The ATM Forum

Technical Committee

Abstract Test Suite for UNI 3.1 ATM Signalling for the Network Side

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Conformance Abstract Test Suite for the UNI 3.1 Signalling for the Network Side

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1. Introduction

This Abstract Test Suite (ATS) is the first version of the ATM Forum UNI 3.1 Signalling Conformance Test Suite for the Network Side. The ATS is based on the UNI Signalling Protocol as described in the ATM Forum User - Network Interface (UNI) Specification, Version 3.1 [1]. The ATS is described in Tree and Tabular Combined Notation (TTCN) [2]. This test suite aligns with the principles defined in the Conformance Testing Methodology and Framework [3].

1.1 Scope and Field of Application

The test suite was designed for point-to-point configurations only, and does not include point-to-multipoint configurations. This ATS for the Network Side conforms only to sections 5.5 to 5.5.5.2 (Call/Connection Control Procedures for ATM Point-to-Point Calls). This test suite does not cover section 5.8 (Address Registration) or (Signalling ATM Adaptation Layer (SAAL)).

Tests for the user side of the UNI Signalling specification and for the Signalling ATM Adaptation Layer (SAAL) are contained in a separate documents.

This conformance test suite is based on the UNI Signalling Protocol as described in the ATM Forum User - Network Interface (UNI) Specification, Version 3.1 [1] . The Implementation Under Test (IUT) is the network side implementation of this protocol. The abstract test cases contained in this document are a comprehensive reflection of the indicated Technical Reference.

The test methodology is a “remote test method” as described in Reference [4]. It is possible that the entire test suite is not applicable for all IUTs. A test selection procedure must be performed to determine the applicability of a test to a particular IUT. Such selection shall be based on the Protocol Implementation Conformance Statement (PICS) and the Protocol Implementation eXtra Information for Testing (PIXIT).

This abstract test suite uses two Adaptation Layer (SSCF/SSCOP) links, one of which acts as the main tester’s line over which test events are sent and received, the other acts as a remote line. The purpose of this test suite is to test that the IUT does not violate any of the protocol procedures of UNI Signalling Protocol as described in the ATM Forum User -Network Interface (UNI) Specification, Version 3.1 [1]. The preferred use of this test suite is under conditions where the only messages that are sent across the interface are those in response to events in the test cases themselves. In order to allow for conditions where the IUT might send additional messages (e.g., STATUS), the test suite has been designed in such a way that the verdicts will not be affected by receipt of these messages.

2. Definitions

This test suite uses valid, invalid and inopportune messages to test the IUT behaviour. These terms are defined as follows:

- A valid message is one that is allowed by A TM Forum UNI 3.1 Specification and is both syntactically correct and occurs or arrives in an expected or allowed context.

- An invalid message is one that is syntactically not allowed by the UNI 3.1 Specification.

- An inopportune message is one that, although syntactically correct, occurs or arrives at an unexpected and disallowed time (according to the UNI 3.1 Specification).

3. General Aspects

As per ISO/IEC 9646, "...a complete and independent specification of the actions required to achieve a specific test purpose..." is called an abstract test case. The abstract test cases for this suite are defined using the remote testing methodology. The test cases include a preamble, a test body and a postamble, which are defined in the following sections.

The following states are tested by this suite:

- Null State (N0)
- Call Initiated State (N1)
- Outgoing Call Proceeding State (N3)
- Call Present State (N6)
- Incoming Call Proceeding State (N9)
- Active State (N10)
- Released Indication State (N12)

There are two states that are not tested as they are transient states. The states that are not tested are:

- Connect Request State (N8)
- Released Request State (N11)

3.1 Test Groups and Subgroups

The Signalling Conformance Test Suite consists of four groups:

- General
- Error
- Timers
- Status

The General group has been further subdivided into three groups containing only valid tests:

- Outgoing
- Incoming
- Clearing

The Error group has been further subdivided into seven groups containing invalid and inopportune tests:

- General (5 sub-groups)
    - Protocol Discriminator Error
    - Message Too Short
    - Message Length Error
    - IE Duplicated more than the Specification
    - Message Type Octet 2 Flag=1

- Call Reference (5 sub-groups)
    - Non Zero bits 5-8 Octet 1

- Length not equal to 3
- Value not in use
- Flag incorrectly set to 1
- Global Call Reference

• Message Sequence

• Mandatory (2 sub-groups)
  - Mandatory IE missing
  - Mandatory IE invalid content

• Non-Mandatory (3 sub-groups)
  - Unrecognized IE.
  - IE.content error
  - Unexpected recognized IE.

• AAL Reset

• AAL Failure

3.2 Preamble

The preamble of a test case consists of the steps required to bring the IUT to the appropriate initial state.

3.3 Test Body

The test body is the sequence of steps within a test case that is essential to achieve the test purpose, followed by the verification of the IUTs ending state. Verdicts are assigned to the outcome of the test cases.

It is important to test the observable behaviour of the IUT, which includes state transitions and Protocol Data Unit (PDU) responses. Many of the IUT states are transitional and may not be implemented.

3.4 Postamble

For this suite, the idle state is the NULL State (N0). At the end of execution of a test body, the IUT may not be in the NULL state. A postamble is required to bring the IUT from the ending state to the NULL state. For all states, a RELEASE COMPLETE message is sent which will release the call in progress, if any, and returns the IUT to the NULL state.

3.5 Timer Definitions

The timer types and values used by the tester are those types and default values defined in the UNI 3.1 Specification. In addition, the following timers are also used:

1.Ts: This timer is ‘sufficiently long for the IUT to respond’. It is used when a response is required to achieve the test purpose.

2.Tw: This timer is defined as ‘shorter than the shortest IUT timer’. It is used when the test purpose is ‘no response'.

These timers are not used to verify the exact timing of an implementation, but are used to limit the time in which the test should wait for a message or to limit the total duration of the test. Default values are provided.

3.6 Configurations Requirements

The test configuration used for Network Side is given in Figure 3-1 below. The ATM tester has two Points of Control and Observation (PCOs) corresponding to two ports on the Implementation Under Test (IUT). PCO_T will provide the IUT with test stimuli to provoke an action from the IUT. This will result in an output signal which will be monitored by either PCO_T or PCO_R. This test configuration is consistent with the remote test method chosen for testing Intermediate Systems (Network Side).

The test cases were developed with the assumption that the IUT has the point-to-point capability. Only the point-to-point configurations are tested (one incoming port and only one outgoing port), this does not include testing where there is one incoming port and several outgoing ports.

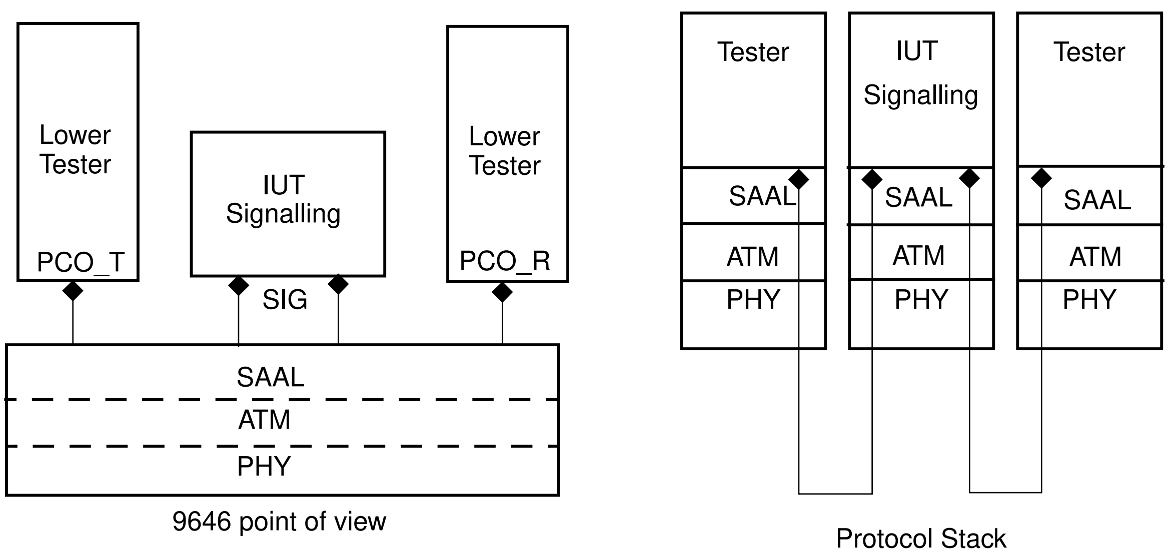

Figure 3-1 Configuration for testing of an Network Side.

This version of the ATS assumes that the input and output signals can be treated independently. This is possible based on the TTCN model in which (1) messages in the FIFO input queue for each PCO are retrieved only when a READ event for that PCO is executed, and (2) the FIFO queues for each PCO are independent from each other. This way, it is possible to send a sequence of messages to the IUT and handle the responses later.

4. Abstract T est Suite

The following section contains the Abstract Test Suite.