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Charging management;
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Service Based Interface (SBI)
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1 Scope

The present document specifies service, operations and procedures of 5G charging for service based interface. This charging description includes the charging architecture and scenarios as well as the mapping of the common charging architecture specified in TS 32.240 [1]. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1].
- The protocol that are used for service based interface is specified in TS 32.291 [58].

The description is following the same methodology as used in TS 23.501 [201] and TS 23.502 [202] for the 5G system.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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- [1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".
- [2] - [49] Void.
- [50] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application". <https://standards.iteh.ai/catalog/standards/sist/6ebed3d2d72e/etsi-ts-132-290-v15-7-0-2021-01>
- [51] - [54] Void.
- [55] - [57] Void.
- [58] 3GPP TS 32.291: "Telecommunication management; Charging management; 5G system; Charging service, stage 3".
- [59] - [99] Void.
- [100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [101] - [200] Void.
- [201] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [202] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [203] - [206] Void.
- [207] - [299] Void.
- [300] 3GPP TS 29.510: " 5G System; Network function repository services; Stage 3".
- [301] - [370] Void.
- [371] - [399] Void.
- [400] - [499] Void.
- [500] - [599] Void.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [100], TS 32.240 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in either 3GPP TR 21.905 [100] or TS 32.240 [1].

5G Access Network: An access network comprising a NG-RAN and/or non-3GPP AN connecting to a 5G Core Network.

5G Core Network: The core network specified in the present document. It connects to a 5G Access Network.

NF service: a functionality exposed by a NF through a service based interface and consumed by other authorized NFs.

NF service operation: An elementary unit a NF service is composed of.

service based interface: It represents how a set of services is provided/exposed by a given NF.

charging session: The association between the CHF (NF Service Producer) that provides the charging service and NF service consumer.

3.2 Symbols

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

Nchf Service-based interface exhibited by Charging Function.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [100] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [100].

5GC	5G Core Network
5GS	5G System
CCS	Converged Charging System
CHF	Charging Function
IEC	Immediate Event Charging
NF	Network Function
PCF	Policy Control Function
SBI	Service based Interface
SMSF	Short Message Service Function
SMF	Session Management Function

4 Architecture reference model

4.1 General

The present document describes the service based architecture for 5G Charging.

4.2 Reference architecture

The NFs with CTF interact with CHF using Nchf interface for converged online and offline charging. The NF PCF interacts with CHF using Nchf interface for Spending Limit Control. The Nchf is a service based interface for NF and CHF.

Figure 4.2.1 depicts the reference architecture for the Nchf Interface.

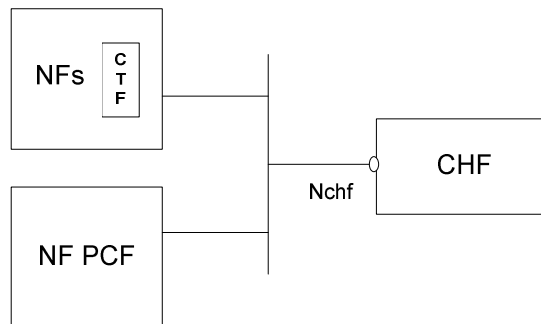


Figure 4.2.1: Reference Architecture for the Nchf Interface; SBI representation

5 Charging function requirement

5.1 Offline charging scenario

5.1.1 Basic principles

Basic principles for offline charging are defined in TS 32.240 [1].

5.1.2 Charging scenarios

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5.1.2.1 Introduction

Two basic scenarios are used:

- Event based charging;
- Session based charging.

Both scenarios may generate CDR files, which may then be transferred to the network operator's BD for the purpose of subscriber billing and/or inter-operator accounting.

5.1.2.2 Scenarios

5.1.2.2.1 Event based charging

Figure 5.1.2.2.1.1 shows a scenario for Post Event Charging, (PEC) where the NF (CTF) interacts with the CHF after the service delivery.

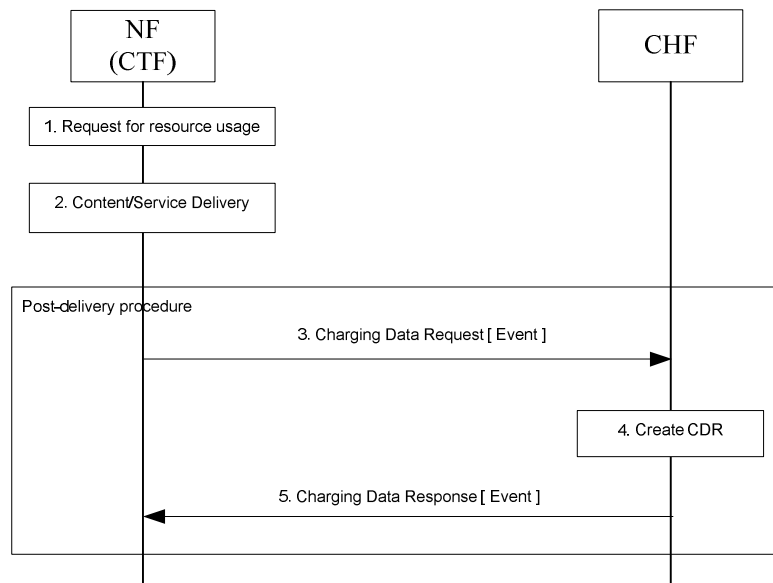


Figure 5.1.2.2.1.1: Post Event Charging

- 1) **Request for resource usage:** A request for session establishment is received in the NF (CTF).
- 2) **Content/Service Delivery:** the NF (CTF) delivers the content/service.
- 3) **Charging Data Request [Event]:** The NF (CTF) the CTF generates charging data related to the delivered service and sends the request for the CHF to store related charging data for CDR generation purpose.
- 4) **Create CDR:** the CHF stores received information and creates a CDR related to the service.
- 5) **Charging Data Response [Event]:** The CHF informs the NF (CTF) on the result of the request.

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5.1.2.2.2 Session based charging

Figure 5.1.2.2.1 shows a scenario for Offline session based charging where the NF (CTF) interacts with the CHF.

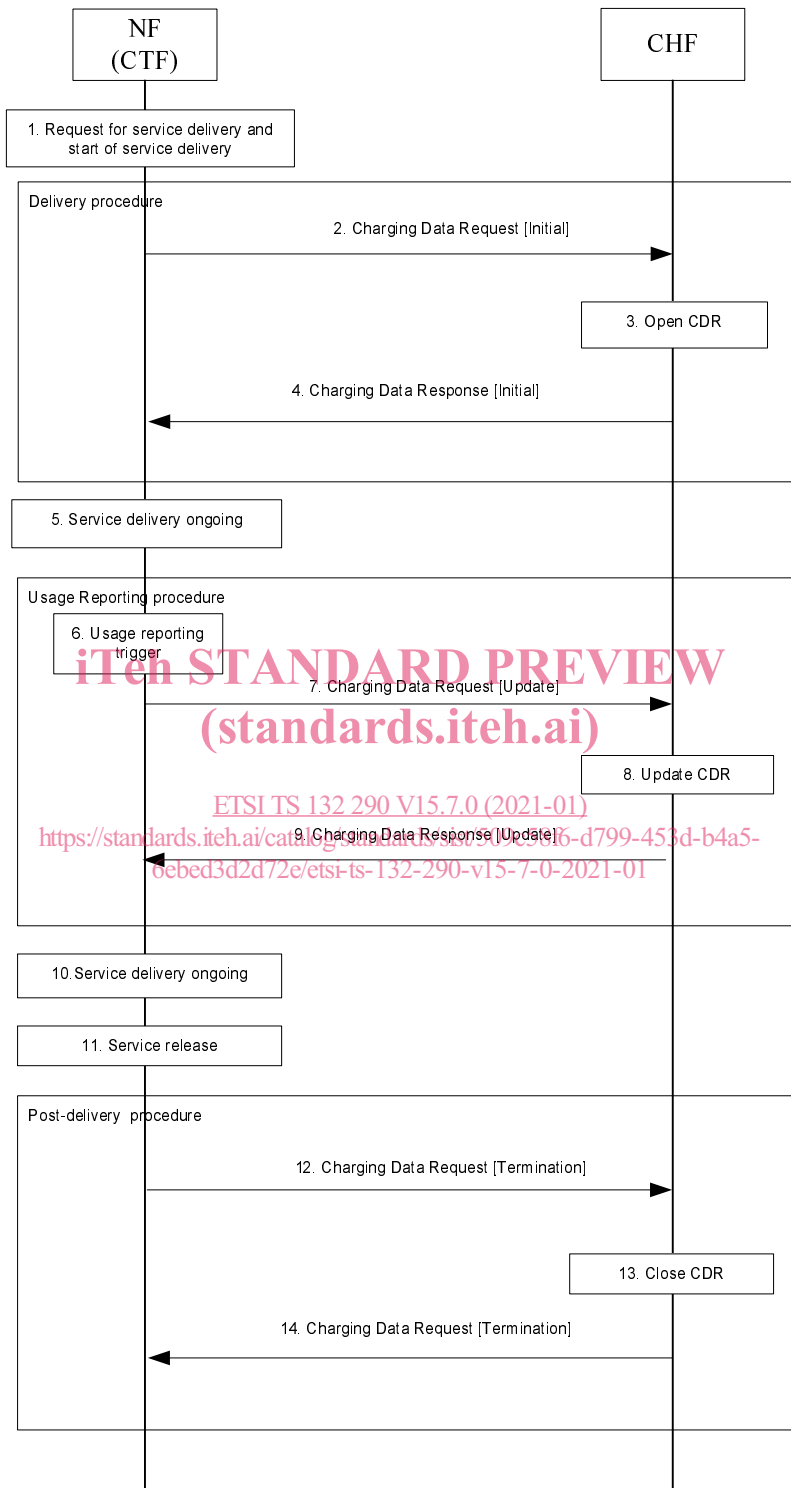


Figure 5.1.2.2.1: Offline charging

- 1) **Request for service delivery and start of service delivery:** A request for session establishment is received in the NF (CTF).
- 2) **Charging Data Request [Initial]:** The NF (CTF) sends the request to inform the CHF about the service to be started.

- 3) **Open CDR:** the CHF opens a CDR related to the service.
- 4) **Charging Data Response [Initial]:** The CHF informs the NF (CTF) on the result of the request and optionally provides the usage reporting triggers applicable to the service.
- 5) **Content/Service Delivery:** the NF (CTF) delivers the content/service.
- 6) **Usage Reporting Trigger:** the NF (CTF) generates charging data related to service delivered, based on a trigger for usage reporting is met.
- 7) **Charging Data Request [Update]:** the NF (CTF) sends the request for reporting the related charging data to the CHF.
- 8) **Update CDR:** the CHF updates the CDR with charging data related to the service.
- 9) **Charging Data Response [Update]:** The CHF informs the NF (CTF) on the result of the request.
- 10) **Content/Service Delivery:** the NF (CTF) delivers the content/service.
- 11) **Service release:** the service is released.
- 12) **Charging Data Request [Termination]:** the NF (CTF) sends the request to the CHF, for charging data related to the service termination.
- 13) **Close CDR:** the CHF closes the CDR with charging data related to the service termination.
- 14) **Charging Data Response [Termination]:** The CHF informs the NF (CTF) on the result of the request.

5.2 Online charging scenario

5.2.1 Basic principles

Basic principles for online charging are defined in TS 32.240 [1].

5.2.2 Charging scenarios

5.2.2.1 Introduction

The following basic scenarios are used:

- 1 Immediate Event Charging
 - a) Decentralized Unit Determination and Centralized Rating
 - b) Centralized Unit Determination and Centralized Rating
 - c) Decentralized Unit Determination and Decentralized Rating
- 2 Event charging with Unit Reservation
 - a) Decentralized Unit Determination and Centralized Rating
 - b) Centralized Unit Determination and Centralized Rating
 - c) Decentralized Unit Determination and Decentralized Rating
- 3 Session charging with Unit Reservation
 - a) Decentralized Unit Determination and Centralized Rating
 - b) Centralized Unit Determination and Centralized Rating
 - c) Decentralized Unit Determination and Decentralized Rating