

I n t e r n a t i o n a l   T e l e c o m m u n i c a t i o n   U n i o n

# ITU-T

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

# Q.4042.1

(12/2018)

SERIES Q: SWITCHING AND SIGNALLING, AND  
ASSOCIATED MEASUREMENTS AND TESTS

Testing specifications – Testing specifications for Cloud  
computing

---

## **Cloud interoperability testing for web applications – part 1: Interoperability testing between the CSC and CSP**

Recommendation ITU-T Q.4042.1

ITU-T



**Documents**  
International  
Telecommunication  
Union  
Document Sharing Hub

ITU-T Q-SERIES RECOMMENDATIONS  
**SWITCHING AND SIGNALLING, AND ASSOCIATED MEASUREMENTS AND TESTS**

|                                                                                |                      |
|--------------------------------------------------------------------------------|----------------------|
| SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE                                 | Q.1–Q.3              |
| INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING                             | Q.4–Q.59             |
| FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN                       | Q.60–Q.99            |
| CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS                                   | Q.100–Q.119          |
| SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4, 5, 6, R1 AND R2                    | Q.120–Q.499          |
| DIGITAL EXCHANGES                                                              | Q.500–Q.599          |
| INTERWORKING OF SIGNALLING SYSTEMS                                             | Q.600–Q.699          |
| SPECIFICATIONS OF SIGNALLING SYSTEM No. 7                                      | Q.700–Q.799          |
| Q3 INTERFACE                                                                   | Q.800–Q.849          |
| DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1                                     | Q.850–Q.999          |
| PUBLIC LAND MOBILE NETWORK                                                     | Q.1000–Q.1099        |
| INTERWORKING WITH SATELLITE MOBILE SYSTEMS                                     | Q.1100–Q.1199        |
| INTELLIGENT NETWORK                                                            | Q.1200–Q.1699        |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000                             | Q.1700–Q.1799        |
| SPECIFICATIONS OF SIGNALLING RELATED TO BEARER INDEPENDENT CALL CONTROL (BICC) | Q.1900–Q.1999        |
| BROADBAND ISDN                                                                 | Q.2000–Q.2999        |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR THE NGN                              | Q.3000–Q.3709        |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR SDN                                  | Q.3710–Q.3899        |
| TESTING SPECIFICATIONS                                                         | Q.3900–Q.4099        |
| Testing specifications for next generation networks                            | Q.3900–Q.3999        |
| Testing specifications for SIP-IMS                                             | Q.4000–Q.4039        |
| <b>Testing specifications for Cloud computing</b>                              | <b>Q.4040–Q.4059</b> |
| Testing specifications for IMT-2020 and IoT                                    | Q.4060–Q.4099        |
| SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2020                             | Q.5000–Q.5049        |
| COMBATING COUNTERFEITING AND STOLEN ICT DEVICES                                | Q.5050–Q.5069        |

*For further details, please refer to the list of ITU-T Recommendations.*

# Recommendation ITU-T Q.4042.1

## Cloud interoperability testing for web applications – part 1: Interoperability testing between the CSC and CSP

### Summary

Cloud interoperability for web applications refers to the interaction between the cloud service customer (CSC) and the cloud service provider (CSP) to obtain predictable results, collaboration among different web applications and consistency and interoperability of a management interface across different web applications.

Recommendation ITU-T Q.4042.1, which is part 1, specifies the cloud interoperability test objectives for web applications between the CSC and CSP.

These test objectives are developed on the basis of cloud computing interoperability testing objectives specified in Recommendation ITU-T Q.4040. The test cases for cloud interoperability testing for web applications are also introduced in the appendices.

### History

| Edition | Recommendation | Approval   | Study Group | Unique ID*                                                                |
|---------|----------------|------------|-------------|---------------------------------------------------------------------------|
| 1.0     | ITU-T Q.4042.1 | 2018-12-14 | 11          | <a href="http://handle.itu.int/11.1002/1000/13800">11.1002/1000/13800</a> |

### Keywords

Cloud computing, interoperability testing, web application.

---

\* 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>.

## FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). 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.

## NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

## INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2019

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

## Table of Contents

|   |                                                                                                                   | Page |
|---|-------------------------------------------------------------------------------------------------------------------|------|
| 1 | Scope.....                                                                                                        | 1    |
| 2 | References.....                                                                                                   | 1    |
| 3 | Definitions .....                                                                                                 | 1    |
|   | 3.1 Terms defined elsewhere .....                                                                                 | 1    |
|   | 3.2 Terms defined in this Recommendation.....                                                                     | 2    |
| 4 | Abbreviations and acronyms .....                                                                                  | 2    |
| 5 | Conventions .....                                                                                                 | 2    |
| 6 | Overview of cloud interoperability testing for web applications .....                                             | 3    |
|   | 6.1 Cloud interoperability for web applications .....                                                             | 3    |
|   | 6.2 Relationship with cloud interoperability testing.....                                                         | 3    |
|   | 6.3 Cloud interoperability testing framework for web applications between<br>CSC and CSP.....                     | 4    |
| 7 | Cloud interoperability testing for web applications between the CSC and CSP .....                                 | 6    |
|   | 7.1 QoE testing for web applications between the CSC and CSP.....                                                 | 6    |
|   | 7.2 Performance testing for web applications between the CSC and CSP.....                                         | 6    |
|   | 7.3 Transaction testing for web applications between the CSC and CSP .....                                        | 6    |
|   | 7.4 Cookies testing for web applications between the CSC and CSP .....                                            | 7    |
|   | 7.5 Link testing for web applications between the CSC and CSP.....                                                | 7    |
|   | 7.6 Account management testing for web applications between the CSC and<br>CSP .....                              | 7    |
|   | Appendix I – Test case template .....                                                                             | 8    |
|   | Appendix II – Test cases for cloud interoperability testing for web applications between<br>the CSC and CSP ..... | 9    |
|   | II.1 Test case: Connection establishment time testing .....                                                       | 9    |
|   | II.2 Test case: First package response time testing .....                                                         | 9    |
|   | II.3 Test case: The whole page response time.....                                                                 | 10   |
|   | II.4 Test case: Load testing .....                                                                                | 10   |
|   | II.5 Test case: Stress testing .....                                                                              | 11   |
|   | II.6 Test case: Stability testing .....                                                                           | 12   |
|   | II.7 Test case: Individual transaction tracing testing .....                                                      | 12   |
|   | II.8 Test case: Total transaction statistics testing.....                                                         | 13   |
|   | II.9 Test case: Slow transaction statistics testing.....                                                          | 13   |
|   | II.10 Test case: Error transaction statistics testing.....                                                        | 14   |
|   | II.11 Test case: Cookies testing .....                                                                            | 14   |
|   | II.12 Test case: Link testing .....                                                                               | 15   |
|   | II.13 Test case: Account management testing.....                                                                  | 15   |
|   | Appendix III – Alignment analysis with Recommendation ITU-T Q.4040 .....                                          | 16   |



# Recommendation ITU-T Q.4042.1

## Cloud interoperability testing for web applications – part 1: Interoperability testing between the CSC and CSP

### 1 Scope

The scope of this Recommendation comprises:

- an overview of cloud interoperability testing for web applications,
- cloud interoperability testing for web applications between the CSC and CSP including QoE testing, performance testing, transaction testing, cookies testing, link testing and account management testing.

NOTE – This Recommendation is the first part of cloud computing interoperability testing for web applications, which focuses on validating the web application interoperability function provided by the CSP to the CSC.

### 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.4040] Recommendation ITU-T Q.4040 (2016), *The framework and overview of cloud computing interoperability testing*.
- [ITU-T Y.101] Recommendation ITU-T Y.101 (2000), *Global Information Infrastructure terminology: Terms and definitions*.
- [ITU-T Y.1401] Recommendation ITU-T Y.1401 (2008), *Principles of interworking*.
- [ITU-T Y.3500] Recommendation ITU-T Y.3500 | ISO/IEC 17788 (2014), *Information technology – Cloud computing – Overview and vocabulary*.
- [ITU-T Y.3502] Recommendation ITU-T Y.3502 | ISO/IEC 17789 (2014), *Information technology – Cloud computing – Reference architecture*.
- [ITU-T Y.4108] Recommendation ITU-T Y.4108/Y.2213 (2008), *NGN service requirements and capabilities for network aspects of applications and services using tag-based identification*.

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

**3.1.1 cloud interoperability** [ITU-T Q.4040]: The capability to interact between CSCs and CSPs or between different CPSs, including the ability of CSCs to interact with cloud services and exchange information, the ability for one cloud service to work with other cloud services, and the ability for CSCs to interact with the cloud service management facilities of the CSPs.

**3.1.2 cloud interoperability testing** [ITU-T Q.4040]: Verifying functions and interaction that realize cloud interoperability.

**3.1.3 cloud service customer (CSC)** [ITU-T Y.3500]: Party which is in a business relationship for the purpose of using cloud services.

**3.1.4 cloud service provider (CSP)** [ITU-T Y.3500]: Party which makes cloud services available.

**3.1.5 inter-cloud computing** [ITU-T Y.3511]: The paradigm for enabling the interworking between two or more cloud service providers.

**3.1.6 interoperability** [ITU-T Y.101]: The ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged.

**3.1.7 interworking** [ITU-T Y.1401]: The term "interworking" is used to express interactions between networks, between end systems, or between parts thereof, with the aim of providing a functional entity capable of supporting an end-to-end communication.

## 3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

**3.2.1 HTML link validator:** The testing tool to check the links in the web application and mark erroneously linked files.

**3.2.2 web application:** Software as a service (SaaS) application that uses browser and server mode (B/S).

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

|      |                                   |
|------|-----------------------------------|
| API  | Application Programming Interface |
| B/S  | Browser and Server Mode           |
| CSC  | Cloud Service Customer            |
| CSP  | Cloud Service Provider            |
| HTTP | Hypertext Transfer Protocol       |
| QoE  | Quality of Experience             |
| SaaS | Software as a Service             |
| SLA  | Service Level Agreement           |
| TCP  | Transmission Control Protocol     |
| UDP  | User Datagram Protocol            |
| URL  | Uniform Resource Locator          |

## 5 Conventions

In this Recommendation:

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus this requirement need not be present to claim conformance.