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SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS

OSI management – Management functions and ODMA
functions

Requirements and guidelines for Implementation Conformance Statements proformas associated with CORBA-based systems

ITU-T Recommendation X.781

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ITU-T Recommendation X.781

Requirements and guidelines for Implementation Conformance Statements proformas associated with CORBA-based systems

Summary

This Recommendation specifies the Implementation Conformance Statements (ICS) proforma of CORBA-based system interfaces which will be used in telecommunication network management, and also provides the testing methodology for CORBA-based interfaces.

Source

ITU-T Recommendation X.781 was prepared by ITU-T Study Group 4 (2001-2004) and approved under the WTSA Resolution 1 procedure on 13 August 2001.

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.

NOTE

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

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ITU-T Recommendation X.781

Requirements and guidelines for Implementation Conformance Statements proformas associated with CORBA-based systems

1 Scope

This Recommendation provides the requirements and guidelines for CORBA Interface Implementation Conformance Statement (CIICS) proforma and the specification of this proforma. The CIICS is a statement made by an implementer to claim conformance to a CORBA/IDL based interface definition.

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.

- ITU-T X.296 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements*.
- ITU-T X.724 (1996), *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management*.
- ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements*.
- OMG (1998), *The Common Object Request Broker: Architecture and Specification, Revision 2.3*.

3 Definitions

3.1 Implementation conformance statements definitions

This Recommendation makes use of the following terms defined in ITU-T X.296 and ISO/IEC 9646-7:

- a) (ICS) item;
- b) (ICS) question;
- c) status (value);
- d) (support) answer.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations:

CIICS	CORBA-based Interface Implementation Conformance Statement
CORBA	Common Object Request Broker Architecture
ICS	Implementation Conformance Statement
IDL	Interface Definition Language
IUT	Implementation Under Test
IXIT	Implementation Extra Information for Testing
ODP	Open Distributed Processing

5 Basis of conformance test methodology for CORBA-based management system interface

5.1 Overview

Conformance relates an implementation to a standard. It states in which way systems, implemented with respect to a standard, can vary without errors occurring in their cooperation. If an implementation fulfils these requirements, then it is conform to the standard. The check of the statements is the conformance test. The starting point is the definition of conformance requirements in implementation independent interface specifications on the bases of an identification of reference points. A management interface specification should define conformance reference points at which an object must be tested to check if it fulfils a set of conformance criteria. During the test, a number of stimuli and events are observed and evaluated at these conformance points.

Management interface specifications should include conformance statements which identify conformance reference points at every interface of the specified objects.

Because in general the information flow between two system components is realized through several reference points, the conformance test has to take into consideration:

- a) the test of such information flow at each reference point; and
- b) the test of consistency between the combinations.

So, a coordinated test at all identified reference points is necessary.

5.2 Methodology of conformance test for CORBA-base interfaces

There are static and dynamic conformance test requirements.

- a) Static conformance test requirements state the functionality which is at least necessary for conformance testing. Basis of the static conformance test is a so-called ICS proforma in which functional limitations and possibilities of the standard are defined. It is a document in form of a questionnaire which has to be answered by the implementer.
- b) Dynamic conformance test requirements specify the whole potential behaviours of an implementation visible at the identified reference points. The dynamic conformance test contains the realization of test cases in a test system.

Test cases include concrete test cases and abstract test cases. The concrete test cases are derived from abstract test cases which have to be given/defined by the standard. A basic precondition for the derivation of the test cases is the definition of test purposes by the standard.

Before starting the test in a test laboratory, the following steps must be processed:

- a) The implementer has to fill out the given ICS proforma. Information which makes the ICS proforma statements more precise or concerns the test realization is taken up in IXIT (implementation extra information for testing).
- b) The so-called real (concrete) test cases should be derived from the abstract test cases of the standard, or they can be derived from the test purposes directly, where generic things (types, etc.) are realized depending on the individual implementation.

Figure 5-1 illustrates this approach.

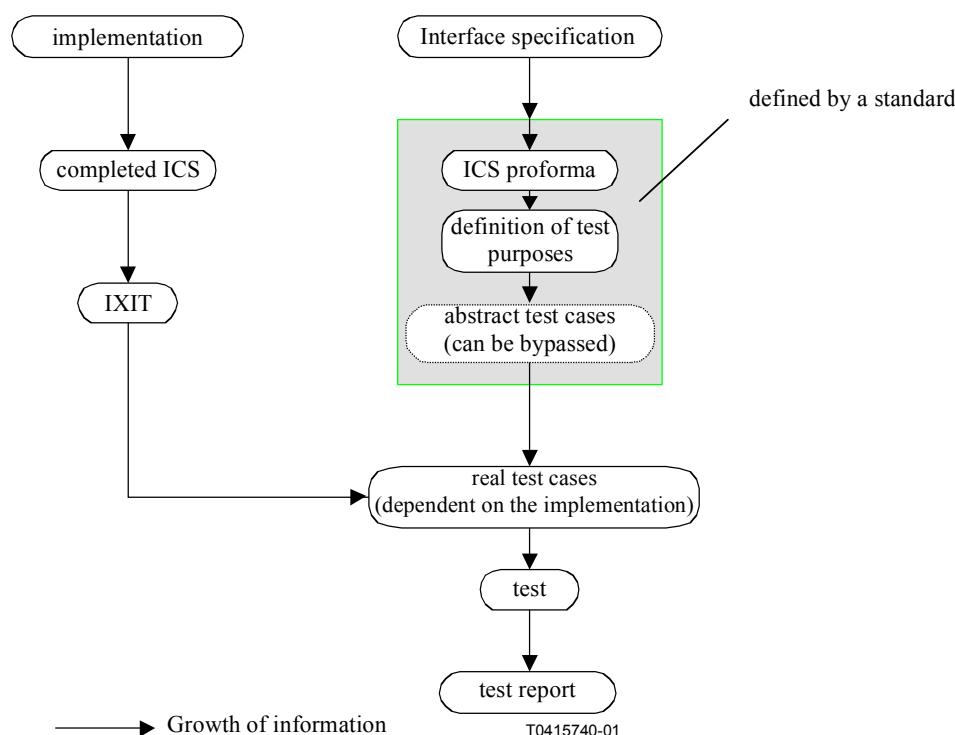


Figure 5-1/X.781 – Testing process of CORBA-based interfaces

6 CORBA-based management interface ICS proforma

The CORBA Interface Definition Language (IDL) is used to define interfaces of objects in CORBA-based systems. The CIICS proforma must express the following IDL features such as IDL modules, interfaces and other IDL types. This clause introduces the features of CORBA IDL firstly, then specifies the CIICS proforma according to these language features.

6.1 IDL overview

The OMG Interface Definition Language (IDL) is the language used to describe the interfaces that client objects call and object implementations provide. An interface definition written in OMG IDL completely defines the interface and fully specifies each operation's parameters. An IUT may include an interface's client function or an interface's server function. So in the interface proforma there should be a space available to specify which side of function (client or server) the IUT implements.

The OMG IDL grammar is very similar to the proposed ANSI C++ standard. It has constructions such as module, interface, constant, type, operation, attribute, exception, valuetype, state member and context declarations. According to the IDL syntax specification, the containment relationship between these constructions can be illustrated as in Figure 6-1.