International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.4010.2

(08/2016)

SERIES Q: SWITCHING AND SIGNALLING

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Message waiting indication using IP multimedia core network subsystem – Part 2: Test suite structure and test purposes; Network side

Recommendation ITU-T Q.4010.2

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Recommendation ITU-T Q.4010.2

Message waiting indication using IP multimedia core network subsystem – Part 2: Test suite structure and test purposes; Network side

Summary

Recommendation ITU-T Q.4010.2 v.1 (2016) provides the testing requirements "Message waiting indication (MWI) using IP multimedia (IM) core network (CN) subsystem – Part 2: Test suite structure and test purposes (TSS&TP); Network side" (based on Recommendation ITU-T Q.3626 v.1).

The version number, v.1, indicates that this is version one of Recommendation ITU-T Q.4010.2, and that it relates to Release 10 of the relevant 3GPP/ETSI standard.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Q.4010.2 v.1	2016-08-29	11	11.1002/1000/13002

Keywords

IMS, IP multimedia subsystem, message waiting indication, MWI, testing, test suite structure and test purposes, TSS&TP.

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

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Message waiting indication using IP multimedia core network subsystem – Part 2: Test suite structure and test purposes; Network side

1 Scope

This Recommendation is Part 2 of a multi-part deliverable covering "Message waiting indication (MWI) using IP multimedia (IM) core network (CN) subsystem – Part 2: Test suite structure and test purposes (TSS&TP); network side", as identified below:

Part 1: "Protocol implementation conformance statement (PICS)";

Part 2: "Test suite structure and test purposes (TSS&TP); Network side";

Part 3: "Test suite structure and test purposes (TSS&TP); User side".

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 Q.3626 v.1] Recommendation ITU-T Q.3626 v.1 (2016), *Message waiting indication – Protocol specification*.

[ITU-T Q.4012.1] Recommendation ITU-T Q.4012.1 v.1 (2016), *Anonymous communication rejection and communication barring using IP multimedia core network subsystem; Conformance testing specification – Part 1: Protocol implementation conformance statement*.

[ITU-T X.290] Recommendation ITU-T X. 290 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – General concepts*.

[ITU-T X.296] Recommendation ITU-T X.296 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements*.

[IETF RFC 3265] IETF RFC 3265 (2002), *Session Initiation Protocol (SIP) – Specific Event Notification*.

[IETF RFC 3842] IETF RFC 3842 (2004), *A Message Summary and Message Waiting Indication Event Package for the Session Initiation Protocol (SIP).*

3 Definitions

3.1 Terms defined elsewhere

For the purposes of this Recommendation, the terms and definitions given in [ITU-T Q.3626 v.1], [ITU-T X. 290], [ITU-T X.296] and the following apply:

3.1.1 PICS proforma: Document, in the form of a questionnaire, which when completed for an implementation or system becomes a PICS.

3.1.2 Protocol ICS (PICS): ICS for an implementation or system claimed to conform to a given protocol specification.

NOTE – This may contain additional information.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AS Application Server

ICS Implementation Conformance Statement

IUT Implementation Under Test

MA Message Account

MIME Multipurpose Internet Mail Extensions

MWI Message Waiting Indication

PICS Protocol Implementation Conformance Statement

SUT System Under Test

TP Test Purpose

TSS Test Suite Structure

5 Conventions

None.

6 Test suite structure

Network		
	AS_ServedUser	OIP_N01_xxx

6.1 Configuration

The scope of this Recommendation is to test the signalling and procedural aspects of the stage 3 requirements as described in [ITU-T Q.3626 v.1]. The stage 3 description respects the requirements to several network entities and end devices. Consequently, several interfaces (reference points) are addressed to satisfy the test of the different entities.

In order to test the appropriate entities the configurations below are applicable:

Testing of the application server (AS): This entity performs the service. Hence the ISC interface is the appropriate access point as shown in Figure 6.1-1.

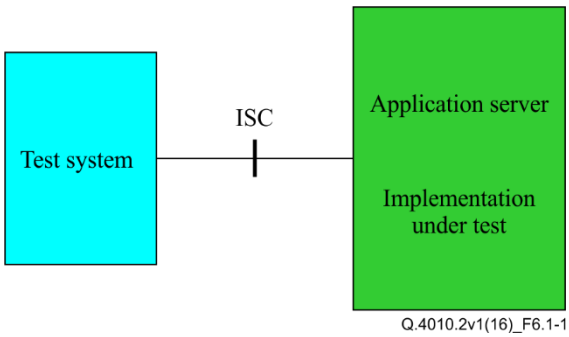

Figure 6.1-1 – Applicable interface to test AS functionalities

If the ISC interface is not accessible, it is also applicable to perform the test of the AS using any NNI (Mw, Mg, Mx) (consider Figure 6.1-2). In case only the Gm interface is accessible this shall be used instead. In this case, be aware that the verification of several requirements is impeded.

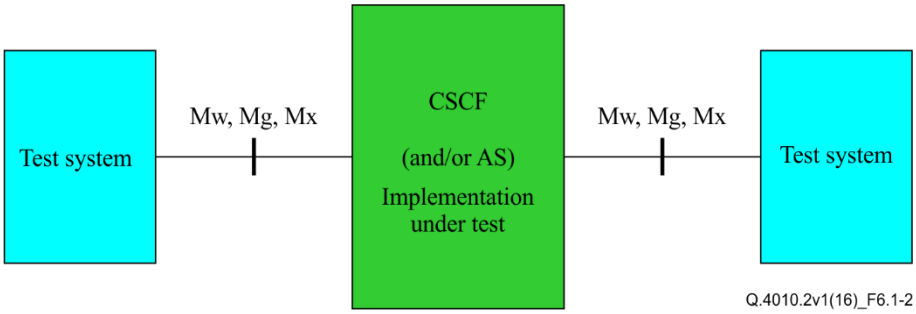

Figure 6.1-2 – Applicable interfaces to test using the (generic) NNI

Figure 6.1-2 illustrates the usage of any NNI.

7 Test purposes

7.1 Introduction

For each requirement in [ITU-T Q.3626 v.1] a test purpose (TP) is defined.

7.1.1 TP naming convention

Test purposes (TPs) are numbered, starting at 001, within each group. Groups are organized according to the test suite structure (TSS). Additional references are added to identify the actual test suite and whether it applies to the network or the user (see Table 7.1-1).

Table 7.1-1 – TP identifier naming convention scheme

Identifier: **<ss>_<iut><group>_<nnn>**			
<ss>	= supplementary service:	e.g. "MWI"	
<iut>	= type of IUT:	U N	User - equipment Network
<group>	= group	2 digit field representing group reference according to TSS	
<nnn>	= 3 digit sequential number	(001-999)	

7.1.2 Test strategy

As the base standard [ITU-T Q.3626 v.1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the protocol implementation conformance statement (PICS) specification [ITU-T Q.4012.1] The criteria applied include the following:

- Whether or not a test case can be built from the TP is not considered.

7.1.3 Reference column "MWI reference"

The column "MWI reference" makes reference to [ITU-T Q.3626 v.1], except where explicitly stated otherwise.

7.2 Invocation and operation

7.2.1 Actions at the application server

TSS Network/AS_ServedUser	**TP** MWI_ N01_001	**MWI reference** Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.4 of [RFC 3842] Clauses 3.1.4.1, 3.1.6.2 of [RFC 3265]	**Selection expression**

Test purpose:
Subscription to the message waiting service, all relevant headers present

Verify that the SUBSCRIBE request will be accepted with following Subscribe-specific headers: Event, Expires and Accept. The 200 OK (SUBSCRIBE) contains the Expires header indicating the subscription duration for the MWI service. A NOTIFY is sent immediately the actual state of a message account (MA). The From header tag and the Call-ID in the NOTIFY are equal to the values in the SUBSCRIBE.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_002	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.1.4.3 of [RFC 3265]	

Test purpose:
The user is able to unsubscribe the service

Verify that the SUBSCRIBE request will be accepted with Expires header with value zero; Check that the 2xx response to the unsubscription contains also an Expires header with value zero. A NOTIFY is sent.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 0
Accept: application/simple-message-summary
200 OK (SUBCRIBE)
Expires: 0
NOTIFY
Event: message-summary
Subscription-State: terminated(; reason=timeout)

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		SUT
SUBSCRIBE	→	
200 OK (SUBSCRIBE)	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_003	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.1.6.2 of [RFC 3265]	

Test purpose:
Refresh of current subscription.

Verify that a SUBSCRIBE request will be accepted at any time before the original subscription expires when From header tag and the Call-ID in the subsequent SUBSCRIBE are equal to the values in the original SUBSCRIBE request. A NOTIFY is sent.

SIP header: SUBSCRIBE 1
To-header with tag=tag_value1
CallId=callId_value1
SUBSCRIBE 2
To-header with tag=tag_value1
CallId=_callId_value1

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		SUT
SUBSCRIBE 1	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	
Refreshing of Subscription		
SUBSCRIBE 2	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_004	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.1.4.2 of [RFC 3265]	

Test purpose:
Unsuccessful refresh of subscription

Verify that a SUBSCRIBE request will be rejected with a "481 Call/Transaction Does Not Exist" response after expiry of the subscription when the subsequent SUBSCRIBE request uses the same dialog (From tag, CallId) as the actual expired subscription.

SIP header: SUBSCRIBE 1
To-header with tag=tag_value1
CallId=_callId_value1
SUBSCRIBE 2
To-header with tag=tag_value1
CallId=callId_value1

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE 1	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	
	Subscription time expired	
SUBSCRIBE 2	→	
481 Call/Transaction Does Not Exist	←	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_005	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.2.2 of [RFC 3265]	

Test purpose:
NOTIFY request after initial subscription

Verify that after a successful subscription to a NOTIFY request is sent containing a "Subscription-State" header with the value "active" and an "expires" parameter which indicates the time remaining on the subscription. The From header tag and the Call-ID in the NOTIFY are equal to the values in the SUBSCRIBE.
The NOTIFY includes:

- Event header set to message-summary
- Subscription-State header set to active (optional) expires parameter set to the time remaining on the subscription
- Content-Type header set to application/simple-message-summary

MIME body:

- Messages-Waiting: yes
- Message-Account: identifying the served user (optional)
- msg-summary-line(s) (optional)

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY
Event: message-summary
Subscription-State: active; expires= <a valid value>
Content-Type: application/simple-message-summary
Messages-Waiting: yes
….

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_006	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.2.2 of [RFC 3265]	

Test purpose:
Subscription terminates after 481 response to NOTIFY request

Verify that a non-200 response (e.g. 481) after a received NOTIFY request will remove the corresponding subscription; Check that no further NOTIFY responses will be received.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
481 Call/Transaction Does Not Exist	→	

Action causes in a message summary state change
No subsequent NOTIFY is sent

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_007	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clauses 3.5, 5.2 of [RFC 3842]	

Test purpose:
Message indicated in the NOTIFY request after initial subscription.

Verify that after a successful subscription, when a message is waiting, a NOTIFY request is sent with a body containing a message summary indicating "Messages-Waiting: yes".

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY
Event: message-summary
Subscription-State: active; expires= <a valid value>
Content-Type: application/simple-message-summary
Messages-Waiting: yes

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_008	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clauses 3.5, 5.2 of [RFC 3842]	PICS 3/1

Test purpose:
Message indicated in the NOTIFY request after initial subscription, msg-account present

Verify that after a successful subscription, when a message is waiting, a NOTIFY request is sent with a body containing a message summary indicating "Messages-Waiting: yes" and containing an "msg-account" line.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY
Event: message-summary
Subscription-State: active
Content-Type: application/simple-message-summary
Messages-Waiting: yes
Message-Account: sip:<URI of served MWI user>

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		SUT
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_009	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clauses 3.5, 5.2 of [RFC 3842]	PICS 3/2

Test purpose:
Message indicated in the NOTIFY request after initial subscription, msg-summary-line present

Verify that after a successful subscription, when a message is waiting, a NOTIFY request is sent with a body containing a message summary indicating "Messages-Waiting: yes" and containing an "msg-summary-line" line.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY
Event: message-summary
Subscription-State: active
Content-Type: application/simple-message-summary
Messages-Waiting: yes
voice-message: <a valid value> **/** <a valid value> **(**<a valid value> **/** <a valid value> **)**

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments: The "new-urgentmsgs SLASH old-urgentmsgs" is optional

ISC		SUT
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_010	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clauses 3.5, 5.2 of [RFC 3842]	

Test purpose:
NOTIFY indicates state change due to a message after successful subscription

Verify that after a successful subscription a NOTIFY message is sent immediately. Afterwards verify that an additional NOTIFY request is sent with a body containing a message summary indicating "Messages-Waiting: yes" when a change in the subscribed state occurs, e.g. a new message has been received at the message account. The From header tag and the Call-ID in the two NOTIFY requests are equal.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY 1
Event: message-summary
Subscription-State: active; expires=<a valid value>
Content-Type: application/simple-message-summary
NOTIFY 2
Event: message-summary
Subscription-State: active; expires=<a valid value>
Content-Type: application/simple-message-summary
Messages-Waiting: yes

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY 1	←	
200 OK (NOTIFY)	→	
Action causes in a message summary state change		
NOTIFY 2	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N01_011	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clauses 3.5, 5.2 of [RFC 3842]	PICS 3/3

Test purpose:
NOTIFY indicates state change due to a message after successful subscription, opt-msg-headers are present

Verify that after a successful subscription a NOTIFY message is sent immediately. Afterwards verify that an additional NOTIFY request is sent with a body containing a message summary indicating "Messages-Waiting: yes" and containing opt-msg-headers that describe newly added message(s) when a change in the subscribed state occurs, e.g. a new message has been received at the message account. The From header tag and the Call-ID in the two NOTIFY requests are equal.

SIP header: SUBSCRIBE
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
NOTIFY 1
Event: message-summary
Subscription-State: active
Content-Type: application/simple-message-summary
Messages-Waiting: yes
NOTIFY 2
Event: message-summary
Subscription-State: active
Content-Type: application/simple-message-summary
Messages-Waiting: yes

To: <user1_public1@home1.net>
From: <user3_public1@home1.net>
Message-ID: <a valid value>>
Message-Context: voice-message

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments: Any set of opt-msg-headers is acceptable for this test, the above code serves only as an example

ISC		SUT
SUBSCRIBE	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY 1	←	
200 OK (NOTIFY)	→	
Action causes in a message summary state change		
NOTIFY 2	←	
200 OK (NOTIFY)	→	

TSS	TP	MWI reference	Selection expression
Network/AS_ServedUser	MWI_N03_012	Clause 4.7.2.5 of [ITU-T Q.3626 v.1] Clause 3.1.4.2 of [RFC 3265]	

Test purpose:
Refresh of subscription in a new dialogue

Verify that at any time before a subscription expires the subscription will be successfully refreshed by sending of a SUBSCRIBE request on a different dialog (different Call-Id and From-Tag) as the existing subscription. The From header tag and the Call-ID in the SUBCRIBE 1 are unequal to the values in the SUBSCRIBE 2.

SIP header: SUBSCRIBE 1
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary
SUBSCRIBE 2
Event: message-summary
Expires: 7200
Accept: application/simple-message-summary

Preconditions: An arrangement exists with the service provider to deliver state changes

Comments:

ISC		**SUT**
SUBSCRIBE 1	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	
	Refreshing of Subscription	
SUBSCRIBE 2	→	
CASE A		
200 OK (SUBSCRIBE)	←	
CASE B		
202 Accepted	←	
NOTIFY	←	
200 OK (NOTIFY)	→	

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Printed in Switzerland
Geneva, 2017