Look and Feel Customization Requirements

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1. Scope   (Informative)

This document defines the requirements for the Look and Feel Customization enabler, which allows the configuration and management of a device Look and Feel.

2. References

2.1. Normative References

[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997,
URL:http://www.ietf.org/rfc/rfc2119.txt

[OMADICT]	"Dictionary for OMA Specifications", Version 2.6, Open Mobile Alliance™,
OMA-ORG-Dictionary-V2_6,

URL: http://www.openmobilealliance.org

2.2. Informative References

3. Terminology and Conventions

3.1. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except "Scope" and "Introduction", are normative, unless they are explicitly indicated to be informative.

3.2. **Definitions**

Active	Property associated with an LFC Element Setting or Package that is currently being used by the device as part of its Look and Feel
Authorized Principal	A Principal (see [OMADICT]) with permissions to perform specific action(s) and/or receive specific information
Default	Property associated with an LFC Element Setting or Package to be used by the device when no other Element Setting or Package is Active
LFC Content Server	An entity that supports the delivery of LFC Packages to an LFC enabled device
LFC Element	One characteristic of a device's LFC (e.g. screen saver, incoming data message alert, ringtone per caller, etc).
LFC Element Setting	The combination of an LFC Element and an associated value for it
LFC Management Server	An entity that issues and handles the commands to perform Remote Management operations to an LFC enabled device.
LFC Operation	An LFC operation is one of the following tasks: deliver, install, remove, update, query, activate and de-activate, permission setting, lock, unlock, inventory, and rollback
LFC Package	Group of LFC Element Settings that are part of the device's Look and Feel. This package is used by a Service Provider to describe part or the whole Look and Feel Customization of the device.
LFC Permission Setting	Is the act of assigning rights to an Authorized Principal to perform LFC Operations on LFC Element Settings and/or LFC Packages
LFC Server	Is an entity that supports LFC Operations in response to LFC Client's requests. Examples are LFC Management Server and LFC Content Server.
Look and Feel	Appearance and behavior of the device's user interface.
Look and Feel Branding	Look and Feel Customization performed by an actor (e.g. enterprise, network operator, manufacturer, service provider, etc) that results in the device being customized with the actor's specific and proprietary Look and Feel.
Look and Feel Customization	Process by which all or part of a device's Look and Feel is modified.
Remote Management	LFC Operations originating from an entity residing on the network to be performed on an LFC capable device
Secure Removable Card	It refers to secure physical devices able to be inserted to and removed from terminal equipments. These devices must be able to protect not only logically but physically the data and/or applications they carry. Typical Secure Removable Card in the LFC is the UICC's (see [OMADICT])

3.3. **Abbreviations**

LFC	Look and Feel Customization

OMA   Open Mobile Alliance

SRC   Secure Removable Card

4. Introduction   (Informative)

The LFC enabler allows Customization of a device Look and Feel. The main objective of the enabler is to allow different entities in a mobile environment such as service providers, network operators, handset manufacturers, enterprises or device owners or device users, to configure the device Look and Feel according to their own requirements and what they are allowed (or have credentials/permissions) to customize. It is also an objective that the LFC enabler must be able to address Look and Feel Customization for all type of devices ranging from low-end, feature phones, smart-phones to communication devices.
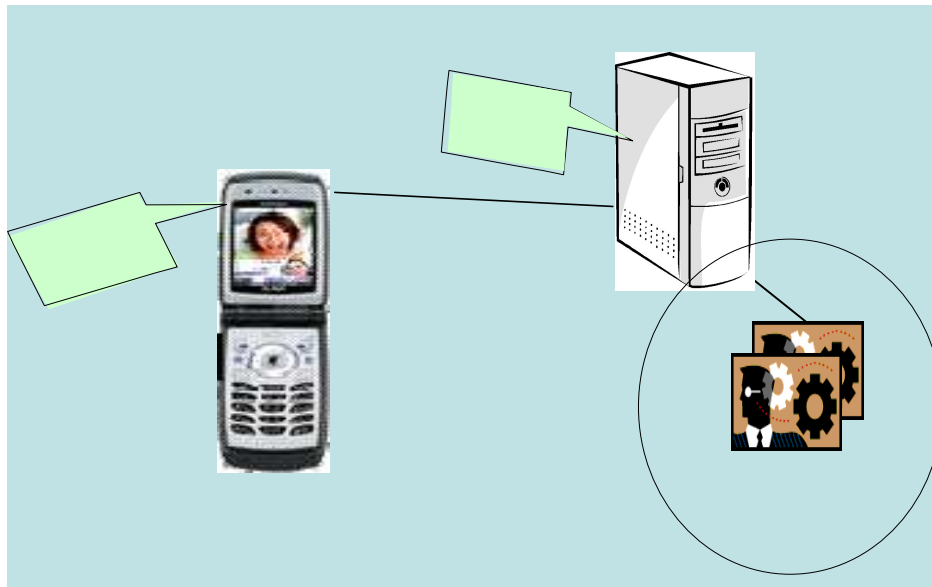
Figure 1: High Level diagram for LFC Enabler

Note: An LFC user can have more than one LFC Service Provider

Elements that could be configured by using the Customization enabler may include (but are not limited to):

- Background, wallpaper and screensaver
- Ring tones, audio cues or sounds
- Start-up / Shutdown experience
- Animations and splash screens
- Status indicators
- Fonts
- Notification and error messages
- Keyboard: soft keys and navigation keys, and shortcuts
- Menus: menu items and arrangement
- Homepage and bookmarks

The customization process consists of LFC Operations. Applying customization information may be carried out using a variety of enablers defined by OMA (examples may be, but not limited to, OMA Download Over-the-Air or OMA Device Management). This enables customization of the device by providing a set of element settings that may be rendered on the device. It is envisaged that some of these elements may be common across all devices whilst other elements may be specific to a device. Existing solutions have been examined to identify new requirements necessary to fulfill the customization use cases.

Given the wide number of different implementations and solutions it is expected that any LFC data model will be implementation-specific and will likely vary for different vendors and different devices. That said, where there exists common agreement on collections of LFC Elements, it may be possible to specify a common data model for such collections. Such a common data model is not essential to the first release of the LFC enabler and should be informed by market experience and driven by interoperability considerations.

The LFC enabler consists of multiple models:

- The lightweight model consists of the basic operations Deliver and Install and the only Authorized Principal is the user. In the lightweight model, LFC content is pulled by the user. The lightweight model uses only the mandatory requirements.

- The network triggered model also consists of the basic operations Deliver and Install with the distinction that the Authorized Principal is a network entity. In the network triggered model, content is pushed from the network. The network triggered model uses only the mandatory requirements.

  Note: The Network Triggered requirements have been finally removed from the LFC 1.0 specification

- The remote managed model also includes other operations in addition to the basic operations and the only Authorized Principle is a network entity. The requirements for the remote managed model are given by the combination of mandatory requirements and Remote Management requirements.

Requirement Group	Lightweight	Network Triggered	Remote Managed
Mandatory	√	√	√
Optional			
Remote Management			√
Network Triggered		√	
Authorized Principal	User	Network Entity	Network Entity
Delivery	Pull	Push	Pull/Push

Table 1: LFC Models and Conformance

The LFC enabler will, where relevant and appropriate, re-use existing work in OMA. In this context, it should be possible to use existing OMA Device Management and provisioning enablers.

4.1   LFC Concepts

The LFC Enabler provides a framework by which Look and Feel Elements (e.g. screen saver, ringtones, etc.) of a device can be provided with data. This data is contained in an LFC Package which can then be acted upon by the device.

The following sections describe the LFC Package, the life-cycle these packages take on the device and some other actions that the LFC Enabler may support.

4.1.1   The LFC Package

The LFC Package is a set of one or more data items, normally related to a theme or brand, which are used to affect the appearance or sounds of the Look and Feel of a mobile device. The addressable items which affect the Look and Feel are known as LFC Elements and the data in the LFC Package which are associated to these LFC Elements are known as LFC Element Settings. The LFC Package also contains information which identifies the LFC Elements to which the data is associated and may provide operational instructions required for their installation or activation.

4.1.2   Life-Cycles of LFC Packages

The LFC Enabler handles LFP Packages through a sequence of stages that resemble a life-cycle. These stages will be described to provide a common understanding of the operations expected of the LFC Enabler.

- **LFC Package Delivery** – This is the stage where an LFC Package is transferred to an LFC-enabled client. The actual form of transfer utilized is not specific to LFC but LFC may need to specify some details supporting those transfer methods (e.g. declare an APPID to be used with OMA PUSH).

- **LFC Package Installation** – This stage is where the LFC Package is readied for use on the LFC Client. Any needed validation or authentication of the data would be performed during this stage.

- **LFC Package Activation** – This stage is where LFC Element Settings in an installed LFC Package are put into use. The activation may be done in the background or involve the user.

- **LFC Package Deactivation** – This stage is where the LFC Element Settings of an active LFC Package are taken out of use. The deactivation may be the result of loading a new LFC Package or directly, in which case the LFC Elements revert to default values. Following deactivation the LFC Package would remain on the device and could be available for another activation.

- **LFC Package Removal** – This stage is where an installed LFC Package is deleted and is no longer available for use.   An attempt to remove an active LFC Package implies that it would be Deactivated and none of the LFC Elements would retain the values defined in the Package.

4.1.3   Additional Operational Activities

The LFC enabler may support additional operations depending on the service model available. These include the following:

- **Lock** – This is an operation which prohibits changes to the associated Active LFC Element Settings. When an LFC Element Setting or LFC Package is locked, the values of the associated LFC Element may not be changed by deactivation or update.

- **Unlock** – This is the reversal of the Lock operation and releases the LFC Element Setting or LFC Package permitting it to be changed

- **Update** – This is an operation which revises the data in an LFC Package on a device. This would not be permitted if any of the LFC Element Settings in the Package are locked. An update of an Active LFCElement Setting would cause the new data to be activated.

- **Query** – This is an operation by which an Authorized Principal can get information about the LFC Packages and LFC Element Settings available on the device. This includes installed and Active items as well as Default settings.

- **Inventory** – This is an operation by which an Authorized Principal can get a listing of all installed LFC Packages available on the device.

- Rollback – This is an operation by which an Authorized Principal can revert an LFC Element Setting to a previous value, values, or LFC Default value

5. Use Cases   (Informative)

5.1. Look and Feel Management

5.1.1   Short Description

Mark is a big fan of a football team and is subscribed to a service offered by Custom Co. that periodically provides new LFC content related to the team.

After several months Mark's subscription expires and according to the terms of the subscription agreement the LFC content must be deleted from the device.

5.1.2   Actors

- o **User**
- o **Service Provider**
- o **LFC ManagementServer**
- o **LFC Client**

5.1.3   Actor specific issues

- **User**: The user has his device customised with regularly updated content from his favourite team and when LFC content is deleted, he wants to be warned and needs to know why it is being removed, by whom and how his device will be impacted. He does not want to be surprised when items disappear.

- **Service Provider**: The service provider regularly updates the Look and Feel in its users' devices, and when a subscription expires it needs to know what LFC content must be removed and which devices host this content currently. It also needs to trust the device that it actually deleted an item when it says it did.

- o **LFC Management Server:** The LFC Management Server issues and handles the commands to perform the LFC Operations. This server can reside under different authorities, such as service provider itself or network operator.

5.1.4   Actor specific benefits

- o **User:** The user has his phone frequently updated with a new Look and Feel and. when his subscription expires the task of deleting content is handled by someone/something else. He can be confident his device only contains content he is entitled to.

- o **Service Provider:** Service provider obtains revenue from the LFC subscription service and can ensure that LFC content is being used within the terms of the subscription agreement.

5.1.5   Pre-conditions

- o The device is able to establish a session with the LFC Management Server.
- o User's subscription has expired.
- o Device hosts LFC content that needs to be deleted.
- o Service Provider has recognised that a subscription has expired and has initiated the appropriate process.

5.1.6   Post-conditions

- o The LFC content on the device has been updated /deleted.
- o The device is able to function normally post update /deletion of LFC content.
- o The LFC Management Server is informed of the outcome of the LFC Operation.

5.1.7   Normal Flow

1. Periodically the Service Provider instructs the LFC Management Server to establish a new session with the device in order to update the device Look and Feel. [A1]

2. LFC Management Server issues a command to the device asking whether the user would like to download and install the new LFC content available

3. The user decides to accept and the content is downloaded and installed updating the previous LFC content

5.1.8   Alternative Flow 1

1. The Service Provider has detected that a subscription has expired and instructs the LFC Management Server to establish a new session with the device in order to delete the LFC content associated with the subscription.

2. LFC Management Server issues a command to the device in order to delete the LFC content.

3. The User is notified about pending deletion and requested confirmation. [A2]

4. User elects to accept deletion attempt (allows deletion to proceed).

5. The LFC content is deleted from the device and the Default value for the LFC Element(s) deleted, if one exists, is reinstated.

5.1.9   Alternative Flow 2

After step (2)

3. The LFC Client notifies the User about pending deletion but does not request confirmation (presents informative message).

4. The LFC content is deleted from the device and the Default value for the LFC Element(s) deleted, if one exists, is reinstated.

5.1.10   Operational and Quality of Experience Requirements

The User must be kept fully informed during the update and deletion process – what is being done, when, why, by whom, what will be the impact on his/her device, and what the end result will be.

5.2.   Device's Portable Look and Feel

5.2.1   Short Description

Debbie has bought a subscription with a service provider named *PhoneIT* that includes a personalized Secure Removable Card and a device.

During the first use, the device notifies Debbie about the presence of *customization* data in the Secure Removable Card and Debbie decides to apply this content to the device's Look and Feel. The device is then customized with the Default service provider's Look and Feel configuration.

After some minutes she realizes that the sound selection was unpleasant so she starts browsing all the different files also provided by *PhoneIT* in the Secure Removable Card. When the new selection is done Debbie applies it to the device's Look and Feel. Debbie then decides to store the new configuration in the Secure Removable Card to make it portable.

5.2.2   Actors

- **End User**
- **Service Provider**

5.2.3   Actor Specific Issues

- **End User:** Wants to keep her personalized Look and Feel data always portable and available in her Secure Removable Card.

- **Service Provider:** Wants to provide a Default Look and Feel Customization of the end user's device but also wants to provide customizable capabilities (e.g. given several choices to their customers and providing a mechanism to update Default configuration) in order to enhance the satisfaction of its customers.

5.2.4   Actor Specific Benefits

- **End User**: Has an appealing and portable Look and Feel configuration as well as an improved user experience.

- **Service Provider**: Gets a stronger image among end users.

5.2.5   Pre-conditions

- The Secure Removable Card must be loaded with LFC content and must be able to receive LFC content from the device.

- The Service Provider must define policies in the Secure Removable Card for end-user notification and automatic synchronization.

- The Service Provider should provide credentials needed to allow access and storage of LFC content in the secure removable device.

5.2.6   Post-conditions

- The device has a customized Look and Feel.

- The End User can keep device's Look and Feel in a Secure Removable Card to facilitate device migration.

5.2.7   Normal Flow

1. The end user turns the handset on.
2. The device detects the presence of LFC content available in the Secure Removable Card as well as the Service Provider policy.
3. If not yet done, the device verifies the Service Provider policy which defines whether or not the end-user should be notified before applying LFC content to the device's Look and Feel.
4. The device applies the Default LFC content available in the Secure Removable Card to the device's Look and Feel.

5.2.8   Alternative Flow

5. The end-user explores the different LFC Elements available in the Secure Removable Card.
6. The end-user applies the chosen LFC Elements to the device's Look and Feel.
7. The end-user stores the customized Look and Feel in the Secure Removable Card.

5.2.9   Operational and Quality of Experience Requirements

The End User shall be able to modify any element of the Service Provider's LFC content available in the Secure Removable Card.

5.3.   Branding Customization

5.3.1   Short Description

Operator X wants to provision the Look & Feel of a specific model of its terminal base. The Operator asks the Original Equipment Manufacturer to provide an LFC "file" or package with all the necessary element settings to customize the phone according to Operator's branding strategy. In this customization the brand components are requested to be non-modifiable".

5.3.2   Actors

- **Service Provider.**
- **Original Equipment Manufacturer**.

5.3.3   Actor Specific Issues

- **Service Provider:** Wants to customise a specific phone with its own brand. Brand elements should not be modified.
- **Original Equipment Manufacturer:** Needs a framework about how to facilitate Look and Feel Customization of its own mobile phones.

5.3.4   Actor Specific Benefits

- **Service Provider:** Able to tailor branding customization to its terminal base.
- **Original Equipment Manufacturer:** Use same process to customise its terminals to different customers.

5.3.5   Pre-conditions

- LFC enabled device
- Mobile device supports OMA Device Management enabler or any other provisioning mechanism.

5.3.6   Post-conditions

- Mobile device is customised with a tailor set of element settings that suits the needs of that particular phone.
- Operator has been provided with a method to easily brand its own terminals
- LFC Elements may be exposed via a Management Object.

5.3.7   Normal Flow

1. Service Provider requests an LFC "file" or package from an OEM, which contains LFC Elements to customise the device according to Service Provider's brand.
2. Service Provider uses a provisioning mechanism to customise the target terminal with this LFC "file" or package.
3. User interaction to accept customisation "file" or package may or may not be requested by the Service Provider.
4. If user confirmation is requested and granted the LFC "file" or package will be rendered on the device. Then the device Look & Feel is adapted according to the set of LFC Elements provided.
5. The device notifies to Service Provider that the operation was successful.

5.3.8   Alternative Flow 1

After step (4)

5. The device exposes part or all of the LFC Elements via a Management Object. LFC Elements marked as "non-modifiable" cannot be modified.

5.3.9   Alternative Flow 2

After step (4)
5. The LFC "file" or package has been marked as "non-modifiable", then the device should be able to expose part or all LFC Elements via a Management Object but will not be able to change any of these elements.

5.3.10 Operational and Quality of Experience Requirements

In some situations the end-user will not be involved in the acceptance of the LFC "file". This LFC "file" or package may deliver branding information that customises Service Provider framework environment

5.4. Look and Feel Lock/Unlock

5.4.1 Short Description

When an Enterprise provisions some Look and Feel Customization element(s) (e.g. enterprise logo) to the enterprise employee's device, the Enterprise wants to lock this customization element(s) so that it can not be changed by the User.

After a customisation element is populated and set as Active in the LFC Client, the Enterprise uses the 'locking' process to stop the User from being able to swap the element's value for a different value. At a later time the Enterprise may choose to unlock the element, allowing the User to change the element's value once more.

If the element has been populated with a file, such as an image, the Enterprise uses the 'locking' process to also make it difficult for the User to find this file on the device. This provides the file with some protection from being edited (bit modified or adapted).

5.4.2 Actors

- o **Enterprise**
- o **LFC Management Server**
- o **LFC Client**
- o **User**

5.4.3 Actor Specific Issues

- o **Enterprise:** The Enterprise would like to protect some Look and Feel customisation element(s) from being changed by the User.

- o **LFC Management Server:** The LFC Management Server issues and handles the commands in the Client.

- o **User:** User is unable to change some Look and Feel customisation element(s).

5.4.4 Actor Specific Benefits

- o **Enterprise:** Enterprise can protect Look and Feel Customization element(s) from being changed by the user.
- o **User:** User can easily follow the policy of the Enterprise.

5.4.5 Pre-conditions

- o The LFC Client is capable of interfacing with the LFC Management Server.

5.4.6 Post-conditions

- o The LFC Client Look and Feel Customization element(s) is locked or unlocked.

5.4.7 Normal Flow

1. Enterprise instructs the LFC Management Server to establish a new session with the LFC Client in order to lock certain Look and Feel Customization element(s). [A1]

2. LFC Management Server issues a command to the LFC Client to lock the Look and Feel Customization element(s).

3. The LFC Client locks the Look and Feel Customization element(s).

4. The LFC Client sends a notification to the Server, confirming the action and informing of the outcome

5.4.8   Alternative Flow

1. Enterprise instructs the LFC Management Server to establish a new session with the LFC Client in order to unlock certain Look and Feel Customization elements

2. LFC Management Server issues a command to the LFC Client to unlock the Look and Feel Customization element(s).

3. The LFC Client unlocks the Look and Feel Customization element(s).

4. The LFC Client sends a notification to the Server, confirming the action and informing of the outcome

5.5.   Look and Feel Provisioning Only

5.5.1   Short Description

A user selects LFC content with which to customize his/her device. The LFC content is downloaded and installed on the device. No Remote Management is necessary during or after the download and installation.

5.5.2   Actors

o **User**

o **Device**

o **LFC Content Server**

5.5.3   Actor Specific Issues

o **User:** The user would like to have his/her device customized with a trendy Look and Feel.

o **Device:** Supports the installation of LFC content but does not support Remote Management

o **LFC Content Server:** Supports the delivery of LFC content but does not support Remote Management

5.5.4   Actor Specific Benefits

o **User:** The user has his/her device customized with a new Look and Feel.

o **Device:** Can offer the ability to customize Look and Feel without the need for Remote Management client software

o **LFC Content Server:** Is able to deliver Look and Feel content without the need for Remote Management server software. This will lower the barriers to entry into the LFC business for content providers.

5.5.5   Pre-conditions

o The device is able to connect to the LFC Content Server

o All the actors participating in the flow have the necessary authority to perform the LFC Operations

o The device supports the installation of LFC content but does not support Remote Management

5.5.6   Post-conditions

o The device is customized with the desired content.

5.5.7   Normal Flow

1. User selects the desired customization content

2. A connection is establish between the device and the LFC Content Server

3. The LFC content is downloaded to the device and appropriate checks are made (user confirmation, sufficient memory, specification version check etc.)

4. The LFC content is installed on the device

5. Once installed on the device, the LFC content is never managed by any remote authority

6. Later, the installed LFC content may be removed by the user, and revert to the Default setting, or be overwritten by new LFC content downloaded by the user

7. When new LFC content is installed, only the LFC Elements that are specified by the new LFC are overwritten. The elements that are not specified by the new LFC content remain unchanged

5.6 Network triggered delivery

Note: The Network Triggered requirements have been finally removed from the LFC 1.0 specification

5.6.1 Short Description

Nico is a Ferrari fan and very interested in Formula 1 racing. As a result he subscribes to the Ferrari Formula 1 mobile life style and experience. Within this subscription Nico receives as set of mobile artefacts that will form his Ferrari user experience. In addition he also wants to have the new packages from Ferrari as they appear and made available. These updates are normally in relationship to the next race that happens every 2 weeks. Given that each race happens in a different location around the world Ferrari has chosen the approach to provide a unique experience for each. Nico wants to be part of this has therefore subscribed to the automatic update of the LFC content from Ferrari.

5.6.2 Actors

o **User**

o **Device**

o **LFC Content Server**

5.6.3 Actor Specific Issues

o **User:** The user would like to have his/her device customized with the latest and updated Ferrari experience.

o **Device:** Can receive LFC packages from the network and support the installation of LFC content.

o **LFC Content Server:** Supports the automatic delivery of LFC content to the subscribers device based on the subscribers personal data

5.6.4 Actor Specific Benefits

o **User:** The user has his/her device customized with the latest and greatest Look and Feel from Ferrari

o **Device:** Can offer the ability to customize Look and Feel without the need for Remote Management client software

o **LFC Content Server:** Is able to deliver Look and Feel content without the need for Remote Management server software. This will lower the barriers to entry into the LFC business for content providers. It also is able to deliver LFC content to the user automatically without the user having to do the tedious task every time.

5.6.5 Pre-conditions

o The LFC Content Server is able to address the device using the user's preferences data.

5.6.6 Post-conditions

o The device is customized with the relevant LFC content from Ferrari.

5.6.7   Normal Flow

1. User subscribes to the Ferrari Mobile experience and selects the automatic update of LFC content

2. The LFC content is pushed to the device and appropriate checks are made (user confirmation, sufficient memory, specification version check etc.)

3. The LFC content is installed on the device

4. Once installed on the device, the LFC content is never managed by any remote authority

5. Later on a new LFC content is made available from Ferrari. The content Server retrieves Nico's preferences and automatically downloads the new package to Nico's device

6. The new package when installed on the device overwrites the previous version.

6. Requirements   (Normative)

6.1 High-Level Functional Requirements

6.1.1 Mandatory Requirements

Label	Description	Enabler Release
LFC-HLMR-0001	The LFC Enabler MUST support the delivery of LFC Packages using existing transport mechanisms	LFC 1.0
LFC-HLMR-0002	The LFC Enabler MUST support the installation of LFC Packages	LFC 1.0
LFC-HLMR-0003	The LFC Enabler MUST support a mechanism to set an LFC Element Setting or LFC Package as non-modifiable by any Authorized Principal	LFC 1.0

Table 2: High-Level Functional Requirements-Mandatory Requirements

6.1.2 Optional Requirements

Label	Description	Enabler Release
LFC-HLOR-001	The LFC Enabler MAY support the removal of LFC Packages from LFC capable devices. Such removal would imply a deactivation of an Active LFC Package	LFC 1.0
LFC-HLOR-002	The LFC Enabler MAY support the update of LFC Element Settings. An update of an Active LFC Element setting would imply that the updated LFC Element setting would be made Active	Deleted
LFC-HLOR-003	The LFC Enabler MAY support the query of LFC Packages by an appropriately authorized application.	Deleted
LFC-HLOR-004	The LFC Enabler MAY support the query of LFC Element Settings by an appropriately authorized application.	Deleted
LFC-HLOR-005	The LFC Enabler MAY support the setting of Permissions on LFC Packages	Deleted
LFC-HLOR-006	The LFC Enabler MAY support the setting of Permissions on LFC Element Settings	Deleted
LFC-HLOR-007	The LFC Enabler MAY support Remote Management	LFC 1.0
LFC-HLOR-008	The LFC Enabler MAY support a mechanism for an Authorized Principal to apply LFC Operations to a group of LFC Element Settings within an LFC package such that LFC Operations on that group are applied to all of them together	Deleted

Table 3: High-Level Functional Requirements-Optional Requirements

6.1.3 Remote Management Requirements

Label	Description	Enabler Release
LFC-HLRM-001	If Remote Management is supported then the LFC Enabler SHOULD support the removal of LFC Packages	LFC 1.0

LFC-HLRM-002	If Remote Management is supported then the LFC Enabler SHOULD support the removal of LFC Element Settings	LFC 1.0
LFC-HLRM-003	If Remote Management is supported then the LFC Enabler MUST support the update of LFC Element Settings	LFC 1.0
LFC-HLRM-004	If Remote Management is supported then the LFC Enabler MAY support the query of LFC Packages	LFC 1.0
LFC-HLRM-005	If Remote Management is supported then the LFC Enabler MAY support the query of LFC Element Settings	LFC 1.0
LFC-HLRM-006	If Remote Management is supported then the LFC Enabler MUST support the setting of Permissions on LFC Packages	LFC 1.0
LFC-HLRM-007	If Remote Management is supported then the LFC Enabler MUST support the setting of Permissions on LFC Element Settings	LFC 1.0
LFC-HLRM-008	If Remote Management is supported then the LFC Enabler MUST support the activation of LFC Packages	LFC 1.0
LFC-HLRM-009	If Remote Management is supported then the LFC Enabler MUST support the activation of LFC Element Settings.	LFC 1.0
LFC-HLRM-010	If Remote Management is supported then the LFC Enabler MUST support the De-activation of LFC Packages	LFC 1.0
LFC-HLRM-011	If Remote Management is supported then the LFC Enabler MUST support the De-activation of LFC Element Settings.	LFC 1.0
LFC-HLRM-012	If Remote Management is supported then the LFC enabler MAY support marking of an LFC Package and/or Element Setting as the Default one on the device.	LFC 1.0
LFC-HLRM-013	If Remote Management is supported then the LFC enabler MAY support the query to identify the Default LFC Package and/or LFC Element Setting	LFC 1.0
LFC-HLRM-014	If Remote Management is supported then the LFC enabler SHALL support a mechanism for an Authorized Principal to lock an LFC Package	LFC 1.0
LFC-HLRM-015	If Remote Management is supported then the LFC enabler SHALL support a mechanism for an Authorized Principal to lock a LFC Element Setting	LFC 1.0
LFC-HLRM-016	If Remote Management is supported then the LFC enabler SHALL NOT allow locking an already locked Look and Feel Customization element or package.	LFC 1.0
LFC-HLRM-017	If Remote Management is supported then the LFC enabler SHALL support a mechanism for an Authorized Principal to unlock an LFC Package	LFC 1.0
LFC-HLRM-018	If Remote Management is supported then the LFC enabler SHALL support a mechanism for an Authorized Principal to unlock a LFC Element Setting	LFC 1.0
LFC-HLRM-019	If Remote Management is supported then the LFC enabler SHALL support the retrieval of the inventory list of all the installed LFC Packages on the device.	LFC 1.0
LFC-HLRM-020	If Remote Management is supported then the LFC Enabler MAY support the query to identify the Active LFC Packages and/or Element Settings.	LFC 1.0

LFC-HLRM-021	If remote management is supported then the LFC Enabler MUST support one or more mechanisms to report errors to the initiator of an LFC Operation	LFC 1.0
LFC-HLRM-022	If Remote Management is supported then the LFC Enabler MUST support one or more mechanisms to notify the outcome of a LFC Operation to the initiator of that LFC Operation	LFC 1.0

Table 4: High-Level Functional Requirements-Remote Management Requirements

6.1.4   Network Triggered Requirements

LFC-HLNT-0001	If the network-triggered model is supported then the LFC Enabler MUST support one or more mechanisms to report errors to the initiator of an LFC Operation.	Deleted
LFC-HLNT-0002	If the network-triggered model is supported then the LFC Enabler MUST support one or more mechanisms to notify the outcome of a LFC Operation to the initiator of that LFC Operation.. .	Deleted

Table 5: High-Level Functional Requirements – Network Triggered Requirements

6.1.5   Security

Label	Description	Enabler Release
LFC-SEC-001	LFC Enabler MUST support a mechanism that protects LFC Element Settings and or LFC Packages against unauthorized changes (e.g. against changing values for a non-modifiable Element).	LFC 1.0

Table 6: Security Requirements

6.1.5.1   Authentication

Label	Description	Enabler Release
LFC-Authen-001	LFC Enabler SHALL support a mechanism to allow mutual authentication between LFC Server and LFC Client	LFC 1.0

Table 7: Security Requirements – Authentication Items

6.1.5.2   Authorization

Label	Description	Enabler Release
LFC-Author-001	The LFC Enabler SHALL only allow an Authorized Principal to perform the LFC Operations.	LFC 1.0

Table 8: Security Requirements – Authorization Items

6.1.5.3   Data Integrity

Label	Description	Enabler Release
LFC-DatInt-001	LFC Enabler SHOULD be able to check the integrity of LFC Packages and/or Element Settings	LFC 1.0

Table 9: Security – Data Integrity Items

6.1.5.4 Confidentiality

Label	Description	Enabler Release

Table 10: Security – Confidentiality Items

6.1.6 Charging

Label	Description	Enabler Release
LFC-CHARG-001	LFC Enabler SHOULD be able to generate charging records to account for the LFC operations it performs as required for the service provider.	LFC 1.0

Table 11: Charging Requirements

6.1.7 Administration and Configuration

Label	Description	Enabler Release

Table 12: Administration and Configuration Requirements

6.1.8 Usability

Label	Description	Enabler Release
LFC-USA-001	The LFC enabler MUST support a mechanism for requesting user confirmation before performing LFC Operations	LFC 1.0
LFC-USA-002	The LFC enabler SHOULD support a mechanism to inform the user of the status of LFC Operations.	LFC 1.0
LFC-USA-003	When an Active LFC Element Setting is removed or deactivated from a device, the LFC Enabler SHALL revert to the LFC Default Value for the device or the previous value.	LFC 1.0
LFC-USA-004	The LFC Client MAY support the rollback of an LFC Element Setting to a previous value or LFC Default value NOTE: It is up to implementation to decide how many previous values are available for rollback.	LFC 1.0

Table 13: Usability Requirements

6.1.9 Interoperability

Label	Description	Enabler Release

Table 14: Interoperability Requirements

6.1.10 Privacy

Label	Description	Enabler Release

Table 15: Privacy Requirements

6.2 **Overall System Requirements**

Label	Description	Enabler Release
LFC-OSR-001	Upon receiving an LFC Package from an Authorized Principal the LFC Enabler SHALL be able to accept and perform the LFC Operations for that LFC Package provided the package is applicable to the device..	LFC 1.0
LFC-OSR-002	If, during an LFC Operation, a critical error occurs in the handling of an LFC Package then the operation SHALL NOT be performed for any LFC Element Setting in the LFC Package. Error handling for non-critical errors is an implementation specific issue. Note: Critical errors may include missing mandatory components, non-recoverable file format errors etc.	LFC 1.0
LFC-OSR-003	The LFC enabler SHOULD support Look and Feel Customization provisioning from a Secure Removable Card.	LFC 1.0

Table 16: Overall System Requirements

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-LFC-V1_0			
OMA-RD-LFC-V1_0-20060911-D	11 Sep 2006	All	Initial draft OMA-REQ-LFC-2006-0008R02-INP_Provisioning_And_Update_Use_Case OMA-REQ-LFC-2006-0011R01-INP_New_Definitions OMA-REQ-LFC-2006-0012R01-INP_I_New_Requirements_Provisioning OMA-REQ-LFC-2006-0016R01-INP_Portable_look_and_feel_use_case
OMA-RD-LFC-V1_0-20061013-D	12 Oct 2006	All	OMA-REQ-LFC-2006-0017R03-INP_Localization_Internationalization OMA-REQ-LFC-2006-0026-CR_RD_Editorial_Updates OMA-REQ-LFC-2006-0030R01-CR_Revision_Existent_Requirements
OMA-RD-LFC-V1_0-20061020-D	20 Oct 2006	All	OMA-REQ-LFC-2006-0034R03-CR Use Case Not Using OMA_DM.zip OMA-REQ-LFC-2006-0027R03-CR L and F Content Deletion.zip OMA-REQ-LFC-2006-0039R01-CR Requirements and use case for Fix Assets and Default Profile.zip OMA-REQ-LFC-2006-0040-INP__Introduction_for_LFC_RD.zip
OMA-RD-LFC-V1_0-20061112-D	12 Nov 2006	All	Includes changes from the call on 9th November 2006 OMA-REQ-LFC-2006-0042-CR Definition of Authorised Principal.zip OMA-REQ-LFC-2006-0045-CR_LFC_RD_Editorial_Changes.zip
OMA-RD-LFC-V1_0-20061130-D	30 Nov 2006	All	Includes changes from the call on 30th November 2006 OMA-REQ-LFC-2006-0035R06-CR Lock Unlock Use Case
OMA-RD-LFC-V1_0-20070102-D	02 Jan 2007	All	Includes changes from the Washington D.C. face to face meeting, 11-13 December 2006 OMA-REQ-LFC-2006-0058-R01-CR_Provisioning_Only_Use Case OMA-REQ-LFC-2006-0060R02-CR_L_and_F_Content_Protection_Use_Case
OMA-RD-LFC-V1_0-20070102-D	04 Jan 2007	All	Includes changes agreed during the conference call, 4 January 2007 OMA-REQ-LFC-2006-0065R01-CR_Tech_Agn.zip OMA-REQ-LFC-2006-0069-CR Removal Req DM Support.zip
OMA-RD-LFC-V1_0-20070104-D	21 Jan 2007	All	Includes changes agreed during the conference call, 21 February 2007 OMA-REQ-LFC-2007-0008R03-CR_LFC_RD_CR
OMA-RD-LFC-V1_0-20070227-D	16 Mar 2007	All	Includes changes agreed during the conference calls on 1st and 15th of March 2007 OMA-REQ-LFC-2007-0018-CR_RD_Editorial_Changes

Document Identifier	Date	Sections	Description
OMA-RD-LFC-V1_0-20070316-D	30 Mar 2007	All	Includes changes agreed during the conference calls on 29th of March 2007 OMA-REQ-LFC-2007-0023-CR_Parameter_Rewording OMA-REQ-LFC-2007-0017R01-CR_Merge_Use_Cases
OMA-RD-LFC-V1_0-20070330-D	24 Apr 2007	All	Includes changes agreed during the Frankfurt meeting 16-20 April 2007 OMA-REQ-LFC-2007-0024R01-CR_Atomic_Requirement_Refine OMA-REQ-LFC-2007-0028R01-CR_LFC_Inventory_operation OMA-REQ-LFC-2007-0029R01-CR_SRM_Support_Optional OMA-REQ-LFC-2007-0030-CR_Error_Handling OMA-REQ-LFC-2007-0032R01-CR_Query_Requirements_Refine
OMA-RD-LFC-V1_0-20070424-D	30 Apr 2007	All	Includes changes agreed during the 26th of April conference call OMA-REQ-LFC-2007-0031R02-CR_LFC_Models OMA-REQ-LFC-2007-0033R01-CR_Activation_Related_Requirements OMA-REQ-LFC-2007-0037-CR_Definition_Update OMA-REQ-LFC-2007-0040-CR__change_of_LFC_Element_Setting_definition OMA-REQ-LFC-2007-0041-CR__New_authentication_requirement_for_LFC_client OMA-REQ-LFC-2007-0043R01-CR_Definition_For_Default.zip OMA-REQ-LFC-2007-0039R02-CR_Solve_Granularity_Issues
OMA-RD-LFC-V1_0-20070501-D	11 May 2007	All	Includes changes agreed during the 10th of May conference call OMA-REQ-LFC-2007-0042R01-CR__Cleaning_up_of_LFC_RD_requirements_section OMA-REQ-LFC-2007-0044R02-CR_NTD
OMA-RD-LFC-V1_0-20070511-D	04 Jun 2007	All	Includes changes agreed during the 24th of May conference call OMA-REQ-LFC-2007-0050R01-CR_High_level_LFC_diagram_for_Introduction_section Also includes clerical corrections as pointed out by Huawei (Ray Wang) via an email sent on 31st of May and as agreed following the email discussion. In addition, this revision includes the changes to alphabetically order the definition table
OMA-RD-LFC-V1_0-20070605-D	25 Jun 2007	All	Includes changes agreed during the Bangkok meeting 11-15 June 2007 OMA-REQ-LFC-2007-0052R02-CR_Definition for LFC Server OMA-REQ-LFC-2007-0054R04-CR_Data model requirements OMA-REQ-LFC-2007-0064-CR_To_address_ACTION ITEM LFC 2007_0011
OMA-RD-LFC-V1_0-20070625-D	26 Jul 2007	All	Includes changes agreed during the July 26th conference call OMA-REQ-LFC-2007-0072R01-CR__addressing editorial comments OMA-REQ-LFC-2007-0076R01-CR_RDRR A009_OSR001 OMA-REQ-LFC-2007-0077R02-CR_RDRR A010 A005_A007 OMA-REQ-LFC-2007-0078-CR_RDRR Comments 011___017
OMA-RD-LFC-V1_0-20070726-D	28 Aug 2007	All	Includes changes agreed during the Seoul meeting, 20-24 August 2007 OMA-REQ-LFC-2007-0079R01-CR_srm_definition OMA-REQ-LFC-2007-0081-CR_RDRR Comments 13_and_19 OMA-REQ-LFC-2007-0084-CR_RD_HLOR A044toA046 OMA-REQ-LFC-2007-0085-CR_HLOR_008

Document Identifier	Date	Sections	Description
OMA-RD-LFC-V1_0-20070828-D	11 Sep 2007	All	Includes changes as proposed and agreed during the Seoul meeting from 2007-0083R01 after the R&A period. OMA-REQ-LFC-2007-0083R01-CR_RD_HLMR A041toA043
OMA-RD-LFC-V1_0-20070911-D	24 Sep 2007	All	Includes changes as agreed during the September 20th conference call OMA-REQ-LFC-2007-0087-CR_RD_A029 References OMA-REQ-LFC-2007-0088-CR_RD_A030 Consumed OMA-REQ-LFC-2007-0089-CR_RD_A051 AuthChange OMA-REQ-LFC-2007-0090-CR_RD_A052 DataIntegrity.zip
OMA-RD-LFC-V1_0-20070924-D	7 Oct 2007	All	Includes changes as agreed during the October 4th conference call OMA-REQ-LFC-2007-0073R03-CR_RD_Sec3and4 Motorola.zip OMA-REQ-LFC-2007-0091-CR_RD_A053 Charging.zip OMA-REQ-LFC-2007-0093R02-CR_Open_RDRR comments.zip OMA-REQ-LFC-2007-0095-CR_RD_A056_Interop.zip
OMA-RD-LFC-V1_0-20071101-D	01 Nov 2007	All	DSO editorial updates
Candidate Versions OMA-RD-LFC-V1_0	11 Dec 2007	All	Status changed to Candidate by TP TP Ref# OMA-TP-2007-0448-INP_LFC_V1.0_RD_for_Candidate_Approval
Revised Versions OMA-RD-LFC-V1_0	28 Apr 2008	All	Includes changes as agreed during the April 10th 2008 REQ conference call OMA-REQ-2008-0049R02-CR_LFC_RD Includes also the change agreed during the Paris LFC meeting, 17th of April. OMA-LFC-2008-0021-CR_Activation_Granularity.doc Status changed to Candidate by TP TP Ref# OMA-TP-2007-0448-INP_LFC_V1.0_RD_for_Candidate_Approval
	30 Apr 2008	All	Includes OMA-LFC-2008-0014R01-CR_LFC_Operations that was left out in previous versions.
	30 May 2008	N/A	Date changed No change of content Only the changed-bar version was updated to show all changes done since the candidate version.
Candidate Versions OMA-RD-LFC-V1_0	22 Jul 2008	N/A	Status changed to Candidate by TP TP Ref# OMA-TP-2008-0275-INP_LFC_V1_0_RD_for_Candidate_Re_approval