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TECHNICAL SPECIFICATION

Core Network and Interoperability Testing (INT);
Diameter Conformance testing for S9 interface;
(3GPP Release 10);
Part 1: Protocol Implementation
Conformance Statement (PICS)

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Core Network and Interoperability Testing (INT).

The present document is part 1 of a multi-part deliverable covering the test specifications for the Diameter protocol on the S9 interface, as identified below:

Part 1: **"Protocol Implementation Conformance Statement (PICS)";**

Part 2: "Test Suite Structure (TSS) and Test Purposes (TP)";

Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

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).

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Introduction

To evaluate protocol conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. Such a statement is called a Protocol Implementation Conformance Statement (PICS).

1   Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) proforma for the test specifications for the Diameter protocol on the S9 interface as specified in TS 129 215 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [3] and ETS 300 406 [4].

The supplier of a protocol implementation which is claimed to conform to TS 129 215 [1] is required to complete a copy of the PICS proforma provided in annex A of the present document and is required to provide the information necessary to identify both the supplier and the implementation.

2   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.

2.1   Normative references

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

> [1]   ETSI TS 129 215 (V10.6.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Policy and Charging Control (PCC) over S9 reference point; Stage 3 (3GPP TS 29.215 version 10.6.0 Release 10)".

> [2]   ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

> [3]   ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

> [4]   ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

2.2   Informative references

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.

> [i.1]   ETSI TR 121 905 (V10.3.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 version 10.3.0 Release 10)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 129 215 [1] and the following apply:

PICS proforma: document, in the form of a questionnaire, designed by the protocol specifier or conformance test suite specifier, which, when completed for an OSI implementation or system, becomes the PICS

NOTE: See ISO/IEC 9646-1 [2].

Protocol Implementation Conformance Statement (PICS): statement made by the supplier of an Open Systems Interconnection (OSI) implementation or system, stating which capabilities have been implemented for a given OSI protocol

NOTE: See ISO/IEC 9646-1 [2].

static conformance review: review of the extent to which the static conformance requirements are met by the IUT, accomplished by comparing the PICS with the static conformance requirements expressed in the relevant standard(s)

NOTE: See ISO/IEC 9646-1 [2].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 129 215 [1] and TR 121 905 [i.1] apply.

4 Conformance

A PICS proforma which conforms to this PICS proforma specification shall be technically equivalent to annex A, and shall preserve the numbering and ordering of the items in annex A.

A PICS which conforms to this PICS proforma specification shall:

a) describe an implementation which claims to conform to TS 129 215 [1];

b) be a conforming ICS proforma which has been completed in accordance with the instructions for completion given in clause A.1;

c) include the information necessary to uniquely identify both the supplier and the implementation.

Annex A (normative):
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 PICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed PICS proforma.

A.1 Guidance for completing the ICS 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 relevant specifications may provide information about the implementation in a standardised manner.

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

- instructions for completing the PICS proforma;

- identification of the implementation;

- identification of the protocol;

- PICS proforma tables (for example: Major capabilities, etc).

A.1.2 Abbreviations and conventions

This annex does not reflect dynamic conformance requirements but static ones. In particular, a condition for support of a PDU parameter does not reflect requirements about the syntax of the PDU (i.e. the presence of a parameter) but the capability of the implementation to support the parameter.

In the sending direction, the support of a parameter means that the implementation is able to send this parameter (but it does not mean that the implementation always sends it).

In the receiving direction, it means that the implementation supports the whole semantic of the parameter that is described in the related protocol specification.

As a consequence, PDU parameter tables in this annex are not the same as the tables describing the syntax of a PDU in the reference specification.

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?".

Reference column

The reference column makes reference to ETSI TS 129 215 [1], except where explicitly stated otherwise.

Status column

The various status used in this annex are in accordance with the rules in table A.1.

Table A.1: Key to status codes

Status code	Status name	Meaning
m	mandatory	The capability shall be supported. It is a static view of the fact that the conformance requirements related to the capability in the reference specification are mandatory requirements. This does not mean that a given behaviour shall always be observed (this would be a dynamic view), but that it shall be observed when the implementation is placed in conditions where the conformance requirements from the reference specification compel it to do so. For instance, if the support for a parameter in a sent PDU is mandatory, it does not mean that it shall always be present, but that it shall be present according to the description of the behaviour in the reference specification (dynamic conformance requirement).
o	optional	The capability may or may not be supported. It is an implementation choice.
n/a	not applicable	It is impossible to use the capability. No answer in the support column is required.
c.<integer>	conditional	The requirement on the capability ("m", "o", "n/a") depends on the support of other optional or conditional items. <integer> is the identifier of the conditional expression.
o.<integer>	qualified optional	For mutually exclusive or selectable options from a set. <integer> is the identifier of the group of options, and the logic of selection of the options.

Mnemonic column

The Mnemonic column contains mnemonic identifiers for each item.

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)

References to items

For each possible item answer (answer in the support column) within the PICS proforma there exists a unique reference, 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.

EXAMPLE: A.5/4 is the reference to the answer of item 4 in table A.5.

A.1.3   Instructions for completing the PICS proforma

The supplier of the implementation may complete the PICS proforma in each of the spaces provided. More detailed instructions are given at the beginning of the different clauses of the PICS proforma.

A.2   Identification of the Network Equipment

Identification of the Network Equipment 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   Network Equipment Under Test identification

Name:

....

....

Hardware configuration:

....

....

....

Software configuration:

....

....

....

A.2.3   Product supplier

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

A.2.4   Client

Name:

....

Address:

....

....

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

....

A.2.5   PICS contact person

Name:

....

Telephone number:

....

Facsimile number:

....

E-mail address:

....

Additional information:

....

....

A.3　Identification of the protocol

This PICS proforma applies to the following specification:

- TS 129 215 [1].

A.4　Global statement of conformance

The implementation described in this PICS meets all the mandatory requirements of the referenced standard?

<div align="center">

[　] **Yes**

[　] **No**

</div>

NOTE:　Answering "No" to this question indicates non-conformance to the protocol specification. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming. Explanations may be entered in the comments field at the bottom of each table or on attached pages.

In the tabulations which follow, all references are to TS 129 215 [1] unless another numbered reference is explicitly indicated.

A.5　PICS proforma tables

A.5.1　Roles

Table A.2: Roles

Item	Roles	Reference	Status	Support
1	H-PCRF	4.3.1	o.1	
1.1	Support of Home Routed Access?	4.3.1.1	c.1	
1.2	Support of Visited Access?	4.3.1.2	c.1	
2	V-PCRF	4.3.2	o.1	
2.1	Support of Home Routed Access?	4.3.2.1	c.2	
2.2	Support of Visited Access?	4.3.2.2	c.2	
o.1:	At least one of these roles shall be supported.			
o.2:	At least one of the access types shall be supported.			
c.1:	o.2, if A.2/1 is supported, else n/a.			
c.2:	o.2, if A.2/2 is supported, else n/a.			

A.5.2   System Capabilities for H-PCRF

The tables provided in this clause need only to be completed for H-PCRF implementations, where item A.2/1 is supported.

Table A.3: H-PCRF General Capabilities

Item	Does the IUT support ...	Reference	Status	Support
1	S9 session establishment procedures?	4.5.1.1	m	
2	S9 session termination procedures?	4.5.1.2	m	
3	subscription to event triggers?	4.5.1.3.1	o	
4	procedures for reporting of deployed event triggers?	4.5.1.3.2	m	
5	multiple BBERF scenarios?	4.5.1.4	m	
6	procedures for provision and validation of default EPS bearer authorized QoS?	4.5.1.5	m	
6.1	provisioning of the authorized QoS for the EPS default bearer in the CCA command when requested by the V-PCRF in the CCR command?	4.5.1.5 ¶3	o	
6.2	unsolicited provisioning of the authorized QoS for the EPS default bearer in the RAR command (i.e. when not requested by the V-PCRF in the CCR command)?	4.5.1.5 ¶4	o	
7	procedures for provision of authorized QoS per APN?	4.5.1.6	m	
7.1	unsolicited provisioning of the authorized QoS per APN in the RAR command (i.e. when not requested by the V-PCRF in the CCR command)?	4.5.1.6 ¶4	o	
8	bearer control mode selection?	4.5.1.7	m	

Table A.4 needs only to be completed when item A.2/1.1 "Support of Home Routed Access" applies.

Table A.4: H-PCRF Capabilities for Home Routed Access

Item	Does the IUT support ...	Reference	Status	Support
1	procedures for provision of QoS rules without request from the V-PCRF?	4.5.2.2	c.3	
2	active S9 session/subsession termination?	4.5.2.4	o	
3.1	handling of multiple BBERFs associated with the same IP-CAN session during handover?	4.5.2.5.2	m	
3.2	handling of two BBERFs with flow mobility within the same IP-CAN session?	4.5.2.5.3	m	
4	deferred session linking handling?	4.5.2.6	m	
5	session linking handling when multiple PDN connections to a single APN are supported?	4.5.2.7	m	
c.3:	m, if A.3/6.2 is supported, else n/a.			

Table A.5 needs only to be completed when item A.2/1.2 "Support of Visited Access" applies.

Table A.5: H-PCRF Capabilities for Visited Access

Item	Does the IUT support ...	Reference	Status	Support
1	provision of QoS rules to the V-PCRF which are not related to any IP-CAN session?	4.3.1.2 ¶2	o	
2	activation predefined PCC rules in PCEF of the VPLMN?	4.4.3 ¶3	o	
3.1	subscription to event triggers for specific S9 subsessions?	4.5.1.3.1 ¶2, 1st item in 1st dashed list	c.4	
3.2	subscription to event triggers for specific S9 sessions?	4.5.1.3.1 ¶2, 2nd item in 1st dashed list	c.4	
3.3	removal of all event triggers?	4.5.1.3.1 ¶10	o	
4	handling of requests for PCC and Qos Rules?	4.5.3.1	m	
5.1	reinstallation, modification or removal of a QoS rules on receipt of a CCR command from the V-PCRF containing an indication that an operation on the QoS rule has failed?	4.5.3.1 ¶21 and ¶27	o.2	
5.2	termination of the S9 session/subsession on receipt of a CCR command from the V-PCRF containing an indication that an operation on the QoS rule has failed?	4.5.3.1 ¶21 and ¶27	o.2	
6.1	PCC and QoS rule provisioning using the PULL procedure?	4.5.3.2	o	
6.2	PCC and QoS rule provisioning using the PUSH procedure?	4.5.3.2	o	
6.3.1	reinstallation, modification or removal of a PCC rules on receipt of a RAA command from the V-PCRF containing an indication that an operation on the PCC rule has failed?	4.5.3.2 ¶6 and ¶17	o.3	
6.3.2	termination of the S9 session/subsession on receipt of a RAA command from the V-PCRF containing an indication that an operation on the PCC rule has failed?	4.5.3.2 ¶6 and ¶17	o.3	
7	active S9 session/subsession termination?	4.5.3.4	o	
c.4 o, if A.3/3 is supported, else n/a.				
o.2 At least one of the two options shall be supported.				
o.3 At least one of the two options shall be supported.				

A.5.3   System Capabilities for V-PCRF

The tables provided in this clause need only to be completed for HSS implementations, where item A.2/2 above is supported.

Table A.6: V-PCRF General Capabilities

Item	Does the IUT support ...	Reference	Status	Support
1	S9 session establishment procedures?	4.5.1.1	m	
2	S9 session termination procedures?	4.5.1.2	m	
3	handling of subscription requests to event triggers?	4.5.1.3.1	o	
4	procedures for reporting of deployed event triggers?	4.5.1.3.2	m	
5	multiple BBERF scenarios?	4.5.1.3.3	m	
6	procedures for provision and validation of default EPS bearer authorized QoS?	4.5.1.5	m	
6.1	request for provisioning of the authorized QoS for the EPS default bearer in the CCR command?	4.5.1.5 ¶2	o	
7	procedures for provision of authorized QoS per APN?	4.5.1.6	m	
7.1	request for provisioning of the authorized QoS per APN in the CCR command?	4.5.1.6 ¶2	o	
8	access network information reporting?	4.5.1.8	m	
9	transfer of Rx messages between the V-AF and the H-PCRF?	4.5.3.6	o	
9.1	checking of initial or modified service information received from the V-AF?	4.5.3.6 ¶4	c.5	
9.2	local handling of AF signalling sessions?	4.5.6.2.	c.5	
10	deferred session linking handling?	4.5.2.6, 4.5.3.7	m	
11	session linking handling when multiple PDN connections to a single APN is supported?	4.5.2.7, 4.5.3.8	m	
12	IP flow mobility?	4.5.3.9	m	
c.5	o, if A.6/9 is supported, else n/a.			

Table A.7 needs only to be completed when item A.2/2.1 "Support of Home Routed Access" applies.

Table A.7: V-PCRF Capabilities for Home Routed Access

Item	Does the IUT support ...	Reference	Status	Support
1	active S9 session/subsession termination?	4.5.2.3	m	
2.1	handling of multiple BBERFs associated with the same IP-CAN session during handover?	4.5.2.5.2	m	
2.2	handling of two BBERFs with flow mobility within the same IP-CAN session?	4.5.2.5.3	m	

Table A.8 needs only to be completed when item A.2/2.2 "Support of Visited Access" applies.

Table A.8: V-PCRF Capabilities for Visited Access

Item	Does the IUT support ...	Reference	Status	Support
1	request of QoS rules from the H-PCRF which are not related to any IP-CAN session?	4.3.2.2 ¶2	o	
2.1	provision of event triggers (requests received from the H-PCRF) to the PCEF via Gx?	4.5.1.3.1 2nd item in 2nd dashed list	c.6	
2.2	provision of event triggers (internal trigger) to the BBERF/PCEF via Gx?	4.5.1.3.1 last ¶	c.6	
3	requests for PCC and Qos Rules?	4.5.3.1	m	
4.1	requests for PCC and QoS rule provisioning (PULL procedure)?	4.5.3.2	m	
4.2	handling of PCC and QoS rule provisioning received from the H_PCRF?	4.5.3.2	m	
5	active S9 session/subsession termination?	4.5.3.3	m	
c.6	o, if A.6/3 is supported, else n/a.			

History

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