ETSI TS 102 516 V3.1.1 (2008-02)

Technical Specification

Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Core Protocol; Conformance Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma

Reference

RTS/MTS-IPT-006[3]-IPv6-CorATS

Keywords

IP, IPv6, testing, TTCN

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://webapp.etsi.org/IPR/home.asp).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Methods for Testing and Specification (MTS).

1 Scope

The present document specifies the Abstract Test Suite (ATS) for the core functions of the Internet Protocol, Version 6, as defined in the specifications [11] through to [21]. The ATS is based on the requirements defined in the IPv6 requirements catalogue (TS 102 514 [2]) and theIPv6 test purposes (TS 102 515 [3]) and written according to the guidelines of TS 102 514 [2], ISO/IEC 9646-2 [5] and ETS 300 406 [9].

The objective of the present document is to provide a basis for conformance tests for IPv6 equipment giving a high probability of inter-operability between different manufacturer's IPv6 equipments.

Annex A provides the Tree and Tabular Combined Notation (TTCN-3) part of the ATS.

Annex B provides the Partial Protocol Implementation Extra Information for Testing (PIXIT) Proforma of the ATS.

Annex C provides the Protocol Conformance Test Report (PCTR) Proforma of the ATS.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] ETSI TS 102 351: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".

[2] ETSI TS 102 514: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Core Protocol; Requirements Catalogue".

[3] ETSI TS 102 515: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Core Protocol; Conformance Test Suite Structure and Test Purposes (TSS&TP)".

[4] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[5] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[6] ISO/IEC 9646-4: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".

[7] ISO/IEC 9646-5: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[8] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[9] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[10] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[11] IETF RFC 1981: "Path MTU Discovery for IP version 6".

[12] IETF RFC 2374: "An IPv6 Aggregatable Global Unicast Address Format".

[13] IETF RFC 2460: "Internet Protocol, Version 6 (IPv6) Specification".

[14] IETF RFC 2461: "Neighbor Discovery for IP Version 6 (IPv6)".

[15] IETF RFC 2462: "IPv6 Stateless Address Autoconfiguration".

[16] IETF RFC 2463: "Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification".

[17] IETF RFC 2675: "IPv6 Jumbograms".

[18] IETF RFC 2711: "IPv6 Router Alert Option".

[19] IETF RFC 2894: "Router Renumbering for IPv6".

[20] IETF RFC 3484: "Default Address Selection for Internet Protocol version 6 (IPv6)".

[21] IETF RFC 3513: "Internet Protocol Version 6 (IPv6) Addressing Architecture".

[22] ETSI TS 102 594: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Security; Conformance Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma".

[23] ETSI TS 102 596: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Mobility; Conformance Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions given in ISO/IEC 9646-1 [4] apply.

abstract test case

Abstract Test Method (ATM)

Abstract Test Suite (ATS)

Implementation Under Test (IUT)

Lower Tester (LT)

Test Purpose (TP)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ATM	Abstract Test Method
ATS	Abstract Test Suite
ETS	Executable Test Suite
IETF	Internet Engineering Task Force
IPv6	Internet Protocol version 6
IUT	Implementation Under Test
MAC	Medium Access Control
MOT	Means Of Testing
MTC	Main Test Component
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PTC	Parallel Test Component
SUT	System Under Test
TC	Test Case
TP	Test Purpose
TRI	TTCN-3 Runtime Interface
TSI	Test System Interface
TSS	Test Suite Structure
UT	Upper Tester

4 Abstract Test Method (ATM)

4.1 IPv6 Test Configuration

Figure 1 shows the IPv6 Test Configuration. More information for the IPv6 Test Configuration is provided below.

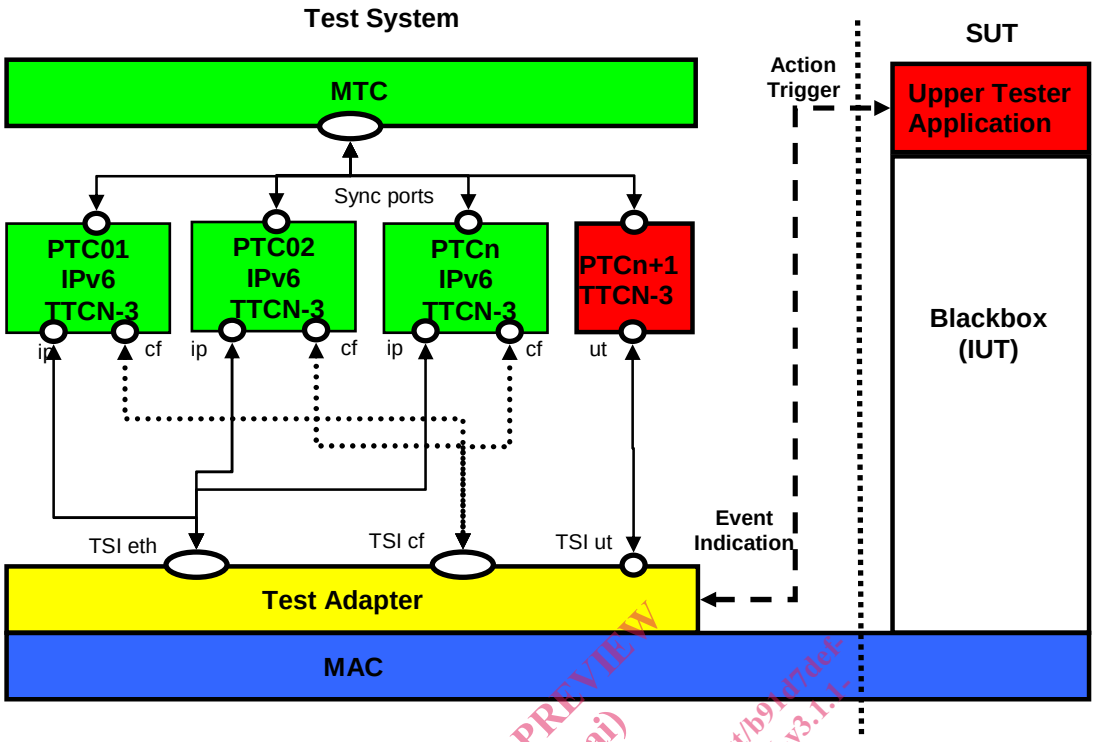

Figure 1: IPv6 Test Configuration

- MTC, PTC01, PTC02 to PTCn run MAC-independent TTCN-3 code.
- Each PTC has 1 cf port and 1 ip port.
- Any IPv6 message (unicast, multicast, all-nodes etc.) is sent via the ip port.
- Configuration messages are sent via the cf port in order to configure the test adapter.
- 1 and the same TSI cf port is mapped to all cf ports.
- 1 and the same TSI eth port is mapped to all ip ports.
- TTCN-3 uses ut port to control the Upper Tester Application.
- The Upper Tester Application allows to configure the IUT, trigger IUT actions and observe IUT events.
- MTC, PTC01, PTC02 to PTCn and its Test Adapter with MAC form the Lower Tester.
- MTC, PTCn + 1 and its Test Adapter with Upper Tester Application form the Upper Tester.
- Upper Tester implementation is not relevant for the prototype.

Test Adapter requirements:

- Test Adapter shall receive the AtsIpv6_TestConfiguration_TypesAndValues.CfMessage from every participating PTC.
- Test Adapter shall set a MAC filter in order to capture IPv6 messages only.
- When receiving an IPv6 message from TRI, the Test Adapter shall:
  - assemble a MAC message containing the IPv6 message and the appropriate Mac Addresses; and
  - send the MAC message to the appropriate network device (MAC interface).

- When receiving a MAC message a network device, the Test Adapter shall:
  - extract the IPv6 message; and
  - enqueue the IPv6 message to the appropriate PTC.

4.2 Test configurations for Core IPv6

This clause describes the ATM used to test the IPv6 core functions as defined in the RFC specifications [11] through to [21]. The three following configurations have been developed to test the two different types of IUT, hosts and routers. Either a simple one-to-one connection between tester and IUT is established which serves as Point of Control and Observation (PCO) or the IUT is connected to two Parallel Test Components (PTCs) that act as router or host respectively.

4.2.1 CF_CORE_01

Figure 2 shows the configuration CF 01. This is the basic configuration for router or host tests. PTC01 simulates HS01 and RT01. This configuration is partly reused in configuration CF_CORE_03 (see figure 4).

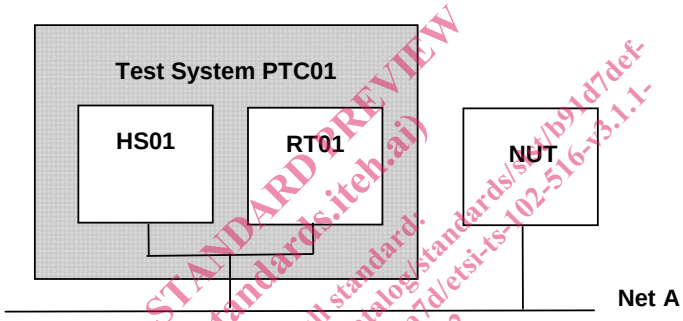

Figure 2: CF_CORE_01

4.2.2 CF_CORE_02

Figure 3 shows CF_CORE_02. The IUT is a router. PTC01 simulates HS01. PTC02 simulate PTC02. CF02_HS01 shall be used in the case where only 1 interface of the IUT is tested.

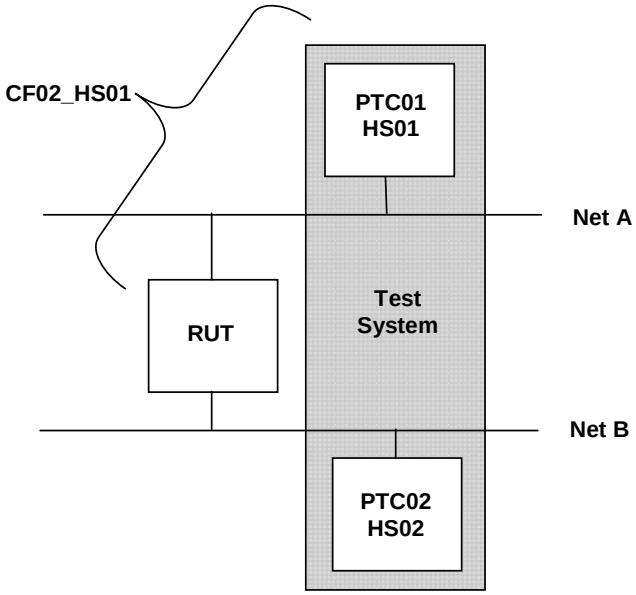

Figure 3: CF_CORE_02

4.2.3 CF_CORE_03

Figure 4 shows CF_CORE_03. The IUT is a host. PTC01 simulates RT01 and HS02. PTC02 simulates RT02 and HS03.

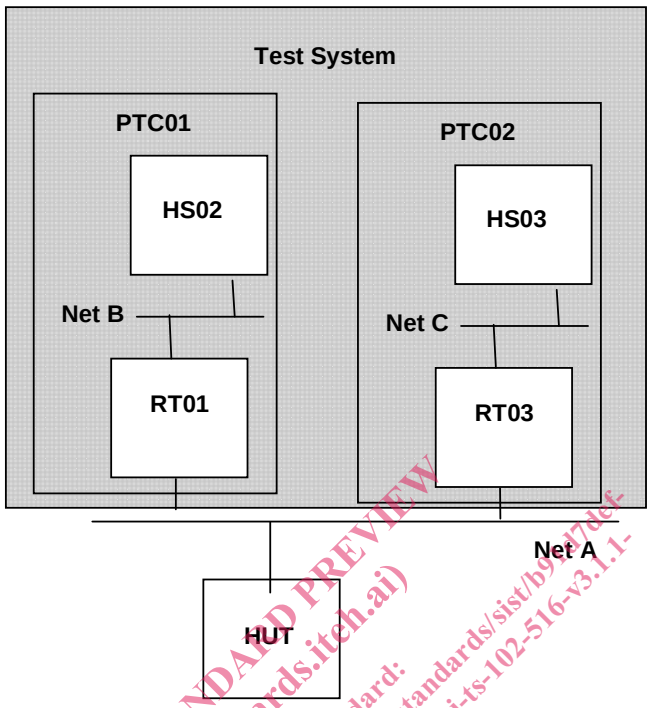

Figure 4: CF_CORE_03

5 Untestable and not implemented Test Purposes (TP)

The ATS is comprised of 271 TC. Those were derived from a total of 396 TP.

5.1 Untestable TP

This clause gives a list of 80 TP, which are not implemented in the ATS due to the chosen ATM or other restrictions:

TP_COR_1092_01, TP_COR_1089_01, TP_COR_1034_01, TP_COR_1008_01, TP_COR_1814_01,
TP_COR_1086_01, TP_COR_1122_01, TP_COR_9012_01, TP_COR_1272_01, TP_COR_9016_01,
TP_COR_9017_01, TP_COR_9018_01, TP_COR_9019_01, TP_COR_8009_01, TP_COR_1225_01,
TP_COR_1276_01, TP_COR_1282_01, TP_COR_1282_02, TP_COR_1256_01, TP_COR_1263_01,
TP_COR_1250_01, TP_COR_1292_01, TP_COR_1471_01, TP_COR_1472_01, TP_COR_1416_01,
TP_COR_1416_02, TP_COR_1416_03, TP_COR_1416_04, TP_COR_1458_01, TP_COR_1448_01,
TP_COR_1444_01, TP_COR_1442_01, TP_COR_8579_01, TP_COR_8492_01, TP_COR_8493_01,
TP_COR_8232_01, TP_COR_8583_01, TP_COR_8387_01, TP_COR_8402_01, TP_COR_8586_01,
TP_COR_8210_01, TP_COR_8246_01, TP_COR_8160_01, TP_COR_8169_01, TP_COR_8168_01,
TP_COR_8805_01, TP_COR_8338_02, TP_COR_8338_03, TP_COR_8338_05, TP_COR_8338_06,
TP_COR_8108_01, TP_COR_1294_01, TP_COR_1245_01, TP_COR_1248_01, TP_COR_1299_01,
TP_COR_9027_01, TP_COR_1304_01, TP_COR_1306_01, TP_COR_1315_01, TP_COR_8578_01,
TP_COR_8560_01, TP_COR_8530_01, TP_COR_8125_01, TP_COR_8126_01, TP_COR_8128_01,
TP_COR_8243_01, TP_COR_8133_01, TP_COR_8379_01, TP_COR_8384_01, TP_COR_8382_01,
TP_COR_1435_01, TP_COR_8577_01, TP_COR_8435_01, TP_COR_8512_01, TP_COR_8516_01,
TP_COR_8235_01, TP_COR_8574_01, TP_COR_8326_01, TP_COR_8297_01, TP_COR_8188_01