM operation mode. The procedures in *Activate Emergency Unlock Mode* and *Deactivate Emergency Unlock Mode* provide further details on how to perform these operations.

- Replenishment of Emergency Unlock activations

The number of Emergency Unlock activations is restricted. By default, Emergency Unlock mode can only be activated twice. An Emergency Unlock reset key must be ordered from the Ericsson software supply



organization preferably before the two activations have been used. The corresponding key file must then be installed on the ME to reset the number of Emergency Unlock activations to two. The procedure in *Replenish Emergency Unlock Activations* provides further details on how to perform this operation.

3 Managed Object Model

The LM managed area is represented in the *Managed Object Model (MOM)* as follows:

```
ManagedElement
+-SystemFunctions
+-Lm
+-AutonomousMode
+-CapacityKey
+-EmergencyUnlock
+-FeatureKey
+-IntegrationUnlock
+-KeyFileManagement
+-KeyFileInformation
```

For general information about the MOM, MOCs, Managed Objects (MOs), cardinality, and related concepts, refer to *Managed Object Model User Guide*.

The LM MOCs are described in Table 1.

Table 1 License Management Managed Object Class Descriptions

Managed Object Class	Description
<i>Lm</i>	The root of the LM model, supports activities and describes information related to LM.
<i>AutonomousMode</i>	Describes the Autonomous Mode state.
<i>CapacityKey</i>	Describes the available capacity license and throughput capacity license keys.
<i>EmergencyUnlock</i>	Handles Emergency Unlock, activation/deactivation, and describes the Emergency Unlock state.
<i>FeatureKey</i>	Describes the available feature license keys.
<i>IntegrationUnlock</i>	Describes the Integration Unlock state.
<i>KeyFileManagement</i>	Handles installation of key files.
<i>KeyFileInformation</i>	Describes the installed key files.





4 Configuration Management

LM is accessed using NETCONF or the Ericsson Command-Line Interface (ECLI) to manipulate the MIB.

The following operations can be performed by the user and are described in Operating Instructions using the ECLI:

Manage Installation

- *Install License Key File*

Manage License Information

- *Update License Information*
- *View License Information*

Manage Emergency Unlock Mode

- *Activate Emergency Unlock Mode*
- *Deactivate Emergency Unlock Mode*
- *Replenish Emergency Unlock Activations*





5 Fault Management

The LM alarms are described in Table 2.

Table 2 License Management Alarms

Alarm	Description
<i>License Management, Autonomous Mode Activated</i>	Raised in Autonomous mode after an installed license key file is missing or becomes corrupted.
<i>License Management, Capacity Usage Threshold Reached</i>	Applies to capacity and throughput capacity licenses. Raised with severity <code>WARNING</code> if <code>grantedCapacityLevel</code> for a given capacity license exceeds the alarm threshold set by attribute <code>capacityAlarmThreshold</code> , but is still below <code>licensedCapacityLimit</code> . If the reservation level reaches <code>licensedCapacityLimit</code> , the severity increases to <code>MAJOR</code> .
<i>License Management, Emergency Unlock Reset Key Required</i>	Raised in Emergency Unlock mode when counter <code>activationsLeft</code> is decremented. The severity increases as the counter is decremented. Cleared after a replenishment followed by a refresh of the license inventory.
<i>License Management, Key File Fault</i>	Raised in Locked mode when the license key file used by LM is unavailable. A missing license key file prevents the ME from using licensed features and functionality.
<i>License Management, License Key Not Available</i>	Raised in Normal mode with severity warning when a license key enters the expiration warning period before it expires. When the expiry date is reached, the severity is raised to major.