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SERIES M: TELECOMMUNICATION MANAGEMENT, INCLUDING TMN AND NETWORK MAINTENANCE

Telecommunications management network

Requirements of the NMS-EMS management interface for NGN service platforms

Recommendation ITU-T M.3348

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Recommendation ITU-T M.3348

Requirements of the NMS-EMS management interface for NGN service platforms

Summary

Recommendation ITU-T M.3348 describes the requirements of the NMS-EMS management interface for NGN service platforms. The requirements are provided using the TMN interface specification methodology described in Recommendation ITU-T M.3020.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T M.3348	2011-01-13	2

Keywords

EMS, interface, NGN, NMS, requirements, service platform.

FOREWORD

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Introduction

The ITU-T M.370x series of Recommendations defines the management functions applicable in the network management system-element management system (NMS-EMS) interface which includes object management, state management, notification management, performance management and fault management. These common management functions are network independent.

While in NGN environment or in a mixed environment of NGN and non-NGN technologies, there are many kinds of service platforms to provide various services. The management and administration interface for controlling the service platform is proprietary to each vendor currently. The service platform consists of IT resources (including hardware and software aspects), service support applications and services. IETF has created detailed specifications related to the management of IT resources. Moreover, regarding service platforms, the management and administration to services and the service support applications are more significant. The specification of the service support applications and services is seldom covered in the current Recommendations so, it is necessary to specify the NMS-EMS management interface for the NGN service platforms.

Recommendation ITU-T M.3348

Requirements of the NMS-EMS management interface for NGN service platforms

1 Scope

This Recommendation defines the requirements for managing service platforms used to introduce new service types (e.g., multimedia service) in NGN. The management functions include monitoring and controlling service support applications and services supported by service platforms. The purpose of this Recommendation is to provide a standardized interface to manage these services and service support applications. It is out of the scope of this Recommendation to manage the resources based on which the services are provided. Management of service instances is out of the scope of this Recommendation.

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

[ITU-T M.3020] Recommendation ITU-T M.3020 (2010), *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.3703] Recommendation ITU-T M.3703 (2010), *Common management services – Alarm management – Protocol neutral requirements and analysis*.

[ITU-T M.3704] Recommendation ITU-T M.3704 (2010), *Common management service – Performance management – Protocol neutral requirements and analysis.*

[ITU-T Y.110] Recommendation ITU-T Y.110 (1998), *Global Information Infrastructure principles and framework architecture*.

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

[ITU-T Y.2011] Recommendation ITU-T Y.2011 (2004), *General principles and general reference model for next generation networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application: [ITU-T Y.110].

3.1.2 interface: [ITU-T M.3010].

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

3.1.4 NGN service stratum: [ITU-T Y.2011].

3.1.5 operations system (OS): [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 element management function (SEMF): [ITU-T M.3060].

3.1.9 service network management function (SNMF): [ITU-T M.3060].

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 service delivery platform (SDP): A complete environment or system architecture designed to enable rapid, cost efficient service creation, deployment, execution, orchestration and management.

3.2.2 service execution environment: The software and hardware which support the execution of the service. The basic environment information of a service includes memory size, disk size, JDK (Java development kit) path, database URI (uniform resource identifier), process priority, etc.

3.2.3 service exposure: An interface provided by the service platform or SDP (service delivery platform), through which the user (can be a system or an end user) can use the function of the service. The basic service exposure information includes service URI (service hostname, service port and service path), service access policies (permitted access user, permitted access time, etc.), etc.

3.2.4 service platform: The collection of software and hardware on the server side, which is constructed by the service provider and used to deliver one or more specific services to end users.

3.2.5 service support application: The software which provides the function of the service using the resource of the service platform.

4 Abbreviations

This Recommendation uses the following abbreviations:

EMS Element Management System

FM Fault Management

ID Identifier

IT Information Technology

JDK Java Development Kit

NGN Next Generation Network

NMS Network Management System

OS	Operations System
PM	Performance Management
QoS	Quality of Service
SDP	Service Delivery Platform
SEMF	Service Element Management Function
SEMS	Service Element Management System
SNMF	Service Network Management Function
SNMS	Service Network Management System
URI	Uniform Resource Identifier

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 Requirements

6.1 Concepts and background

Figure 1 indicates the interface addressed in this Recommendation. The interface is a Q interface, through which an agent (SEMS, which refers to the system providing the SEMF, or service platforms providing embedded SEMF) can communicate management information for its managed entities to a manager (SNMS, which refers to the system providing the SNMF).

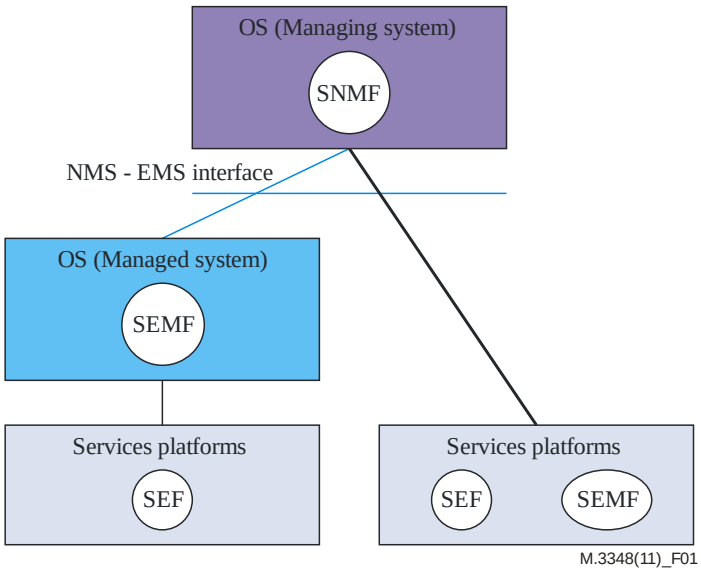

Figure 1 – The NMS-EMS interface addressed in this Recommendation

As described in [ITU-T Y.2011], the service stratum may involve a complex set of geographically distributed service platforms or in the simple case just the service functions in two end-user sites. The service platforms provide the user services, such as a telephone service, a web service, etc. To provide these services, 'the application support functions and service support functions' and related control functions in NGN should be covered by the service platform. The dashed rectangle in Figure 2 shows the functions covered by the service platform in the NGN functional architecture.

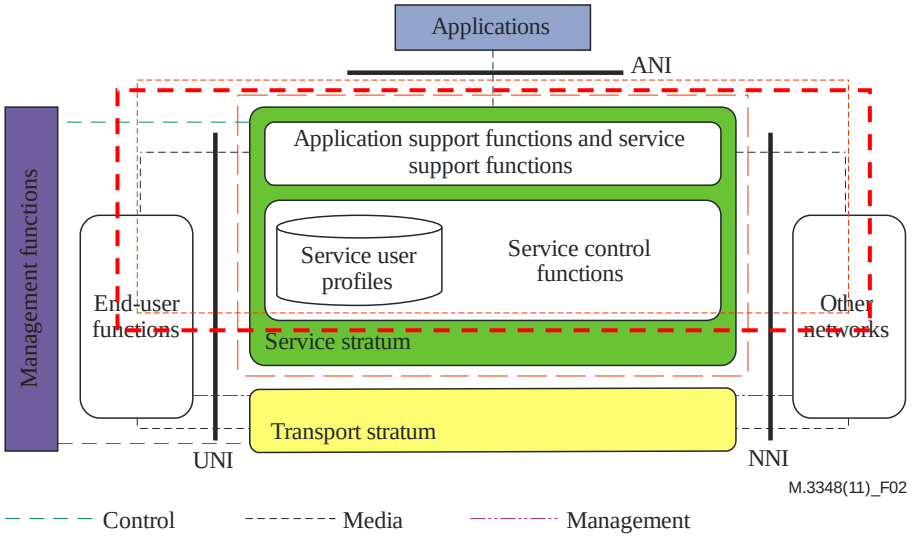

Figure 2 – Functions covered by the service platform in the NGN functional architecture

According to the networks of telecom operators, there are two kinds of service platforms: traditional service platform and service delivery platform (SDP). (Both the service platform and the SDP are viewed as network elements in this Recommendation.)

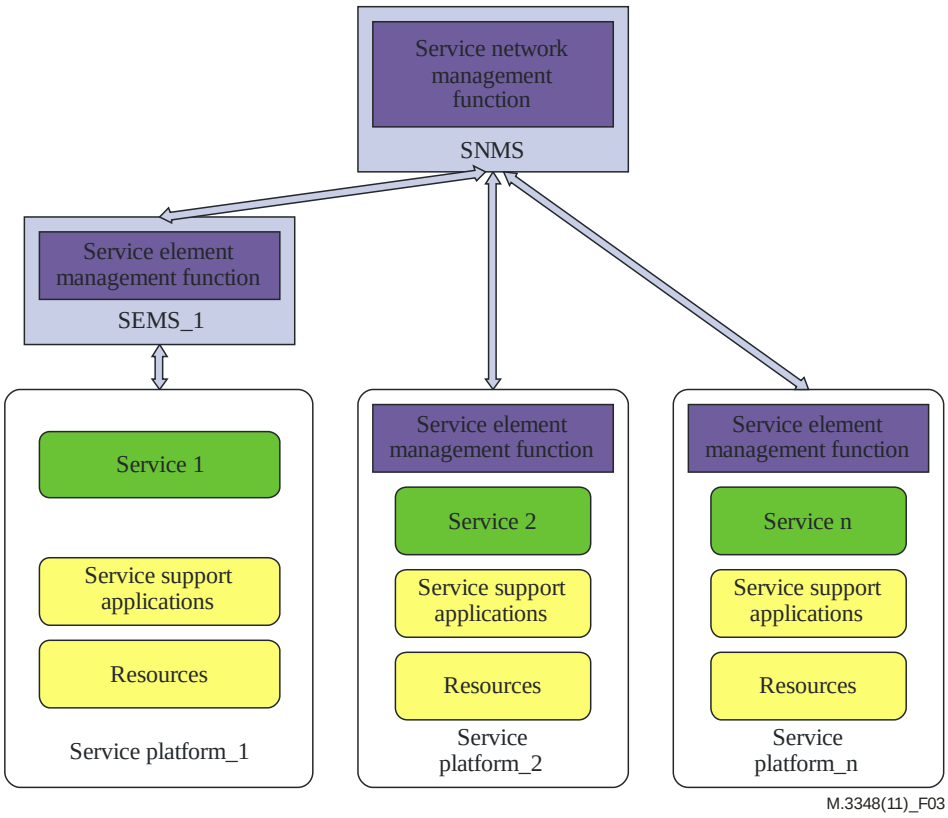

Figure 3 – Scenario 1 for management of service platforms

Figure 3 shows the traditional service platform scenario. Each service platform provides a specific service, and its service element management function (SEMF) is provided either by a dedicated SEMS or by itself. The service network management function (SNMF) is provided by a SNMS. This should be supported.

Service platform consists of three aspects: Resources, service support applications and service. Resources are common IT infrastructures of the service platform, which consist of hardware and software. Hardware consists of network devices, storage devices and servers. Software consists of baseware (e.g., operating system, JAVA virtual machine) and middleware (e.g., database, web server, application server). Service support applications are the system procedures to support the services' runtime environments, which consist of service creation, service execution, service exposure, service management, security, etc.

In Figure 4, the concept of SDP is introduced, so that multiple services can be provided or flexibly created through this. The SEMF is provided either by a dedicated SEMS or by the SDP itself, and the SNMF is provided by a SNMS.

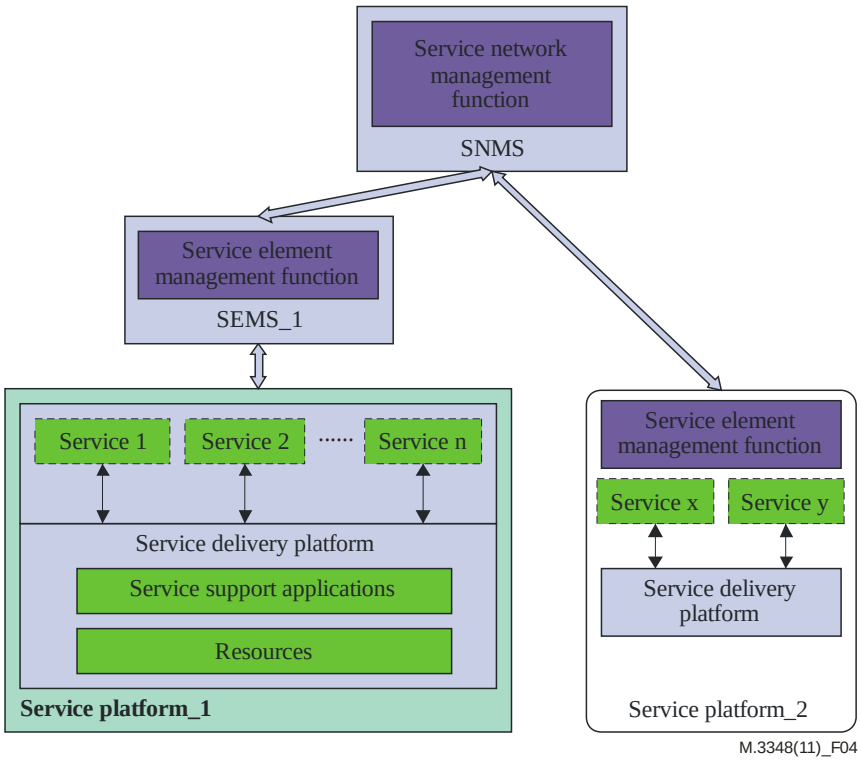

Figure 4 – Scenario 2 for management of service platforms

6.2 Business-level requirements

6.2.1 Requirements

This Recommendation only focuses on the management interface between the manager and the agent, and the interface management functions associated with them. Through the interface, the manager can query and modify configuration information, and the agent can report changes in configuration, performance data, and fault information to the manager.

Since the functions and information of configuration management, performance management (PM) and fault management (FM) are varied with different service platforms, only the common requirements that are independent of any specific service platform will be covered in this Recommendation.

Besides the requirements for the common management functions of NMS-EMS interfaces which are described in the ITU-T M.370x series of Recommendations, the requirements of NMS-EMS management interfaces for NGN service platforms are described as follows.

6.2.1.1 Configuration management

6.2.1.1.1 Service configuration management

Identifier	Definition
REQ-SP-FUN-101	The manager shall be able to query the service configuration information. The information of a specific service includes service ID, service name, service description, service version, service status, service owner, service QoS information, service exposure information, etc.
REQ-SP-FUN-102	The manager shall be able to configure the basic service information. The basic service attributes include service name, service description, service version, service status, service owner, etc.
REQ-SP-FUN-103	The agent shall be able to notify the changed information of the service configuration to the manager. When the service configuration information changes, the agent shall send a message to the manager about this. The message type includes update, delete and add. When the message type is add, the content of the message is the basic information of the newly added service. When the message type is deleted, the content of the message is the service ID. When the message type is update, the content of the message is service ID and the update attributes of the service.
REQ-SP-FUN-104	The manager shall be able to stop/start a specific service. The manager can enable, disable, and upgrade a service by this function.
REQ-SP-FUN-105	The manager shall be able to configure the service QoS information. The basic QoS information of a service includes service QoS level, service capacity, assigned resources, etc.
REQ-SP-FUN-106	The manager shall be able to configure the service execution environment parameters.
REQ-SP-FUN-107	The manager shall be able to configure the service exposure parameters.

6.2.1.1.2 Configuration management for service support application

Identifier	Definition
REQ-SP-FUN-201	The manager shall be able to query the configuration information related to service support applications. The information of application includes application ID, application name, software provider information (i.e., vendor name, vendor contact, etc.), release version, release time, licence, patch version, application components contained, contained application components information, etc.
REQ-SP-FUN-202	The manager shall be able to configure the basic configuration information related to a service support application. The parameters that can be modified include running status (i.e., start-up, suspended, stop, etc.), enable status (e.g., enable, disable, replace, etc.), etc.
REQ-SP-FUN-203	The manager shall be able to inform the service support applications of new patches to download.

REQ-SP-FUN-204 The agent shall be able to notify the changed information of the service support application's configuration to the manager. When the service support application's configuration information changes, the agent shall send a message to the manager about this.

6.2.1.2 Fault management

The requirements for the common parts of FM are described in [ITU-T M.3703], which will be reused in this Recommendation.

For NGN service platforms, the alarm report can be generated from several managed object classes.

The alarm information mentioned below is for example purpose. It is outside the scope of this Recommendation to define the detailed alarm information.

Identifier	Definition
REQ-SP-FUN-301	An alarm event will be generated if the service or service function is in the fault condition or the service performance measurement data crosses the thresholds, e.g., service (or service function) unavailability, failure ratio of service (or service function) alarm, response time of service (or service function) alarm, etc.
REQ-SP-FUN-302	An alarm event will be generated if the service support application is in the fault condition or the application performance measurement data crosses the thresholds, e.g., status abnormal, usage ratio of memory alarm, etc.
REQ-SP-FUN-303	An alarm event will be generated if the resources are in the fault condition or the resources performance measurement data crosses the thresholds, e.g., connecting failure, response time alarm, etc.

6.2.1.3 Performance management

The requirements for the common parts of PM are described in [ITU-T M.3704], which will be reused in this Recommendation.

The performance measurement data of the service platform includes performance measurement data related to services, service support application, resources.

The performance parameter mentioned below is for example purpose. It is outside the scope of this Recommendation to define the detailed performance parameters.

Identifier	Definition
REQ-SP-FUN-401	The service platforms provide the user services, such as telephone service, data service and media service, etc. The service performance measurement data is different among the various service types, such as a telephone service including connecting ratio, call failure, holding time, etc., a data service including success ratio, data rate, data transfer time, etc., and a media service including streaming accessibility, streaming access time, video quality, audio quality, etc.
REQ-SP-FUN-402	The service support application performance measurement data includes CPU usage ratio, memory usage ratio, usage ratio of files, idle size of files, number of processes, number of handles, etc.

6.2.2 Actor roles

The SEMS or service platform providing embedded SEMF: The entity acts as an agent role.

The SNMS: The entity acts as a manager role.

6.2.3 Telecommunication resources

The managed objects contained in the service platforms are viewed as relevant telecommunication resources in this Recommendation.

6.2.4 High-level use cases

The use-case diagram in Figure 5 shows the overall interaction of the service platform management interface.

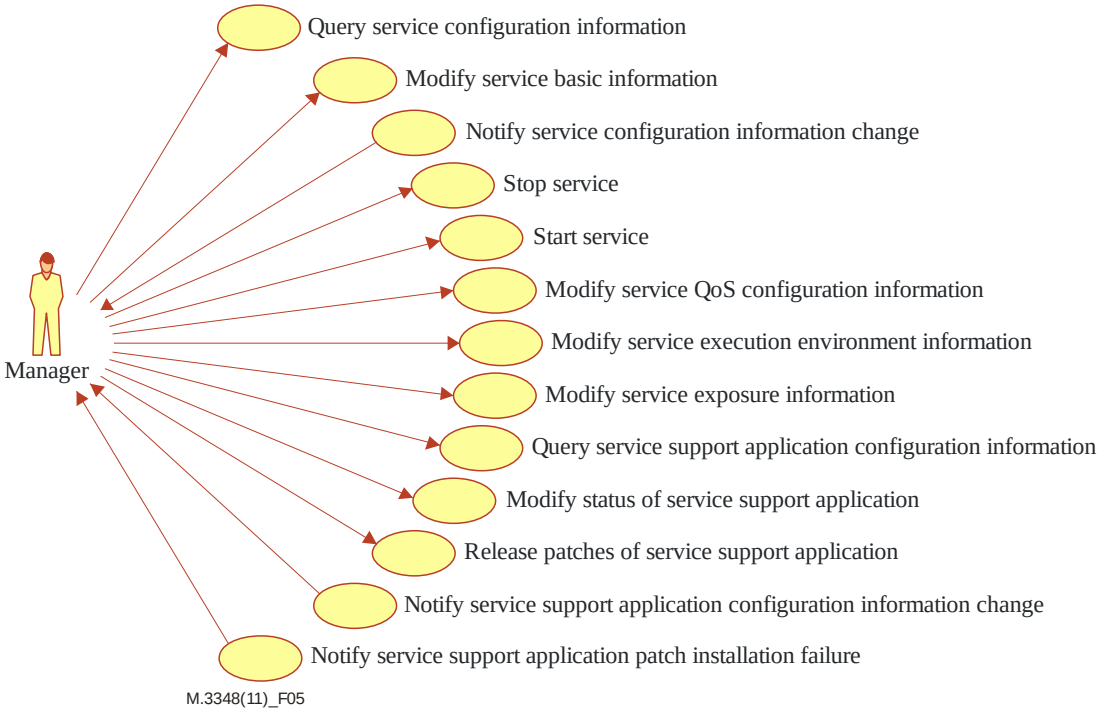

Figure 5 – The use-case diagram of the service platform management interface

6.3 Specification-level requirements

6.3.1 Requirements

There are no specification-level requirements.

6.3.2 Actor roles

See clause 6.2.2.

6.3.3 Telecommunication resources

See clause 6.2.3.

6.3.4 Use cases

6.3.4.1 Query service configuration information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager queries the configuration information of the specific service provided by the agent through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to get the configuration information of the specific service.	
Step 1 (M)	The manager sends a request to the agent to get the complete information of specific services or all services in the service platform. The request should include the following information: – service ID list. When the manager needs to get information of all services in a service platform, the service ID list can be empty.	
Step 2.1 (M)	When the requested retrieval has completed, the agent returns the service information, which should contain the following: – Service basic information: • service ID; • service name; • service description; • service version; • service status; • service owner. – Service QoS information: • service QoS level; • service capacity; • assigned resources. – Service execution environment information: • memory size; • disk size; • JDK path; • database URI; • process priority. – Service exposure information: • service URI; • service access policies.	
Step 2.2 (M)	If the retrieval 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	Invalid parameter, Invalid filter definition, Communication or process failure.	
Post-conditions	The manager receives the information of the requested services list.	
Traceability	REQ-SP-FUN-101	

6.3.4.2 Modify service basic information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager configures 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 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
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 service parameters of a specific service. The request should include the following information: – service ID; – list of name and new value pairs of the service attributes to be modified. The modifiable basic service attributes include service name, service description, service version, service owner, etc.	
Step 2.1 (M)	When the requested service modification has completed, the agent returns the result successful 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 agent gives the manager a response indicating that the specified attribute values are modified successfully, or the modification fails because of some errors.	
Exceptions	Unknown service ID, Unknown parameter, Incorrect parameter values, Communication or process failure.	
Post-conditions	The attribute values of the specified service are modified.	
Traceability	REQ-SP-FUN-102	

6.3.4.3 Notify service configuration information change

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The agent shall be able to notify the changed information of the service configuration to the manager.	
Actors and roles	The manager is the consumer of the notification from the agent.	
Telecom resources	See clause 6.2.3.	
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 service configuration information has changed.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Step 1 (M)	The agent sends a service change notification to the manager, and the notification should include the following information: – service ID; – list of name and new value pairs of the changed service configuration information.	
Ends when	The agent has sent out the notification.	
Exceptions	None.	
Post-conditions	The manager receives the service change notification.	
Traceability	REQ-SP-FUN-103	

6.3.4.4 Stop service

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager stops a specific service through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	The status of the service is "Started".	
Begins when	The manager sends a request to stop a specific service.	
Step 1 (M)	The manager sends a request to the agent to stop a specific service; the request should include the following information: – service ID.	
Step 2.1 (M)	When the requested service stop has completed, the agent returns the result successful indication.	
Step 2.2 (M)	If the operation fails, 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 specified service is stopped successfully, or the operation fails because of some errors.	
Exceptions	Unknown service ID, Service already stopped, Communication or process failure.	
Post-conditions	The status of the specified service is "Stopped".	
Traceability	REQ-SP-FUN-104	

6.3.4.5 Start service

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager starts a specific service through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	The status of the service is "stopped".	
Begins when	The manager sends a request to start a specific service.	
Step 1 (M)	The manager sends a request to the agent to start a specific service; the request should include the following information: – service ID.	
Step 2.1 (M)	When the requested service start has completed, the agent returns the result successful indication.	
Step 2.2 (M)	If the operation fails, 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 specified service is started successfully, or the operation fails because of some errors.	
Exceptions	Unknown service ID, Service already started, Communication or process failure.	
Post-conditions	The status of the specified service is "Started".	
Traceability	REQ-SP-FUN-104	

6.3.4.6 Modify service QoS configuration information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager configures the QoS parameters of a specific service through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to modify the QoS configuration parameters associated with a specific service.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Step 1 (M)	The manager sends a request to the agent to modify the QoS configuration parameters of a specific service; the request should include the following information: – service ID; – list of name and new value pairs of the QoS configuration parameters to be modified. The modifiable QoS information of a service includes service QoS level, service capacity, assigned resources, etc.	
Step 2.1 (M)	When the requested service modification has completed, the agent returns the result successful 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 agent gives the manager a response indicating that the specified attribute values are modified successfully, or the modification fails because of some errors.	
Exceptions	Unknown service ID, Unknown parameter, Communication or process failure, Invalid parameter values.	
Post-conditions	The attribute values of the specified service are modified.	
Traceability	REQ-SP-FUN-105	

6.3.4.7 Modify service execution environment information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager modifies one or more execution environment parameters of a specific service through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to modify one or more execution environment parameters associated with a specific service.	
Step 1 (M)	The manager sends a request to the agent to modify one or more execution environment parameters of a specific service; the request should include the following information: – service ID; – list of name and new value pairs of the execution environment to be modified. The modifiable environment information of a service includes memory size, disk size, process priority, etc.	
Step 2.1 (M)	When the requested service modification has completed, the agent returns the result successful indication.	
Step 2.2 (M)	If the modification 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 agent gives the manager a response indicating that the specified attribute values are modified successfully, or the modification fails because of some errors.	
Exceptions	Unknown service ID, Unknown parameter, Communication or process failure, Invalid parameter values.	
Post-conditions	The attribute values of the specified service are modified.	
Traceability	REQ-SP-FUN-106	

6.3.4.8 Modify service exposure information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager modifies one or more exposure parameters of a specific service through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to modify one or more exposure parameters associated with a specific service.	
Step 1 (M)	The manager sends a request to the agent to modify service exposure parameters of a specific service; the request should include the following information: – service ID; – list of name and new value pairs of the exposure parameters to be modified. The modifiable service exposure information includes service URI, service access policies, etc.	
Step 2.1 (M)	When the requested service modification has completed, the agent returns the result successful 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 agent gives the manager a response indicating that the specified attribute values are modified successfully, or the modification fails because of some errors.	
Exceptions	Unknown service ID, Unknown parameter, Communication or process failure, Invalid parameter values.	
Post-conditions	The attribute values of the specified service are modified.	
Traceability	REQ-SP-FUN-107	

6.3.4.9 Query service support application configuration information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager queries the configuration information of the specific service support application provided by the agent through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to get the configuration information of the specific service support application.	
Step 1 (M)	The manager sends a request to the agent to get the complete information of a specific service support application; the request should include the following information: – application ID.	
Step 2.1 (M)	When the requested retrieval has completed, the agent returns the service support application information, which should contain the following: – application ID; – application name; – software provider information; – release version; – release time; – licence; – patch version; – application components contained; – contained application components information; – running status; – enable status; – etc.	
Step 2.2 (M)	If the retrieval 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	Invalid parameter, Invalid filter definition, Communication or process failure.	
Post-conditions	The manager has received the information list of the requested service support applications.	
Traceability	REQ-SP-FUN-201	

6.3.4.10 Modify status of service support application

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager modifies the status of a specific service support application through the management interface.	
Actors and roles	The agent is the consumer of the request.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	
Pre-conditions	None.	
Begins when	The manager sends a request to modify the status of a specific service support application.	
Step 1 (M)	The manager sends a request to the agent to modify the status of a specific service support application; the request should include the following information: – application ID; – list of name and new value pairs of the application status attributes to be modified. The modifiable attributes include running status (e.g., start-up, suspended, stop, etc.), enable status (e.g., enable, disable, replace, etc.).	
Step 2.1 (M)	When the requested service support application modification has completed, the agent returns the result successful 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 agent gives the manager a response indicating that the specified attribute values are modified successfully, or the modification fails because of some errors.	
Exceptions	Unknown application ID, Unknown parameter, Communication or process failure, Invalid parameter values.	
Post-conditions	The attribute values of the specified service support application are modified.	
Traceability	REQ-SP-FUN-202	

6.3.4.11 Release service support application patch

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The manager notifies the agent of new service support application patch. The agent downloads this patch and upgrades the specified service support application according to the policies received from the manager. (The procedures of downloading and installation of the patch is outside the scope of this Recommendation.)	
Actors and roles	The agent is the consumer of the notification from the manager.	
Telecom resources	See clause 6.2.3.	
Assumptions	The communication between the manager and the agent is available.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Pre-conditions	The service support application patch is ready.	
Begins when	The manager sends notification of new patches of service support application and updates policies.	
Step 1 (M)	The manager sends a new patch notification to the agent, and the notification should include the following information: – application ID; – patch information (patch name, patch version); – the download address of the patch; – updating policies (restart is needed or not, backup is needed or not, etc.).	
Step 2 (M)	The agent receives the notification and returns the confirmation to the manager.	
Ends when	The agent gives the manager a response indicating that the patch information is received successfully, or some error occurs.	
Exceptions	Unknown application ID, Unknown parameter, Communication or process failure.	
Post-conditions	The manager has received the response from the agent.	
Traceability	REQ-SP-FUN-203.	

6.3.4.12 Notify service support application configuration information change

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	The agent shall be able to notify the changed configuration information of the service support application to the manager.	
Actors and roles	The manager is the consumer of the notification from the agent.	
Telecom resources	See clause 6.2.3.	
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 service configuration information has changed.	
Step 1 (M)	The agent sends a service support application change notification to the manager, and the notification should include the following information: – application ID; – list of name and new value pairs of the changed service support application configuration information.	
Ends when	The agent has sent out the notification.	
Exceptions	None.	
Post-conditions	The manager receives the service support application change notification.	
Traceability	REQ-SP-FUN-204	

6.3.4.13 Notify service support application patch installation failure

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	When the agent cannot install the service support application's patch successfully, the agent shall be able to notify this information to the manager.	
Actors and roles	The manager is the consumer of the notification from the agent.	
Telecom resources	See clause 6.2.3.	
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 installation of the service support application's patch fails.	
Step 1 (M)	The agent sends a service support application patch installation failure notification to the manager, and the notification should include the following information: – application ID; – patch information (patch name, patch version); – fail reason.	
Ends when	The agent has sent out the notification.	
Exceptions	None.	
Post-conditions	The manager receives the service support application patch installation failure notification.	
Traceability	REQ-SP-FUN-203	

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