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SERIES X: DATA NETWORKS, OPEN SYSTEM
COMMUNICATIONS AND SECURITY

ITU-T X.290-series – Supplement on interoperability testing framework and methodology

ITU-T X-series Recommendations – Supplement 5



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FOREWORD

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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.

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Introduction

The need for interoperability testing arises when it is required to demonstrate that two or more systems or system components are capable of communicating with each other. Conformance testing (CT) checks whether an implementation is implemented correctly with respect to the requirements stated in the relevant standard or specification. A framework and methodology for conformance testing is specified in the ITU-T X.290-series Recommendations. By itself, it has two important limitations in ensuring interoperation of communicating systems. First, specifications may contain non-interoperable components such as optional features. Second, complete conformance testing may be impractical due to the large number of tests that may be required to cover all the requirements. Therefore, interoperability testing (IOPT) on multiple implementations is needed to complement conformance testing.

This supplement is intended to assist ITU-T Study Groups responsible for developing protocol specifications, conformance test suites and interoperability test suites by defining a testing methodology that includes a framework for test purposes, a test architecture and test methods for use in interoperability testing. It is also intended as a guide to the developers of interoperability test suites, test tool developers and test operators, with the objective of achieving a common framework for testing. Specification writers would understand non-interoperation phenomena and their causes better so that they can be more informed and prepared to write interoperable specifications. System developers would be helped in developing interoperable systems and services. Interoperability test suites developers would know how to write practically complete interoperability test suites (i.e., they would know what needs to be tested and would also know the gap between what should be tested and what can be tested). Test operators would get help in understanding the causes of interoperability problems and in finding out how to fix problems.

This supplement is complementary to, and may be used in conjunction with, testing methodologies and test specification languages defined in related Recommendations such as:

- ITU-T X.290 through ITU-T X.296, and
- ITU-T Z.161 through ITU-T Z.163,

where the X.290-X.296 series addresses conformance and provides the methodology and framework for conformance, and the Z.161-Z.163 series defines a general test scenarios description language for conformance testing and interoperability testing. A particularly related document in terms of its technical contents is Supplement 4 to ITU-T X-series Recommendations: *ITU-T X.290-series: Supplement on generic approach to interoperability testing*, which provides general guidance on the specification and execution of interoperability tests for communication systems in next generation networks (NGN). It is meant to be applied to communication equipment interoperability testing and in many places gives specific guidance on how test suites can be written and interoperability testing can be carried out. On the other hand, this Supplement 5 to the ITU-T X.290-series of Recommendations targets at more foundational principles and issues that underlie specific interoperability testing approaches and on the basis of which interoperability testing approaches can be carried out and assessed. In addition, Recommendations concerning ITU-T formal languages such as ASN.1, MSC, SDL and UML can be used in relation with this supplement, for test data description, system behaviours and test scenarios descriptions, communication system modelling, and software modelling, respectively.

Supplement 5 to ITU-T X-series Recommendations

ITU-T X.290-series – Supplement on interoperability testing framework and methodology

1 Scope

This supplement provides a generic framework and methodology for interoperability testing of interconnected communication systems. The framework is complementary to, and may be used in conjunction with, testing methodologies and test specification languages defined in related Recommendations. This supplement is also intended to assist study groups responsible for developing protocol specifications and conformance test suites.

This methodology is applicable to interoperability testing of protocols and also to interoperability testing of all areas of software. It is also intended as a guide to the developers of interoperability test suites, test tool developers and test operators, with the objective of achieving a common framework for testing.

2 References

- [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.291] Recommendation ITU-T X.291 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Abstract test suite specification*.
- [ITU-T X.292] Recommendation ITU-T X.292 (2002), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – The Tree and Tabular Combined Notation (TTCN)*.
- [ITU-T X.293] Recommendation ITU-T X.293 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Test realization*.
- [ITU-T X.294] Recommendation ITU-T X.294 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Requirements on test laboratories and clients for the conformance assessment process*.
- [ITU-T X.295] Recommendation ITU-T X.295 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Protocol profile test specification*.
- [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*.

3 Definitions

This supplement defines the following terms:

3.1 application programming interface (API): Allows a software application to make use of another piece of software through well-defined software functions and procedures with fully specified parameters.