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SERIES M: TELECOMMUNICATION MANAGEMENT,
INCLUDING TMN AND NETWORK MAINTENANCE

Telecommunications management network

**Requirements for the NGN service activation
across the interface between the network
management system and the element
management system**

Recommendation ITU-T M.3347



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Recommendation ITU-T M.3347

Requirements for the NGN service activation across the interface between the network management system and the element management system

Summary

Recommendation ITU-T M.3347 describes the requirements for the next generation network (NGN) service activation across the interface between the network management system (NMS) and the element management system (EMS) in the service provisioning business process. The requirements are provided using the telecommunications management network (TMN) interface specification methodology described in Recommendation ITU-T M.3020. The general requirements include subscriber configuration, user configuration, subscribed service configuration, user service relation configuration, user service relation update notification and bulk configuration. This Recommendation defines the interface requirements for each configuration function.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T M.3347	2012-05-14	2

Keywords

Agent, manager, NGN, OS, requirements, service, service activation, service provider.

FOREWORD

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Introduction

ITU-T has described the provisioning function set group which is contained in configuration management [ITU-T M.3400]. The provisioning function set group consists of procedures which are necessary to bring equipment into service, not including installation. However, the interface between the network management system (NMS) and the element management system (EMS) of the service provisioning has not been defined.

With the rapid growth of next generation networks (NGNs) and the expansion of new NGN services, it is more important for the service provider (SP) to improve the end-user experience. Consequently, it is necessary to define the NMS-EMS interface for service activation in order to improve the automation capability, effectiveness and quality of service provisioning.

This Recommendation contains the requirements for the NGN service activation across the NMS-EMS interface.

Recommendation ITU-T M.3347

Requirements for the NGN service activation across the interface between the network management system and the element management system

1 Scope

This Recommendation contains the requirements for the NGN service activation across the interface between the network management system (NMS) and the element management system (EMS) in the service provisioning business process. The requirements are provided using the telecommunications management network (TMN) interface specification methodology described in [ITU-T M.3020].

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T F.500] Recommendation ITU-T F.500 (1992), *International public directory services*.

[ITU-T M.3010] Recommendation ITU-T M.3010 (2000), *Principles for a telecommunications management network*.

[ITU-T M.3020] Recommendation ITU-T M.3020 (2009), *Management interface specification methodology*.

[ITU-T M.3050.1] Recommendation ITU-T M.3050.1 (2007), *Enhanced Telecom Operations Map (eTOM) – The business process framework*.

[ITU-T M.3060] Recommendation ITU-T M.3060/Y.2401 (2006), *Principles for the Management of Next Generation Networks*.

[ITU-T M.3208.1] Recommendation ITU-T M.3208.1 (1997), *TMN management services for dedicated and reconfigurable circuits network: Leased circuit services*.

[ITU-T M.3400] Recommendation ITU-T M.3400 (2000), *TMN management functions*.

[ITU-T M.3702] Recommendation ITU-T M.3702 (2010), *Common management services – Notification management – Protocol neutral requirement and analysis*.

[ITU-T Y.2001] Recommendation ITU-T Y.2001 (2004), *General overview of NGN*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 element management function (EMF) [ITU-T M.3060]

3.1.2 interface [ITU-T M.3010]

3.1.3 network management function (NMF) [ITU-T M.3060]

3.1.4 next generation network (NGN) [ITU-T Y.2001]

3.1.5 operations system [ITU-T M.3010]

3.1.6 Q interface [ITU-T M.3010]

3.1.7 service [ITU-T M.3050.1]

3.1.8 service provider [ITU-T M.3208.1]

3.1.9 subscriber [ITU-T M.3050.1]

3.1.10 user [ITU-T F.500]

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 service activation: The procedure of making a service ready for use, which processes information related to the telecommunications management for the purpose of configuration and activation of the resources reserved for supporting a specific service instance.

3.2.2 subscribed service: A service instance subscribed by the subscriber.

3.2.3 user service: A service instance configured by the subscriber and assigned to a user.

3.2.4 user service relation: The relationship between a user and a user service, which contains the information including user identifier, the service instance identifier, and the user usage preference for the service instance.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

EMF	Element Management Function
NGN	Next Generation Network
NMF	Network Management Function
OS	Operations System
OSF	Operations Systems Function
QoS	Quality of Service
RMF	Resource Management Function
SLA	Service Level Agreement
SMF	Service Management Function
SP	Service Provider
SRM	Service Resource Management
SRMF	Service Resource Management Function
TMN	Telecommunications Management Network
TRMF	Transport Resource Management Function

5 Conventions

In this Recommendation, mandatory requirements are indicated by the use of the word "shall". Desirable requirements are indicated by the use of the word "should". Optional requirements are indicated by the use of the word "may" or "can".

6 Concepts and background

The "service" used in this Recommendation refers to "service instance" in all the cases.

In the NGN management functional view reference to [ITU-T M.3060], the service provisioning is supported by several operations systems functions (OSFs) laid in different management layers.

The service management function (SMF) is dedicated to service management and manages the service life cycles and service profiles. Each service profile expresses the transport and service resources requirements needed to activate the service and the underlying service resource management function (SRMF) and transport resource management function (TRMF) map these requirements into network parameters of the underlying network elements. The SMF also manages the service and transport resources required for enabling the activation of services according to the subscription contract, including the required connectivity and its associated characteristics: bandwidth, quality of service (QoS), and level of subscriber line access (SLA).

All management functions in SMF are resource/technology independent and will not provide any technical knowledge on the underlying resources involved in the provisioning of services to the customers: no information about transport or service platforms is available through service management functions.

The SMF relies on the SRMF and TRMF to map its service-oriented view and information to the required entities in the appropriate NGN resources.

The network management function (NMF) interprets the requirements from the SMF into network parameters of the underlying network elements and performs service activation action through the element management function (EMF) to activate the related resources for a specific service.

Figure 1 shows the interface addressed in this Recommendation. The operations system (OS) (managing system) realizes the service activation related function of the NMF and the OS (managed system) realizes the service activation related function of the EMF. The interface is a Q interface.

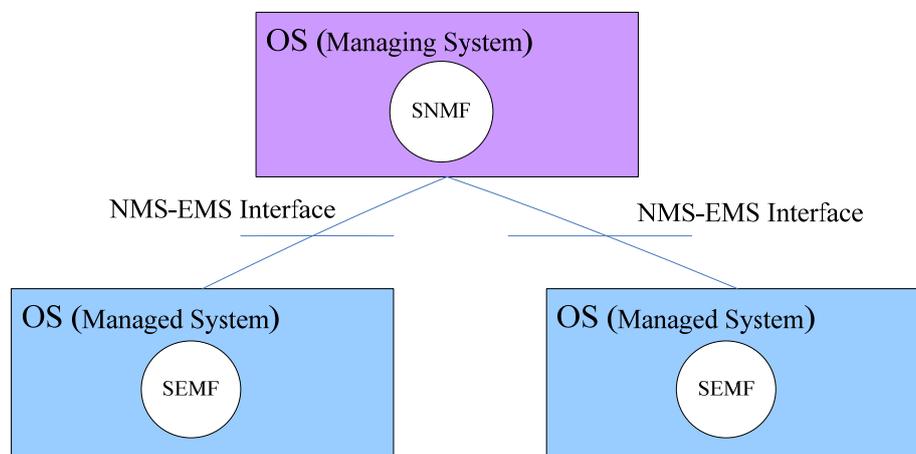


Figure 1 – The NMS-EMS interface addressed in this Recommendation

This Recommendation defines the requirements for the NGN service activation across the NMS-EMS interface in the service provisioning business process.

The subscriber is an entity that can subscribe some services for an SP. The subscribed service must be activated in the SP's network before it can be used; this process has been illustrated in the above paragraphs of this clause. A subscriber is associated with one or more users, who actually use the service. A subscriber needs to assign services to users, and a service assigned to a user is a user service. As users can have different usage preference for a service, the user service relationship is used to record this requirement. To support the service activation process, the information about the

subscriber, user, subscribed service and user service need to be configured in the managed system through the interface addressed in this Recommendation. The service in the managed system can be configured by the user after activation for usage preference via the telecommunication network, and if the managing system wants to receive updated information on the user service relation, it can subscribe to the managed system for notification of updates of the user service relation.

7 Requirements

7.1 Business level requirements

7.1.1 Requirements

The general requirements include:

- Subscriber configuration
- User configuration
- Subscribed service configuration
- User service relation configuration
- User service relation update notification
- Bulk configuration
- Non-functional requirements

7.1.1.1 Subscriber configuration

REQ-SA-FUN-101 The managing system shall be able to request the managed system to create a new subscriber with the subscriber's identification. The managed system shall return the creation result.

The subscriber's identification cannot be modified after creation.

The information of a specific subscriber includes subscriber ID, subscriber name, subscriber type (organization, individual), etc.

REQ-SA-FUN-102 The managing system shall be able to request the managed system to modify the existing subscriber's information identified by the subscriber's identification. The information that can be modified includes subscriber name and subscriber type. The managed system shall return the modification result.

REQ-SA-FUN-103 The managing system shall be able to request the managed system to delete the existing subscriber identified by the subscriber's identification. If the subscriber to be deleted still has subscribed services in use, it cannot be deleted. The managed system shall return the deletion result.

REQ-SA-FUN-104 The managing system shall be able to request the managed system to query the information of the existing subscriber identified by the subscriber's identification. The managed system shall return the query result.

7.1.1.2 User configuration

REQ-SA-FUN-201 The managing system shall be able to request the managed system to create a new user with the user's identification. The managed system shall return the creation result.

The user's identification cannot be modified after creation.

The information of a specific user includes user ID, user name, user type (person, process, etc.), and user credential information (username/password, etc.).

REQ-SA-FUN-202 The managing system shall be able to request the managed system to modify an existing user's information identified by the user's identification. The information that can be modified includes user name, user type (person, process, etc.), and user credential information. The managed system shall return the modification result.

REQ-SA-FUN-203 The managing system shall be able to request the managed system to delete an existing user identified by the user's identification. If the user to be deleted still has user services in use, it cannot be deleted. The managed system shall return the deletion result.

REQ-SA-FUN-204 The managing system shall be able to request the managed system to query the information of an existing user identified by the user's identification. The managed system shall return the query result.

7.1.1.3 Subscribed service configuration

REQ-SA-FUN-301 The managing system shall be able to request the managed system to create a new service with the service's identification associated with the subscriber information. The managed system shall return the creation result.

The service's identification cannot be modified after creation.

The information of a specific subscribed service includes service ID, service specification ID¹, effective time, expiration time, service status, service credential information (network access number, username/password, etc.), service QoS information, service characteristics (bandwidth, payment form (prepaid/postpaid), mailbox size, etc.), service resources. Different kinds of services may have different characteristics and may be based on different resources. There should be a mechanism to extend the characteristics and resources of services.

REQ-SA-FUN-302 The managing system shall be able to request the managed system to modify the information of an existing service identified by the service's identification. The information that can be modified includes effective time, expiration time, service credential information, service QoS information, service characteristics, and service resources. The managed system shall return the modification result.

¹ A service specification is a service template that describes the characteristics of the service.

- REQ-SA-FUN-303 The managing system shall be able to request the managed system to suspend or resume an existing service identified by the service's identification. The managed system shall return the operation result and the status of the service.
- REQ-SA-FUN-304 The managing system shall be able to request the managed system to remove an existing service identified by the service's identification. The managed system shall return the removing result.
- REQ-SA-FUN-305 The managing system shall be able to request the managed system to query the information of an existing service identified by the service's identification. The managed system shall return the query result.

7.1.1.4 User service relation configuration

- REQ-SA-FUN-401 The managing system shall be able to request the managed system to create a user service relation between a user and a subscribed service. The managed system shall return the creation result.
- The user service relation's identification cannot be modified after creation.
- The information of a specific user service includes user service relation ID, user ID, service ID, and the user's usage preference information about this service.
- REQ-SA-FUN-402 The managing system shall be able to request the managed system to modify an existing user service identified by the user service's identification. The information that can be modified includes usage preference information. The managed system shall return the modification result.
- REQ-SA-FUN-403 The managing system shall be able to request the managed system to delete an existing user service identified by the user service's identification. The managed system shall return the deletion result.
- REQ-SA-FUN-404 The managing system shall be able to request the managed system to query an existing user service relationship by the user service relation's identification. The managed system shall return the query result.

7.1.1.5 User service relation update notification

- REQ-SA-FUN-501 The managing system shall be able to request the managed system to subscribe notifications of user service relation updates, so that when a user service relation is updated in a managed system without request by the managing system, the managing system can be informed. The managed system shall return the notification subscription result.
- REQ-SA-FUN-502 The managing system shall be able to request the managed system to unsubscribe notifications of a user service relation update not requested by the managing system. The managed system shall return the notification unsubscription result.
- REQ-SA-FUN-503 The managed system shall be able to generate notifications based on notification subscription to the managing system when a user service relation is updated in the managed system not requested by the managing system.

7.1.1.6 Bulk configuration

REQ-SA-FUN-601 All the operations of subscriber configuration, user configuration, subscribed service configuration, and user service relation configuration can be performed in a batch mode.

The managing system shall be able to send a bulk configuration request to the managed system. The request contains the address information of a bulk configuration data file to be downloaded and performed by the managed system. The managed system shall be able to get this data file, analyse it and perform the configuration operations.

Then the managed system shall be able to send a notification of the bulk configuration result to the managing system. The notification contains the address information of a bulk configuration result data file to be downloaded by the managing system.

7.1.1.7 Non-functional requirements

REQ-SA-NON-101 The NMS-EMS interface provided by the managed system shall be able to support both the synchronous and asynchronous interaction mode. All of the operations illustrated in this Recommendation, except for the bulk configuration and user service update notification, are synchronous.

REQ-SA-NON-102 The NMS-EMS interface provided by the managed system shall be able to support a security mechanism and policy to verify the validation of the managing system.

REQ-SA-NON-103 The NMS-EMS interface provided by the managed system shall be able to support a parallel transaction.

7.1.2 Actor roles

Managed system: The entity performing the agent role.

Managing system: The entity performing the manager role.

7.1.3 Telecommunication resources

The managed network resources are viewed as relevant telecommunications resources in this Recommendation.

7.1.4 High level use case diagrams

The following seven figures illustrate the high-level use case diagrams that summarize the functionality and interfaces of the service provisioning provided by the managed system. Figure 2 illustrates the general use cases, Figure 3 illustrates the subscriber configuration function set, Figure 4 is the user configuration function set, Figure 5 is the subscribed service configuration function set, Figure 6 is the service configuration function set, Figure 7 is the user service update notification function set, and Figure 8 is the bulk configuration function set.

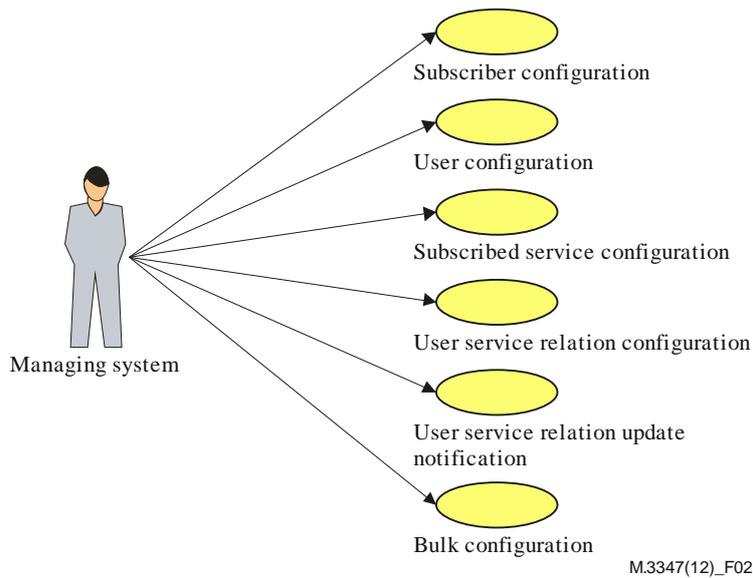


Figure 2 – General use cases

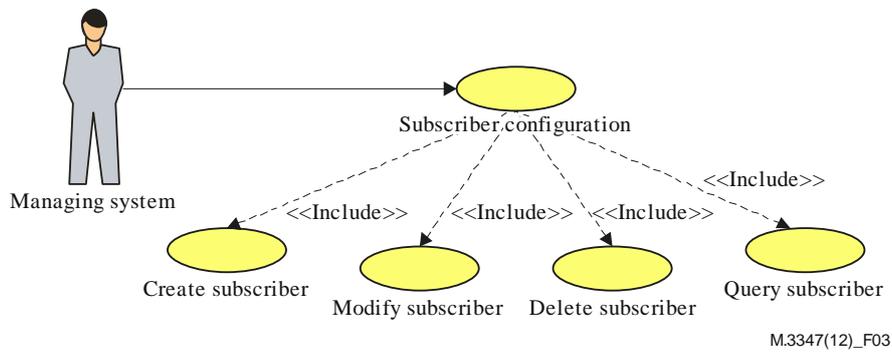


Figure 3 – Subscriber configuration use cases

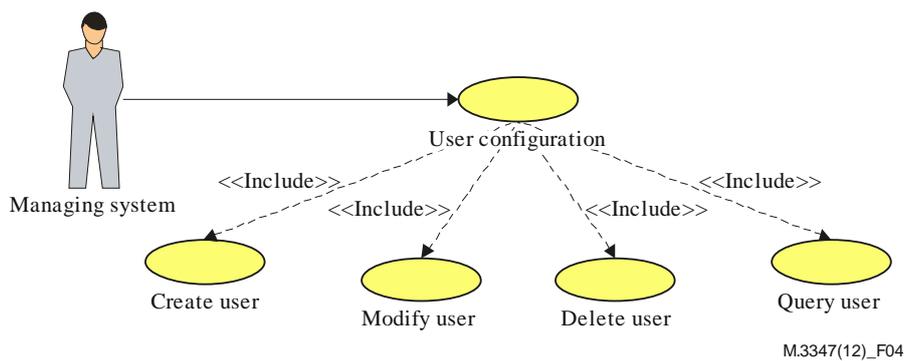


Figure 4 – User configuration use cases

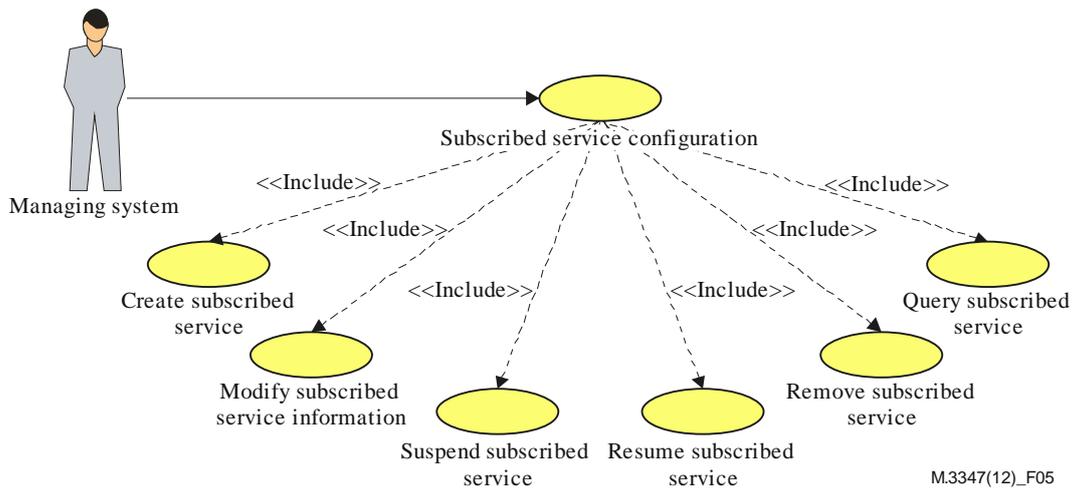


Figure 5 – Subscribed service configuration use cases

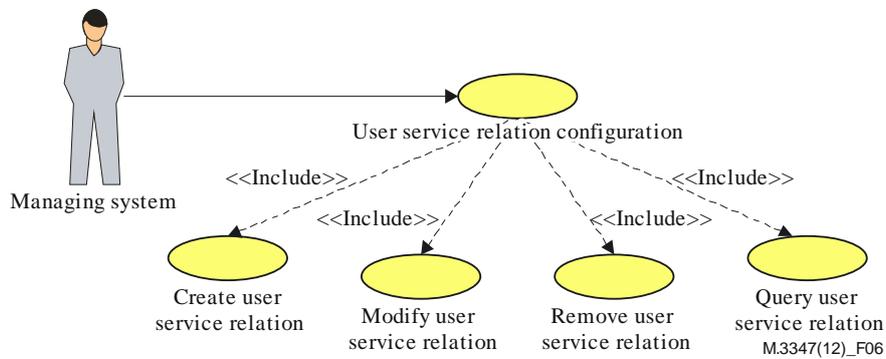


Figure 6 – User service relation configuration use cases

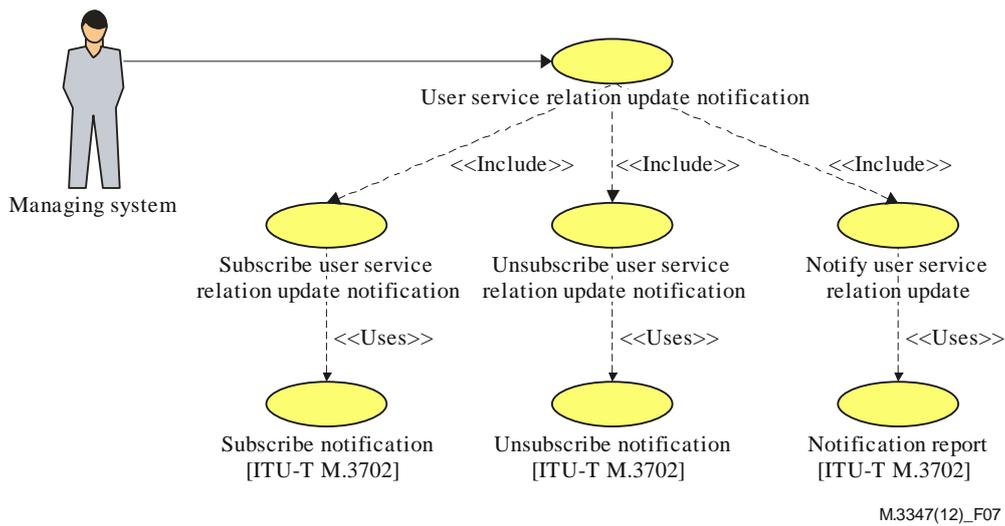


Figure 7 – User service relation update notification use cases

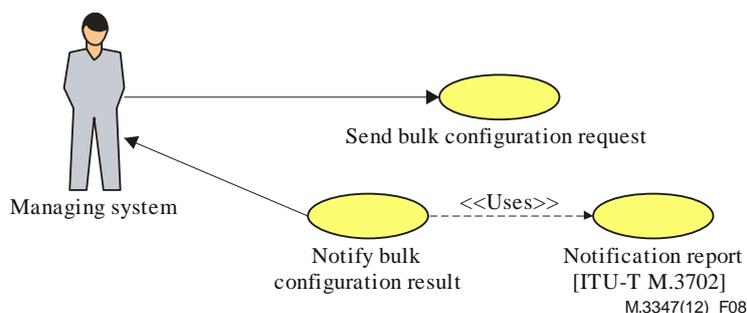


Figure 8 – Bulk configuration use cases

7.2 Specification level requirements

7.2.1 Requirements

There are no specification level requirements.

7.2.2 Actor roles

See clause 7.1.2.

7.2.3 Telecommunications resources

See clause 7.1.3.

7.2.4 Use cases

7.2.4.1 Create subscriber

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to create a new subscriber with the subscriber's identification.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	None.	
Begins when	The Manager sends a request to create a new subscriber.	
Step 1 (M)	The Manager sends a request to the Agent to create a new subscriber; the request should include the following information: <ul style="list-style-type: none"> – subscriber's identification (subscriber ID) – subscriber name – subscriber type (organization, individual). 	
Step 2.1 (M)	When the requested subscriber creation has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the creation fails, the Agent will return error information. The possible errors are listed under "Exceptions".	

Use case stage	Evolution/specification	<<Uses>> Related use
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	User ID repeated, Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the subscriber is created successfully, or the creation fails because of some errors.	
Traceability	REQ-SA-FUN-101	

7.2.4.2 Modify subscriber

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager modifies the basic information of a specific subscriber through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified subscriber exists in the Agent.	
Begins when	The Manager sends a request to modify the basic information associated with a specific subscriber.	
Step 1 (M)	The manager sends a request to the Agent to modify the basic information of a specific subscriber; the request should include the following information: <ul style="list-style-type: none"> – subscriber ID – list of attribute name and new value pairs of the subscriber to be modified. The modifiable basic subscriber attributes include subscriber name, subscriber type. 	
Step 2.1 (M)	When the requested subscriber modification has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the modification fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown subscriber ID, Unknown parameter, Incorrect parameter values, Attribute not modifiable, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the subscriber is modified successfully, or the modification fails because of some errors.	
Traceability	REQ-SA-FUN-102	

7.2.4.3 Delete subscriber

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to delete a specific subscriber.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified subscriber exists in the Agent. The subscriber to be deleted does not have subscribed services in use.	
Begins when	The Manager sends a request to delete a specific subscriber.	
Step 1 (M)	The manager sends a request to the Agent to delete a specific subscriber; the request should include the following information: – subscriber ID.	
Step 2.1 (M)	When the requested subscriber deletion has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the deletion fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown subscriber ID, Has subscribed services in use, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the subscriber is deleted successfully, or the deletion fails because of some errors.	
Traceability	REQ-SA-FUN-103	

7.2.4.4 Query subscriber

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager queries the information of specific subscribers through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified subscribers exist in the Agent.	
Begins when	The Manager sends a request to query the information associated with specific subscribers.	
Step 1 (M)	The manager sends a request to the Agent to query the information of specific subscribers; the request should include the following information: – list of subscriber IDs.	

Use case stage	Evolution/specification	<<Uses>> Related use
Step 2.1 (M)	When the requested query has completed, the Agent returns the subscriber(s) information, which should contain a LIST of the following information: <ul style="list-style-type: none"> – subscriber ID – subscriber name – subscriber type – user ID list. 	
Step 2.2 (M)	If the query fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown subscriber IDs, Communication or Process Failure.	
Post-conditions	The Manager receives the information of the requested subscribers list.	
Traceability	REQ-SA-FUN-104	

7.2.4.5 Create user

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to create a new user with the user's identification.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	None.	
Begins when	The Manager sends a request to create a new user.	
Step 1 (M)	The manager sends a request to the Agent to create a new user; the request should include the following information: <ul style="list-style-type: none"> – user's identification (user ID) – user name – user type (person, process, etc.) – user credential information (username/password, etc.) – subscriber ID (indicating which subscriber this user belongs to). 	
Step 2.1 (M)	When the requested user creation has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the creation fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	

Use case stage	Evolution/specification	<<Uses>> Related use
Exceptions	User ID repeated, Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user is created successfully, or the creation fails because of some errors.	
Traceability	REQ-SA-FUN-201	

7.2.4.6 Modify user

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager modifies the basic information of a specific user through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user exists in the Agent.	
Begins when	The Manager sends a request to modify the basic information associated with a specific user.	
Step 1 (M)	The Manager sends a request to the Agent to modify the basic information of a specific user; the request should include the following information: <ul style="list-style-type: none"> – user ID – list of attribute name and new value pairs of the user to be modified. The modifiable basic user attributes include user name, user type, user credential information. 	
Step 2.1 (M)	When the requested user modification has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the modification fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user ID, Unknown parameter, Incorrect parameter values, Attribute not modifiable, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user is modified successfully, or the modification fails because of some errors.	
Traceability	REQ-SA-FUN-202	

7.2.4.7 Delete user

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to delete a specific user.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user exists in the Agent. The user to be deleted does not have user services in use.	
Begins when	The Manager sends a request to delete a specific user.	
Step 1 (M)	The manager sends a request to the Agent to delete a specific user; the request should include the following information: – user ID.	
Step 2.1 (M)	When the requested user deletion has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the deletion fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user ID, Has user services in use, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user is deleted successfully, or the deletion fails because of some errors.	
Traceability	REQ-SA-FUN-203	

7.2.4.8 Query user

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager queries the information of specific users through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified users exist in the Agent.	
Begins when	The Manager sends a request to query the information associated with specific users.	
Step 1 (M)	The manager sends a request to the Agent to query the information of specific users; the request should include the following information: – list of user IDs.	

Use case stage	Evolution/specification	<<Uses>> Related use
Step 2.1 (M)	When the requested query has completed, the Agent returns the users information, which should contain a list of the following information: <ul style="list-style-type: none"> – user ID – user name – user type – user credential information – subscriber ID. 	
Step 2.2 (M)	If the query fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user IDs, Communication or Process Failure.	
Post-conditions	The Manager receives the information of the requested users list.	
Traceability	REQ-SA-FUN-204	

7.2.4.9 Create subscribed service

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to create a new service with the service's identification associated with the subscriber.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	None.	
Begins when	The Manager sends a request to create a new service.	
Step 1 (M)	The Manager sends a request to the Agent to create a new service; the request should include the following information: <ul style="list-style-type: none"> – service ID – service specification ID – effective time – expiration time – service status – service credential information (network access number, username/password, etc.) – service QoS information – service characteristics values (bandwidth, payment form (prepaid/postpaid), mailbox size, etc.) – service resources. 	
Step 2.1 (M)	When the requested service creation has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the creation fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	

Use case stage	Evolution/specification	<<Uses>> Related use
Exceptions	Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the service is created successfully, or the creation fails because of some errors.	
Traceability	REQ-SA-FUN-301	

7.2.4.10 Modify subscribed service information

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager modifies the basic information of a specific service through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified service exists in the Agent.	
Begins when	The Manager sends a request to modify the basic information associated with a specific service.	
Step 1 (M)	The manager sends a request to the Agent to modify the basic information of a specific service; the request should include the following information: <ul style="list-style-type: none"> – service ID – list of name and new value pairs of the service attributes to be modified. The modifiable basic service attributes include effective time, expiration time, service credential information service, QoS information, service characteristics values and service resources. 	
Step 2.1 (M)	When the requested service modification has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the modification fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown service ID, Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the service is modified successfully, or the modification fails because of some errors.	
Traceability	REQ-SA-FUN-302	

7.2.4.11 Suspend subscribed service

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager sends a request to suspend a specific service through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified service exists in the Agent and it is not suspended.	
Begins when	The Manager sends a request to suspend a specific service.	
Step 1 (M)	The Manager sends a request to the Agent to suspend a specific service; the request should include the following information: – service ID	
Step 2.1 (M)	When the requested service suspending has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the suspension fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown service ID, Service Already Suspended, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the service is suspended successfully, or the suspension fails because of some errors.	
Traceability	REQ-SA-FUN-303	

7.2.4.12 Resume subscribed service

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager sends a request to resume a suspended service through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified service exists in the Agent. And it is suspended.	
Begins when	The Manager sends a request to resume a specific service.	
Step 1 (M)	The manager sends a request to the Agent to resume a specific service; the request should include the following information: – service ID.	
Step 2.1 (M)	When the requested service resumption has completed, the Agent returns the success indication.	

Use case stage	Evolution/specification	<<Uses>> Related use
Step 2.2 (M)	If the resumption fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown service ID, Service Already Resumed, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the service is resumed successfully, or the resumption fails because of some errors.	
Traceability	REQ-SA-FUN-303	

7.2.4.13 Remove subscribed service

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to remove a specific service.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified service exists in the Agent. The specified service is not in use.	
Begins when	The Manager sends a request to remove a specific service.	
Step 1 (M)	The Manager sends a request to the Agent to remove a specific service, the request should include the following information: – service ID.	
Step 2.1 (M)	When the requested service removal has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the deletion fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown service ID, Still in use, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the service is removed successfully, or the removal fails because of some errors.	
Traceability	REQ-SA-FUN-304	

7.2.4.14 Query subscribed service

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager queries the information of a specific service through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified service exists in the Agent.	
Begins when	The Manager sends a request to query the information associated with specific services.	
Step 1 (M)	The manager sends a request to the Agent to query the information of specific services; the request should include the following information: <ul style="list-style-type: none"> – list of service IDs. 	
Step 2.1 (M)	When the requested query has completed, the Agent returns the requested information, which should contain a LIST of the following information: <ul style="list-style-type: none"> – service ID – service specification ID – effective time – expiration time – service status – service credential information – service QoS information – service characteristics values – service resources – service state. 	
Step 2.2 (M)	If the query fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown service ID, Communication or Process Failure.	
Post-conditions	The Manager receives the information of the requested services list.	
Traceability	REQ-SA-FUN-305	

7.2.4.15 Create user service relation

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests the Agent to create a user service relation between a user and a subscribed service.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user and the service exist in the Agent.	
Begins when	The Manager sends a request to create a new user service relation.	
Step 1 (M)	The manager sends a request to the Agent to create a new user service relation; the request should include the following information: <ul style="list-style-type: none"> – user service relation ID – user ID – service ID – the user's usage preference information about this service. 	
Step 2.1 (M)	When the requested user service relation creation has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the creation fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user ID, Unknown service ID, Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user service relation is created successfully, or the creation fails because of some errors.	
Traceability	REQ-SA-FUN-401	

7.2.4.16 Modify user service relation

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager modifies the basic information of a specific user service relation through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user service relation exists in the Agent.	
Begins when	The Manager sends a request to modify the basic information associated with a specific user service relation.	

Use case stage	Evolution/specification	<<Uses>> Related use
Step 1 (M)	The manager sends a request to the Agent to modify the basic information of a specific user service relation; the request should include the following information: <ul style="list-style-type: none"> – user service relation ID – name and new value of the usage preference information. 	
Step 2.1 (M)	When the requested user service modification has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the modification fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user service relation ID, Unknown parameter, Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user service relation is modified successfully, or the modification fails because of some errors.	
Traceability	REQ-SA-FUN-402	

7.2.4.17 Remove user service relation

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The Manager requests the Agent to remove a specific user service relation.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user service relation exists in the Agent.	
Begins when	The Manager sends a request to delete a specific user service relation.	
Step 1 (M)	The manager sends a request to the Agent to remove a specific user service relation; the request should include the following information: <ul style="list-style-type: none"> – user service relation ID. 	
Step 2.1 (M)	When the requested service relation removal has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the removal fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user service relation ID, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the user service is removed successfully, or the removal fails because of some errors.	
Traceability	REQ-SA-FUN-403	

7.2.4.18 Query user service relation

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager queries the information of a specific user service through the management interface.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The specified user service relation exists in the Agent.	
Begins when	The Manager sends a request to query the information associated with specific user service relations.	
Step 1 (M)	The Manager sends a request to the Agent to query the information of specific user service relations; the request should include the following information: <ul style="list-style-type: none"> – list of user service relation IDs. 	
Step 2.1 (M)	When the requested query has completed, the Agent returns the request user service relation information, which should contain a LIST of the following information: <ul style="list-style-type: none"> – user service relation ID – user ID – service ID – user's usage preference information about this service. 	
Step 2.2 (M)	If the query fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown user service relation IDs, Communication or Process Failure.	
Post-conditions	The Manager receives the information of the requested user service relation list.	
Traceability	REQ-SA-FUN-404	

7.2.4.19 Subscribe to user service relation update notification

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Manager requests to subscribe notifications of user service relation update through the management interface. This use case reuses the "subscribe notification" use case in [ITU-T M.3702].	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	None.	

Use case stage	Evolution/specification	<<Uses>> Related use
Begins when	The Manager sends a request to subscribe notifications of user service relation update.	
Step 1 (M)	The manager sends a request to the Agent to subscribe notifications of user service relation update. See [ITU-T M.3702] for more details.	Subscribe notification in [ITU-T M.3702]
Step 2.1 (M)	When the requested subscription has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the subscription fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Already Subscribed; Incorrect parameter values, Communication or Process Failure.	
Post-conditions	The Agent gives the Manager a response indicating that the subscription is successful, or the subscription fails because of some errors.	
Traceability	REQ-SA-FUN-501	

7.2.4.20 Unsubscribe to user service relation update notification

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The Manager requests to unsubscribe notifications of user service relation update through the management interface. This use case reuses the "unsubscribe notification" use case in [ITU-T M.3702].	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The Manager has subscribed notifications of user service relation update.	
Begins when	The Manager sends a request to unsubscribe notifications of user service relation update.	
Step 1 (M)	The manager sends a request to the Agent to unsubscribe notifications of user service relation update. See [ITU-T M.3702] for more details.	Unsubscribe notification in [ITU-T M.3702]
Step 2.1 (M)	When the unsubscription has completed, the Agent returns the success indication.	
Step 2.2 (M)	If the unsubscription fails, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The result is returned by the Agent, or some error occurs.	
Exceptions	Unknown subscription, Not subscribed, Communication or Process Failure.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Post-conditions	The Agent gives the Manager a response indicating that the unsubscription is successful, or the unsubscription fails because of some errors.	
Traceability	REQ-SA-FUN-502	

7.2.4.21 Notify user service relation update

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The Agent notifies the changed user service relation information to the Manager through the management interface. This use case reuses the "report notification" use case in [ITU-T M.3702].	
Actors and roles	The Manager is the consumer of the notification from the Agent.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The Manager has already subscribed notifications from the Agent.	
Begins when	The user service information has changed not requested by the Manager.	
Step 1 (M)	The Agent sends a user service change notification to the Manager, and the notification should include the following information: <ul style="list-style-type: none"> – user service relation ID; – list of name and new value pairs of the changed user service information 	Notification report in [ITU-T M.3702]
Ends when	The notification is delivered to the subscribed managers.	
Exceptions	None.	
Post-conditions	The manager receives the user service relation update notification.	
Traceability	REQ-SA-FUN-503	

7.2.4.22 Send bulk configuration request

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The Manager sends a bulk configuration request to the Agent through the management interface. The request contains the address information of a bulk configuration data file to be downloaded and performed by the Agent.	
Actors and roles	The Agent is the consumer of the request.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Pre-conditions	The bulk configuration data file to be performed has been prepared by the Manager.	
Begins when	The Manager sends the configuration request to the Agent.	
Step 1 (M)	The Manager sends the configuration request to the Agent. The request should include the following information: <ul style="list-style-type: none"> – operation to be performed (create subscriber, modify subscriber, delete subscriber, create user, modify user, delete user, create subscribed service, modify subscribed service information, suspend subscribed service, resume subscribed service, remove subscribed service, create user service relation, modify user service relation information, remove user service relation) (NOTE – There will only appear one operation for a bulk configuration data file.) – the download address of the bulk configuration data file. 	
Step 2.1 (M)	After receiving this request, the Agent will check the bulk configuration request. If it can be performed, the Agent will return a confirmation to the Manager.	
Step 2.2 (M)	If the bulk configuration request cannot be performed, or there is something wrong with the request, the Agent will return error information. The possible errors are listed under "Exceptions".	
Ends when	The Agent gives the Manager a response indicating that the request is received successfully, or some error occurs.	
Exceptions	Unknown Operation, Bulk Configuration Unsupported, Communication or Process Failure.	
Post-conditions	The Manager received the response from the Agent.	
Traceability	REQ-SA-FUN-601	

7.2.4.23 Notify bulk configuration result

Use case stage	Evolution/specification	<<Uses>> Related use
Goal	The Agent sends a notification of bulk configuration result to the Manager through the management interface. The notification contains the address information of a bulk configuration result data file to be downloaded by the Manager.	
Actors and roles	The Manager is the consumer of the notification from the Agent.	
Telecom resources	See clause 7.1.3.	
Assumptions	The communication between the Manager and the Agent is available.	
Pre-conditions	The Bulk configuration is performed by the Agent. The manager has subscribed to this type of notifications and the subscription is not suspended.	Subscribe notification in [ITU-T M.3702]
Begins when	The Agent sends the notification of bulk configuration result to the Manager.	

Use case stage	Evolution/specification	<<Uses>> Related use
Step 1 (M)	The Agent sends a notification of bulk configuration result to the Manager, and the notification should include the following information: – the download address of the bulk configuration result data file.	Report notification in [ITU-T M.3702]
Ends when	A notification of bulk configuration result is delivered to all subscribed Managers.	
Exceptions	Communication or Process Failure.	
Post-conditions	The Manager receives the bulk configuration result notification.	
Traceability	REQ-SA-FUN-601	

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