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Supplement 48
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SERIES Q: SWITCHING AND SIGNALLING

Guideline document for specifying API/object interface between network control and application layer

ITU-T Q-series Recommendations – Supplement 48

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Supplement 48 to ITU-T Q-series Recommendations

Guideline document for specifying API/object interface between network control and application layer

Summary

There are many API/Object Interface-related activities outside of ITU-T Study Group 11 and API/Object Interface specifications are developed in them. In order to enhance the usefulness of such API/Object Interface, some common guideline may be required. This Supplement intends to clarify the guidelines that make sure the effectiveness of each API/Object Interface and facilitate the smooth introduction of it.

Source

Supplement 48 to ITU-T Q-series Recommendations was agreed on 12 March 2004 by ITU-T Study Group 11 (2001-2004).

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Supplement 48 to ITU-T Q-series Recommendations

Guideline document for specifying API/object interface between network control and application layer

1 Scope

This Supplement provides guidelines for specifying API/Object Interface in the API/Object Interface-related activities outside of the ITU-T. It focuses on the specifications of API/Object Interface between network control and application layers, which can be referred in the Scope clause of API Reference Document [d1].

2 References

2.1 Website references

[w1] 3GPP website: http://www.3gpp.org/

[w2] Parlay website: http://www.parlay.org/

[w3] ETSI website: http://docbox.etsi.org/TISPAN/Open/OSA

2.2 Document references

[d1] ITU-T Q-series Recommendations – Supplement 40 (2002), *Technical Report: Reference document on API/object interface between network control and application layer*.

[d2] 3GPP TR 21.905, *Vocabulary for 3 GPP Specifications*.

[d3] ITU-T Recommendation E.164 (1997), *The international public telecommunication numbering plan*.

[d4] IETF RFC 1630 (1994), *Universal Resource Identifiers in WWW: A Unifying Syntax for the Expression of Names and Addresses of Objects on the Network as used in the World-Wide Web*.

[d5] ITU-T Recommendation X.213 (2001) | ISO/IEC 8348:2002, *Information technology – Open Systems Interconnection – Network service definition*.

[d6] ITU-T Recommendation Q.850 (1998), *Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part*.

3 Definitions

The definitions with regard to OSA follow the definitions in 3GPP vocabulary document [d2].

4 Abbreviations

API	Application Programming Interface
CAP	CAMEL Application Part
ISUP	ISDN User Part
NSAP	Network Service Access Point
OSA	Open Service Access
SDO	Standards Developing Organization
URI	Uniform Resource Identifier

5 Guidelines for specifying API/object interface

In this clause, the guidelines needed to be considered when specifying APIs are described. Each subclause covers specific subject areas to be considered. They include expected API features to be supported for the subject area, existing specification and other information.

5.1 Mapping with protocol messages

5.1.1 Importance of mapping specification

Application portability on multi-vendor environment is one of the main objects of open API technology. However, different interpretation of the API specification may lead to that situation that an API message mapped to a protocol message "x" in one API platform X is mapped to another protocol message "y" in another API platform Y.

Therefore, to ensure the application portability, provision of explicit mapping specifications clarifying the mapping of API messages with protocol messages (e.g., ISUP messages) is very important.

5.1.2 Expected descriptive requirements on mapping document

Any mapping description will be needed to provide the following information in order to assure the successful application portability in API-based developments.

1) *Mapping sequence*

A mapping sequence should describe how the API messages are invoked by an application map to the corresponding protocol messages. An example mapping sequence diagram is shown in Figure 1. Mapping sequence templates may be developed in the future.

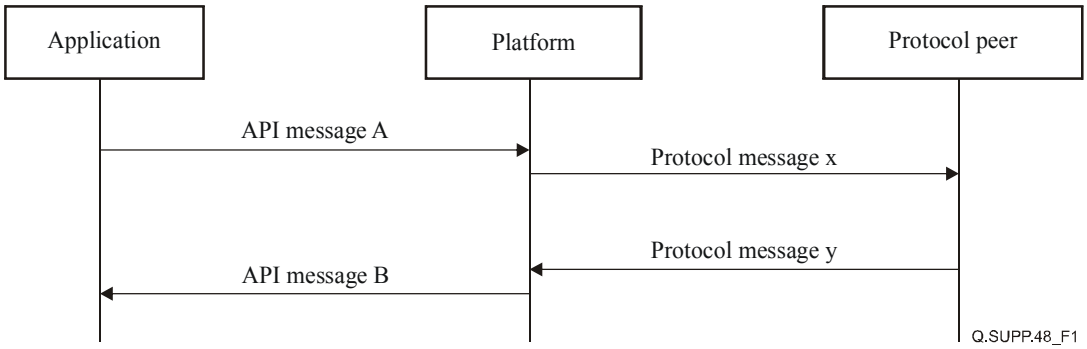

Figure 1 – Example of mapping sequence diagram

2) *Parameter mapping*

Parameter mapping should include the detailed relation between the parameters in an API message and the parameters in the corresponding protocol message. An example of parameter mapping is shown in Table 1. Parameter mapping templates may be developed in the future.

Table 1 – Example of parameter mapping table

	API message A	Protocol message x
1	Parameter A1	Parameter x1
2	Parameter A2	Parameter x2

3) *Other descriptive requirements*

In addition to the mapping sequence diagram and parameter mapping table introduced above, the following information may also be included in the mapping description:

– State transition model within the platform;

– Conditions to invoke API other than protocol messages;

– etc.

Templates for describing these items may also be developed in the future.

5.1.3 Areas for developing mapping specification

APIs being developed in SDOs may be applicable to several areas, but the importance of mapping specification may depend on the area the APIs are to be applied.

Among them, the call control area would have highest importance for the development of API mapping specification. Importance of API mapping to other areas will be studied in the future.

5.1.4 Existing mapping specifications

The following activities are identified.

1) 3GPP [w1]

3GPP has been developing the mapping specification related to its API works. The following documents are already developed:

– 3G TR 29.998-04-1: Mapping for OSA Call Control to CAP;

– 3G TR 29.998-04-4: Mapping for OSA Multiparty Call Control to SIP;

– 3G TR 29.998-05-1: Mapping for OSA User Interaction to CAP;

– 3G TR 29.998-05-4: Mapping for OSA User Interaction to SMS;

– 3G TR 29.998-06: Mapping for OSA User location to MAP;

– 3G TR 29.998-08: Mapping for OSA Data session Control to CAP.

It also has the following plan to develop new mapping specifications:

– OSA PAM (Presence & Availability Management) to SIP (work in progress).

2) Other standards developing organizations (SDOs)

Further investigation is needed on the activities of other SDOs on mapping specifications.

5.2 Modelling total process for introducing API-based application

5.2.1 Importance of total process description for introducing API-based application

In order to enhance applicability of APIs, clarification on the total process of introducing API-based application to the network is also required in addition to the API specification itself.

By clarifying what is required for each process and what kind of involvement SDOs are expected for each process (or no involvement needed), introduction of API-based application (and/or platform) into the network will be facilitated and each SDO can focus on most effective standard activities related to APIs.

5.2.2 Modelling of total process for introducing API-based application

A modelling of total process for introducing API-based application will be the basis in describing the total process for introducing API-based application. An initial modelling is shown in Figure 2. Further enhancements of this model are left for further study.

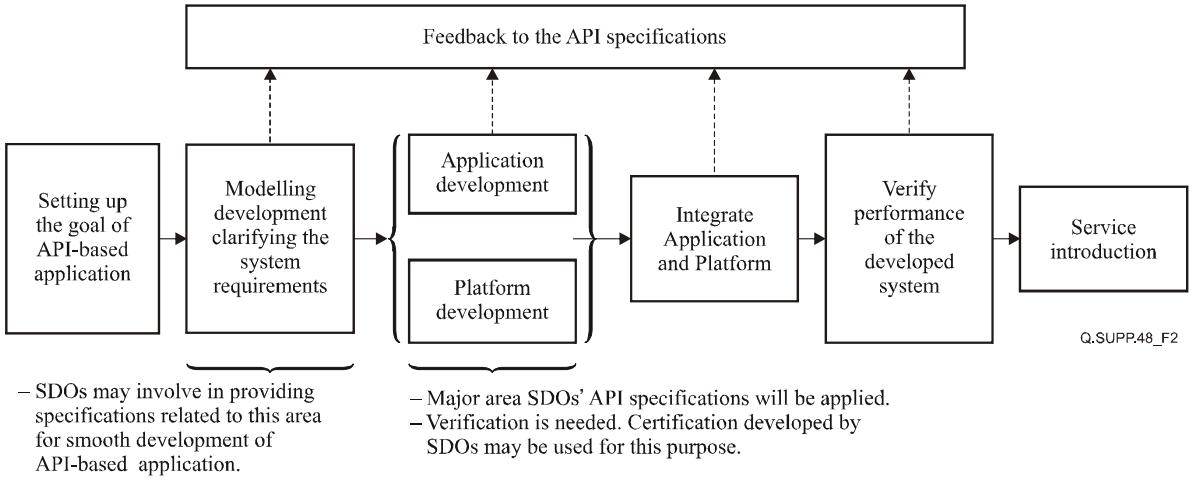

Figure 2 – An initial modelling of total process for introducing API-based application and possible involvement of SDOs

5.2.3 Considerations relevant to steps in total process for introducing API-based application

For the following steps, considerations identified as beneficial in introducing API-based application will be described:

– model development clarifying the system requirements;

– application development; and

– platform development.

5.3 Requirement on address information

5.3.1 Importance of address-independent interface

In the next generation network, several types of address information are supposed to be adopted, e.g., E.164 [d3], URI [d4] and NSAP [d5]. The API between network control function and service application should not restrict the type of address considering the usefulness of the API in a wide area. API should be independent not only from protocols but also from address types. Therefore, parameters of API including address information should have some mechanism that can deal with each address type.

5.3.2 Expected features of API in handling address information

In order to handle various address types, the parameter that handles address information needs to meet the following requirements to ensure the availability of API:

1) Parameter for address information included in the API between network control and service application should not have condition specific for particular type of address. The parameter should be applied to each address type without any change.

2) The length of the parameter should cover the maximum length of each address type that is anticipated as a candidate address type for the next generation network.

5.3.3 Existing specification to handle address information

The following activities are identified.

– ETSI [w3].

The following address types are specified in the parameter for the exchange of address information. The detail information is contained in ETSI ES 202 915-2 V1.2.1.

– IP address (including multicast and unicast address);

– E.164;

– AESA;

– URL;

– SMTP;

– X.400;

– SIP.

The specification above covers both features described in 5.3.2.

5.4 Requirement on release cause

5.4.1 Importance of protocol independent interface

Some service applications want to judge how to behave according to the cause of release sent by terminals. Service applications may also need to send specific cause of release to terminals. APIs between network control and service application should deal with the cause of release in their parameters. Though the number or the classification of release cause are different with each protocol, the API between network control and service application, which must be protocol independent, should not be bound to a specific protocol in handling release cause. Therefore, API should deal with protocol-specific cause value without being conscious of the type of its protocol.

5.4.2 Expected features of API in handling release cause

5.4.2.1 Requirement for API in handling release cause

API specification between network control and service application should be able to deal with cause of release. The parameter which contains release cause value is required to be independent from each protocol.

5.4.2.2 Example solutions to meet the requirement

Example solutions to the requirement in 5.4.2.1 are as follows.

1) Parameter for cause of release contains:
   – cause values defined in each protocol; and
   – protocol identifier, which can be omitted in a single protocol environment.
2) Parameter for cause of release contains newly defined common cause of release, which is protocol independent and can cover all protocol-dependent cause values.
3) Parameter for cause of release contains the limited number of newly defined cause of release, which is protocol independent and needs to be mapped to each protocol-dependent cause value.

In example 1, the application should know which protocol is used in network control. It may cause complexity if the application is protocol independent. Example 2 needs significant effort to define new release causes to cover all the identified protocols; continuous enhancement is also necessary

to cover newly specified cause values in each protocol. Example 3 may be easy from the aspect of developing API specification, but needs mapping work from newly developed cause to release cause specified in each protocol.

These are just example solutions to the requirement and to be listed only for the better understanding of the requirement. Some other solutions may also be possible and this Supplement does not intend to recommend either of the solutions.

5.4.3 Existing release cause specifications

The following activities are identified.

– ETSI [w3].

In ETSI ES 202 915-4-2 V1.2.1, the parameter for release cause that contains Value and Location is defined. It just refers to ITU-T Rec. Q.850 to aid understanding for detail Value and Location. It does not define any new common cause of release and no specific codes are given. Therefore, this specification in ETSI may be categorized under item 2 in 5.4.2.2.

In ETSI ES 202 915-4-3 V1.2.1, thirteen cause values are newly defined. It can be categorized under item 3 in 5.4.2.2.

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