

License Management

DESCRIPTION

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1 Understanding License Management

1.1 Key License Management Concepts

Network License Server (NeLS) is a license storage and management solution that is running outside the application environment. Network license management is a distributed solution for simplifying the license management in complex network solutions. NeLS performs license management aggregation at network level, and each Managed Element (ME) performs license management at ME level. For the distributed solution to work, connection is required between the different parts.

Note: The *Lm* Managed Object Classes (MOCs) can be found in the Managed Object Model (MOM). For general information about the MOM, MOCs, cardinality, and related concepts, refer to *Managed Object Model User Guide*.

LM provides a management interface for the network license keys.

License keys grant the use of purchased functionality or capacity. License keys are generated by the Ericsson software supply organization based on the application licensing model. Network license keys for the MEs are installed centrally in NeLS. Network licenses are identified by a license name and a version number. A valid license is one that has been provisioned in NeLS and is not expired or future dated.

The network licenses have the following categories:

- Feature licenses

Control access to the optional features for the MEs in a network function.

- Capacity licenses

Control the capacity that can be shared (divided) among the MEs at the same time.

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.

Before expiring, license keys enter a license expiry warning period. The user is notified of the start of this warning period and license key expiration by NeLS alarms.

License keys installed in NeLS can be future dated. These keys only become valid as of their start date.



1.2 Modes of Operation

LM operates in the following modes:

- Integration Unlock mode
- Normal mode
- Emergency Unlock mode
- Autonomous mode
- Locked mode

1.3 Integration Unlock Mode

LM runs in Integration Unlock mode after installation. While in this mode, LM can function without access to installed licenses. This mode allows use of the system when access to valid licenses is unavailable, for example, because a valid LKF is missing in NeLS, or the connection to NeLS has not been configured yet.

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 the `expiration` attribute of the `IntegrationUnlock` MO. When Integration Unlock ends, LM attempts to synchronize the granted licenses with NeLS. Any license that was used during Integration Unlock mode that is not present in NeLS is marked as not found.

1.4 Normal Mode

Normal mode is the default operational state of the LM. During normal mode, the LM provides the application client with information about the feature sets and capacity levels that are available in NeLS.

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

1.5 Emergency Unlock Mode

Emergency Unlock mode authorizes access to all licensed features and all available capacity independent of official license keys. The ME raises the alarm `License Management, Emergency Unlock Reset Key Required` to indicate this mode. Emergency Unlock is intended to temporarily provide or restore system functionality in extraordinary situations where an essential license cannot be renewed before it expires, or connectivity with NeLS is expected to remain unavailable for an extended period.



The Emergency Unlock mode window cannot exceed seven days. During this seven-day window, all application requests to use features and capacity up to resource availability are authorized. All licenses used during Emergency Unlock mode are set to expire at the end of the Emergency Unlock window.

When Emergency Unlock ends, LM automatically attempts to compare and synchronize the granted licenses with NeLS. If the comparison is successful, LM begins operating in Integration Unlock Mode or Normal mode. If the synchronization fails, LM returns to the previous operating mode. Any license granted during Emergency Unlock mode that is not present in NeLS during synchronization is marked as not found. These transitions are illustrated in Figure 1.

1.6 Autonomous Mode

LM automatically transitions from Normal mode to Autonomous mode when the connection between LM and NeLS is lost. The ME raises the alarm `License Management, Autonomous Mode Activated` within five minutes of LM transitioning to Autonomous mode to indicate this change. During Autonomous mode, licenses that are already reserved by the ME continue to function normally. However, new licenses cannot be requested from NeLS. Other licenses remain unavailable until communication with NeLS is restored.

While in Autonomous mode, LM denies any application request for a license that is not already reserved. Application capacity can be restricted during Autonomous mode, as applications cannot increase the number of capacity tokens above the level that was granted at the time of the transition to Autonomous mode.

LM can operate in Autonomous mode for a predefined duration, recorded by the `expiration` attribute of the `AutonomousMode` MO. If communication with NeLS cannot be re-established within this window, all licenses are considered expired and the ME enters Locked mode.

When the NeLS connection goes down, LM waits for a preset period (for example, 3–5 minutes) before attempting to reconnect for the first time. LM tries to reconnect to NeLS at regular intervals as specified by the `retryInterval` attribute of the `NeLSConfiguration` Managed Object (MO). After re-establishing the NeLS connection, LM automatically reverts to Normal mode.

LM does not transition into Autonomous mode if licenses have never been provisioned in NeLS.

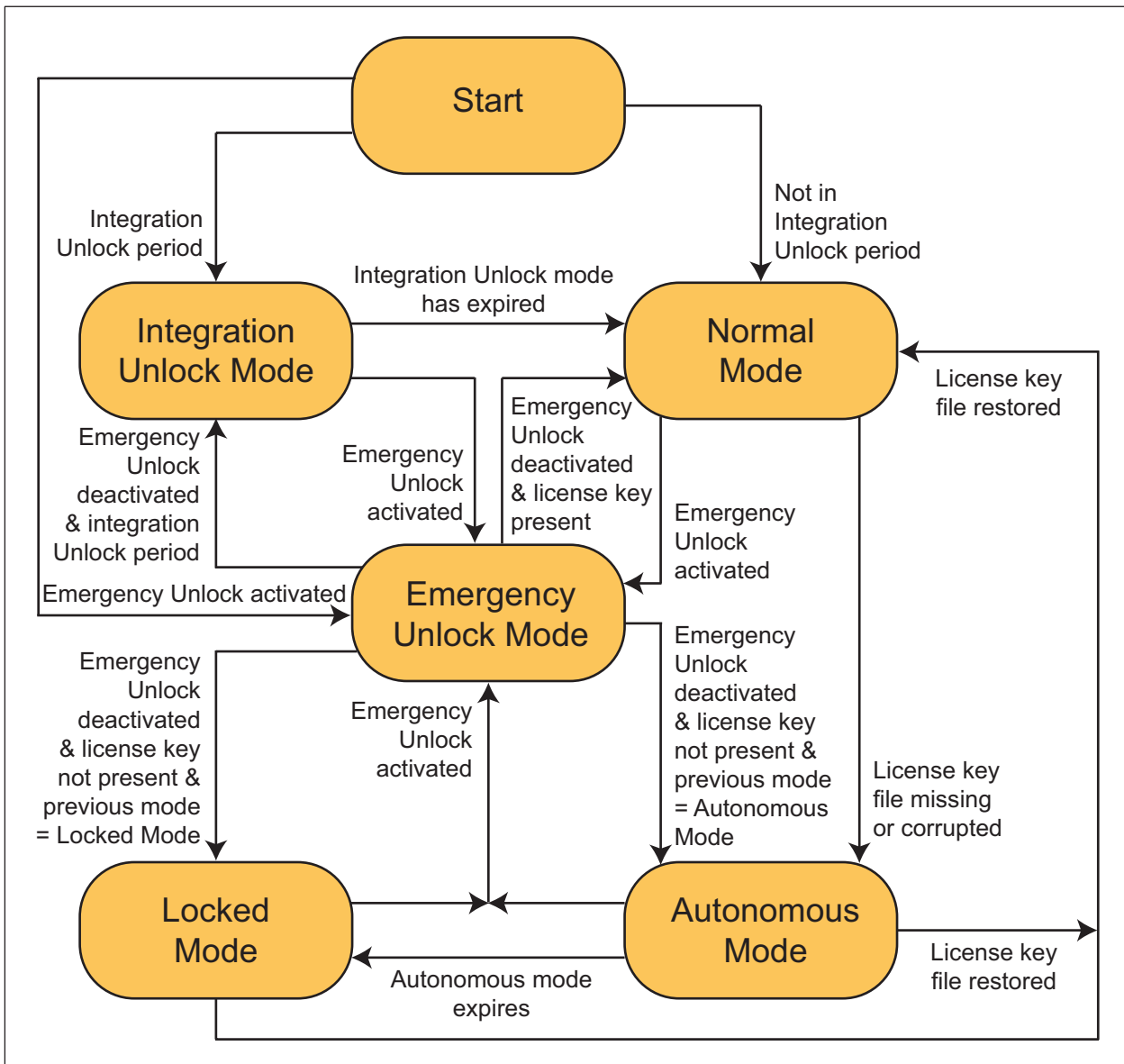


Figure 1 License Management State Transitions

1.7 Locked Mode

The License Manager transitions from Autonomous mode to Locked mode if access to the NeLS license repository has not been restored by the end of the Autonomous mode window. The ME raises the alarm `License Management, Key File Fault` to indicate this change.

While operating 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 tries to reconnect to NeLS at regular intervals as specified



by the `retryInterval` attribute of the `NeLSConfiguration` MO. After re-establishing the NeLS connection, LM automatically reverts to Normal mode.

2 Basic License Management Procedures

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

- View license information

Information about available licenses and their use is published to the Management Information Base (MIB). This read-only information is automatically updated every 30 minutes. The user can manually update the license information out-of-band, and check the license inventory available on the ME for preventive maintenance and problem resolution purposes. For more details on how to perform this operation, refer to *View License Information*.

- Activation/deactivation of Emergency Unlock mode

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

- Configure NeLS Connection

LM must be configured to direct license requests to NeLS using the `host` and `port` attributes of the `NeLSConfiguration` MO. For more details on how to perform this operation, refer to *Configure Connection to NeLS*.

3 Advanced License Management Procedures

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

- Configure SSL Connection to NeLS



The NeLS connection must always be encrypted using SSL certificates provided by Ericsson. Optionally, a second security layer, using the SSL certificates of the operator, is available. A faulty SSL setup can lead to connectivity issues. For high-level support, the instruction *Configure SSL Connection to NeLS* is available.

4 License Management-Related Alarms

Table 1 License Management-Related Alarms

Alarm	Description
<i>License Management, Autonomous Mode Activated</i>	Raised in Autonomous mode after LM has lost its connection to the license repository.
<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 repository used by LM is unavailable. An unavailable license repository prevents the ME from using licensed features and functionality.