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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

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Should indicates a recommendation to do something

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The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

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Will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document is part of a series of documents that specify charging aspects of network slicing.

The present document includes the charging aspects of network slice performance and analytics, including charging scenarios, data and way of data transfer specific for the network slice.

The architecture for network slice charging follows common architecture and concepts specified in TS 32.240 [1].

The charging aspect of network slice charging on PDU session charging is specified in TS 32.255 [15].

The network slice performance and analytics charging collects and processes charging information related to performance metrics of a network slice.

All references, abbreviations, definitions, descriptions, principles and requirements, used in the present document, that are common across 3GPP TSs, are defined in TR 21.905 [100]. Charging management in 3GPP networks/domains, services or subsystems are provided in the umbrella TS 32.240 [1] and are copied into clause 3 of the present document for ease of reading. Finally, those items that are specific to the present document are defined exclusively in the present document.

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*.

[1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[2] - [14] Void

[15] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G data connectivity domain charging; Stage 2".

[16] - [49] Void.

[50] 3GPP TS 32.290: "Telecommunication management; Charging management; 5G system; Services, operations and procedures of charging using Service Based Interface (SBI)".

[51] 3GPP TS 32.291: "Telecommunication management; Charging management; 5G system; Charging service, stage 3".

[52] - [54] Void.

[55] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".

[56] 3GPP TS 32.297: "Telecommunication management; Charging management; Charging Data Record (CDR) file format and transfer".

[57] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) parameter description".

[58] - [99] Void.

[100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[101] - [149] Void.

[150] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[151] - [199] Void.

[200] 3GPP TS 28.202: "Charging management; Network slice management charging in the 5G System (5GS); Stage 2".

[201] - [249] Void.

[250] 3GPP TS 28.533: "Management and orchestration; Architecture framework".

[251] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[252] - [270] Void.

[271] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[272] - [299] Void.

[300] 3GPP TS 29.510: "5G System; Network function repository services; Stage 3".

[301] - [400] Void.

[401] - [499] Void.

[500] GSMA NG.116: "Generic Network Slice Template".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

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

3.2 Symbols

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

Bns Reference point for the CDR file transfer from the network slice CGF to the BD.
Ga Reference point for CDR transfer between a CDF and the CGF.
Nchf Service based interface exhibited by CHF.
Nnwdaf Service based interface exhibited by NWDAF.

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].

CEF Charging Enablement Function
CGF Charging Gateway Function
CHF Charging Function
MnS Management Service

NSPA	Network Slice Performance and Analytics
NWDAF	Network Data Analytics Function
PEC	Post Event Charging

4 Architecture considerations

4.1 High-level description

4.1.1 Network slice charging architecture

The architecture for network slice charging follows common architecture and concepts specified in TS 32.240 [1].

The network slice charging shall support charging of network slice management specified in TS 28.202 [200] and performance and analytics based charging in the present document.

The NWDAF is part of the architecture specified in TS 23.501 [2] and the figure 4.1.1-1 shows the Network Data Analytics Exposure architecture specified in TS 23.288 [150].

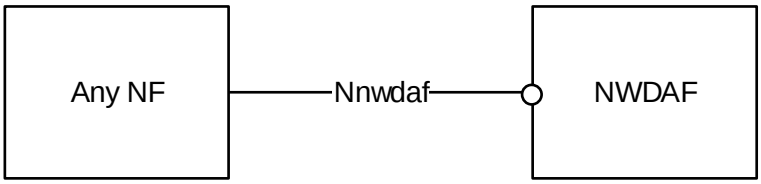

Figure 4.1.1-1: Network Data Analytics Exposure architecture

The figure 4.1.1-2 shows the management service which offers management capabilities, specified in TS 28.533 [250] clause 4.

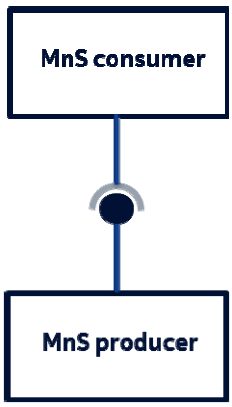

Figure 4.1.1-2: Management Service

4.2 Network slice performance and analytics charging architecture

4.2.1 High level network slice performance and analytics architecture

The scope of the present document is network slice performance and analytics charging, the details for other type of network slice charging are defined in TS 32.255 [15] and TS 28.202 [200].

4.2.2 Converged charging architecture

The architectural options for network slice performance and analytics converged charging are depicted in figure 4.2.2-1.

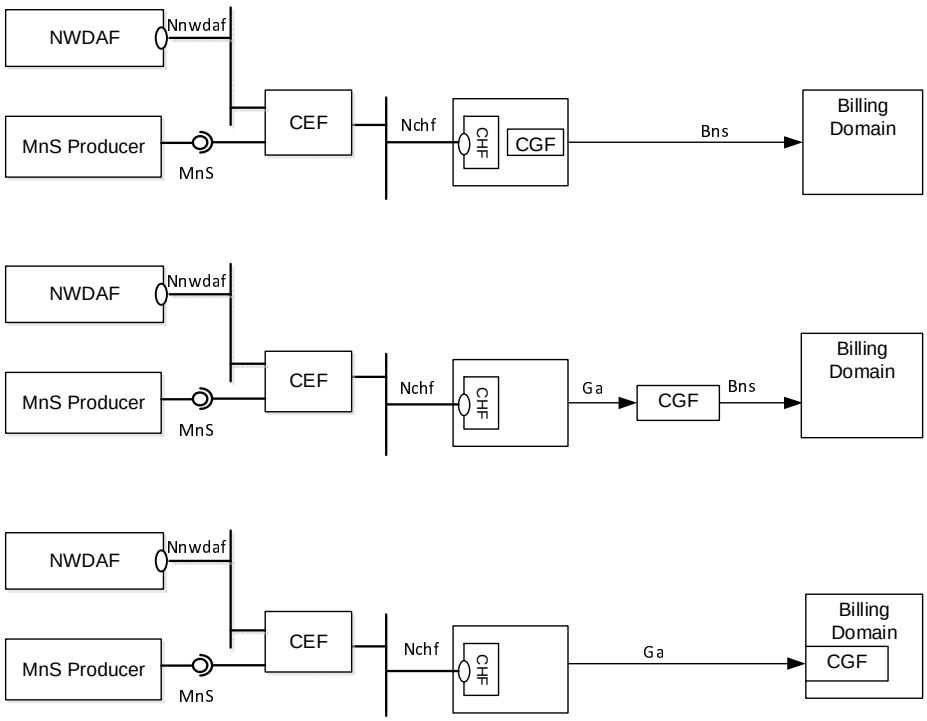

Figure 4.2.2-1: Network slice performance and analytics converged charging architecture

The Charging Enablement Function (CEF):

- subscribes to notifications by consuming management services or services exposed by other functions, for receiving required charging information from the services.
- unsubscribes to notifications by consuming management services or services exposed by other functions, for cancelling the subscription to performance and analytics information.
- determines the occurrence of chargeable events. When it determines that a chargeable event has occurred it then triggers charging by consuming the Nchf services.

Charging information addressed by the CEF in the present document, are related to performance and analytics for network slices.

The MnS producer is defined in TS 28.533 [250]: the MnS producer in the present document is the producer of performance MnS.

For network slice performance and analytics converged charging the CEF is a consumer of either one or both:

- performance management service (MnS) for network slice exposed by the MnS Producer, specified in TS 28.532 [253];
- Network Data Analytics service (Nnwdaf) for network slice exposed by the Network Data Analytics Function (NWDAF), described in TS 23.288 [150].

And the CEF is a consumer of:

- charging (Nchf) service.

The general architecture components can be found in TS 32.240 [1].

Ga is described in clause 5.2.4 and Bns in clause 5.2.5 of the present document, and Nchf is described in TS 32.290 [50].

5 Network slice performance and analytics charging principles and scenarios

5.1 Network slice performance and analytics charging principles

5.1.1 General

Performance and analytics based charging shall be achieved by subscription to the performance metrics or analytics information of a specific network slice and report them to CHF for charging purpose. The detail of performance and analytics information is specified in the clause 5.1.3.

Network slice performance and analytics charging shall support collection of network slice performance metrics related to network slice charging based on network slice performance and analytics charging requirements.

5.1.2 Requirements

The following are high-level charging requirements specific to the network slice performance and analytics charging:

- The CEF shall support subscription to specific network slice performance and analytics information.
- The CEF shall support reporting charging information based on network slice performance and analytics information.
- The CEF shall support reporting performance and analytics charging information per network slice.
- The CEF shall support PEC scenario to report performance and analytics charging information.

5.1.3 Network slice performance and analytics charging information

The following is a non-exhaustive list related to one or more of the performance and analytics inputs relevant to charging for network slice:

- Latency as defined in clause 6.3, TS 28.554 [271]
- Throughput as defined in clause 6.3, TS 28.554 [271]
- Maximum packet loss rate as defined in GSMA NG.116 [500]
- Service Experience statistics information as defined in clause 6.4, TS 23.288 [150]
- The number of PDU sessions as defined in clause 6.4, TS 28.554 [271]
- The number of registered subscribers as defined in clause 6.2, TS 28.554 [271]
- Load level information as defined in clause 6.3, TS 23.288 [150].

5.1.4 NWDAF discovery

The NWDAF service discovery by the CEF is specified in TS 29.510 [300].

5.1.5 CHF selection

The CHF selection, i.e. CHF address determination, by the CEF is done based on the following and with this priority order (highest to lowest):

- NRF based discovery;
- pre-configured CHF address in the CEF.

5.2 Network slice performance and analytics charging scenarios

5.2.1 Basic principles

5.2.1.1 General

Network slice performance and analytics charging is performed by the CEF interacting with CHF using Nchf specified in TS 32.290 [50] and TS 32.291 [51].In order to provide the data required for the charging management activities outlined in TS 32.240 [1], the CEF shall be able to perform converged charging for each of the following:

- the performance and analytics information obtained from NWDAF.
- the performance and analytics information obtained from MnS;

The CEF shall be able to obtain performance and analytics information from the NWDAF and/or MnS as follows:

- The Subscribe/Notify are exchanged between the CEF and the NWDAF using the Nnwdaf service. The interactions are issued by the CEF towards the NWDAF when certain conditions are met.
- The Subscribe/Notify are exchanged between the CEF and the MnS producer. The interactions are issued by the CEF when certain conditions are met.

The CEF shall be able to perform converged charging by interacting with CHF, for charging data related to network slice performance and analytics. The Charging Data Request and Charging Data Response are exchanged between the CEF and the CHF, based on PEC scenarios specified in TS 32.290 [50]. The Charging Data Request is issued by the CEF towards the CHF when certain conditions (chargeable events) are met.

The charging information is collected per Single Network Slice Selection Assistance Information (S-NSSAI).

The services provided by NWDAF are defined in the TS 23.288[150] and the services provided by MnS producer are defined in the TS 28.533 [250]. The charging functionalities for network slice performance and analytics, i.e. CEF functionality, charging events and charging procedures, are defined in the following clauses.

Whether performance and analytics charging for an S-NSSAI in the CEF is active or not is based on configuration. Which performance and analytics information is obtained from NWDAF or MnS by the CEF is based on configuration.

The configuration may be per S-NSSAI, detailed information about the configuration or provisioning of the configuration is outside the present document.

The contents and purpose of each charging event that triggers interaction with CHF, as well as the chargeable events that trigger them, are described in clauses 5.2.2.

A detailed formal description of the converged charging parameters to CHF defined in the present document can be found in TS 32.291 [51].

A detailed formal description of the CDR parameters defined in the present document can be found in TS 32.298 [57].

5.2.1.2 Applicable triggers in network slice performance and analytics charging

Triggers for CEF to invoke a Charging Data Request [Event] towards the CHF are defined as following trigger conditions.

When a charging event is issued towards the CHF, it includes details such as Single Network Slice Selection Assistance Information (S-NSSAI). Table 5.2.1.2-1 summarizes the set of default trigger conditions and their category which shall be supported by the CEF.

Table 5.2.1.2-1: Default Trigger conditions in CEF

Trigger Conditions	Trigger level	Default category	CHF allowed to change category	CHF allowed to enable and disable	Message when "immediate reporting" category
Notify event for a subscription	-	Deferred	Not Applicable	Not Applicable	Charging Data Request [Event]
Expiry of time limit per S-NSSAI	-	Immediate	Not Applicable	Not Applicable	Charging Data Request [Event]
Threshold reached for a performance indicator (e.g. load level per S-NSSAI)	-	Immediate	Not Applicable	Not Applicable	Charging Data Request [Event]
Limit reached for number of notify events per subscription made by CEF	-	Immediate	Not Applicable	Not Applicable	Charging Data Request [Event]
Limit reached for number of notify events per S-NSSAI	-	Immediate	Not Applicable	Not Applicable	Charging Data Request [Event]
NOTE 1: In addition, there may be operator specific triggers. NOTE 2: The threshold and limit is default configured and updated based on the configuration.					

The CDR generation mechanism processed by the CHF upon receiving Charging Data Request [Event] issued by the CEF for these chargeable events, is specified in clause 5.2.3.

5.2.2 Message flows

5.2.2.1 General

The message flows in the present document specify the interaction for performance and analytics charging functionality, based on the performance and analytics information from NWDAF and MnS.

The charging interaction is based on Charging Data Request /Response messages specified in TS 32.290 [50], exchanged between the CEF and the CHF.

One source of performance and analytics information is based on the messages specified in TS 23.288 [150], exchanged between the CEF and NWDAF.

Another source of performance and analytics information is based on the messages specified in TS 28.532 [251], exchanged between the CEF and MnS.

5.2.2.2 Analytics and performance charging from CEF

5.2.2.2.1 General

The clause below describes analytics and performance charging from CEF scenarios.

5.2.2.2.2 General analytics and performance charging – PEC

The following figure 5.2.2.2.2-1 describes analytics and performance charging:

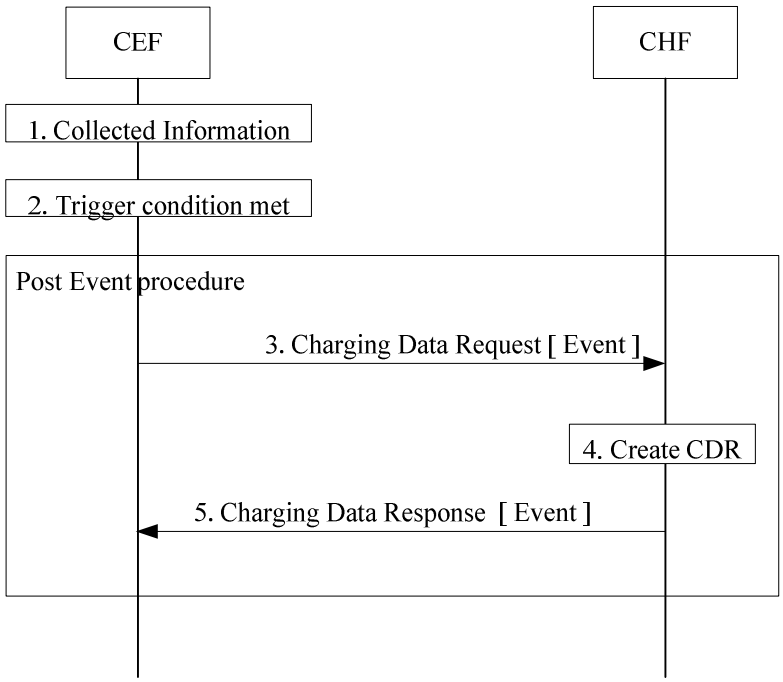

Figure 5.2.2.2.2-1: Analytics and performance reporting

1) **Collection of analytics and performance information:** Collection of information related to the network slice analytics and performance is done by the CEF.

2) **Trigger condition met:** the CEF determines based on the collected information and the trigger conditions that a report of charging information to the CHF is needed.

3) **Charging Data Request [Event]:** The CEF generates charging data related to the collected information and sends the charging data request for the CHF to process the related charging data for CDR generation purpose.

4) **Create CDR:** the CHF stores received information and creates a CDR related to the event.

5) **Charging Data Response [Event]:** The CHF informs the CEF on the result of the request.

5.2.2.3 Network Slice data analytics subscription from NWDAF

5.2.2.3.1 General

The clause below describes network data analytics subscription scenarios. The CEF acts as a NWDAF Service Consumer and uses the Nnwdaf_AnalyticsSubscription service to subscribe to the applicable analytics information required for the chargeable events, based on clause 6.1.1 in TS 23.288 [150].

5.2.2.3.2 Network slice performance and analytics information Subscribe/Notify

The following figure 5.2.2.3.2-1 procedure is used by CEF to subscribe/unsubscribe at NWDAF to be notified on performance and analytics information, using Nnwdaf_AnalyticsSubscription service for Network Slice defined in TS 23.288 [150].

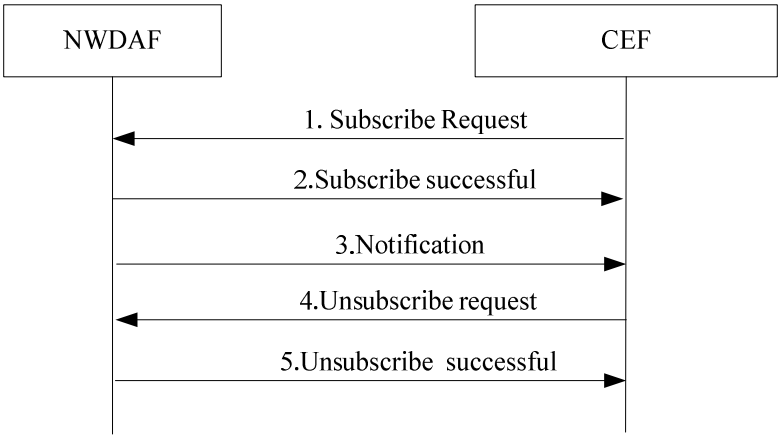

Figure 5.2.2.3.2-1: Analytics and performance from NWDAF

1) **Subscribe Request:** the CEF decides to start the collection of performance and analytics information and subscribes to performance and analytics information from NWDAF with the performance indicator, S-NSSAI and subscription condition (e.g. Start time, stop time).

2) **Subscribe Respond:** the NWDAF responses the subscription successful.

3) **Notification:** based on the subscription of performance and analytics information, the NWDAF notifies the CEF with the performance and analytics information.

NOTE: There might be several “notification” during the subscription.

4) **Unsubscribe Request:** the CEF cancels the subscription to performance and analytics information.

5) **Unsubscribe Respond:** the NWDAF responses the unsubscription successful.

The CEF could update the subscription during the duration of the subscription.

5.2.2.4 Network slice performance and analytics subscription using MnS

5.2.2.4.1 General

CEF may support subscription to network slice performance information using MnS. The clauses below describes message flow of network slice performance and analytics charging using MnS defined in clause 11.3.1 in TS 28.532 [251] (e.g. Subscribe operation, unsubscribe operation and notifyFileReady).

5.2.2.4.2 Network slice performance and analytics information Subscribe/Notify

The following figure 5.2.2.4.2-1 procedure is used by CEF to subscribe/unsubscribe the performance and analytics information using MnS.

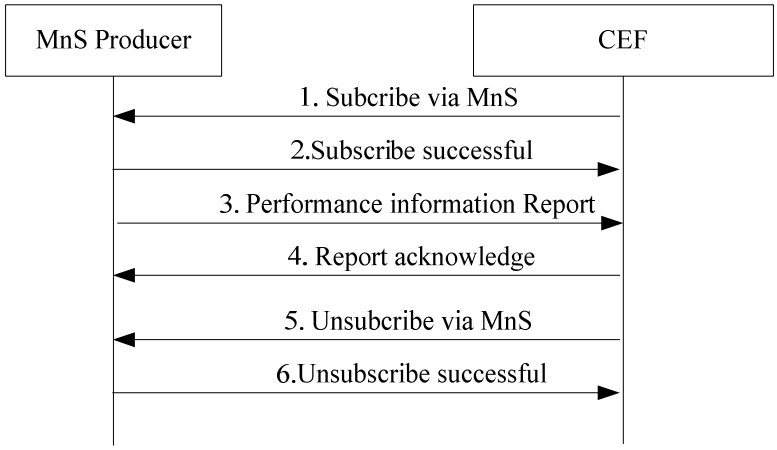

Figure 5.2.2.4.2-1: Performance and analytics information from MnS Producer

1) **Subscribe Request:** The CEF decides to start the collection of performance and analytics information and subscribes to performance and analytics information using MnS with the performance indicator, S-NSSAI and subscription condition (e.g. Start time, stop time).

2) **Subscribe Respond:** the MnS producer responses the subscription successful.

3) **Notification:** Based on the subscription of performance and analytics information, the MnS producer notifies the CEF with the performance and analytics information.

NOTE: There might be several “notification” during the subscription.

4) **Notification Acknowledge:** the CEF sends the acknowledge notification.

5) **Unsubscribe Request:** the CEF cancels the subscription to performance and analytics information.

6) **Unsubscribe Respond:** the MnS producer responses the unsubscription successful.

The CEF could update the subscription during the duration of the subscription

5.2.3 CDR generation

5.2.3.1 Introduction

The network slice performance and analytics CHF CDRs are generated by the CHF to collect charging information that they subsequently transfer to the Charging Gateway Function (CGF).

The following clauses describe in detail the conditions for generating the network slice performance and analytics CHF CDR, which shall be supported by the CHF.

5.2.3.2 Triggers for CHF CDR

5.2.3.2.1 General

A network slice performance and analytics CHF CDR is used to capture charging information related to network slice performance and analytics chargeable events for PEC.

5.2.3.2.2 Triggers for CHF CDR generation

A network slice performance and analytics CHF CDR is generated by the CHF for each received Charging Data Request [Event].

5.2.4 Ga record transfer flows

Details of the Ga protocol application are specified in TS 32.295 [55].

5.2.5 Bns CDR file transfer

Details of the Bns protocol application are specified in TS 32.297 [56].

6 Definition of charging information

6.1 Data description for network slice performance and analytics charging

6.1.1 Message contents

6.1.1.1 General

The Charging Data Request and Charging Data Response are specified in clause 5.1.2.2.1 of TS 32.290 [50].

Table 6.1.1.1-1 describes the use of these messages for network slice performance and analytics charging.

Table 6.1.1.1-1: network slice performance and analytics charging messages reference table

Message	Source	Destination
Charging Data Request	CEF	CHF
Charging Data Response	CHF	CEF

The following clauses describe the different fields used in the Charging Data messages and the category in the tables is used according to the charging data configuration defined in clause 5.4 of TS 32.240 [1].

6.1.1.2 Charging Data Request message

Table 6.1.1.2-1 illustrates the basic structure of a Charging Data Request message from the CEF as used for performance and analytics based charging.

Table 6.1.1.2-1: Charging Data Request message contents

Information Element	Category for converged charging	Description
Session Identifier	O_C	Described in TS 32.290 [57].
Subscriber Identifier	-	This field is not applicable.
Tenant Identifier	O_M	This field if present is the identifier of subscriber of network slice.
NF Consumer Identification	M	Described in TS 32.290 [57].
NF Functionality	M	Described in TS 32.290 [57].
NF Name	O_C	Described in TS 32.290 [57].
NF Address	O_C	Described in TS 32.290 [57].
NF PLMN ID	O_C	Described in TS 32.290 [57].
Invocation Timestamp	M	Described in TS 32.290 [57].
Invocation Sequence Number	M	Described in TS 32.290 [57].
Retransmission Indicator	-	This field is not applicable.
One-time Event	O_C	Described in TS 32.290 [57].
One-time Event Type	O_C	Described in TS 32.290 [57].
Notify URI	-	This field is not applicable.
Service Specification Information	O_C	Described in TS 32.290 [57].
Triggers	O_C	Described in TS 32.290 [57].
Multiple Unit Usage	O_C	Described in TS 32.290 [57], with the exception that quota management is not applicable.
Rating Group	M	Described in TS 32.290 [57]
Requested Unit	-	This field is not applicable.
Used Unit Container	O_C	Described in TS 32.290 [57]
Service Identifier	-	This field is not applicable.
Quota management Indicator	-	This field is not applicable.
Triggers	O_C	This field is described in TS 32.290 [57] and holds the network slice performance and analytics specific triggers described in clause 5.2.1.
Trigger Timestamp	O_C	Described in TS 32.290 [57]
Time	-	This field is not applicable.
Total Volume	-	This field is not applicable.
Uplink Volume	-	This field is not applicable.
Downlink Volume	-	This field is not applicable.
Service Specific Unit	-	This field is not applicable.
Event Time Stamps	-	This field is not applicable.
Local Sequence Number	O_M	Described in TS 32.290 [57]
NSPA Container Information	O_C	This field holds the network slice performance and analytics container specific information described in clause 6.2.1.3.
NSPA Charging Information	O_C	This field holds the network slice information, which is reported to the CHF described in clause 6.2.1.2.

6.1.1.3 Charging data response message

Table 6.1.1.3-1 illustrates the basic structure of a Charging Data Response message from the CHF as used for performance and analytics based charging.

Table 6.1.1.3-1: Charging Data Response message contents

Information Element	Category for converged charging	Description
Session Identifier	O_C	Described in TS 32.290 [57].
Invocation Timestamp	M	Described in TS 32.290 [57].
Invocation Result	O_C	Described in TS 32.290 [57].
Invocation Sequence Number	-	This field is not applicable.
Session Failover	O_C	Described in TS 32.290 [57].
Triggers	-	This field is not applicable.
Multiple Unit Information	-	This field is not applicable.

6.1.2 Ga message contents

Details of the Ga message contents are specified in TS 32.295 [55].

6.1.3 CDR description on the B_{ns} interface

6.1.3.1 General

This clause describes the CDR content and format generated for performance and analytics based charging.

The following table provide a brief description of each CDR parameter. The category in the tables is used according to the charging data configuration defined in clause 5.4 of TS 32.240 [1]. Full definitions of the CDR parameters, sorted by the name in alphabetical order, are provided in TS 32.298 [57].

6.1.3.2 Network slice performance and analytics CHF CDR data

If enabled, network slice performance and analytics CDRs shall be produced for each network slice (i.e. S-NSSAI).

The fields of network slice performance and analytics CHF CDR are specified in table 6.1.3.2-1.

Table 6.1.3.2-1: Network slice performance and analytics CHF record data

Field	Category	Description
Record Type	M	CHF record.
Recording Network Function ID	O_M	This field holds the name of the recording entity, i.e. the CHF id.
Tenant Identifier	O_M	This field if present is the identifier of subscriber of network slice..
NF Consumer Information	M	This field holds the information of the CEF that used the charging service.
NF Functionality	M	This field contains the function of the node (i.e. CEF)
NF Name	O_C	This field holds the name of the CEF used.
NF Address	O_C	This field holds the IP Address of the CEF used.
NF PLMN ID	O_C	This field holds the PLMN identifier (MCC MNC) of the CEF.
List of Multiple Unit Usage	O_M	This field holds a list of changes in charging conditions for one single Network Slice Selection Assistance. The list is categorized per rating group. Each change is time stamped.
Rating Group	O_M	This filed holds the rating group.
Used Unit Container	O_C	This field holds the information connected to the reported network slice.
Triggers	O_C	This field holds the reason for closing the used unit container.
Trigger Timestamp	O_C	This field holds the timestamp of the trigger.
Local Sequence Number	M	This field holds the container sequence number.
NSPA Container Information	O_C	This field holds the network slice performance and analytics container specific information described in clause 6.2.1.3.
NSPA Charging Information	O_M	This field holds the network slice performance and analytics charging information defined in clause 6.2.1.2.
Record Opening Time	M	Described in TS 32.298 [57].
Duration	M	Described in TS 32.298 [57].
Record Sequence Number	C	Described in TS 32.298 [57].
Cause for Record Closing	M	Described in TS 32.298 [57].
Local Record Sequence Number	O_M	Described in TS 32.298 [57].
Record Extensions	O_C	Described in TS 32.298 [57].

6.2 Network slice performance and analytics charging specific parameters

6.2.1 Definition of network slice performance and analytics charging information

6.2.1.1 General

The Charging Information parameter used for network slice performance and analytics charging is provided in the following clauses.

6.2.1.2 Definition of Performance and Analytics Charging Information

Specific charging information used for network slice performance and analytics charging is provided within the Performance and Analytics Charging Information.

The detailed structure of the Performance and Analytics Charging Information can be found in table 6.2.1.2.1.

Table 6.2.1.2-1: Structure of NSPA Charging Information

Information Element	Category	Description
Single NSSAI	M	This field holds network slice information the performance and analytics information belongs to.

6.2.1.3 Definition of NSPA Container Information

Specific charging information used for network slice performance and analytics charging is provided within the NSPA Container Information.

The detailed structure of the NSPA Charging Information can be found in table 6.2.1.3.1.

Table 6.2.1.3-1: Structure of NSPA Container Information

Information Element	Category	Description
Latency	OC	This field holds latency as described in 28.554 [271].
Throughput	OC	This field holds throughput as described in TS 28.554 [271]
Maximum packet loss rate	OC	This field holds maximum packet loss rate as described in TS GSMA NG.116 [500]
Service Experience statistics data	OC	This field holds service experience statistics data as described in TS 23.288 [150]
Number of PDU sessions	OC	This field holds the number of PDU sessions as described in TS 28.554 [271].
Number of registered Subscribers	OC	This field holds the number of registered subscribers as described in TS 28.554 [271].
Load level	OC	This field holds the load level as described in TS 23.288 [150].

6.2.2 Formal network slice performance and analytics charging parameter description

6.2.2.1 Network slice performance and analytics CHF CDR parameters

The detailed definitions, abstract syntax and encoding of network slice performance and analytics CHF CDRs parameters are specified in TS 32.298 [57].

6.2.2.2 Network slice performance and analytics resources attributes

The detailed definitions of resources attributes used for network slice performance and analytics charging are specified in TS 32.291 [51].

6.2.3 Detailed message format for converged charging

The following clause specifies per Operation Type the charging data that are sent by CEF for network slice performance and analytics converged charging.

The Operation Types are listed in the following order: I (Initial)/T (Termination)/E (Event). Therefore, when all Operation Types are possible it is marked as ITE. If only some Operation Types are allowed for a node, only the appropriate letters are used (i.e. IT or E) as indicated in the table heading. The omission of an Operation Type for a particular field is marked with "-" (i.e. I-E). Also, when an entire field is not allowed in a node the entire cell is marked as "-".

Table 6.2.3-1 defines the basic structure of the supported fields in the *Charging Data Request* message for CEF converged charging.

Table 6.2.3-1: Supported fields in *Charging Data Request* message

Information Element	Analytics and Performance Supported Operation Types	CEF E
Session Identifier		-
Subscriber Identifier		-
Tenant Identifier		E
NF Consumer Identification		E
Invocation Timestamp		E
Invocation Sequence Number		E
Retransmission Indicator		-
One-time Event		E
One-time Event Type		E
Notify URI		-
Triggers		E
Multiple Unit Usage		E
Rating Group		E
Used Unit Container		E
Triggers		E
NSPA Container Information		E
NSPA Charging Information		
Single NSSAI		E

Table 6.2.3-2 defines the basic structure of the supported fields in the *Charging Data Response* message for CEF converged charging.

Table 6.2.3-2: Supported fields in *Charging Data Response* message

Information Element	Analytics and Performance Supported Operation Types	CEF E
Session Identifier		E
Invocation Timestamp		E
Invocation Result		E
Invocation Sequence Number		-
Session Failover		E
Triggers		-
Multiple Unit information		-

6.3 Bindings for network slice performance and analytics converged charging

This mapping between the Information Elements, resource attributes and CHF CDR parameters for network slice performance and analytics converged charging is described in clause 7 of TS 32.291 [51].

Annex A (informative): Change history

Change history							
Date	**Meeting**	**Tdoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2020-09	SA#89e					Upgrade to change control version including EditHelp review	16.0.0
2020-12	SA#90e	SP-201043	0002	1	F	Correction of the Category and Operation Types	16.1.0
2020-12	SA#90e	SP-201043	0004	-	F	Update description of Charging Enablement Function	16.1.0
2020-12	SA#90e	SP-201043	0006	-	F	Correction on sender of Charging Data Response message	16.1.0
2020-12	SA#90e	SP-201043	0007	-	F	Correction on NSPA Container Information in Charging Data Request message	16.1.0
2023-09	SA#101	SP-230940	0010	1	F	Correction on Charging Data message content for NSPA Charging	16.2.0

History

Document history		
V16.0.0	October 2020	Publication
V16.1.0	January 2021	Publication
V16.2.0	September 2023	Publication