



**Integrated broadband cable
telecommunication networks (CABLE);
Testing; Conformance test specifications
for NAT64 technology;
Part 1: Protocol Implementation
Conformance Statement (PICS) proforma**

Reference

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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

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Integrated broadband cable telecommunication networks (CABLE).

The present document produced for the transition technologies accommodates an urgent need in the industry to define requirements that enable seamless transition of Cable Networks to IPv6. Considering the depletion of IPv4 addresses, transition to IPv6 is required in order to enable continued growth of the customer base connected to Cable Networks and ensure service continuity for existing and new customers. High-quality connectivity to all kinds of IP-based services and networks is essential in today's business and private life.

A plethora of transition technologies have been proposed in IETF, other standardization organizations and by manufacturers of IP technology to allow coexistence of IPv4 and IPv6 hosts, access and core networks as well as services. Each of these technology options is specified, implemented and deployed in various forms and stages. The present document is based on the requirements of ETSI TS 101 569-1 [1].

The present document is part 1 of a multi-part deliverable covering the conformance test specification for NAT64 technology:

- Part 1: "**Protocol Implementation Conformance Statement (PICS) proforma**";
- Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";
- Part 3: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) proforma for conformance test specifications for the IPv6 transition technology NAT64 as defined in ETSI TS 101 569-1 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [3].

A supplier of an implementation which is claimed to conform to ETSI TS 101 569-1 [1] is required to complete a copy of the PICS proforma provided in the annex A of present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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

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

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 101 569-1 (V1.1.1) (2013-10): "Integrated Broadband Cable Telecommunication Networks (CABLE); Cable Network Transition to IPv6 Part 1: IPv6 Transition Requirements".
- [2] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [3] ISO/IEC 9646-7 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TS 101 569-1 [1], ISO/IEC 9646-1 [2] and ISO/IEC 9646-7 [3] apply. In particular, the following terms given in ISO/IEC 9646-1 [2] apply:

Implementation Conformance Statement (ICS): statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented. The ICS can take several forms: protocol ICS, profile ICS, profile specific ICS, information object ICS, etc.

ICS proforma: document, in the form of a questionnaire, which when completed for an implementation or system becomes an ICS

Protocol ICS (PICS): ICS for an implementation or system claimed to conform to a given protocol specification

3.2 Abbreviations

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

ALG	Application Layer Gateway
ATS	Abstract Test Suite
FTP	File Transfer Protocol
GRT	Global Routing Table
GW	Gateway
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPv4	IP version 4
IPv6	IP version 6
IUT	Implementation Under Test
LSN	Large Scale NAT
MSS	(TCP) Maximum Segment Size
MTU	Maximum Transmission Unit
NAT	Network Address Translation / Network Address Translator
PDU	Protocol Data Unit
SUT	System Under Test
VRF	Virtual Routing and Forwarding

4 Conformance requirement concerning PICS

If it claims to conform to the present document, the actual PICS proforma to be filled in by a supplier shall be technically equivalent to the text of the PICS proforma given in annex A, and shall preserve the numbering/naming and ordering of the proforma items.

An ICS which conforms to the present document shall be a conforming PICS proforma completed in accordance with the instructions for completion given in clause A.1.

Annex A (normative): NAT64 PICS Proforma

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the NAT64 PICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed NAT64 PICS.

A.1 Guidance for completing the PICS proforma

A.1.1 Purposes and structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in ETSI TS 101 569-1 [1] may provide information about the implementation in a standardized manner.

The PICS proforma is subdivided into clauses for the following categories of information:

- guidance for completing the PICS proforma;
- identification of the implementation;
- identification of the ETSI TS 101 569-1 [1];
- global statement of conformance;
- PICS proforma tables.

A.1.2 Abbreviations and conventions

The PICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [3].

Item column

The item column contains a number which identifies the item in the table.

Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Status column

The following notations, defined in ISO/IEC 9646-7 [3], are used for the status column:

- | | |
|-----|--|
| m | mandatory - the capability is required to be supported. |
| o | optional - the capability may be supported or not. |
| n/a | not applicable - in the given context, it is impossible to use the capability. |
| x | prohibited (excluded) - there is a requirement not to use this capability in the given context. |
| o.i | qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table. |

ci	conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying a unique conditional status expression which is defined immediately following the table.
i	irrelevant (out-of-scope) - capability outside the scope of the reference specification. No answer is requested from the supplier.

NOTE 1: This use of "i" status is not to be confused with the suffix "i" to the "o" and "c" statuses above.

Reference column

The reference column makes reference to ETSI TS 101 569-1 [1] except where explicitly stated otherwise.

Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [3], are used for the support column:

Y or y	supported by the implementation.
N or n	not supported by the implementation.
N/A, n/a or -	no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

NOTE 2: As stated in ISO/IEC 9646-7 [3], support for a received PDU requires the ability to parse all valid parameters of that PDU. Supporting a PDU while having no ability to parse a valid parameter is non-conformant. Support for a parameter on a PDU means that the semantics of that parameter are supported.

Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values: example:	<min value> .. <max value> 5 .. 20
- list of values: example: example: example:	<value1>, <value2>, ..., <valueN> 2, 4, 6, 8, 9 '1101'B, '1011'B, '1111'B '0A'H, '34'H, '2F'H
- list of named values: example:	<name1>(<val1>), <name2>(<val2>), ..., <nameN>(<valN>) reject(1), accept(2)
- length: example:	size (<min size> .. <max size>) size (1 .. 8)

Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

References to items

For each possible item answer (answer in the support column) within the PICS proforma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE: 5/1 is the reference to the answer of item 1 in table A.5 of annex A.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.1.3 Instructions for completing the PICS proforma

The supplier of the implementation shall complete the PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided, using the notation described in clause A.1.2.

If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately. More detailed instructions are given at the beginning of the different clauses of the PICS proforma

A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the PICS should be named as the contact person.

A.2.1 Date of the statement

.....

A.2.2 Implementation Under Test (IUT) identification

IUT name:

.....

.....

IUT version:

.....

A.2.3 System Under Test (SUT) identification

SUT name:

.....

.....

Hardware configuration:

.....

.....

.....

Operating system:

.....

A.2.4 Product supplier

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.2.5 Client (if different from product supplier)

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

A.2.6 PICS contact person

(A person to contact if there are any queries concerning the content of the PICS) Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

A.3 Identification of the protocol

This PICS proforma applies to the following standard:

ETSI TS 101 569-1 [1]: "Integrated Broadband Cable Telecommunication Networks (CABLE); Cable Network Transition to IPv6 Part 1: IPv6 Transition Requirements " concerning NAT64 IPv6 transition technology.

A.4 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the standard specification ETSI TS 101 569-1 [1]. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming, on pages attached to the PICS proforma.

A.5 Tables

A.5.1 Transition Hardware

The different roles the conformance tests use.

Table A.1: Hardware

Prerequisite:				
Item	Name of field	Reference	Status	Support
1	LSN role	[TS:6.4.9] Technical Viability	m	
2	B4 role	[TS:6.4.9] Technical Viability	m	

A.5.2 Fragmentation & MTU procedures

The supplier of the implementation shall state the support of the implementation for each of the following fragmentation procedure items, in table A.2.

Table A.2: Fragmentation

Prerequisite:				
Item	Name of field	Reference	Status	Support
1	IPv4 packet downstream	[TS:6.4.6.20] LSN Fragmentation and Buffering	m	
2	MSS	[TS:6.4.9] Technical Viability	m	

A.5.3 Forwarding procedures

The supplier of the implementation shall state the support of the implementation for each of the following forwarding procedure items, in table A.3.

Table A.3: Forwarding procedures

Prerequisite: 2/3				
Item	Name of field	Reference	Status	Support
1	From GRT TO VRF	[TS:6.4.1] LSN Feature Summary	m	
2	From VRF TO GRT	[TS:6.4.1] LSN Feature Summary	m	
3	1:1 NAT mapping	[TS:6.5.7.9] 1:1 IP Mapping	m	
4	1:n NAT mapping and port	[TS:6.4.4.4] Feature: Shared/Split	m	

A.5.4 Withdrawal procedures

The supplier of the implementation shall state the support of the implementation for each of the following withdrawal procedure items, in table A.4.

Table A.4: Withdrawal procedures

Prerequisite:				
Item	Name of field	Reference	Status	Support
1	LSN GW address withdrawal on route failure	[TS:6.4.6.16] NAT64 Address Withdrawal	m	
2	LSN GW address withdrawal on cache failure	[TS:6.4.6.16] NAT64 Address Withdrawal	m	
3	LSN GW address withdrawal on hardware failure	[TS:6.4.6.16] NAT64 Address Withdrawal	m	

A.5.5 Transition procedures

The supplier of the implementation shall state the support of the implementation for each of the following transition procedure items, in table A.5.

Table A.5: Transition procedures

Prerequisite:				
Item	Name of field	Reference	Status	Support
1	NAT64 Timers	[TS:6.4.6.4] NAT64 LSN timers	m	
2	FTP ALG	[TS:6.4.1] LSN Feature Summary	m	
3	Multiple NAT Pools	[TS:6.4.6.10] Feature: NAT Grouping	m	
4	Static Port Reservation	[TS:6.4.6.22] Feature: Port Reservation	m	
5	ICMP translation	[TS:6.4.1] LSN Feature Summary	m	
6	Anycast Addressing	[6.4.6.14] Feature: Anycast Gateway	m	

Annex B (informative): Bibliography

IETF RFC 4008: "Definitions of Managed Objects for Network Address Translators (NAT)", March 2005.

NOTE: Available at <http://tools.ietf.org/rfc/rfc4008.txt>.

IETF RFC 4087: "IP Tunnel MIB", June 2005.

NOTE: Available at <http://tools.ietf.org/rfc/rfc4087.txt>.

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History

Document history		
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