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Technical Specification

Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1 Scope

The present document specifies the Stage 3 of the real-time transfer of tariff information between a Charge Determination Point (CDP) and a Charge Generation Point (CGP) by means of the Session Initiation Protocol (SIP).

It identifies the protocol procedures and switching functions needed to support the transfer of tariff information related to IP multimedia services. The information needed to support the ISDN User part (ISUP) signalling aspects of charging (ES 201 296 [6]) for Advice of Charge information purposes is also specified, however, it can be used for other purposes as well where applicable.

The present document is applicable to an environment where different operators are working together. It is also applicable to a single network operator environment.

Whether the present document is applicable to a national environment and/or can be used for inter-network purposes depends on regulatory demands and/or bilateral agreements. It should be noted that there are network requirements and signalling limitations that are not covered because they are outside the scope of the present document. Examples of these are as follows:

- the on-line provided advice of charge information may not accurately reflect the correct charging rate due to discount rates, special charging arrangements, etc. It is out of scope to ensure alignment of this information;
- complaint handling between network operators in case of incorrect advice of charge information;
- explicit encryption or special security mechanisms;
- usage of the transferred tariff information for charging purposes;
- interaction between UE and CGP for possible confirmation of provided tariffs;
- any function behind the CGP towards the UE.

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.
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  - 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;
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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 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".

[2] IETF RFC 2976: "The SIP INFO Method".

[3] IETF RFC 4006: "Diameter Credit-Control Application".

[4] ETSI ES 283 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Stage 3 [3GPP TS 24.229 [Release 7], modified]".

[5] ISO 4217: "International Organization for Standardization; Type Currency Code List".

[6] ETSI ES 201 296 (V1.3.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP); Signalling aspects of charging".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 181 002 [1] and the following apply:

absolute time: time of the day representing GMT

add-on charge: single additional charge which does not change the current tariff

NOTE: An add-on charge can either be metered in non-monetary units (e.g. meter-pulse) or in monetary-units (e.g. currency).

charge: number of charge units (for the usage of a chargeable event (telecommunication service))

Charge Determination Point (CDP): determines which tariff/add-on charge should be applied , and inserts the charging information to the appropriate SIP requests or responses

NOTE: Example of a CDP is a SIP AS at the visited IMS network providing the premium rate service.

Charge Generation Point (CGP): receives the charging information that was added by a CDP and transferred in the appropriate SIP requests or responses

NOTE: Example of a CGP is an originating SIP AS at the home IMS network for advice of charge purposes.

charge unit: base element for the charging process, expressed in non-monetary or monetary units

charging: function whereby information related to a chargeable event is formatted and transferred in order to make it possible to determine usage for which the charged party may be billed

real-time: time, typically in number of seconds, to perform the on-line mechanism used for fraud control and cost control

subtariff: within a tariff sequence, a charge unit per time unit

NOTE: Each subtariff has an individual duration and an individual charge unit.

tariff: set of parameters defining the network utilization charges for the use of a particular bearer / session / service

NOTE 1: A tariff can either be metered in non-monetary units (e.g. meter-pulse) or in monetary units (e.g. currency).

NOTE 2: Relationship between tariff and charge units (charging) should be clarified.

NOTE 3: A tariff consists of a tariff sequence.

tariff determination instance: particular charging-related process with a corresponding communication between a charge determination point and a charge registration/charge generation point

tariff sequence: list of consecutive subtariffs which has to be applied for the charging of the communication event

NOTE: The subtariffs are applied at the start of the communication event and are applied consecutively according to the list of the subtariffs. The last subtariff may have an unlimited duration.

3.2 Abbreviations

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

AOC	Advice Of Charge
AOCRG	Add-On ChaRGing information
ASE	Application Service Element
CDP	Charge Determination Point
CGP	Charge Generation Point

CRGT	ChaRGing Tariff information
GMT	Greenwich Mean Time
ID	IDentification
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Service Data Network
ISUP	ISDN User Part
NGN	Next Generation Network
PSTN	Public Switch Telephone Network
SIP	Session Initiation Protocol
UE	User Equipment

4 SIP Transfer of Charging Information

4.1 Description

4.1.1 General description

The present document specifies the procedures for the realtime transfer of charging information in SIP between a Charge Determination Point (CDP) and a Charge Generation Point (CGP). CDP is a network function that determines which tariff/add-on charge should be applied and inserts the charging information to the appropriate SIP requests or responses, whereas the CGP is a network function that receives the charging information that was added by a CDP.

Example of CDP is a SIP AS at the visited IMS network providing the premium rate service. Example of the CGP is the originating SIP AS at the home IMS network for advice of charge purposes.

The functionality is needed to support the charging of value added services that are charged by the operator of the originating end user, the home IMS operator, in case the operator of the originating end user has no knowledge about the charging information related to these value-added services.

A charge determination and charge generation point of the communication may be located within the network of one operator (single network operator environment) or may be located in different networks of different operators (multi-operator environment).

The configuration of several charge determination points for one communication is possible. It is assumed that there is only one CGP for the communication.

The transferred charging information represents direct charging information (no pointers to charging data), either in monetary (e.g. currency) units or non-monetary (e.g. meter-pulse) units.

The following functionality is provided:

i) apply a communication attempt charge for unsuccessful communications;

ii) apply a communication setup charge (once) at start of charging;

iii) apply an initial communication tariff at start of charging and an (optional) next tariff at an absolute time during the communication;

iv) change immediately the current tariff;

v) apply immediately an add-on charge (either a number of non-monetary units or an amount of monetary units) during the communication. This add-on charge is additive and does not change the tariff in force;

vi) differentiation as to whether the charging information is to be used for advice of charge purposes only, or for subscriber charging purposes (which would also allow it to be used for advice of charge purposes);

vii) perform validation (e.g. check range of parameters, check whether a request from a certain network operator can be accepted);

viii) apply a "one time charge" (i.e. non-periodic charge/flat rate) as a minimum communication charge at start of charging;

4.1.2 Network provider option

Not applicable.

4.2 Coding requirements

CDP and CGP shall support the INFO method according to RFC 2976 [2] in support of SIP Transfer of Charging Information.

CDP and CGP shall support multipart MIME content.

The SIP Transfer of Charging Information XML schema, version 1.0, is defined in annex C. The Charging Information XML schema shall be transported as a SIP MIME body. The MIME type for the Charging Information is "application/vnd.etsi.sci+xml". Any SIP message that transports a body with Charging Information shall identify the payload as MIME type "application/vnd.etsi.sci+xml".

4.3 Functional requirements

4.3.1 Overall requirements

a) CGP receives tariff information and shall not send it further, however, the received tariff information can be used for the AoC info provision to the UE.

b) There is only one CGP per service usage and the CGP is always located within the home network of the served subscriber.

c) CDP determines the tariff to be applied or an add on charge, and provides for transfer to the CGP.

d) There can be one or more CDP per service usage. CDP may be located in the originating or in the terminating network.

e) Sending of next tariff information.

A determination point shall not send next tariff information with a switch-over time that is more than 23 h and 45 min after the current time.

f) Format of the Charging Information.

All information issued for the same communication has to be in the same format, i.e. monetary or non-monetary. This needs bilateral agreements between the network operators concerned.

If non-monetary formats are used, the corresponding monetary value of a non-monetary unit needs bilateral agreements between the network operators concerned.

A CDP has to encode the tariff information in a format that can be validated by the receiving CGP.

4.3.2 Procedures at a Charge Determination Point

4.3.2.1 Procedures during communication set-up

4.3.2.1.1 Tariff indication

When a Charge Determination Point has determined that:

- the tariff which has to be activated immediately at start of charging; and/or
- the next tariff which has to be activated at an absolute switch-over time; and/or

- the absolute switch-over time (GMT),

has to be transmitted to the charge generation point, the application process shall issue the Tariff indication.

A Tariff indication may be re-issued during communication set-up phase (i.e. at any time up to the dialog confirmation), replacing previously issued information.

If the tariff is time dependent, then the next tariff and the absolute time at which the current tariff has to be replaced by this next tariff shall be sent. It can be sent together with the current tariff in the initial Tariff indication. The next tariff and the tariff switch-over time shall always be sent together.

The current tariff and the next tariff have the same tariff parameter structure, i.e. a Communication Attempt charge, a Communication Setup charge and a Communication charge (up to a maximum of 4 communication subtariffs).

The tariff format used for the communication is indicated by the first Tariff indication and shall not be changed during the communication.

The following clauses specify the procedures for some specific cases.

4.3.2.1.2 Communication attempt charge

The communication attempt charge is a direct charge, to be charged only for unsuccessful communications.

If a communication attempt charge is relevant to the communication, the communication attempt charge information shall be included in the Tariff indication.

To cover the scenario in the generation point where the received absolute switch-over time has already been reached at the receipt of the Tariff indication or just before start of charging, the communication attempt charge shall also be sent in the first Next Tariff parameter.

In case of monetary-format, the charge amount is indicated by a currency factor multiplied by a currency scale.

In case of non-monetary format, the charge amount is indicated by a number of meter-pulse units.

4.3.2.1.3 Communication set-up charge

The communication setup charge is a direct charge, to be charged once at start of charging.

If communication setup charge is relevant to the communication, the communication setup charge information shall be included in the first Tariff indication.

To cover the scenario in the generation point where the received absolute switch-over time has already been reached at the receipt of the Tariff indication or just before start of charging, the communication setup charge shall also be sent in the first Next Tariff parameter.

In the case of monetary-format, the charge amount is indicated by a currency factor multiplied with a currency scale.

In the case of non-monetary-format the charge amount is indicated by a number of meter-pulse units.

4.3.2.1.4 Communication charge

The communication charge is a direct charge, to be applied at start of charging.

If communication charge is relevant, this information shall be included in the first Tariff indication and before start of charging.

a) Non-monetary-format.

   In case of non-monetary-format, the charge amount is indicated by a number of meter-pulse units to be applied per time unit. The Communication charge is free when its value is zero.

b) Monetary-format.

   In case of monetary-format, the charge amount per time unit is indicated by a currency factor multiplied by a currency scale. The communication charging is free of charge when the product is zero.