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IP Multimedia Subsystem (IMS) Application Server (AS)
Services Stage 3
(3GPP TS 29.175 version 19.5.0 Release 19)**



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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:

Version x.y.z

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- x the first digit:
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

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

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

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.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- 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 specifies the stage 3 protocol and data model for the Nimsas Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the IMS AS.

The 5G System stage 2 architecture and procedures are specified in TS 23.501 [2] and TS 23.502 [3].

The IP Multimedia Subsystem (IMS) supporting DC architecture and procedures are specified in TS 23.228 [14].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in TS 29.500 [4] and TS 29.501 [5].

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 TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [7] 3GPP TR 21.900: "Technical Specification Group working methods".
- [8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [9] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [11] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [13] IETF RFC 7807: "Problem Details for HTTP APIs".
- [14] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [15] 3GPP TS 29.562: "5G System; Home Subscriber Server (HSS) Services; Stage 3".
- [16] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [17] 3GPP TS 29.176: "IP Multimedia Subsystems (IMS); Media Function (MF) Services; Stage 3".
- [18] 3GPP TS 24.610: "Communication HOLD (HOLD) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".
- [19] 3GPP TS 24.186: "IMS Data Channel applications; Protocol specification".

- [20] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [21] 3GPP TS 24.604: "Communication Diversion (CDIV) using IP Multimedia (IM); Core Network (CN) subsystem; Protocol specification".
- [22] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

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 [1] 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 [1].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.228 [14] apply:

- **Bootstrap data channel**
- **DC Application Server**
- **Rich Call Data (RCD) server**
- **Rich Call Data (RCD) server address**
- **Rich Call Data (RCD) information**
- **Rich Call Data (RCD) URL**
- **Rich Call Data (RCD) properties**

3.2 Symbols

For the purposes of the present document, the following symbols given in 3GPP TS 23.228 [14] apply:

- | | |
|-----|---|
| DC1 | Reference Point between an SBI capable IMS AS and DCSF. |
| DC2 | Reference Point between an SBI capable IMS AS and MF. |

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], 3GPP TS 23.228 [14] and the following apply. An abbreviation defined in the present document or 3GPP TS 23.228 [14] takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

- | | |
|--------|--|
| AR | Augmented Reality |
| DTLS | Datagram Transport Layer Security |
| IMS AS | IP Multimedia Subsystem Application Server |
| MF | Media Function |
| NEF | Network Exposure Function |
| SCP | Service Communication Proxy |

4 Overview

The IP Multimedia Subsystem (IMS) architecture supporting the Data Channel services is defined in 3GPP TS 23.228 [14].

The IP Multimedia Subsystem (IMS) Application Server (AS) is enhanced to offer services to e.g. DCSF, HSS, NEF or trusted AF via the Nimsas service-based interface (see 3GPP TS 23.228 [14]) and support the following functionalities:

- The IMS AS interacts with the DCSF via DC1 for event notifications;
- The IMS AS receives the data channel control instructions from the DCSF and accordingly interacts with the MF via DC2 for data channel media resource management;
- The IMS AS receives the data channel management requirement from NEF or trusted AF and interacts with the DCSF and MF for data channel management.
- The IMS AS interacts with the HSS/NEF for subscriber related events subscription, and notifies the NEF with the subscriber related events which are subscribed, and interacts with the NEF for non-subscriber related events subscription and notification, e.g. subscriptions to any UE;
- The IMS AS receives the provisioning information (e.g. RCD properties) from NEF or trusted AF and stores in HSS repository data to support the 3rd party user identity.

Figure 4-1 provides the reference model (in service-based interface representation and in reference point representation), with focus on the IMS AS.

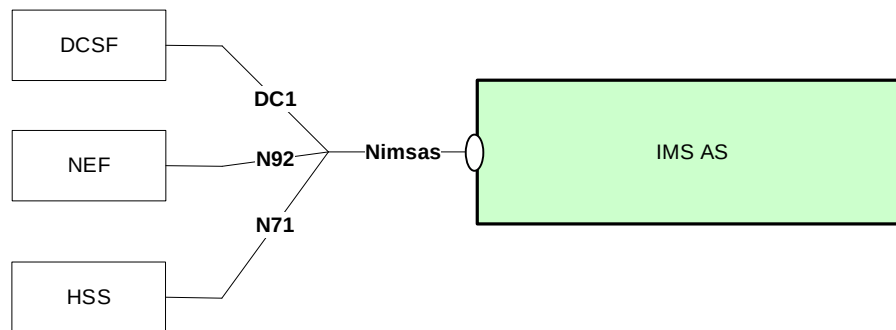


Figure 4-1: Reference model – IMS AS

DC1 is the reference point between an SBI capable IMS AS and DCSF.

N92 is the reference point between an SBI capable IMS AS and NEF.

N71 is the reference point between an SBI capable IMS AS and HSS.

5 Services offered by the IMS AS

5.1 Introduction

The IMS AS offers to other NFs the following services:

- Nimsas_SessionEventControl. This service enables the consumer to be notified about session events when served IMS subscribers take part in IMS sessions.
- Nimsas_MediaControl. This service enables the consumer to control IMS AS handling of media flow within an IMS session.
- Nimsas_ImSessionManagement. This service enables the consumer to request IMS AS to create or release an IMS session or modify the media in a specific IMS session.
- Nimsas_EventExposure. This service enables the service consumer to subscribe to subscriber-related events (e.g. HSS) and non-subscriber related events (e.g. NEF).
- Nimsas_ImParameterProvision. This service enables the consumer to provision the IMS user related information (e.g. RCD URL, RCD server address or RCD information) for the target IMPU.

Table 5.1-1 summarizes the SBI services produced by the IMS AS and the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Nimsas_SessionEventControl	6.1	IMS AS SessionEventControl Service	TS29175_Nimsas_SessionEventControl.yaml	nimsas-sec	A.2
Nimsas_MediaControl	6.2	IMS AS MediaControl Service	TS29175_Nimsas_MediaControl.yaml	nimsas-mc	A.3
Nimsas_ImSessionManagement	6.3	IMS AS ImSessionManagement Service	TS29175_Nimsas_ImSessionManagement.yaml	nimsas-ism	A.4
Nimsas_EventExposure	6.4	IMS AS EventExposure Service	TS29175_Nimsas_ImEE.yaml	nimsas-ee	A.5
Nimsas_ImParameterProvision	6.5	IMS AS ImParameterProvision Service	TS29175_Nimsas_ImParameterProvision.yaml	nimsas-ipp	A.6

5.2 Nimsas_SessionEventControl Service

5.2.1 Service Description

The Nimsas_SessionEventControl service enables the consumer to be notified about session events when served IMS subscribers take part in IMS sessions.

5.2.2 Service Operations

5.2.2.1 Introduction

The Service operations defined for the Nimsas_SessionEventControl service are as follows:

- **Notify:** It allows the IMS AS to notify the IMS session control events of a specific IMS subscriber to NFs. This service operation reports the event to the consumer that has subscribed implicitly.

NOTE: Explicit subscription to receive session events is another service operation defined in TS 23.228 [14] which has not specified in this Release. In this Release an implicit subscription is assumed where the IMS AS notifies a configured or discovered the NF consumer of a call event through a Notify.

Table 5.2.2.1-1: Service operations supported by the Nimsas_SessionEventControl service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Notify	Notification about IMS session control events of a specific IMS subscriber.	Subscribe/Notify	DCSF

5.2.2.1A Subscribe

This is a pseudo operation, the IMS AS does not actually provide Subscribe service operation through Nimsas_SessionEventControl service in this Release. The actual subscription is implicitly subscribed with the SessionEventNotificationUri.

5.2.2.2 Notify

5.2.2.2.1 General

This service operation is invoked by IMS AS and used to enable the IMS AS to notify the NF service consumers (e.g. DCSF) of IMS session events related to a specific served IMS subscriber requesting use of IMS media (e.g. data channel media).

5.2.2.2.2 Notification for Session Event

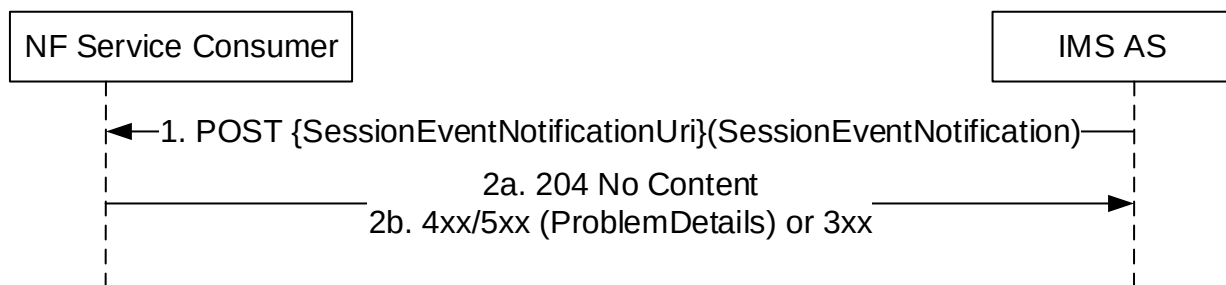


Figure 5.2.2.2-1: Notification for Session Event

1. If the IMS AS observes the IMS session control events of a specific IMS subscriber that requesting use of IMS data channel media, and it determines based on the IMS subscriber's service profile that the events need to be notified to the DCSF, the IMS AS shall send a POST request to the SessionEventNotificationUri as specified in clause 6.1.5.2.2.

The IMS AS discovers the DCSF and its session event notification URI based on local configuration or via NRF, as specified in clause AC.7.1 of 3GPP TS 23.228 [14].

Based on the operators's policy, if the terminating IMS AS observes the IMS session control events based on the terminating IMS subscriber's DC subscription and DC capability that the events need to be notified to the DCSF, the IMS AS shall send a POST request to the SessionEventNotificationUri as specified in clause 6.1.5.2.2.

- 2a. Upon success, the NF Service Consumer responds with "204 No Content". The NF service consumer may invoke the Nimsas_MediaControl service before sending the session event notification response to IMS AS if the NF service consumer determines that media resources for data channel are needed.
- 2b. On failure or redirection:
 - If the NF Service Consumer does not consider the "SessionEventNotificationUri" as a valid notification URI, the NF Service Consumer shall return "404 Not Found" status code with the ProblemDetails IE providing details of the error.
 - In the case of redirection, the NF service consumer shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another NF service consumer endpoint. A RedirectResponse IE may be included in the content of POST response.

5.3 Nimsas_MediaControl Service

5.3.1 Service Description

The Nimsas_MediaControl service enables the consumer to control IMS AS handling of media flow within an IMS session. The service can be used by the consumer before responding to a Nimsas_SessionEventControl_Notity request.

If interworking between DC capable UE and non-DC capable UE is supported, the Nimsas_MediaControl shall support to indicate transforming data channel media to video media.

5.3.2 Service Operations

5.3.2.1 Introduction

The Service operations defined for the Nimsas_MediaControl service are as follows:

- **MediaInstruction:** It provides instructions to the IMS AS for all media flows a consumer wants to control based on its policies for the received IMS session event, and that may require media resource reservation on MF.

NOTE: For the case when a specific media flow needs to be terminated in MF media resource (i.e. termination of a Data Channel media descriptor offered by one of the IMS subscribers) or originated by the MF (i.e. origination of a data channel media descriptor to be offered towards one of the IMS subscribers), the consumer must provide a complete MF media specification including information required by MF to know how to terminate or originate the media flow.

Table 5.3.2.1-1: Service operations supported by the Nimsas_MediaControl service

Service Operations	Description	Operation Semantics	Example Consumer(s)
MediaInstruction	Instructions to the IMS AS for all media flows a consumer wants to control based on its policies for the received IMS session event	Request/Response	DCSF

5.3.2.2 MediaInstruction

5.3.2.2.1 General

This service operation provides instructions to the IMS AS for all media flows a consumer wants to control based on its policies for the received IMS session event, and that may require resource reservation in media resource

The MediaInstruction service operation defined for Nimsas_MediaControl service is used:

- to enable the NF consumer to instruct the IMS AS how to manage the MF media resource. E.g., setting up the bootstrap data channel with MF both for originating and terminating side, terminating the media flow of the originating UE to MF and updating the MF resource with MDC2 media endpoint information of DC Application Server.

5.3.2.2.2 Media Instruction

Figure 5.3.2.2.2-1 shows a scenario where the NF service consumer (e.g. DCSF) sends a request to the IMS AS to instruct the IMS AS how to manage the MF media resource. The request contains the IMS session identity ({sessionId}) which is assigned by the IMS AS during the IMS session setup and will be notified to consumer via Nimsas_SessionEventControl notify service operation. After that, the consumer shall reuse the session ID it received from the IMS AS for referencing the same session.

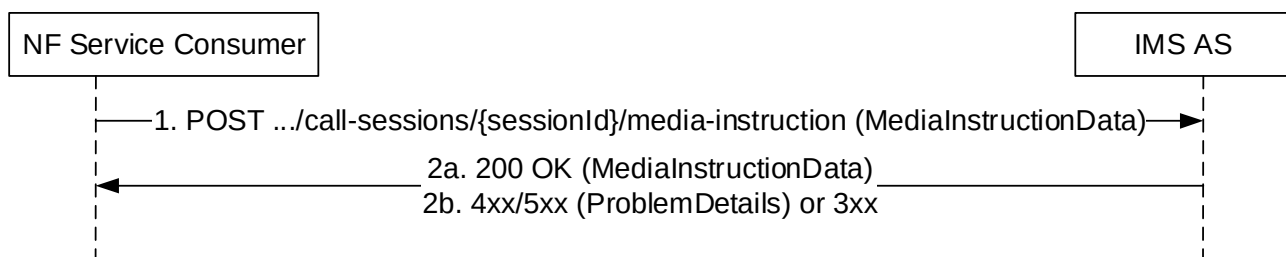


Figure 5.3.2.2.2-1: Media instruction from NF service consumer

1. The NF service consumer shall send a POST request to the resource representing the individual session resource in the IMS AS. The payload body of the POST request shall contain the media instructions for all the media flows that the NF Service Consumer want to control based on its policies for the received IMS session event via Nimsas_SessionEventControl notification.

For the scenario of interworking via MF, the NF service consumer should instruct the data channel media with "TERMINATE_MEDIA" in data type MediaInstructions and indicate to negotiate the video media with "audioVideoReNegotiationInd" in data type MediaInstructions.

2a. Upon success, the IMS AS responds with "200 OK" with the message body containing a representation of the created media instruction data.

2b. On failure or redirection:

In the case of failure, one of the HTTP status code listed in Table 6.2.3.2.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.2.3.2.4.2.2-2.

In the case of redirection, the NF service producer shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another NF service producer endpoint.

5.4 Nimsas_ImsSessionManagement Service

5.4.1 Service Description

The Nimsas_ImsSessionManagement service enables the NF service consumer to request IMS AS to create or release an IMS session or modify the media in a specific IMS session, or enables the IMS AS to notify the IMS session events to the interested NF service consumer.

5.4.2 Service Operations

5.4.2.1 Introduction

The service operations defined for the Nimsas_ImsSessionManagement service are as follows:

- Create: It allows the NF consumer to create an IMS session with standalone data channel media.
- Update: It allows the the NF consumer to modify the media in a specific IMS session, such as adding, updating or removing the corresponding data channel media.
- Delete: It allows the NF consumer to release the specific IMS session with standalone data channel media.
- Notify: It allows the IMS AS to notify the subscribed IMS session events to the NF consumer.

Table 5.4.2.1-1: Service operations supported by the Nimsas_ImsSessionManagement service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Create	Create an IMS session with standalone data channel media.	Request/Response	NEF, trusted AF
Update	Modify the media in a specific IMS session.	Request/Response	NEF, trusted AF
Delete	Release a specific IMS session with standalone data channel media.	Request/Response	NEF, trusted AF
Notify	Notify the IMS session events.	Subscribe/Notify	NEF, trusted AF

5.4.2.2 Create Service Operation

5.4.2.2.1 General

This service operation is used by the service consumer (e.g AF, NEF) to create an IMS session with standalone data channel media.

5.4.2.2.2 Creation of a new IMS session

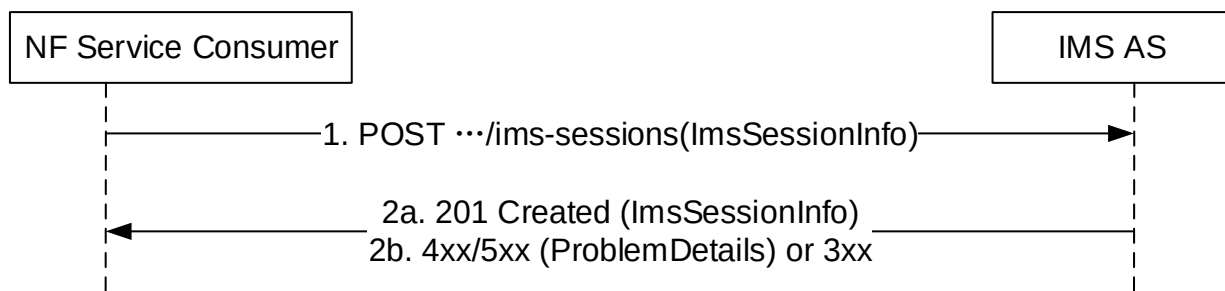


Figure 5.4.2.2.2-1: Creation of a new IMS session

1. The NF Service Consumer shall send a POST request to create an "Individual IMS Session" resource in the IMS AS. The payload body of the POST request shall contain a representation of the individual IMS session resource (ImsSessionInfo) to be created.

If the "notifUri" and "notifCorrelationId" attributes are included within the "ImsSessionInfo" data type, this request creates an implicit subscription to IMS session event notification related to this session.

- 2a. Upon the reception of the HTTP POST request, if the request is accepted and no error occur, the IMS AS shall create a new session ID for the session and the mediaCorrelationId for each media used in the IMS session.

The IMS AS shall include a HTTP Location header to provide the location of a newly created resource (ImsSessionInfo) together with the status code 201 Created indicating the requested resource is created in the response message.

- 2b. On failure, one of the HTTP status code listed in table 6.3.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.3.3.2.3.1-3.

On redirection, the IMS AS shall include 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.4.2.3 Update Service Operation

5.4.2.3.1 General

This service operation is used by the service consumer (e.g. AF, NEF) to modify the media in a specific IMS session, such as creating or closing application data channel(s).

5.4.2.3.2 Partial updating an existing IMS session

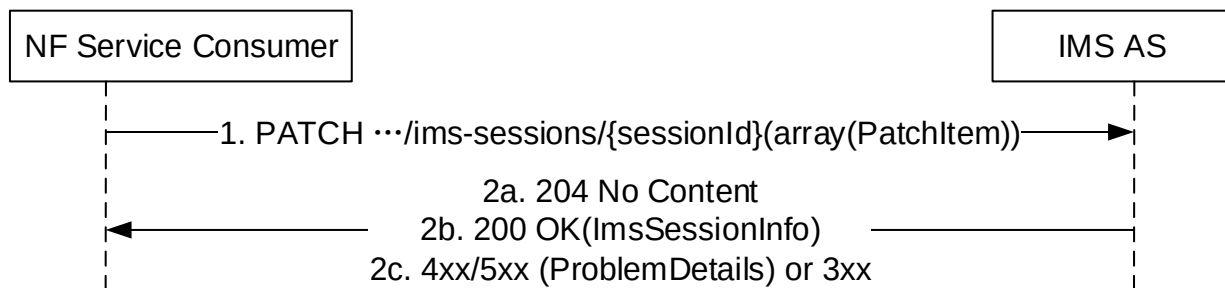


Figure 5.4.2.3.2-1: Update an IMS session

1. The NF Service Consumer shall send a PATCH request to modify an "Individual IMS Session" resource in the IMS AS. The modification may be for adding, updating or deleting a media in the existing IMS session.

For adding, removing or updating a media in an existing ImsSessionInfo, the payload body of the PATCH request shall contain an "add", "remove" or "replace" PATCH operation respectively, with one item of the attribute "mediaInfoSet" of the ImsSessionInfo. The IMS AS shall use the mediaCorrelationId to check whether the operated media exists in the IMS session.

If the payload of the PATCH request includes the "notifUri" and "notifCorrelationId" within the "ImsSessionInfo" data type, this request creates an implicit subscription to IMS session event notification related to this session.

- 2a. On success, if the change is to delete the existing media and IMS AS accepts the request change, the IMS AS shall return the status code 204 No Content.
- 2b. On success, if the change is to add a new media or to update the existing media within an IMS session and the IMS AS accepts the request change, the IMS AS shall return the status code 200 OK. The response shall contain the new resource representation of the resource Individual IMS Session, which includes the added and modified resource or its sub-resource.
- 2c. On failure, one of the HTTP status code listed in table 6.3.3.3.1-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.3.3.3.1-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.4.2.3.3 Updating an existing IMS session

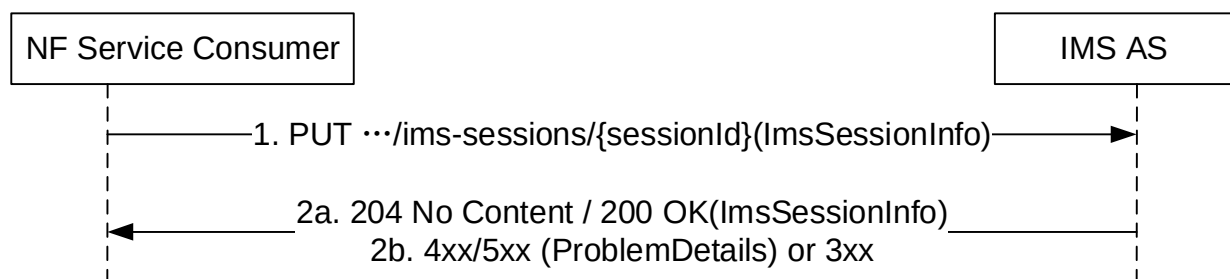


Figure 5.4.2.3.3-1: Updating an existing IMS session

1. The NF Service Consumer shall send a PUT request with the Resource URI "{apiRoot}/nimsas-ism/<apiVersion>/ims-sessions/{sessionId} " to update an "existing IMS session" resource in the IMS AS identified by the {sessionId}.
- 2a. On success, the IMS AS shall return the status code "204 No Content" or "200 OK" with the resource representation of the updated resource Individual Ims Event Subscription.
- 2b. On failure, one of the HTTP status code listed in table 6.4.3.3.2-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.3.2-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.4.2.4 Delete Service Operation

5.4.2.4.1 General

This service operation is used by the service consumer (e.g. AF, NEF) to release the specific IMS session.

5.4.2.4.2 Releasing an existing IMS Session

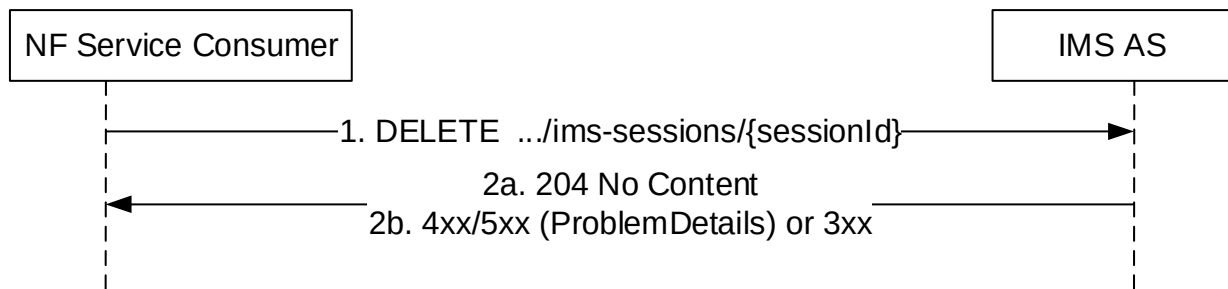


Figure 5.4.2.4.2-1: Releasing an existing IMS Session

1. The NF service consumer shall send a DELETE request to delete an existing Individual IMS Session resource in the IMS AS.
- 2a. On success, the request is accepted, the IMS AS shall reply with the status code "204 No Content" indicating that the resource identified by sessionId is successfully deleted in the response message.
- 2b. On failure, one of the HTTP status codes listed in table 6.3.3.3.2-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.3.3.3.2-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.4.2.5 Notify

5.4.2.5.1 General

This service operation is invoked by IMS AS and used to enable the IMS AS to notify the NF service consumers (e.g. NEF, trusted AF) of IMS session events related to a specific IMS subscriber.

5.4.2.5.2 Notification for IMS Session Event

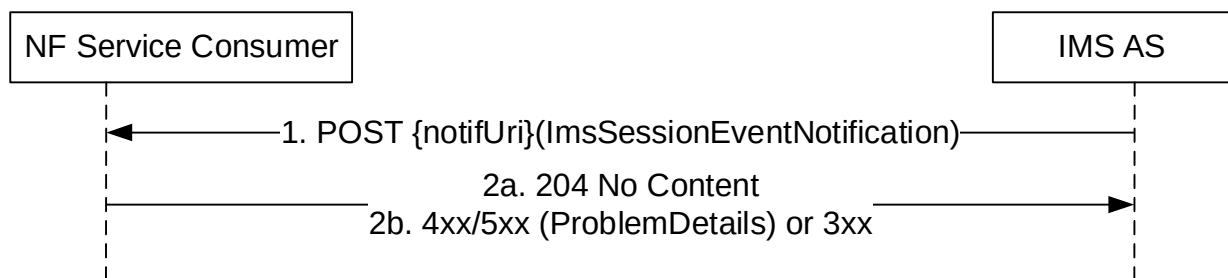


Figure 5.4.2.5.2-1: Notification for IMS Session Event

1. If the IMS AS detects the IMS session events of a specific IMS subscriber, and it determines based on the event subscriptions that the IMS session events need to be notified to the NF service consumer, the IMS AS shall send a POST request to the notifUri as specified in clause 6.3.5.2.2.
- 2a. Upon success, the NF Service Consumer responds with "204 No Content".
- 2b. On failure or redirection:
 - If the NF Service Consumer receives a notification from IMS AS for session event that is not found for the service consumer, the NF Service Consumer shall return "404 Not Found" status code with the ProblemDetails IE providing details of the error.

- In the case of redirection, the NF service consumer shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another NF service consumer endpoint. A RedirectResponse IE may be included in the content of POST response.

5.5 Nimsas_EventExposure Service

5.5.1 Service Description

The Nimsas_EventExposure service enables the service consumer (e.g. HSS on behalf of NEF) to subscribe to subscriber related events so that originally subscribing NF (e.g. NEF) is notified about the subscribed events detected by IMS AS (see 3GPP TS 23.228 [14]).

The Nimsas_EventExposure service enables the service consumer (e.g. NEF) to subscribe to the non-subscriber related events (e.g. any UE) and to be notified about the subscribed events detected by IMS AS (see 3GPP TS 23.228 [14]).

5.5.2 Service Operations

5.5.2.1 Introduction

The service operations defined for the Nimsas_EventExposure service are as follows:

- **Subscribe:** It allows the NF consumer to subscribe for a specific subscriber or non-subscriber related IMS event.
- **Unsubscribe:** It allows the the NF consumer to delete the subscription for a specific subscriber or non-subscriber related event.
- **Notify:** It allows the IMS AS to notify the specific subscriber or non-subscriber related event to NFs (e.g. NEF). This service operation reports the information associated with a subscribed event.

Table 5.5.2.1-1: Service operations supported by the Nimsas_EventExposure service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Subscribe	Subscribe to a specific subscriber or non-subscriber related IMS event.	Subscribe/Notify	NEF, HSS, trusted AF
Unsubscribe	Delete the subscription to a specific subscriber or non-subscriber related IMS event.	Subscribe/Notify	NEF, HSS, trusted AF
Notify	Notification about events detected by IMS AS.	Subscribe/Notify	NEF, trusted AF

5.5.2.2 Subscribe

5.5.2.2.1 General

This service operation is used by the service consumer (e.g HSS, NEF) to subscribe the IMS events on the IMS AS or update an existing subscription on the IMS AS.

The IMS AS may offer this service as a Service Producer to enable an NF to subscribe to event notifications, e.g. on behalf of another NF, and get notified about an event.

The IMS AS shall include the events it supports as part of its NF profile registered in NRF.

NOTE: The events supported by IMS AS in the NF profile can be known or unknown. The NF consumer (e.g. HSS) does not need to know the semantics of an unknown event.

5.5.2.2.2 Subscription for event notifications

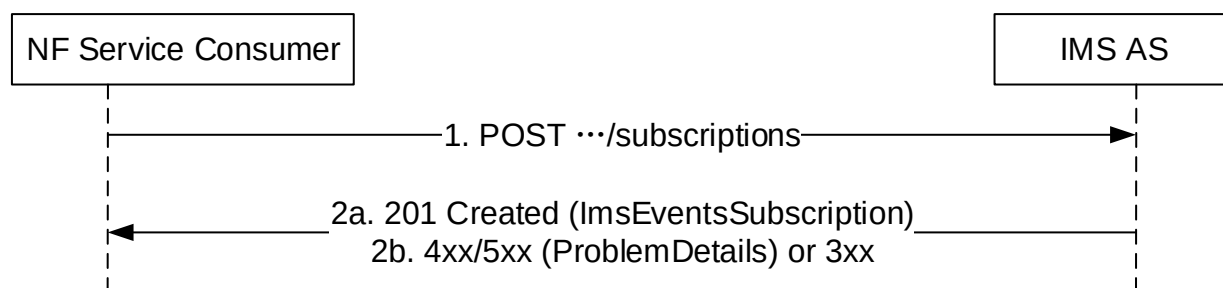


Figure 5.5.2.2.2-1: Creation of a new subscription

1. The NF Service Consumer shall send a POST request to create an "Individual IMS Event Subscription" resource in the IMS AS. The payload body of the POST request shall contain a representation of the individual IMS event subscription resource (ImsEventsSubscription) to be created. The request may contain an expiry time representing the time upto which the subscription is to be kept active (i.e. the time after which the subscribed event(s) shall stop generating reports).

- 2a. Upon the reception of the HTTP POST request, if the request is accepted and no error occur, the IMS AS shall create a new subscription ID for the subscription.

The IMS AS shall include a HTTP Location header to provide the location of a newly created resource (ImsEventsSubscriptionCreated) together with the status code "201 Created" indicating the requested resource is created in the response message. The response may include an expiry time, which may be equal to the requested expiry time or lower.

- 2b. On failure, one of the HTTP status code listed in table 6.4.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.2.3.1-3.

On redirection, the IMS AS shall include 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.5.2.2.3 Updating an existing subscription

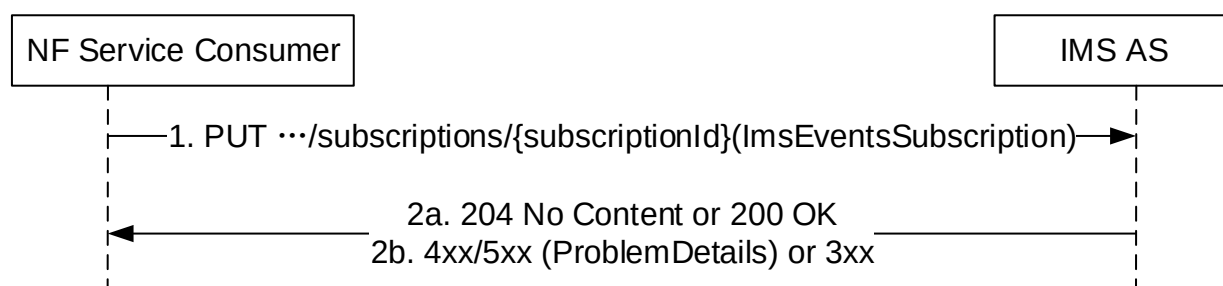


Figure 5.5.2.2.3-1: Updating an existing subscription

1. The NF Service Consumer shall send a PUT request with the Resource URI "{apiRoot}/nimsas-ee/<apiVersion>/subscriptions/{subscriptionId}" to update an "Individual IMS Event Subscription" resource in the IMS AS identified by the {subscriptionId}. The ImsEventsSubscription data structure provided in the request body shall include the same contents as described in clause 5.5.2.2.2.

- 2a. On success, the IMS AS shall return the status code "204 No Content" or "200 OK" with the resource representation of the updated resource Individual Ims Event Subscription.

- 2c On failure, one of the HTTP status code listed in table 6.4.3.3.2-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.3.2-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.5.2.2.4 Subscription Partial Update

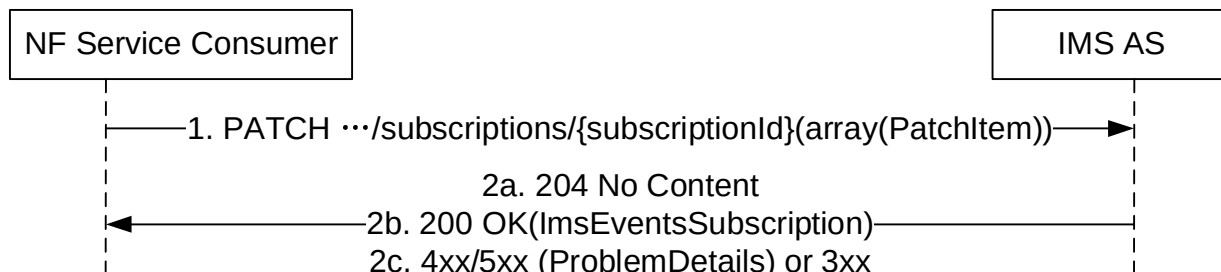


Figure 5.5.2.2.4-1: Partially update a subscription

1. The NF Service Consumer shall send a PATCH request to modify an "Individual IMS Event Subscription" resource in the IMS AS identified by the {subscriptionId}. The content of the PATCH request shall contain the list of operations (add/delete/replace) to be applied to the subscription; these operations may be directed to individual parameters of the subscription or to the list of the subscribed events.
- 2a. On success, if the change is to delete the events to be subscribed and IMS AS accepts the request change, the IMS AS shall return the status code 204 No Content.
- 2b. On success, if the change is to add new events to be subscribed or to update the existing subscribed event within a subscription and the IMS AS accepts the request change, the IMS AS shall return the status code 200 OK. The response shall contain the new resource representation of the resource Individual IMS Event Subscription.
- 2c. On failure, one of the HTTP status code listed in table 6.4.3.3.3.3-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.3.3.3-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.5.2.3 Unsubscribe

5.5.2.3.1 General

This service operation is used by the service consumer (e.g. HSS, NEF) to unsubscribe from event notifications.

5.5.2.3.2 Unsubscribe from notifications

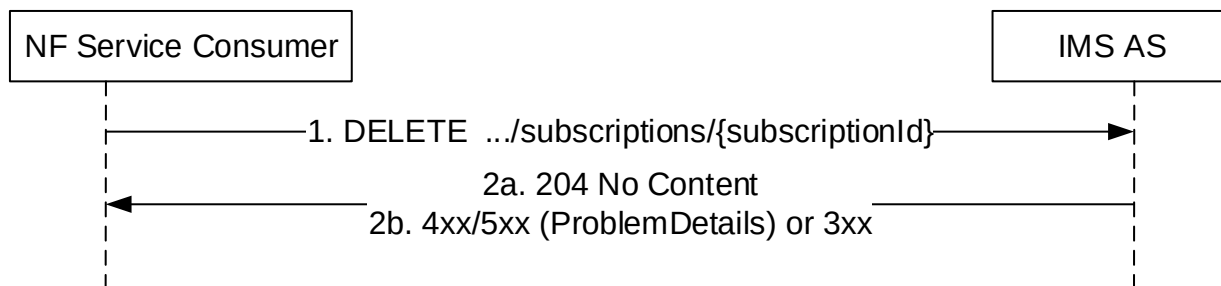


Figure 5.5.2.3.2-1: Unsubscribe from notifications

1. The NF service consumer shall send a DELETE request to delete an existing Individual IMS Event Subscription resource in the IMS AS.

2a. On success, the request is accepted, the IMS AS shall reply with the status code "204 No Content" indicating that the resource identified by subscriptionId is successfully deleted in the response message.

2b. On failure, one of the HTTP status code listed in table 6.4.3.3.2-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.3.2-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.5.2.4 Notify

5.5.2.4.1 General

This service operation is used by the IMS AS to enables the IMS AS to notify the NF service consumers (e.g. HSS, NEF) of IMS session events related to a specific served IMS subscriber requesting use of IMS media (e.g. data channel media).

5.5.2.4.2 Notification for IMS Event

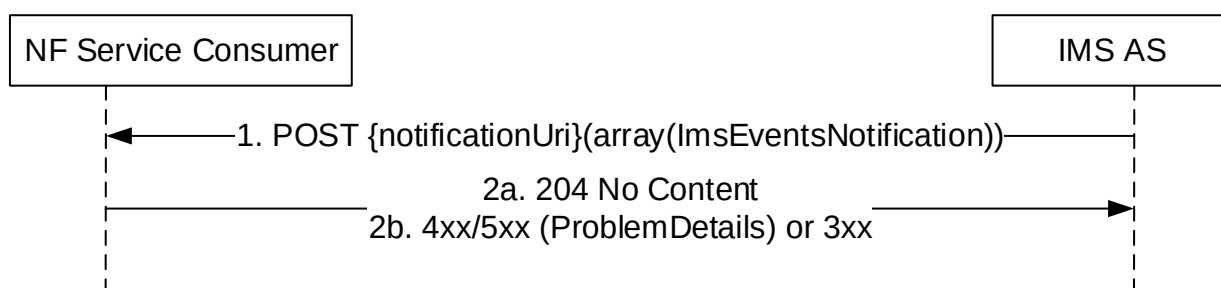


Figure 5.2.2.2-1: Notification for IMS Event

1. If the IMS AS observes the IMS events of a specific IMS subscriber, the IMS AS shall send a POST request to the request with "{notificationURI}" received in the Nimsas_ImsEE_Subscribe service operation as Resource URI.

2a. Upon success, the NF Service Consumer responds with "204 No Content".

2b. On failure or redirection:

- If the NF Service Consumer receives a notification from IMS AS for IMS event subscription that is not found for the service consumer, the NF Service Consumer shall return "404 Not Found" status code with the ProblemDetails IE providing details of the error.
- In the case of redirection, the NF service consumer shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another NF service consumer endpoint. A RedirectResponse IE may be included in the content of POST response.

5.5.2.5 Subscription Info Retrieval

5.5.2.5.1 General

This service operation allows the retrieval of subscription information.

5.5.2.5.2 Subscription Info Retrieval

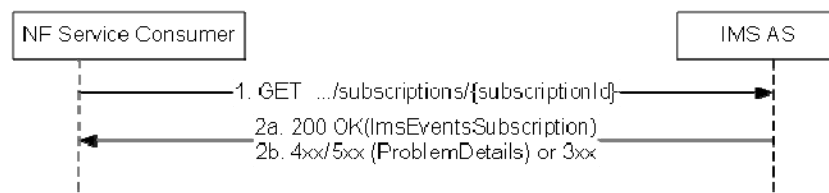


Figure 5.5.2.4.2-1: Subscription info retrieval

1. The NF Service Consumer shall send an HTTP GET request to the resource URI "subscription" collection resource.
- 2a. On success, the IMS AS shall return the status code 200 OK. The response shall contain the resource representation of the resource Individual IMS Event Subscription.
- 2b. On failure, one of the HTTP status codes listed in table 6.4.3.3.1-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.4.3.3.1-3.

On redirection, the IMS AS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint to another IMS AS (service) instance.

5.6 Nimsas_ImsParameterProvision Service

5.6.1 Service Description

The Nimsas_ImsParameterProvision service enables the service consumer (e.g. the NEF or trusted AF) to provision the IMS user related information for the target IMPU to support the 3rd party user identity information (see 3GPP TS 23.228 [14]).

5.6.2 Service Operations

5.6.2.1 Introduction

The service operations defined for the Nimsas_ImsParameterProvision service are as follows:

- Create: It allows the NF consumer to provision the IMS user related information for a target subscriber.
- Update: It allows the NF consumer to update the IMS user related information for a target subscriber.
- Delete: It allows the NF consumer to delete the IMS user related information for a target subscriber.

Table 5.6.2.1-1: Service operations supported by the Nimsas_ImsParameterProvision service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Create	Create the IMS user related information for a target subscriber.	Request/Response	NEF, trusted AF
Update	Update the IMS user related information for a target subscriber.	Request/Response	NEF, trusted AF
Delete	Delete the IMS user related information for a target subscriber.	Request/Response	NEF, trusted AF

5.6.2.2 Create Service Operation

5.6.2.2.1 General

This service operation is used by the service consumer (e.g. the NEF) to create the IMS Parameter Provisioning Data entry for a certain AF which contains the IMS user related information (e.g., RCD URL, RCD server address or RCD information for the target IMPU).

5.6.2.2.2 Creation of the Parameter Provisioning Data Entry per AF

The request contains the IMS UE's identity ($\{imsUeId\}$) which shall be an IMPU.

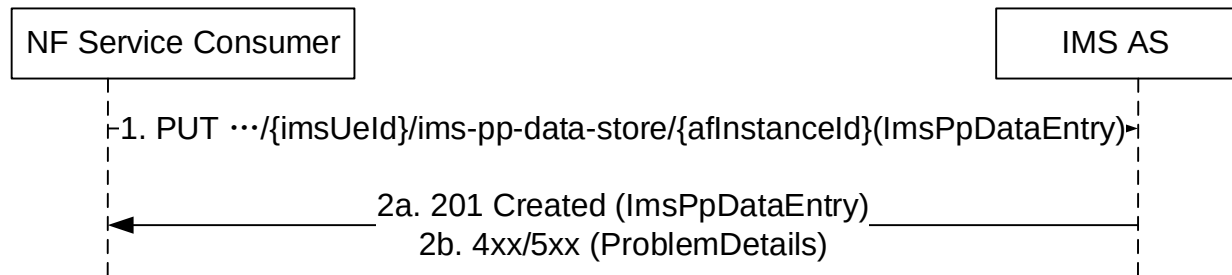


Figure 5.6.2.2.2-1: Creation of the IMS Parameter Provisioning Data Entry per AF

1. The NF Service Consumer (e.g. the NEF) sends a PUT request to the resource that represents the new IMS Parameter Provisioning Data entry for the AF identified by the `afInstanceId`. The request body shall contain an `ImsPpDataEntry` object representing the value of the new resource.
- 2a. Upon the reception of the HTTP PUT request, if the request is accepted and no error occurs, the IMS AS shall respond with "201 Created" and the response body shall contain the `ImsPpDataEntry` object representing the new created resource.
- 2b. On failure, one of the HTTP status codes listed in table 6.5.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a `ProblemDetails` structure with the "cause" attribute set to one of the application errors listed in table 6.5.3.2.3.1-3.

5.6.2.3 Update Service Operation

5.6.2.3.1 General

This service operation is used by the service consumer (e.g. the NEF) to modify the IMS Parameter Provisioning Data entry for a certain AF which contains the IMS user related information (e.g., RCD URL, RCD server address or RCD information for the target IMPU).

5.6.2.3.2 Updating the Parameter Provisioning Data Entry per AF

The request contains the IMS UE's identity ($\{imsUeId\}$) which shall be an IMPU.

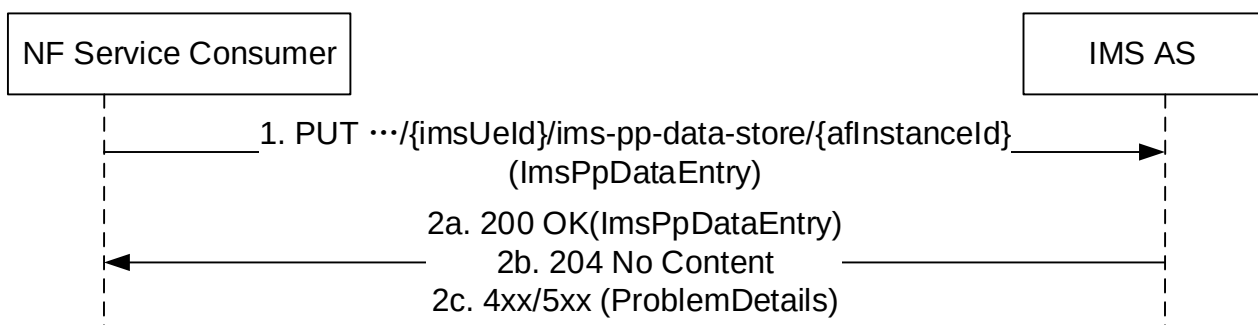


Figure 5.6.2.3.2-1: Update the IMS Parameter Provisioning Data Entry per AF

1. The NF Service Consumer shall send a PUT request to modify the resource that represents the IMS Parameter Provisioning Data entry for the AF identified by the afInstanceId. The request body shall contain an ImsPpDataEntry object representing the value of the modified resource.
- 2a., 2b. On success, the IMS AS shall return the status code "200 OK" with the resource representation of the updated resource ImsPpDataEntry or "204 No Content".
- 2c. On failure, one of the HTTP status codes listed in table 6.5.3.3.1-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.5.3.3.1-3.

5.6.2.4 Delete Service Operation

5.6.2.4.1 General

This service operation is used by the service consumer (e.g. AF, NEF) to delete the IMS user related information for a target subscriber.

5.6.2.4.2 Deleting the Parameter Provisioning Data Entry per AF

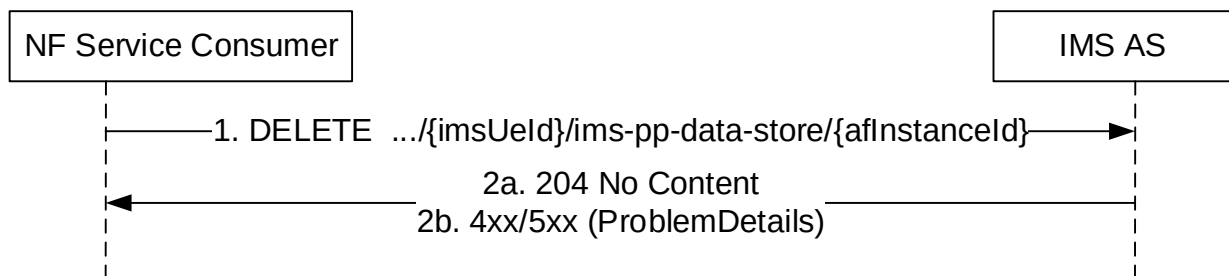


Figure 5.6.2.4.2-1: Deleting the IMS Parameter Provisioning Data Entry per AF

1. The NF service consumer shall send a DELETE request to delete the resource that represents the IMS Parameter Provisioning Data entry for the AF identified by the afInstanceId.
- 2a. On success, the request is accepted, the IMS AS shall reply with the status code "204 No Content" indicating that the resource identified by ImsPpDataEntry is successfully deleted in the response message.
- 2b. On failure, one of the HTTP status codes listed in table 6.5.3.3.2-3 indicating the error shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in table 6.5.3.3.2-3.

6 API Definitions

6.1 Nimsas_SessionEventControl Service API

6.1.1 API URI

The Nimsas_SessionEventControl service shall use the Nimsas_SessionEventControl API.

The API URI of the Nimsas_SessionEventControl API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "nimsas-sec".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

6.1.2 Usage of HTTP

6.1.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nimsas_SessionEventControl API is contained in Annex A.

6.1.2.2 HTTP standard headers

6.1.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

6.1.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

6.1.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.1.3 Resources

6.1.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.1.3.1-1 depicts the resource URIs structure for the Nimsas_SessionEventControl service API.

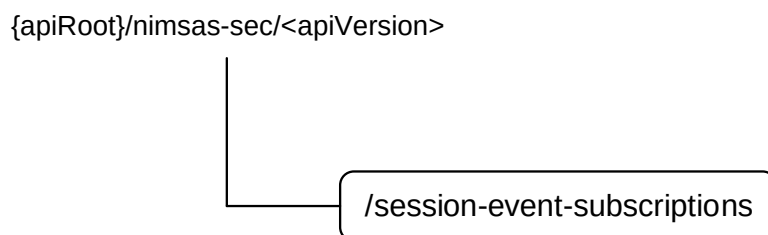


Figure 6.1.3.1-1: Resource URI structure of the Nimsas_SessionEventControl API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
Session Event Subscriptions (Collection)	/session-event-subscriptions	POST	This is a pseudo resource.

6.1.3.2 Resource: Session Event Subscriptions

6.1.3.2.1 Description

6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nimsas-sec/<apiVersion>/session-event-subscriptions

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
Any			

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a				
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

6.1.3.2.4 Resource Custom Operations

None.

6.1.4 Custom Operations without associated resources

None in this release of the specification.

6.1.5 Notifications

6.1.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Session Event Notification	{SessionEventNotificationUri}	POST	Report the session event observed.

6.1.5.2 Session Event Notification

6.1.5.2.1 Description

The Session Event Notification is used by the IMS AS to report the observed Session Event to notification endpoints.

6.1.5.2.2 Target URI

The Callback URI "{SessionEventNotificationUri}" shall be used with the callback URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Callback URI variables

Name	Definition
SessionEventNotificationUri	The notification URI of the Service Consumer (i.e., DCSF) to receive the session events. In this release, the SessionEventNotificationUri of the Service Consumer is locally configured in the IMS AS or discovered by the IMS AS via NRF (in the default notification subscription with the "DC_SESSION_EVENT_NOTIFICATION" notification type).

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-1.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
SessionEventNotification	M	1	The session event notification to notification endpoints.

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	This case represents a successful notification of the event.
ProblemDetails	O	0..1	404 Not Found	Indicates the session event notification has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - USER_NOT_FOUND, e.g. if the NF Service Consumer (e.g. DCSF) does not serve this service user; - NOTIFICATION_URI_NOT_FOUND, if the NF Service Consumer (e.g. DCSF) considers the "SessionEventNotificationUri" is not recognized.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.5.2.3-3: Headers supported by the 307 Response Code on this endpoint

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF instance ID towards which the notification is redirected

Table 6.1.5.2.3-4: Headers supported by the 308 Response Code on this endpoint

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF instance ID towards which the notification is redirected

6.1.6 Data Model

6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Nimsas_SessionEventControl service based interface protocol.

Table 6.1.6.1-1: Nimsas_SessionEventControl specific Data Types

Data type	Clause defined	Description
SessionEventNotification	6.1.6.2.2	The session event notification item.
NotificationEvent	6.1.6.2.3	The notification event information.
SessionInfo	6.1.6.2.4	The session information related to the notification event.
MediaInfo	6.1.6.2.5	The media information related to the notification event.
DcMediaSpec	6.1.6.2.6	The data channel media specification information which includes media description attributes.
QosHintInfo	6.1.6.2.7	The QoS requirement of the media.
EventType	6.1.6.3.3	The type of the event for which the notification is generated.
MediaType	6.1.6.3.4	The type of the media for which the notification is generated.
SessionCase	6.1.6.3.5	The type of the session case.
EventInitiator	6.1.6.3.6	The initiator of the event for which the notification is generated.
PsDataOffStatus	6.1.6.3.7	The active/inactive status of PS Data Off for a served UE.

Table 6.1.6.1-2 specifies data types re-used by the Nimsas_SessionEventControl service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nimsas_SessionEventControl service based interface.

Table 6.1.6.1-2: Nimsas_SessionEventControl re-used Data Types

Data type	Reference	Comments
ImsPublicId	3GPP TS 29.562 [15]	IMS Public Identity.
DcStream	3GPP TS 29.571 [16]	Data Channel mapping and configuration information.
MaxMessageSize	3GPP TS 29.571 [16]	Maximum message size of to be expected.
DcEndpoint	3GPP TS 29.571 [16]	local or remote endpoint for the Data Channel.
SessionId	3GPP TS 29.571 [16]	IMS Session Identity.
MediaId	3GPP TS 29.571 [16]	IMS media flow identity.
BdcUsedBy	3GPP TS 29.571 [16]	The party using the bootstrap data channel.
AppBindingInfo	3GPP TS 29.571 [16]	The application binding information of the application data channel.
MediaInfoExternal	6.3.6.2.4	The media related information.

6.1.6.2 Structured data types

6.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.1.6.2.2 Type: SessionEventNotification

Table 6.1.6.2.2-1: Definition of type SessionEventNotification

Attribute name	Data type	P	Cardinality	Description
notificationEvent	NotificationEvent	M	1	The NotificationEvent corresponds to a report on one subscribed event.
sessionId	SessionId	M	1	The session ID is the identity of the IMS session for which the event relates to. This IE contains the information in the Call-ID header which is the typical header of SIP message.
sessionInfo	SessionInfo	C	0..1	The sessionInfo is the IMS session related information, e.g. the calling and called identity. It shall be contained when the attribute eventType of the notificationEvent is one of the "SESSION_ESTABLISHMENT_REQUEST", "MEDIA_CHANGE_REQUEST", "EXTERNAL_SESSION_CREATE", "SESSION_ESTABLISHMENT_SUCCESS" (NOTE).
mediaInfoList	map(MediaInfo)	C	1..N	Media info list includes a list of media related information, e.g. media identity, media type and media specifications. The mediaId attribute within the MediaInfo data type is the key of the map. It shall be contained when the attribute eventType of the notificationEvent is one of the "SESSION_ESTABLISHMENT_REQUEST", "SESSION_ESTABLISHMENT_PROGRESS", "SESSION_ESTABLISHMENT_ALERTING", "SESSION_ESTABLISHMENT_SUCCESS", "MEDIA_CHANGE_REQUEST", "MEDIA_CHANGE_SUCCESS", "MEDIA_CHANGE_FAILURE", or "MEDIA_CHANGE_CANCEL".
psDataOff	PsDataOffStatus	C	0..1	It indicates the active/inactive status of PS Data Off for the served UE. It shall be present if the attribute eventType of the notificationEvent is set to one of the following: - "SESSION_ESTABLISHMENT_REQUEST", when IMS session establishment is invoked; - "PS_DATA_OFF_STATUS_CHANGE", when the status change of PS Data Off happens without any other changes to the IMS session; It may be present in other cases if the change of PS Data Off status happens together with other events (e.g. media changes).
mediaInfoSet	array(MediaInfo External)	C	0..1	Media information set includes a set of media information. It shall be contained when the attribute eventType of the notificationEvent is one of the "EXTERNAL_SESSION_UPDATE", "EXTERNAL_SESSION_CREATE"
NOTE: The sessionInfo shall be present when the attribute eventType of the notificationEvent is set to "SESSION_ESTABLISHMENT_SUCCESS" and the originating IMS AS received the redirected-to party identity via the History-Info header field in the 200 OK responses to the initial INVITE request.				

6.1.6.2.3 Type: NotificationEvent

Table 6.1.6.2.3-1: Definition of type NotificationEvent

Attribute name	Data type	P	Cardinality	Description
eventType	EventType	M	1	The event type of the event for which the notification is generated.
eventInitiator	EventInitiator	C	0..1	Event initiator indicates initiator of the event, e.g. "served IMS subscriber", "remote IMS subscriber" or "external party". It shall be contained when the eventType is set to one of the following: - "SESSION_ESTABLISHMENT_REQUEST", - "MEDIA_CHANGE_REQUEST", - "EXTERNAL_SESSION_CREATE".

6.1.6.2.4 Type: SessionInfo

Table 6.1.6.2.4-1: Definition of type SessionInfo

Attribute name	Data type	P	Cardinality	Description
callingIdentity	ImsPublicId	O	0..1	The IMS public identity of the calling IMS subscriber, or a specific Public Service Identity. (NOTE 1)
calledIdentity	ImsPublicId	O	0..1	The IMS public identity of the called IMS Subscriber, or a specific Public Service Identity of DCSF. (NOTE 2)
sessionCase	SessionCase	O	0..1	Indicator to indicate that whether this is an originating IMS session, a terminating IMS session or external initiated IMS session.
NOTE 1: The value of the callingIdentity shall be set to the value of the P-Asserted-Identity header field of the received initial INVITE request, see 3GPP TS 24.186 [19] clause 9.3.2.2 and clause 9.3.3.2.				
NOTE 2: The value of the calledIdentity shall be set to the Request URI of the received initial INVITE request, see 3GPP TS 24.186 [19] clause 9.3.2.2 and clause 9.3.3.2. If communication diversion occurs and the originating IMS AS received the History-Info header field in after receiving the 200 OK responses to the initial INVITE request, the originating IMS AS shall set the calledIdentity attribute based on the received History-Info header field, see 3GPP TS 24.604 [21] clause 4.5.2.7.				

6.1.6.2.5 Type: MediaInfo

Table 6.1.6.2.5-1: Definition of type MediaInfo

Attribute name	Data type	P	Cardinality	Description
mediaId	MediaId	M	1	The media ID uniquely identifies this media item within the list. The identity is allocated by IMS AS.
mediaType	MediaType	M	1	The media type of the media for which the notification is generated.
dcMediaSpec	DcMediaSpec	C	0..1	The data channel media specification includes the relevant media attributes of interest to the consumer. It shall be contained if the mediaType is set to "DC".
mediaSuspended	boolean	C	0..1	This IE indicates whether the media is suspended or not. It shall be contained if the media is suspended or resumed as specified in 3GPP TS 24.610 [18] and 3GPP TS 24.186 [19]. - true: the media is suspended. - false: the media is resumed.
mediaRemovalInd	boolean	C	0..1	This IE indicates whether the media is to be removed or not. It shall be only present with true value if the media is to be removed, e.g. removal of bootstrap data channel media during the interaction with supplementary service, or removal of application data channel in other cases. Presence with false value shall be prohibited.

6.1.6.2.6 Type: DcMediaSpec

Table 6.1.6.2.6-1: Definition of type DcMediaSpec

Attribute name	Data type	P	Cardinality	Description
streams	map(DcStream)	M	1..N	Represents the data channel mapping and configuration information when originating/terminating data channel media flows on the Mb interface. The streamId attribute within the DcStream data type is the key of the map. (NOTE)
maxMessageSize	MaxMessageSize	O	0..1	Represents the maximum message size of to be expected. (NOTE)
receivedDcEndpoint	DcEndpoint	M	0..1	Represents the SCTP and DTLS endpoint information for the Data Channel received from the SDP offer/answer. (NOTE)
bdcUsedby	BdcUsedBy	C	0..1	Represents the party using the bootstrap data channel. It shall be present when the mediaId in the data type MediaInfo represents bootstrap data channel and the streamId set to 100 and 110.
appBindingInfo	AppBindingInfo	C	0..1	Represents the application binding information of the application data channel. It shall be present when the mediaId in the data type MediaInfo represents application data channel, and the media is not multiplexed.
multiAppBindingInfo	array(AppBindingInfo)	C	1..N	Represents the multiple application binding informations. It shall be present when the mediaId in the data type MediaInfo represents application data channel and the media is multiplexed. When present, the appDcInfoList within each of the AppBindingInfo shall be included.
qosHintInfo	QosHintInfo	C	0..1	Represents the QoS information that is provided within the SDP media level attribute "a=3gpp-qos-hint". It shall be present when the received SDP offer and SDP answer contains the "a=3gpp-qos-hint" attribute line.
NOTE: The attribute and the value are derived from the SDP received by the IMS AS in a SIP INVITE or a re-INVITE request and the corresponding response related to an IMS Data Channel.				

6.1.6.2.7 Type: QosHintInfo

Table 6.1.6.2.7-1: Definition of type QosHintInfo

Attribute name	Data type	P	Cardinality	Description
loss	number	O	0..1	Represents the maximum desirable end-to-end transport level packet loss rate in percent (without "%" sign) as a zero-based-integer or as a non-zero-real value.
localLoss	number	O	0..1	Represents the maximum desirable end-to-end transport level packet loss rate applied across the local link. It may be included if the loss is included.
latency	number	O	0..1	Represents the maximum desirable end-to-end transport level packet latency in milliseconds as a zero-based-integer or as a non-zero-real value.
localLatency	number	O	0..1	Represents the maximum desirable end-to-end transport level packet latency applied across the local link. It may be included if the loss is included.

6.1.6.3 Simple data types and enumerations

6.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.1.6.3.3 Enumeration: EventType

The enumeration EventType represents the type of the event for which the notification is generated. It shall comply with the provisions defined in table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration EventType

Enumeration value	Description
"SESSION_ESTABLISHMENT_REQUEST"	Session establishment request event.
"SESSION_ESTABLISHMENT_PROGRESS"	Session establishment progress event.
"SESSION_ESTABLISHMENT_ALERTING"	Session establishment alerting event.
"SESSION_ESTABLISHMENT_SUCCESS"	Session establishment success event.
"SESSION_ESTABLISHMENT_FAILURE"	Session establishment failure event.
"SESSION_ESTABLISHMENT_CANCEL"	Session establishment cancel event.
"MEDIA_CHANGE_REQUEST"	Media change request event.
"MEDIA_CHANGE_SUCCESS"	Media change success event.
"MEDIA_CHANGE_FAILURE"	Media change failure event.
"MEDIA_CHANGE_CANCEL"	Media change cancel event.
"SESSION_TERMINATION"	Session termination event.
"EXTERNAL_SESSION_UPDATE"	External session update event.
"EXTERNAL_SESSION_CREATE"	External session create event.
"PS_DATA_OFF_STATUS_CHANGE"	PS Data Off status change event.

6.1.6.3.4 Enumeration: MediaType

The enumeration MediaType represents the type of the media for which the notification is generated. It shall comply with the provisions defined in table 6.1.6.3.4-1.

Table 6.1.6.3.4-1: Enumeration MediaType

Enumeration value	Description
"DC"	Data channel media type.
"AUDIO"	Audio media type.
"VIDEO"	Video media type.

6.1.6.3.5 Enumeration: SessionCase

The enumeration SessionCase represents the type of the session to for which the notification is generated. It shall comply with the provisions defined in table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration SessionCase

Enumeration value	Description
"ORIGINATING_IMS_SESSION"	Originating IMS session.
"TERMINATING_IMS_SESSION"	Terminating IMS session.
"EXTERNAL_INITIATED_IMS_SESSION"	External party initiated IMS session.

6.1.6.3.6 Enumeration: EventInitiator

The enumeration EventInitiator represents the initiator of the event for which the notification is generated. It shall comply with the provisions defined in table 6.1.6.3.6-1.

Table 6.1.6.3.6-1: Enumeration EventInitiator

Enumeration value	Description
"SERVED_IMS_SUBSCRIBER"	Served IMS subscriber.
"REMOTE_IMS_SUBSCRIBER"	Remote IMS subscriber.
"EXTERNAL_PARTY"	External party, i.e. 3rd party.

6.1.6.3.7 Enumeration: PsDataOffStatus

The enumeration PsDataOffStatus represents the active/inactive status of PS Data Off for a served UE. It shall comply with the provisions defined in table 6.1.6.3.7-1.

Table 6.1.6.3.7-1: Enumeration PsDataOffStatus

Enumeration value	Description
"ACTIVE"	PS Data Off status is set to active.
"INACTIVE"	PS Data Off status is set to inactive.

6.1.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

6.1.6.5 Binary data

None in this release of the specification.

6.1.7 Error Handling

6.1.7.1 General

For the Nimsas_SessionEventControl API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nimsas_SessionEventControl API.

6.1.7.2 Protocol Errors

No specific procedures for the Nimsas_SessionEventControl service are specified.

6.1.7.3 Application Errors

The application errors defined for the Nimsas_SessionEventControl service are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description
USER_NOT_FOUND	404 Not Found	The service user is not served by this DCSF, e.g. no data channel configurations for this service user is found.
NOTIFICATION_URI_NOT_FOUND	404 Not Found	The session event notification URI is not recognized by the NF service consumer (i.e. DCSF).

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nimsas_SessionEventControl API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description

6.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nimsas_SessionEventControl API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nimsas_SessionEventControl API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nimsas_SessionEventControl service.

The Nimsas_SessionEventControl API defines a single scope "nimsas-sessioneventcontrol" for the entire service, and it does not define any additional scopes at resource or operation level.

6.1.10 HTTP redirection

An HTTP request may be redirected to a different IMS AS service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different NF consumer (e.g. DCSF) instance will return the NF Instance ID of the new NF consumer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an NF consumer (e.g. DCSF) redirects a service request to a different NF consumer using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NF consumer towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

6.2 Nimsas_MediaControl Service API

6.2.1 API URI

The Nimsas_MediaControl service shall use the Nimsas_MediaControl API.

The API URI of the Nimsas_MediaControl API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "nimsas-mc".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.2.3.

6.2.2 Usage of HTTP

6.2.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nimsas_MediaControl API is contained in Annex A.

6.2.2.2 HTTP standard headers

6.2.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

6.2.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

6.2.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.2.3 Resources

6.2.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.2.3.1-1 depicts the resource URIs structure for the Nimsas_MediaControl service API.

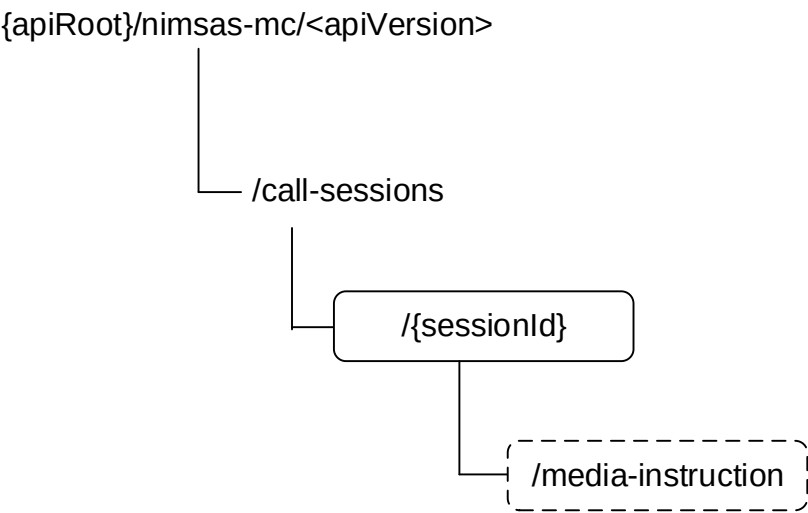


Figure 6.2.3.1-1: Resource URI structure of the Nimsas_MediaControl API

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
Individual call session (Document)	/call-sessions/{sessionId}/media-instruction	media-instruction (POST)	Instructs the IMS AS on how to control the media resources.

6.2.3.2 Resource: Individual call session

6.2.3.2.1 Description

This resource represents an individual call session created in the IMS AS.
 This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/nimsas-mc/<apiVersion>/call-sessions/{sessionId}

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.2.1
sessionId	SessionId	Session ID assigned by the IMS AS during the IMS session setup and will be notified to consumer via Nimsas_SessionEventControl service. The consumer shall reuse the session ID it received from the IMS AS for referencing the same session.

6.2.3.2.3 Resource Standard Methods

None.

6.2.3.2.4 Resource Custom Operations

6.2.3.2.4.1 Overview

Table 6.2.3.2.4.1-1: Custom operations

Operation Name	Custom operation URI	Mapped HTTP method	Description
media-instruction	{resourceUri}/media-instruction	POST	Update call session service operation.

6.2.3.2.4.2 Operation: media-instruction

6.2.3.2.4.2.1 Description

6.2.3.2.4.2.2 Operation Definition

This custom operation updates an individual call session resource and provide a set of media instruction information for a given IMS session, towards IMS AS.

This operation shall support the request data structures specified in table 6.2.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.2.3.2.4.2.2-2.

Table 6.2.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MediaInstructionData	M	1	Representation of the updates to apply to the call session.

Table 6.2.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MediaInstructionData	C	0..1	200 OK	Successful update of the call session, when the IMS AS needs to return information in the response.
n/a			204 No Content	Successful update of the call session, when the IMS AS does not need to return information in the response.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	400 Bad Request	Indicates the media instruction has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - MEDIA_ID_NOT_FOUND
NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.2.3.3.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF instance ID towards which the request is redirected.

Table 6.2.3.3.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected.

6.2.4 Custom Operations without associated resources

None in this release of the specification.

6.2.5 Notifications

None in this release of the specification.

6.2.6 Data Model

6.2.6.1 General

This clause specifies the application data model supported by the API.

Table 6.2.6.1-1 specifies the data types defined for the Nimsas_MediaControl service based interface protocol.

Table 6.2.6.1-1: Nimsas_MediaControl specific Data Types

Data type	Clause defined	Description
ArMediaSpecification	6.2.6.2.5	The AR media specification information needed for AR communication services from application layer.
AudioVideoReNegotiationInd	6.2.6.2.7	The audio/video media re-negotiation indication information to connect the UE's audio/video media stream to MF.
DcMediaSpecification	6.2.6.2.4	The data channel media specification information needed for data channel media stream from application layer.
InterworkingInstruction	6.2.6.2.8	The interworking instruction of data channel transcoding.
Mdc2EndpointInfo	6.2.6.2.6	The MDC2 media endpoint information.
Mdc2AudioVideoEndpoint	6.2.6.2.9	The endpoint information of DC AS for the video media in MDC2 interface.
MediaInstruction	6.2.6.3.3	The media instruction for handling a specific media flow.
MediaInstructionData	6.2.6.2.2	The media instruction data for a specific session.
MediaInstructions	6.2.6.2.3	The media instructions for a specific media flow.
MediaConnSide	6.2.6.3.4	The side that the audio or video media need to be connected to MF. E.g., both the originating and terminating side.
TranscodeMode	6.2.6.3.5	The mode of data channel transcoding.
SendRecvMode	6.2.6.3.6	The send and recv mode of the media stream.

Table 6.2.6.1-2 specifies data types re-used by the Nimsas_MediaControl service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nimsas_MediaControl service based interface.

Table 6.2.6.1-2: Nimsas_MediaControl re-used Data Types

Data type	Reference	Comments
DcStream	3GPP TS 29.571 [16]	Data Channel mapping and configuration information.
MdcEndpoint	3GPP TS 29.571 [16]	The MDC1 and MDC2 Endpoint information.
MaxMessageSize	3GPP TS 29.571 [16]	Maximum SCTP user message size.
Mdc2Protocol	3GPP TS 29.176 [17]	Transport layer protocols for MDC2 interface.
MediaId	3GPP TS 29.571 [16]	IMS media flow identity.
MediaIdRm	3GPP TS 29.571 [16]	IMS media flow identity.
MediaProxy	3GPP TS 29.571 [16]	Media proxy configuration applicable to the media flow.
MediaResourceType	3GPP TS 29.571 [16]	IMS media resource type.
ReplaceHttpUrl	3GPP TS 29.571 [16]	A list of replacement HTTP URL per stream ID.
SessionId	3GPP TS 29.571 [16]	IMS session identity.
Uri	3GPP TS 29.571 [16]	URI
BdcUsedBy	3GPP TS 29.571 [16]	The party using the bootstrap data channel.
AppBindingInfo	3GPP TS 29.571 [16]	The application binding information of the application data channel.
QoSHintInfo	6.1.6.2.7	The QoS hint information of the media.
AvatarMedia	3GPP TS 29.176 [17]	Avatar media specification.
Endpoint	3GPP TS 29.571 [16]	Endpoint information.
AudioVideoMedia	3GPP TS 29.571 [16]	The description of audio and video media.

6.2.6.2 Structured data types

6.2.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.2.6.2.2 Type: MediaInstructionData

Table 6.2.6.2.2-1: Definition of type MediaInstructionData

Attribute name	Data type	P	Cardinality	Description
sessionId	SessionId	M	1	The session ID is the identity of the IMS session for which the MediaInstructions applies.
mediaInstructionSet	map(MediaInstructions)	M	1..N	The mediaInstructionSet includes a set of instructions for each media flow to control. The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [20], with a maximum of 32 characters.

6.2.6.2.3 Type: MediaInstructions

Table 6.2.6.2.3-1: Definition of type MediaInstructions

Attribute name	Data type	P	Cardinality	Description
mediaId	MediaIdRm	M	1	The media ID uniquely identifies this media item within the list and used by the producer (IMS AS) and the consumer for referencing purposes. The consumer reuses the media ID it received from the IMS AS for referencing the same media. This field shall be null for instructions related to originating new media or for data channel media components de-multiplexed from a data channel multiplexing media which do not reuse the media ID of that data channel multiplexing media.
associatedMediaId	MediaId	C	0..1	The identifier of the original multiplexed media stream which is de-multiplexed. It shall be included only when the mediaId is null, mediaInstruction is set to "ORIGINATE" and the media stream identified by the value of this attribute is de-multiplexed.
mediaResourceType	MediaResourceType	M	1	The mediaResourceType identify the Media Resource types the Media instruction is intended for.
mediaInstruction	MediaInstruction	C	0..1	It shall be included if the mediaResourceType is set to "DC". When present, mediaInstruction includes instructions to the producer (IMS AS) for handling the media.
dcMediaSpecification	DcMediaSpecification	C	0..1	Represents the additional media specifications needed for data channel media stream from application layer. It shall be contained if the mediaResourceType is set to "DC".
arMediaSpecification	ArMediaSpecification	O	0..1	Represents the additional media specifications needed for AR communication services from application layer.
mediaProcessingUrl	Uri	C	0..1	The mediaProcessingURL indicates the address where MF receive service-related media instructions. This field shall be contained in the response when originating a new media.
audioVideoReNegotiationInd	AudioVideoReNegotiationInd	C	0..1	Represents the audio/video media re-negotiation indication information to connect the UE's audio/video media stream to MF which is required by the application data channel. It shall be included if the mediaResourceType is set to "AUDIO" or "VIDEO".
mdc2AudioEndpoint	Mdc2AudioVideoEndpoint	C	0..1	Represents the audio media endpoint information in MDC2 interface. It shall be included when the attribute renderingMode within the avatarMedia is set to "NET_CENTRIC_DCAS".
mdc2VideoEndpoint	Mdc2AudioVideoEndpoint	C	0..1	Represents the video media endpoint information in MDC2 interface. It shall be included when the attribute renderingMode within the avatarMedia is set to "NET_CENTRIC_DCAS".
avatarMedia	AvatarMedia	O	0..1	Represents the additional media specifications needed for avatar communication services.

6.2.6.2.4 Type: DcMediaSpecification

Table 6.2.6.2.4-1: Definition of type DcMediaSpecification

Attribute name	Data type	P	Cardinality	Description
mediaProxyConfig	MediaProxy	M	1	Represents the media proxy configuration on the MF. The value shall be set to "HTTP_PROXY" if the mediaId represents the bootstrap data channel. The value shall be set to "DC_APPLICATION_PROXY" if the mediaId represents the network initiated P2P application data channel.
replaceHttpUrls	map(ReplaceHttp Url)	C	1..N	Represents a list of replacement HTTP URL per stream ID allocated by the application layer for the specific IMS subscriber when requesting the application list (e.g. graphical user interface) via the MDC1 interface. It shall be included if the mediaId represents a bootstrap data channel and streamId is 0 or 100. The streamId attribute within the ReplaceHttpUrl data type is the key of the map.
mdc1EndpointDcsf	MdcEndpoint	C	0..1	Represents the MDC1 media endpoint information reserved on DCSF, e.g., the IP address and port number of DCSF. It shall be included in the request of the media instruction if the mediaId represents a bootstrap data channel. (NOTE)
mdc1EndpointMf	MdcEndpoint	C	0..1	Represents the negotiated MDC1 media endpoint information on MF, e.g., the IP address and port number of DC capable MF. It shall be included in the request of the media instruction if the mediaId represents a bootstrap data channel. (NOTE)
mdc2EndpointInfo	Mdc2EndpointInfo	C	0..1	Represents the negotiated MDC2 media endpoint information, e.g., the protocol stack, IP address and port number. It shall be included if in the request of the media instruction the mediaId represents an application data channel.
streams	map(DcStream)	M	1..N	Represents the data channel mapping and configuration information when originating/terminating data channel media flows on the Mb interface. The streamId attribute within the DcStream data type is the key of the map.
bdcUsedby	BdcUsedBy	C	0..1	Represents the party using the bootstrap data channel. It shall be contained when the mediaId in the data type MediaInstructions represents bootstrap data channel and the streamId sets to 100 and 110.
appBindingInfo	AppBindingInfo	C	0..1	Represents the application binding information of the application data channel. It shall be contained when the mediaId in the data type MediaInstructions represents application data channel.
qosHintInfo	QosHintInfo	O	0..1	Represents the QoS information that is provided within the SDP media level attribute "a=3gpp-qos-hint".
interworkingInfo	InterworkingInstruction	O	0..1	Represents how to transcode the data channel media via MF.
dclwKind	boolean	O	0..1	Indicates the DC media is for DC interworking via DC AS. This attribute is set to "true" if the DC media is for DC interworking via DC AS. If the attribute is not present it means it is "false".
NOTE: The MDC1 interface shall use "TCP/TLS/HTTP" protocol stack and the corresponding IP, TCP, TLS and HTTP related attributes in MdcEndpoint should be included.				

6.2.6.2.5 Type: ArMediaSpecification

Table 6.2.6.2.5-1: Definition of type ArMediaSpecification

Attribute name	Data type	P	Cardinality	Description
mediaProcessingSpec	string	M	1	It specifies how the AR media stream should be processed. It indicates how the MF assists in the AR media rendering function.

6.2.6.2.6 Type: Mdc2EndpointInfo

Table 6.2.6.2.6-1: Definition of type Mdc2EndpointInfo

Attribute name	Data type	P	Cardinality	Description
mdc2Protocol	Mdc2Protocol	C	0..1	Represents the transport layer protocol or protocol stack for MDC2 interface when the "HTTP_PROXY" media proxy configuration is used in MF. It shall be included if the value of the mediaProxyConfig within the data type DcMediaSpecification is set to "HTTP_PROXY".
mdc2EndpointDcAs	MdcEndpoint	C	0..1	Represents the negotiated MDC2 media endpoint information on DC AS. It shall be included in the POST request message for the media control. The attributes "tlsId", "sctpPort" and "fingerprint" within the MdcEndpoint shall be present when the value of the mediaProxyConfig within the DcMediaSpecification is set to "UDP_PROXY". (NOTE)
mdc2EndpointMf	MdcEndpoint	C	0..1	Represents the negotiated MDC2 media endpoint information on MF. It shall be included in the successful POST response message for the media control API. The attributes "tlsId", "sctpPort" and "fingerprint" within the MdcEndpoint shall not be present when the value of the mediaProxyConfig within the data type DcMediaSpecification is set to "UDP_PROXY". (NOTE)
NOTE: When the mdc2Protocol is set to "UDP/DTLS/SCTP", "TCP/TLS" or "SCTP/DTLS", the attributes "tlsId" and "fingerprint" within the data type MdcEndpoint shall be included, and the "securitySetup" may be included. When the value of mdc2Protocol is set to "UDP/DTLS/SCTP", the attribute "sctpPort" within the data type MdcEndpoint shall be included.				

6.2.6.2.7 Type: AudioVideoReNegotiationInd

Table 6.2.6.2.7-1: Definition of type AudioVideoReNegotiationInd

Attribute name	Data type	P	Cardinality	Description
reNegotiation	boolean	M	1	When present, the IE shall indicate whether the audio or video media re-negotiation to connect the UE's media stream to MF is required by the application data channel. The media type will be represented by the value of the mediaResourceType. - true: media re-negotiation to connect the UE's audio or video media stream to MF is required. - false: media re-negotiation to connect the UE's audio or video media stream to MF is not required.
mediaConnSide	MediaConnSide	C	0..1	Represent the audio or video media connection side that the application data channel required. It shall be included if the reNegotiation present and the attribute value is set to true.
mediaDirection	SendRecvMode	O	0..1	Represents the media direction of the audio/video media.

6.2.6.2.8 Type: InterworkingInstruction

Table 6.2.6.2.8-1: Definition of type InterworkingInstruction

Attribute name	Data type	P	Cardinality	Description
transcodeMode	TranscodeMode	M	1	Indicates the mode of the media transcoding.
addTransInfo	string	O	0..1	Additional information on how to transcode the data channel media.

6.2.6.2.9 Type: Mdc2AudioVideoEndpoint

Table 6.2.6.2.9-1: Definition of type Mdc2AudioVideoEndpoint

Attribute name	Data type	P	Cardinality	Description
mdc2AVEndpointDCAs	Endpoint	C	0..1	Represents the MDC2 endpoint information on DC AS for audio or video media. It shall be included in the POST request message for the media control.
mdc2AVEndpointMF	Endpoint	C	0..1	Represents the MDC2 endpoint information on MF for audio or video media. It shall be included in the successful POST response message for the media control API.
audioVideoMedia	AudioVideoMedia	C	0..1	Represents the description of audio or video media. It shall be included in the successful POST response message for the media control API.

6.2.6.3 Simple data types and enumerations

6.2.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.2.6.3.2 Simple data types

The simple data types defined in table 6.2.6.3.2-1 shall be supported.

Table 6.2.6.3.2-1: Simple data types

Type Name	Type Definition	Description

6.2.6.3.3 Enumeration: MediaInstruction

The enumeration MediaInstruction represents the instructions to the producer (IMS AS) for handling the media. It shall comply with the provisions defined in table 6.2.6.3.3-1.

Table 6.2.6.3.3-1: Enumeration MediaInstruction

Enumeration value	Description
"TERMINATE_MEDIA"	Terminate the offered media descriptor of the UE in the media resource.
"ORIGINATE_MEDIA"	Originate and offer a media descriptor from the mediaResource to the UE.
"TERMINATE_AND_ORIGINATE_MEDIA"	Terminate the offered media flow in the mediaResource from the UE and originate the same media flow from the mediaResource to the other UE.
"UPDATE_MEDIA"	Update a media flow of the mediaResource previously allocated by the instructions "TerminateMedia", "OriginateMedia" and "TerminateAndOriginateMedia".
"DELETE_MEDIA"	Delete a media flow of the mediaResource previously allocated by the instructions "TerminateMedia", "OriginateMedia" and "TerminateAndOriginateMedia".
"REJECT_MEDIA"	Remove an offered media flow.

6.2.6.3.4 Enumeration: MediaConnSide

The enumeration MediaConnSide represents the audio or video media connection side. It shall comply with the provisions defined in table 6.2.6.3.4-1.

Table 6.2.6.3.4-1: Enumeration MediaConnSide

Enumeration value	Description
"BOTH"	Both the originating and terminating side of the audio or video media stream shall be connected to the MF.
"TERMINATING_SIDE"	Only the terminating side of the audio or video media stream are connected to the MF.
"ORIGINATING_SIDE"	Only the originating side of the audio or video media stream are connected to the MF.

6.2.6.3.5 Enumeration: TranscodeMode

The enumeration TranscodeMode represents the media transcode instruction. It shall comply with the provisions defined in table 6.2.6.3.5-1.

Table 6.2.6.3.5-1: Enumeration TranscodeMode

Enumeration value	Description
"DC_TO_VIDEO"	Data channel media is to be transcoded to video media.

6.2.6.3.6 Enumeration: SendRecvMode

The enumeration SendRecvMode represents the audio or video media connection side. It shall comply with the provisions defined in table 6.2.6.3.6-1.

Table 6.2.6.3.6-1: Enumeration SendRecvMode

Enumeration value	Description
"SENDRECV"	The media is send and recv.
"SENDONLY"	The media is send only.
"RCVONLY"	The media is receive only.

6.2.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

6.2.6.5 Binary data

None in this release of the specification.

6.2.7 Error Handling

6.2.7.1 General

For the Nimsas_MediaControl API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nimsas_MediaControl API.

6.2.7.2 Protocol Errors

No specific procedures for the Nimsas_MediaControl service are specified.

6.2.7.3 Application Errors

The application errors defined for the Nimsas_MediaControl service are listed in table 6.2.7.3-1.

Table 6.2.7.3-1: Application errors

Application Error	HTTP status code	Description
MEDIA_ID_NOT_FOUND	400 Bad Request	Indicates that the requested mediaId is not found in the IMS AS.

6.2.8 Feature negotiation

The optional features in table 6.2.8-1 are defined for the Nimsas_MediaControl API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.2.8-1: Supported Features

Feature number	Feature Name	Description

6.2.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nimsas_MediaControl API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nimsas_MediaControl API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nimsas_MediaControl service.

The Nimsas_MediaControl API defines a single scope " nimsas-mc " for the entire service, and it does not define any additional scopes at resource or operation level.

6.2.10 HTTP redirection

An HTTP request may be redirected to a different IMS AS service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different IMS AS producer instance will return the NF Instance ID of the new IMS AS producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an IMS AS redirects a service request to a different IMS AS using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new IMS AS towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

6.3 Nimsas_ImsSessionManagement Service API

6.3.1 API URI

The Nimsas_ImsSessionManagement service shall use the Nimsas_ImsSessionManagement API.

The API URI of the Nimsas_ImsSessionManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "nimsas-ism".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.3.3.

6.3.2 Usage of HTTP

6.3.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nimsas_SessionEventControl API is contained in Annex A.

6.3.2.2 HTTP standard headers

6.3.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

6.3.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

6.3.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.3.3 Resources

6.3.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.3.3.1-1 depicts the resource URIs structure for the Nimsas_ImsSessionManagement service API.

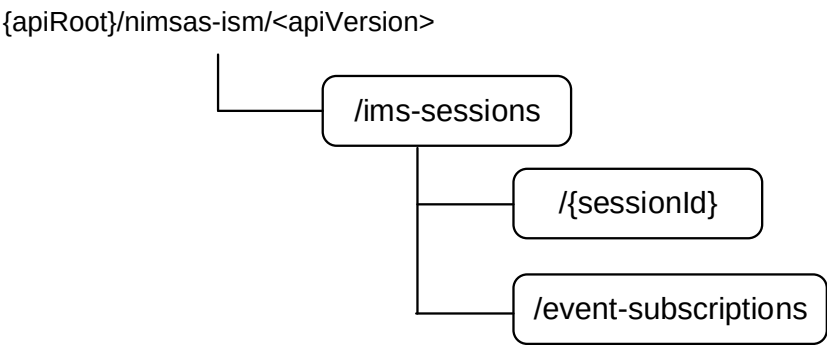


Figure 6.3.3.1-1: Resource URI structure of the Nimsas_ImsSessionManagement API

Table 6.3.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.3.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
IMS Sessions (Collection)	/ims-sessions	POST	Creates a new Individual IMS Session resource.
Individual IMS Session (Document)	/ims-sessions/{sessionId}	PUT	Update an existing "Individual IMS Session" resource.
		PATCH	Modify an existing Individual IMS Session resource.
		DELETE	Delete an existing Individual IMS Session resource.
IMS Session Event Subscriptions (Collection)	/ims-sessions/event-subscriptions	POST	This is a pseudo resource.

6.3.3.2 Resource: IMS Sessions

6.3.3.2.1 Description

The IMS Sessions Collection resource represents a collection of IMS Sessions created by NF service consumers of Nimsas_ImSessionManagement service at a given IMS AS. The resource is modelled as Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.3.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nimsas-ism/<apiVersion>/ims-sessions**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.3.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.3.1

6.3.3.2.3 Resource Standard Methods

6.3.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.3.3.2.3.1-1.

Table 6.3.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.2.3.1-2 and the response data structures and response codes specified in table 6.3.3.2.3.1-3.

Table 6.3.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ImSessionInfo	M	1	Creates a new Individual IMS Session resource

Table 6.3.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsSessionInfo	M	1	201 Created	The creation of an Individual IMS Session resource is confirmed and a representation of that resource is returned.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.3.3.2.3.1-4: Headers supported by the 201 response code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/nimsas-ism/<apiVersion>/ims-sessions/{sessionId}.

Table 6.3.3.2.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.3.3.2.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.3.3.2.4 Resource Custom Operations

None.

6.3.3.3 Resource: Individual IMS Session

6.3.3.3.1 Description

The Individual IMS Session resource represents an individual IMS session created by the NF service consumers of Nimsas_ImsSessionManagement service at a given IMS AS. This resource is modelled as the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.3.3.3.2 Resource Definition

Resource URI: {apiRoot}/nimsas_ism/<apiVersion>/ims-sessions/{sessionId}

The <apiVersion> shall be set as described in clause 6.3.1.

This resource shall support the resource URI variables defined in table 6.3.3.3.2-1.

Table 6.3.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.3.1
sessionId	string	Identifies an individual IMS session to the Nimsas_ImsSessionManagement service.

6.3.3.3.3 Resource Standard Methods

6.3.3.3.3.1 PATCH

This method shall support the URI query parameters specified in table 6.3.3.3.3.1-1.

Table 6.3.3.3.3.1-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [4] clause 6.6	

This method shall support the request data structures specified in table 6.3.3.3.3.1-2 and the response data structures and response codes specified in table 6.3.3.3.3.1-3.

Table 6.3.3.3.3.1-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
array(PatchItem)	M	1..N	Document describes the modification(s) to an Individual IMS Session resource.

Table 6.3.3.3.1-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PatchResult	M	1	200 OK	Upon success, the execution report is returned. (NOTE 3)
n/a			204 No Content	Upon success, an empty response body is returned. (NOTE 3)
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	409 Conflict	Indicates the creation of media context has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - MEDIA_CORRELATION_ID_CONFLICT, if the media to be created has the identical mediaCorrelationId with one already created media.
ProblemDetails	O	0..1	404 Not Found	Indicates the modification of IMS session has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SESSION_NOT_FOUND
ProblemDetails	O	0..1	422 Unprocessable Entity	Indicates the modification of IMS session has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - BDC_REMOVAL_NOT_ALLOWED
NOTE 1: The mandatory HTTP error status code for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. NOTE 3: If all the modification instructions in the PATCH request have been implemented, the IMS AS shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the IMS AS shall respond with PatchResult.				

Table 6.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.3.3.3.2-1.

Table 6.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.2-2 and the response data structures and response codes specified in table 6.3.3.3.2-3.

Table 6.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No content	
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
Problem Details	O	0..1	404 Not Found	Indicates the deletion of the IMS session has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - <code>SESSION_NOT_FOUND</code>
NOTE 1: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.3.3.3.3 PUT

This method shall support the URI query parameters specified in table 6.3.3.3.3-1.

Table 6.3.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.3.3.3.3-2 and the response data structures and response codes specified in table 6.3.3.3.3-3.

Table 6.3.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ImsSessionInfo	M	1	Parameters to update the "Individual IMS Session" resource.

Table 6.3.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsSessionInfo	M	1	200 OK	Successful response. The "Individual IMS Session" resource is successfully updated and the representation of that resource is returned.
n/a			204 No Content	Successful response. The "Individual IMS Session" resource is successfully updated and no content is returned in the response body.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	Indicates the modification of Individual IMS Session has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SESSION_NOT_FOUND
ProblemDetails	O	0..1	409 Conflict	Indicates the creation of media context has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - MEDIA_CORRELATION_ID_CONFLICT
NOTE 1: The mandatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.3.3.3.4 Resource Custom Operations

None.

6.3.4 Custom Operations without associated resources

None in this release of specification.

6.3.5 Notifications

6.3.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 6.3.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
IMS Session Event Notification	{notifUri}	POST	Report the IMS session event observed.

6.3.5.2 IMS Session Event Notification

6.3.5.2.1 Description

The IMS Session Event Notification is used by the IMS AS to report the observed IMS Session Event to notification endpoints.

6.3.5.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 6.3.5.2.2-1.

Table 6.3.5.2.2-1: Callback URI variables

Name	Definition
notifUri	The notification URI of the Service Consumer (i.e., NEF, trusted AF) to receive the IMS session events.

6.3.5.2.3 Standard Methods

6.3.5.2.3.1 POST

This method shall support the request data structures specified in table 6.3.5.2.3.1-1 and the response data structures and response codes specified in table 6.3.5.2.3.1-2.

Table 6.3.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
ImsSessionEventNotification	M	1	The IMS session event notification to notification endpoints.

Table 6.3.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	This case represents a successful notification of the event.
ProblemDetails	O	0..1	404 Not Found	Indicates the session event notification has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.3.5.2.3-3: Headers supported by the 307 Response Code on this endpoint

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF instance ID towards which the notification is redirected

Table 6.3.5.2.3-4: Headers supported by the 308 Response Code on this endpoint

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of the NF service consumer instance to which the request should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF instance ID towards which the notification is redirected

6.3.6 Data Model

6.3.6.1 General

This clause specifies the application data model supported by the API.

Table 6.3.6.1-1 specifies the data types defined for the Nimsas_ImsSessionManagement service based interface protocol.

Table 6.3.6.1-1: Nimsas_ImsSessionManagement specific Data Types

Data type	Clause defined	Description
ImsSessionInfo	6.3.6.2.2	The IMS session information and the media list used in the IMS session.
DcMediaPara	6.3.6.2.5	The parameters of the IMS DC media.
ImsSessionEventNotification	6.3.6.2.6	The IMS Session event notification.
MediaInfoExternal	6.3.6.2.4	The media information used in the external created or updated IMS session.
SessionInfoSM	6.3.6.2.3	The session information to be used.
TargetIdInfo	6.3.6.2.7	The public identity(ies) of the IMS Subscriber the DC is targeted.
DcType	6.3.6.3.3	The type of data channel.
AdcType	6.3.6.3.4	The type of the application data channel.
ImsSessionEventType	6.3.6.3.6	The event type of IMS session event.

Table 6.3.6.1-2 specifies data types re-used by the Nimsas_ImsSessionManagement service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nimsas_ImsSessionManagement service based interface.

Table 6.3.6.1-2: Nimsas_ImsSessionManagement re-used Data Types

Data type	Reference	Comments
AppBindingInfo	3GPP TS 29.571 [16]	The application binding information of the application data channel.
ImsPublicId	3GPP TS 29.562 [15]	IMS Public Identity.
MediaType	6.1.6.3.4	The media type used in the IMS session.
SessionId	3GPP TS 29.571 [16]	IMS Session Identity.
Mdc2EndpointInfo	6.2.6.2.6	The MDC2 media endpoint information.
MediaInfo	6.1.6.2.5	The media information related to the notification event.
Uri	3GPP TS 29.571 [16]	URI.

6.3.6.2 Structured data types

6.3.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.3.6.2.2 Type: ImsSessionInfo

Table 6.3.6.2.2-1: Definition of type ImsSessionInfo

Attribute name	Data type	P	Cardinality	Description
sessionId	SessionId	C	0..1	The session ID is the identity of the IMS session. This IE contains the service producer generated identity which uniquely identifies the IMS session. This IE shall be present when updating or deleting an existing IMS session. Otherwise, it shall not be present.
sessionInfo	SessionInfoSM	M	1	The sessionInfo is the IMS session related information.
mediaInfoSet	array(MediaInfoExternal)	M	1..N	Media info set includes a list of media related information.
notifUri	Uri	O	0..1	This IE may be present if the NF consumer intends to receive IMS session events for the served IMS subscriber. When present, it shall contain the URI of the NF consumer to receive IMS session event notification.
notifCorrelationId	string	C	0..1	This IE shall be present if notifUri is available. When present, it shall contain the correlation ID to associate the IMS session event notification to be reported.

6.3.6.2.3 Type: SessionInfoSM

Table 6.3.6.2.3-1: Definition of type SessionInfoSM

Attribute name	Data type	P	Cardinality	Description
callingId	ImsPublicId	M	1	The public identity of the calling IMS subscriber or the identity of the consumer NF, e.g. DC AS.
calledId	ImsPublicId	M	1	The public identity of the called IMS Subscriber.

6.3.6.2.4 Type: MediaInfoExternal

Table 6.3.6.2.4-1: Definition of type MediaInfoExternal

Attribute name	Data type	P	Cardinality	Description
mediaType	MediaType	M	1	The media type used in the session. In this release, the mediaType can only set to "DC".
mediaCorrelationId	string	M	1	The media correlation ID is the identity of the media.
dcMediaParas	array(DcMediaPara)	C	1..N	The information of the created data channel media. It shall be contained when the attribute "mediaType" is set to "DC".

6.3.6.2.5 Type: DcMediaPara

Table 6.3.6.2.5-1: Definition of type DcMediaPara

Attribute name	Data type	P	Cardinality	Description
dcType	DcType	M	1	The data channel type of the data channel.
adcType	AdcType	C	0..1	The type of application data type. This IE shall be contained when the attribute "dcType" is set to "ADC".
appBindingInfo	AppBindingInfo	C	0..1	Represents the application binding information of the application data channel. It shall be contained when the attribute "dcType" is set to "ADC".
targetIds	array(TargetIdInfo)	C	1..N	Represents the public identity(ies) of the IMS Subscriber the DC is targeted. It shall be contained when the attribute "dcType" is set to "ADC".
targetId	ImsPublicId	C	0..1	the public identity of the IMS Subscriber the BDC is targeted. It shall be contained when the attribute "dcType" is set to "BDC".
mdc2EndpointInfo	Mdc2EndpointInfo	C	0..1	Represents the negotiated MDC2 media endpoint information, e.g., the protocol stack, IP address and port number. It shall be contained when the attribute "dcType" is set to "ADC" and adcType set to "P2A" or "P2A2P".

6.3.6.2.6 Type: ImsSessionEventNotification

Table 6.3.6.2.6-1: Definition of type ImsSessionEventNotification

Attribute name	Data type	P	Cardinality	Description
sessionId	SessionId	M	1	The session ID is the identity of the IMS session. This IE contains the value of the sessionId attribute provided during the IMS session creation within the ImsSessionInfo data type.
eventType	ImsSessionEvent ntType	M	1	This IE indicates the type of IMS session event.
notifCorrelationId	string	M	1	This IE indicates the correlation ID used to associate the IMS session event notification to be reported.
mediaInfoSet	array(MediaInfo External)	O	1..N	Media info set includes a list of media related information.
callingIdentity	ImsPublicId	O	0..1	The IMS public identity of the calling party. It may be included if the eventType is set to "SESSION_ESTABLISHMENT_FAILURE", "MEDIA_CHANGE_SUCCESS", "MEDIA_CHANGE_FAILURE", or "SESSION_TERMINATION".
calledIdentity	ImsPublicId	O	0..1	The IMS public identity of the called party. It may be included if the eventType is set to "SESSION_ESTABLISHMENT_FAILURE", "MEDIA_CHANGE_SUCCESS", "MEDIA_CHANGE_FAILURE", or "SESSION_TERMINATION".
failureReason	string	O	0..1	The reason of the failure which is human readable. It may be included if the eventType is set to "SESSION_ESTABLISHMENT_FAILURE", or "MEDIA_CHANGE_FAILURE".

6.3.6.2.7 Type: TargetIdInfo

Table 6.3.6.2.7-1: Definition of type TargetIdInfo

Attribute name	Data type	P	Cardinality	Description
callingIdentity	ImsPublicId	C	0..1	The IMS public identity of the calling IMS subscriber. It shall be contained when the attribute adcType set to "P2P" or "P2A2P". (NOTE)
calledIdentity	ImsPublicId	C	0..1	The IMS public identity of the called IMS Subscriber. It shall be contained when the attribute adcType set to "P2P" or "P2A2P". (NOTE)
NOTE: One of the callingIdentity or calledIdentity shall be contained when the attribute adcType set to "P2A".				

6.3.6.3 Simple data types and enumerations

6.3.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.3.6.3.2 Simple data types

The simple data types defined in table 6.3.6.3.2-1 shall be supported.

Table 6.3.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.3.6.3.3 Enumeration: DcType

The enumeration DcType represents the type of data channel. It shall comply with the provisions defined in table 6.3.6.3.3-1.

Table 6.3.6.3.3-1: Enumeration DcType

Enumeration value	Description
"BDC"	Bootstrap data channel.
"ADC"	Application data channel.

6.3.6.3.4 Enumeration: AdcType

The enumeration AdcType represents the type of the application data channel. It shall comply with the provisions defined in table 6.3.6.3.4-1.

Table 6.3.6.3.4-1: Enumeration AdcType

Enumeration value	Description
"P2P"	P2P application data channel
"P2A"	P2A application data channel
"P2A2P"	P2A2P application data channel

6.3.6.3.5 Void

6.3.6.3.6 Enumeration: ImsSessionEventType

The enumeration ImsSessionEventType represents the IMS session event type for which the notification is generated. It shall comply with the provisions defined in table 6.3.6.3.6-1.

Table 6.3.6.3.6-1: Enumeration ImsSessionEventType

Enumeration value	Description
"SESSION_ESTABLISHMENT_SUCCESS"	Session establishment success event.
"SESSION_ESTABLISHMENT_FAILURE"	Session establishment failure event.
"MEDIA_CHANGE_SUCCESS"	Media change success event.
"MEDIA_CHANGE_FAILURE"	Media change failure event.
"SESSION_TERMINATION"	Session termination event.

6.3.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

6.3.6.5 Binary data

None in this release of the specification.

6.3.7 Error Handling

6.3.7.1 General

For the Nimsas_ImsSessionManagement API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nimsas_ImsSessionManagement API.

6.3.7.2 Protocol Errors

No specific procedures for the Nimsas_ImsSessionManagement service are specified.

6.3.7.3 Application Errors

The application errors defined for the Nimsas_ImsSessionManagement service are listed in Table 6.3.7.3-1.

Table 6.3.7.3-1: Application errors

Application Error	HTTP status code	Description
SESSION_NOT_FOUND	404 Not Found	The service user is not served by this DCSF, e.g. no data channel configurations for this service user is found.
CONTEXT_NOT_FOUND	404 Not Found	The NF Service Consumer (e.g. NEF, trusted AF) receives a notification from IMS AS for session event that is not found for the service consumer.
MEDIA_CORRELATION_ID_CONFLICT	409 Conflict	Indicates that a new media to be created has the identical mediaCorrelationId already assigned to one created media.
BDC_REMOVAL_NOT_ALLOWED	422 Unprocessable Entity	Indicates the BDC is not allowed to be removed in a IMS session containing ADC.

6.3.8 Feature negotiation

The optional features in table 6.3.8-1 are defined for the Nimsas_ImsSessionManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.3.8-1: Supported Features

Feature number	Feature Name	Description
1	PatchReport	If some of the modifications included in the PATCH request are not successfully implemented, the IMS AS reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [4].

6.3.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nimsas_ImsSessionManagement API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nimsas_ImsSessionManagement API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nimsas_ImsSessionManagement service.

The Nimsas_ImsSessionManagement API defines a single scope "nimsas-imssessionmanagement" for the entire service, and it does not define any additional scopes at resource or operation level.

6.3.10 HTTP redirection

An HTTP request may be redirected to a different IMS AS service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different NF provider (e.g. IMS AS) instance will return the NF Instance ID of the new NF provider instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an NF provider (e.g. IMS AS) redirects a service request to a different NF provider using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NF provider towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

6.4 Nimsas_ImsEE Service API

6.4.1 API URI

The Nimsas_ImsEE service shall use the Nimsas_ImsEE API.

The API URI of the Nimsas_ImsEE API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "nimsas-ee".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.4.3.

6.4.2 Usage of HTTP

6.4.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nimsas_ImsEE API is contained in Annex A.

6.4.2.2 HTTP standard headers

6.4.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

6.4.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

6.4.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.4.3 Resources

6.4.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.4.3.1-1 depicts the resource URIs structure for the Nimsas_EE service API.

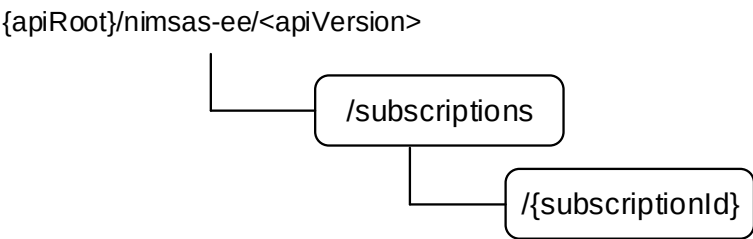


Figure 6.4.3.1-1: Resource URI structure of the Nimsas_ImSEE API

Table 6.4.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.4.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
IMS Event Subscriptions (Collection)	/subscriptions	POST	Creates a new Individual IMS Event Subscription resource.
Individual IMS Event Subscription (Document)	/subscriptions/{subscriptionId}	GET	Get the information of a subscription identified by {subscriptionId}.
		PUT	Updates an existing Individual IMS Event Subscription resource identified by {subscriptionId}.
		PATCH	Updates an existing Individual IMS Event Subscription resource identified by {subscriptionId}.
		DELETE	Delete an existing Individual IMS Subscription resource identified by {subscriptionId}.

6.4.3.2 Resource: IMS Event Subscriptions

6.4.3.2.1 Description

The IMS Event Subscriptions resource represents all subscriptions to the Nimsas_ImsEE service at a given IMS AS. The resource is modelled as Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]). The resource allows an NF service consumer to create a new Individual IMS Event Subscription resource.

6.4.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nimsas-ee/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.4.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1

6.4.3.2.3 Resource Standard Methods

6.4.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.4.3.2.3.1-1.

Table 6.4.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.2.3.1-2 and the response data structures and response codes specified in table 6.4.3.2.3.1-3.

Table 6.4.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ImsEventsSubscription	M	1	Creates a new Individual IMS Event Subscription resource.

Table 6.4.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsEventsSubscriptionCreated	M	1	201 Created	The creation of an Individual IMS Event Subscription resource is confirmed and a representation of that resource is returned.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	Indicates the creation of Individual IMS Event Subscription has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - OPERATION_NOT_ALLOWED
NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.4.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/nimsas-ee/<apiVersion>/subscriptions/{subscriptionId}.

Table 6.4.3.2.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.4.3.2.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.4.3.2.4 Resource Custom Operations

None.

6.4.3.3 Resource: Individual IMS Event Subscription

6.4.3.3.1 Description

The Individual IMS Event Subscription resource represents an individual IMS event subscription created by the NF service consumers of Nimsas_ImseE service at a given IMS AS. This resource is modelled as the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.4.3.3.2 Resource Definition

Resource URI: {apiRoot}/nimsas-ee/<apiVersion>/subscriptions/{subscriptionId}

The <apiVersion> shall be set as described in clause 6.4.1.

This resource shall support the resource URI variables defined in table 6.4.3.3.2-1.

Table 6.4.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1
subscriptionId	string	Identifies an individual IMS event subscription to the Nimsas_ImseE service.

6.4.3.3.3 Resource Standard Methods

6.4.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.4.3.3.3.1-1.

Table 6.4.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.1-2 and the response data structures and response codes specified in table 6.4.3.3.1-3.

Table 6.4.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsEventsSubscription	M	1..N	200 OK	A response body containing representation of the Individual IMS Event Subscription resource.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	Indicates the information retrieval of Individual IMS Event Subscription has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SUBSCRIPTION_NOT_FOUND
ProblemDetails	O	0..1	403 Forbidden	Indicates the information retrieval of Individual IMS Event Subscription has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - OPERATION_NOT_ALLOWED
NOTE 1: The mandatory HTTP error status code for the GET method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.4.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.4.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.4.3.3.3.2 PUT

This method shall support the URI query parameters specified in table 6.4.3.3.3.2-1.

Table 6.4.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.2-2 and the response data structures and response codes specified in table 6.4.3.3.3.2-3.

Table 6.4.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ImsEventsSubscription	M	1..N	Parameters to replace a subscription to IMS Event Subscription resource.

Table 6.4.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsEventsSubscriptionCreated	M	1..N	200 OK	Represents a successful update on the subscription and the representation of that resource is returned.
n/a			204 No Content	
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	Indicates the modification of Individual IMS Event Subscription has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SUBSCRIPTION_NOT_FOUND
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - OPERATION_NOT_ALLOWED
NOTE 1: The mandatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.4.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.4.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.4.3.3.3.3 PATCH

This method shall support the URI query parameters specified in table 6.4.3.3.3.3-1.

Table 6.4.3.3.3.1-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.3-2 and the response data structures and response codes specified in table 6.4.3.3.3.3-3.

Table 6.4.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
array(PatchItem)	M	1..N	Parameters to replace a subscription to IMS Event Subscription resource.

Table 6.4.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsEventsSubscriptionCreated	M	1..N	200 OK	Represents a successful update on the subscription and the representation of that resource is returned.
n/a			204 No Content	
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	Indicates the modification of Individual IMS Event Subscription has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SUBSCRIPTION_NOT_FOUND
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - OPERATION_NOT_ALLOWED
NOTE 1: The mandatory HTTP error status code for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.4.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.4.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.4.3.3.4 DELETE

This method shall support the URI query parameters specified in table 6.4.3.3.4-1.

Table 6.4.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.4-2 and the response data structures and response codes specified in table 6.4.3.3.4-3.

Table 6.4.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No content	
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
Problem Details	O	0..1	404 Not Found	Indicates the deletion of the Individual IMS session has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - SUBSCRIPTION_NOT_FOUND
NOTE 1: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.4.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.4.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.4.3.3.4 Resource Custom Operations

None.

6.4.4 Custom Operations without associated resources

None in this release of specification.

6.4.5 Notifications

6.4.5.1 General

Notifications shall comply with clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 6.4.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Event Notification	{notificationURI}	POST	Reports one or several observed Events.

6.4.5.2 Event Notification

6.4.5.2.1 Description

The Event Notification is used by the IMS AS to report one or several observed Events to an NF service consumer that has subscribed to such Notifications.

6.4.5.2.2 Target URI

The Callback URI {notificationURI} shall be used with the callback URI variables defined in table 6.4.5.1-1.

Table 6.4.5.2.2-1: Callback URI variables

Name	Data type	Definition
notificationURI	Uri	The Notification Uri as assigned within the Individual IMS Event Subscription and described within the ImsEventsSubscription type.

6.4.5.2.3 Standard Methods

6.4.5.2.3.1 POST

This method shall support the URI query parameters specified in table 6.4.5.2.3-1.

Table 6.4.5.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.5.2.3-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
array(ImsEventsNotification)	M	1..N	Provides Information about observed IMS Events.

Table 6.4.5.2.3-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during the event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during the event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.
ProblemDetails	O	0..1	404 Not Found	Indicates the notification of IMS event has failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

Table 6.4.5.2.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF consumer (service) instance towards which the notification request is redirected.

Table 6.4.5.2.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF consumer (service) instance towards which the notification request is redirected.

6.4.6 Data Model

6.4.6.1 General

This clause specifies the application data model supported by the API.

Table 6.4.6.1-1 specifies the data types defined for the Nimsas_ImSEE service based interface protocol.

Table 6.4.6.1-1: Nimsas_ImSEE specific Data Types

Data type	Clause defined	Description
ImEventsSubscription	6.4.6.2.2	Represents an Individual IMS Event Subscription resource.
ImEventsNotification	6.4.6.2.4	The events notification.
EventNotification	6.4.6.2.5	The notification information for a specific event.
ImEventsSubscriptionCreated	6.4.6.2.10	Created Individual IMS Event Subscription

Table 6.4.6.1-2 specifies data types re-used by the Nimsas_ImsEE service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nimsas_ImsEE service based interface.

Table 6.4.6.1-2: Nimsas_ImsEE re-used Data Types

Data type	Reference	Comments
DateTime	3GPP TS 29.571 [16]	
ImsEvent	3GPP TS 29.571 [16]	The IMS events
ImsEventConfiguration	3GPP TS 29.571 [16]	The IMS event configuration info.
ImsPublicId	3GPP TS 29.562 [15]	IMS Public Identity.
ImsEventReport	3GPP TS 29.571 [16]	The IMS event report.
ImsEventReportInfo	3GPP TS 29.571 [16]	The IMS event report specific information.
ImsReportingOptions	3GPP TS 29.571 [16]	The IMS event reporting options.
SessionId	3GPP TS 29.571 [16]	The IMS session ID.
PatchItem	3GPP TS 29.571 [16]	The patch item.
Uri	3GPP TS 29.571 [16]	
ReferenceId	3GPP TS 29.503 [22]	Reference ID value of the event configuration and event report

6.4.6.2 Structured data types

6.4.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.4.6.2.2 Type: ImsEventsSubscription

Table 6.4.6.2.2-1: Definition of type ImsEventsSubscription

Attribute name	Data type	P	Cardinality	Description
subscriberId	ImsPublicId	O	0..1	Represents the IMS public subscriber identifies that the subscription targeted for. (NOTE)
anyUeInd	boolean	O	0..1	Identifies whether the request applies to any UE. This attribute is set to "true" if applicable for any UE, otherwise, it is set to "false". (NOTE)
subscriptionId	string	C	0..1	Subscription ID. This parameter shall be supplied by the IMS AS in HTTP responses that include an object of ImsEventsSubscription.
eventList	map(ImsEventConfiguration)	M	1..N	A map (list of key-value pairs) where the key shall be a "Reference ID" value, which shall be a 64-bit unsigned integer (as defined by the "Referenceld" data type specified in 3GPP TS 29.503 [22], clause 6.4.6.3.2), converted to a string, and which shall be unique for each event configuration created by the NF consumer. It contains the IMS events to be configured in the subscription request or the events successfully configured by the IMS AS for this subscription in a subscription response.
imsReportingOptions	ImsReportingOptions	O	0..1	This IE may be included if the NF service consumer wants to describe how the reports of the event to be generated. If this attribute is absent, the default report mode shall be "ON_EVENT_DETECTION".
notificationURI	Uri	C	0..1	Identifies the recipient of Notifications sent by the NF consumer. This parameter shall be supplied by the NF service consumer in the HTTP POST requests that create the subscriptions for event notifications and in the HTTP PUT requests that update the subscriptions for event notifications. When an NF Service Consumer subscribes on behalf of another NF, the notificationURI identifies a resource under the authority of the other NF.
supportedFeatures	SupportedFeatures	O	0..1	These are the features supported by the sender of the message.
notificationCorrelationId	string	C	0..1	This IE shall be present if the notificationURI IE is present. When present, this attribute identifies the notification correlation ID present by NF consumer in subscription. The combination value of the notificationURI IE and this IE shall be unique per subscription for a given NF service consumer.
NOTE: If the event subscription applies for a specific UE, subscriberId shall be included; otherwise anyUeInd set to true shall be included.				

6.4.6.2.3 Void

6.4.6.2.4 Type: ImsEventsNotification

Table 6.4.6.2.4-1: Definition of type ImsEventsNotification

Attribute name	Data type	P	Cardinality	Description
eventNotifications	array(EventNotification)	M	1..N	Notifications about Individual Events.
notificationCorrelationId	string	M	1	String identifying a notification correlation Id received in the subscribe .

6.4.6.2.5 Type: EventNotification

Table 6.4.6.2.5-1: Definition of type EventNotification

Attribute name	Data type	P	Cardinality	Description
event	ImsEvent	M	1	Event that is notified.
referenceId	ReferenceId	O	0..1	Reference ID value of the notified event
eventReport	ImsEventReportInfo	O	0..1	Report Information per event type
subscriberId	ImsPublicId	M	1	Represents the IMS public subscriber.
timestamp	DateTime	M	1	Time at which the event is observed.
sessionId	SessionId	O	0..1	Identifies the session ID.

6.4.6.2.6 Void

6.4.6.2.7 Void

6.4.6.2.8 Void

6.4.6.2.9 Void

6.4.6.2.10 Type: ImsEventsSubscriptionCreated

Table 6.4.6.2.10-1: Definition of type ImsEventsSubscriptionCreated

Attribute name	Data type	P	Cardinality	Description
imsEventsSubscription	ImsEventsSubscription	M	1	This IE shall contain the representation of the created IMS event subscription.
eventReports	array(ImsEventReport)	O	1..N	If immediate report is requested, this IE shall contain the associated status to the event(s) being requested if the status associated to at least one of the requested event(s) is available at the time of subscription.

6.4.6.2.11 Void

6.4.6.3 Simple data types and enumerations

6.4.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.4.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

6.4.6.5 Binary data

None in this release of the specification.

6.4.7 Error Handling

6.4.7.1 General

For the Nimsas_ImSEE API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nimsas_ImSEE API.

6.4.7.2 Protocol Errors

No specific procedures for the Nimsas_ImSEE service are specified.

6.4.7.3 Application Errors

The application errors defined for the Nimsas_ImSEE service are listed in Table 6.4.7.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nimsas_ImSEE service. The following application errors listed in Table 6.4.7.3-1 are specific for the Nimsas_ImSEE service.

Table 6.4.7.3-1: Application errors

Application Error	HTTP status code	Description
SUBSCRIPTION_NOT_FOUND	404 Not Found	The service user is not served by this IMS AS.
OPERATION_NOT_ALLOWED	403 Forbidden	Indicates the IMS Event subscription is not allowed to be created/modified or the information of the IMS Event subscription is not allowed to be retrieved.
CONTEXT_NOT_FOUND	404 Not Found	The NF service consumer receives a notification from IMS AS for IMS event subscription that is not found for the service consumer.

6.4.8 Feature negotiation

The optional features in table 6.4.8-1 are defined for the Nimsas_ImSEE API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.4.8-1: Supported Features

Feature number	Feature Name	Description

6.4.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nimsas_ImSEE API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nimsas_ImSEE API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nimsas_ImSEE service.

The Nimsas_ImSEE API defines a single scope "nimsas-ee" for the entire service, and it does not define any additional scopes at resource or operation level.

6.4.10 HTTP redirection

An HTTP request may be redirected to a different IMS AS service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different NF provider (e.g. IMS AS) instance will return the NF Instance ID of the new NF provider instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an NF provider (e.g. IMS AS) redirects a service request to a different NF provider using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NF provider towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

6.5 Nimsas_ImParameterProvision Service API

6.5.1 API URI

The Nimsas_ImParameterProvision service shall use the Nimsas_ImParameterProvision API.

The API URI of the Nimsas_ImParameterProvision API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "nimsas-ipp".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.5.3.

6.5.2 Usage of HTTP

6.5.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Nimsas_ImParameterProvision API is contained in Annex A.

6.5.2.2 HTTP standard headers

6.5.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

6.5.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

6.5.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.5.3 Resources

6.5.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.5.3.1-1 depicts the resource URIs structure for the Nimsas_ImsParameterProvision service API.

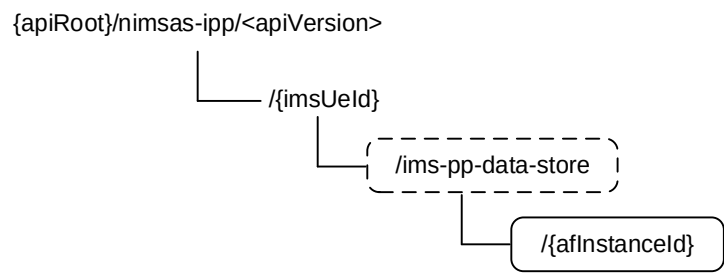


Figure 6.5.3.1-1: Resource URI structure of the Nimsas_ImsParameterProvision API

Table 6.5.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.5.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
ImsParameterProvisioningDataEntry	{imsUeId}/ims-pp-data-store/{afInstanceId}	PUT	Create or update a parameter provisioning data entry per AF for a specific IMS user.
		DELETE	Delete a parameter provisioning data entry per AF for a specific IMS user.

6.5.3.2 Resource: ImsParameterProvisioningDataEntry

6.5.3.2.1 Description

The ImsParameterProvisioningDataEntry resource is used to allow the storage of a collection of parameter provisioning entries for different Application Functions.

In this release, this resource is used to store the IMS user related information created by NF service consumers of Nimsas_ImsParameterProvision service for a given IMS user.

The resource is modelled as Document resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.5.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nimsas-ipp/<apiVersion>/{imsUeId}/ims-pp-data-store/{afInstanceId}**

This resource shall support the resource URI variables defined in table 6.5.3.2.2-1.

Table 6.5.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.1
imsUeId	string	Represents the IMS Public Identity (i.e. IMPU). Pattern: "^([impu-sip]:([a-zA-Z0-9 \-!~*()&=+\$.;?V]+)\@([A-Za-z0-9]+([A-Za-z0-9]+\.)+[a-z]{2,}) impu-tel:[+0-9]{5,15}))\$"
afInstanceId	string	The string identifying the AF instance.

6.5.3.2.3 Resource Standard Methods

6.5.3.2.3.1 PUT

This method shall support the URI query parameters specified in table 6.5.3.2.3.1-1.

Table 6.5.3.2.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.2.3.1-2 and the response data structures and response codes specified in table 6.5.3.2.3.1-3.

Table 6.5.3.2.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ImsPpDataEntry	M	1	Creates or updates an ImsParameterProvisioningDataEntry resource.

Table 6.5.3.2.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ImsPpDataEntry	M	1	200 OK	Successful resource update, a response body containing a representation of the modified ImsParameterProvisioningDataEntry resource is returned.
ImsPpDataEntry	M	1	201 Created	Successful resource creation, a response body containing a representation of the created ImsParameterProvisioningDataEntry resource is returned.
n/a			204 No Content	Successful resource update.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.5.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.5.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.5.3.2.3.1-6: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/nimsas-ipp/<apiVersion>/imsUeld/ims-pp-data-store/{afInstanceId}

6.5.3.2.3.2 DELETE

This method shall support the URI query parameters specified in table 6.5.3.2.3.2-1.

Table 6.5.3.2.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.2.3.2-2 and the response data structures and response codes specified in table 6.5.3.2.3.2-3.

Table 6.5.3.2.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.2.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No content	Successful resource deletion.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
Problem Details	O	0..1	404 Not Found	Indicates that the deletion of an <code>ImsParameterProvisioningDataEntry</code> resource failed due to application error. The "cause" attribute may be used to indicate one of the following application errors: - <code>RESOURCE_URI_STRUCTURE_NOT_FOUND</code>
NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.5.3.2.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

Table 6.5.3.2.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative IMS AS (service) instance. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target IMS AS instance ID towards which the request is redirected.

6.5.3.2.4 Resource Custom Operations

None.

6.5.4 Custom Operations without associated resources

None in this release of specification.

6.5.5 Notifications

None in this release of specification.

6.5.6 Data Model

6.5.6.1 General

This clause specifies the application data model supported by the API.

Table 6.5.6.1-1 specifies the data types defined for the `Nimsas_ImsParameterProvision` service based interface protocol.

Table 6.5.6.1-1: Nimsas_ImsParameterProvision specific Data Types

Data type	Clause defined	Description
ImsPpDataEntry	6.5.6.2.2	The IMS parameter provision data entry.

Table 6.5.6.1-2 specifies data types re-used by the Nimsas_ImsParameterProvision service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nimsas_ImsParameterProvision service based interface.

Table 6.5.6.1-2: Nimsas_ImsParameterProvision re-used Data Types

Data type	Reference	Comments
RcdProperties	3GPP TS 29.571 [16]	Contains the RCD properties (i.e. RCD information, RCD server address or RCD URL).

6.5.6.2 Structured data types

6.5.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.5.6.2.2 Type: ImsPpDataEntry

Table 6.5.6.2.2-1: Definition of type ImsPpDataEntry

Attribute name	Data type	P	Cardinality	Description
rcdProp	RcdProperties	O	0..1	Contains the RCD properties (i.e. RCD information, RCD server address or RCD URL).

6.5.6.3 Simple data types and enumerations

6.5.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.5.6.3.2 Simple data types

The simple data types defined in table 6.5.6.3.2-1 shall be supported.

Table 6.5.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.5.6.4 Data types describing alternative data types or combinations of data types

None in this release of the specification.

6.5.6.5 Binary data

None in this release of the specification.

6.5.7 Error Handling

6.5.7.1 General

For the Nimsas_ImsParameterProvision API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nimsas_ImsParameterProvision API.

6.5.7.2 Protocol Errors

No specific procedures for the Nimsas_ImsParameterProvision service are specified.

6.5.7.3 Application Errors

The application errors defined for the Nimsas_ImsParameterProvision service are listed in Table 6.5.7.3-1.

Table 6.5.7.3-1: Application errors

Application Error	HTTP status code	Description

6.5.8 Feature negotiation

The optional features in table 6.5.8-1 are defined for the Nimsas_ImsParameterProvision API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.5.8-1: Supported Features

Feature number	Feature Name	Description

6.5.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nimsas_ImsParameterProvision API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nimsas_ImsParameterProvision API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nimsas_ImsParameterProvision service.

The Nimsas_ImsParameterProvision API defines a single scope "nimsas-ipp" for the entire service, and it does not define any additional scopes at resource or operation level.

6.5.10 HTTP redirection

An HTTP request may be redirected to a different IMS AS service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different NF provider (e.g. IMS AS) instance will return the NF Instance ID of the new NF provider instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an NF provider (e.g. IMS AS) redirects a service request to a different NF provider using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NF provider towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI specifications in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5.3.1 of 3GPP TS 29.501 [5] and clause 5B of 3GPP TR 21.900 [7]).

A.2 Nimsas_SessionEventControl API

openapi: 3.0.0

info:

```
title: 'IMS AS SessionEventControl Service'
version: 1.1.0
description: |
  Nimsas_SessionEventControl Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

```
externalDocs:
  description: >
    3GPP TS 29.175 V19.4.0; IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application
    Server (AS) Services; Stage 3
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.175/'
```

```
servers:
- url: '{apiRoot}/nimsas-sec/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501
```

```
security:
- {}
- oAuth2ClientCredentials:
  - nimsas-sec
```

```
paths:
  /session-event-subscriptions:
    post:
      # This is a pseudo operation, NF service consumers shall NOT invoke this method!
      summary: Nimsas_SessionEventControl Subscribe service operation, pseudo operation
      tags:
        - Session Event Subscriptions (Collection)
      operationId: Subscribe
      requestBody:
        required: true
        content:
          application/json:
            # Unspecified schema for the JSON body, since this is not used by consumer or producer.
            schema: {}
      responses:
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
```

```

callbacks:
  eeNotification:
    '{SessionEventNotificationUri}':
      # The notification URI is provided by local configuration or via NRF.
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SessionEventNotification'
        responses:
          '204':
            description: No Content, notification was succesfull.
          '307':
            description: Temporary Redirect
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
            headers:
              Location:
                description: >
                  The URI pointing to the resource located on the redirect target NF
                  service consumer.
                required: true
                schema:
                  type: string
          '308':
            description: Permanent Redirect
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
            headers:
              Location:
                description: >
                  The URI pointing to the resource located on the redirect target NF
                  service consumer.
                required: true
                schema:
                  type: string
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29571_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29571_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29571_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29571_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29571_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29571_CommonData.yaml#/components/responses/500'
          '502':
            $ref: 'TS29571_CommonData.yaml#/components/responses/502'
          '503':
            $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nimsas-sec: Access to the Nimsas_SessionEventControl API

```

schemas:

STRUCTURED DATA TYPES

```
SessionEventNotification:
  description: The session event notification item.
  type: object
  required:
    - notificationEvent
    - sessionId
  properties:
    notificationEvent:
      $ref: '#/components/schemas/NotificationEvent'
    sessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
    sessionInfo:
      $ref: '#/components/schemas/SessionInfo'
    mediaInfoList:
      description: >
        Contains a media related information. The mediaId attribute within the MediaInfo
        data type is the key of the map.
      type: object
      additionalProperties:
        $ref: '#/components/schemas/MediaInfo'
      minItems: 1
    psDataOff:
      $ref: '#/components/schemas/PsDataOffStatus'
    mediaInfoSet:
      type: array
      minItems: 1
      items:
        $ref: 'TS29175_Nimsas_ImsSessionManagement.yaml#/components/schemas/MediaInfoExternal'
```

```
NotificationEvent:
  description: The notification event information.
  type: object
  required:
    - eventType
  properties:
    eventType:
      $ref: '#/components/schemas/EventType'
    eventInitiator:
      $ref: '#/components/schemas/EventInitiator'
```

```
SessionInfo:
  description: The session information related to the notification event.
  type: object
  properties:
    callingIdentity:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    calledIdentity:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    sessionCase:
      $ref: '#/components/schemas/SessionCase'
```

```
MediaInfo:
  description: The media information related to the notification event.
  type: object
  required:
    - mediaId
    - mediaType
  properties:
    mediaId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MediaId'
    mediaType:
      $ref: '#/components/schemas/MediaType'
    dcMediaSpec:
      $ref: '#/components/schemas/DcMediaSpec'
    mediaSuspended:
      type: boolean
    mediaRemovalInd:
      type: boolean
      enum:
        - true
```

```

DcMediaSpec:
  description: >
    The data channel media specification information contains media description attributes.
  type: object
  required:
    - streams
    - receivedDcEndpoint
  properties:
    streams:
      description: >
        Contains a data channel mapping and configuration information. The streamId
        attribute within the DcStream data type is the key of the map.
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DcEndpoint'
      minItems: 1
    maxMessageSize:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MaxMessageSize'
    receivedDcEndpoint:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DcEndpoint'
    bdcUsedBy:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BdcUsedBy'
    appBindingInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AppBindingInfo'
    multiAppBindingInfo:
      description: Includes a list of multiplexed application binding information.
      type: array
      minItems: 1
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AppBindingInfo'
    qosHintInfo:
      $ref: '#/components/schemas/QosHintInfo'

```

```

QosHintInfo:
  description: The QoS hint information used for the media.
  type: object
  properties:
    loss:
      description: the maximum desirable end-to-end transport level packet loss rate
      type: number
      format: zero-based-integer or non-zero-real
    localLoss:
      description: the maximum desirable end-to-end transport level packet loss rate applied
      type: number
      format: zero-based-integer or non-zero-real
    latency:
      description: the maximum desirable end-to-end transport level packet latency
      type: number
      format: zero-based-integer or non-zero-real
    localLatency:
      description: the maximum desirable end-to-end transport level packet latency applied
      type: number
      format: zero-based-integer or non-zero-real

```

ENUMS

```

EventType:
  description: The type of the event for which the notification is generated.
  anyOf:
    - type: string
      enum:
        - SESSION_ESTABLISHMENT_REQUEST
        - SESSION_ESTABLISHMENT_PROGRESS
        - SESSION_ESTABLISHMENT_ALERTING
        - SESSION_ESTABLISHMENT_SUCCESS
        - SESSION_ESTABLISHMENT_FAILURE
        - SESSION_ESTABLISHMENT_CANCEL
        - MEDIA_CHANGE_REQUEST
        - MEDIA_CHANGE_SUCCESS
        - MEDIA_CHANGE_FAILURE
        - MEDIA_CHANGE_CANCEL
        - SESSION_TERMINATION
        - EXTERNAL_SESSION_UPDATE
        - EXTERNAL_SESSION_CREATE

```

```

    - PS_DATA_OFF_STATUS_CHANGE
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.

MediaType:
  description: The type of the media for which the notification is generated.
  anyOf:
    - type: string
      enum:
        - DC
        - AUDIO
        - VIDEO
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.

SessionCase:
  description: The type of the session case.
  anyOf:
    - type: string
      enum:
        - ORIGINATING_IMS_SESSION
        - TERMINATING_IMS_SESSION
        - EXTERNAL_INITIATED_IMS_SESSION
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.

EventInitiator:
  description: The initiator of the event for which the notification is generated.
  anyOf:
    - type: string
      enum:
        - SERVED_IMS_SUBSCRIBER
        - REMOTE_IMS_SUBSCRIBER
        - EXTERNAL_PARTY
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.

PsDataOffStatus:
  description: The active/inactive status of PS Data Off.
  anyOf:
    - type: string
      enum:
        - ACTIVE
        - INACTIVE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.

```

A.3 Nimsas_MediaControl API

openapi: 3.0.0

info:

```

title: 'IMS AS MediaControl Service'
version: 1.1.2
description: |
  Nimsas_MediaControl Service.
  © 2026, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.

```

externalDocs:

```

description: >
  3GPP TS 29.175 V19.5.0; IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application
  Server (AS) Services; Stage 3

```

```

url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.175'

servers:
- url: '{apiRoot}/nimsas-mc/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:
- {}
- oAuth2ClientCredentials:
  - nimsas-mc

paths:
  /call-sessions/{sessionId}/media-instruction:
    post:
      summary: Update
      operationId: UpdateCallSession
      tags:
        - Individual call session (Document)
      parameters:
        - name: sessionId
          in: path
          description: Session ID assigned by the IMS AS during the IMS session setup.
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
      requestBody:
        description: Representation of the updates to apply to the call session.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MediaInstructionData'
      responses:
        '200':
          description: >
            Successful update of the call session, when the IMS AS needs to return information
            in the response.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MediaInstructionData'
        '204':
          description: >
            Successful update of the call session, when the IMS AS does not need to return
            information in the response.
        '307':
          description: Temporary Redirect
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
          headers:
            Location:
              description: The URI pointing to the resource located on the redirect target IMS AS.
              schema:
                type: string
        '308':
          description: Permanent Redirect
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
          headers:
            Location:
              description: The URI pointing to the resource located on the redirect target IMS AS.
              schema:
                type: string
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':

```

```

    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29571_CommonData.yaml#/components/responses/406'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '501':
    $ref: 'TS29571_CommonData.yaml#/components/responses/501'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nimsas-mc: Access to the Nimsas_MediaControl API.

```

schemas:

STRUCTURED DATA TYPES

```

MediaInstructionData:
  description: The media instruction data for a specific session.
  type: object
  required:
    - sessionId
    - mediaInstructionSet
  properties:
    sessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
    mediaInstructionSet:
      description: >
        Contains a set of instructions for each media flow to control. The mediaId
        attribute within the MediaInstructions data type is the key of the map.
      type: object
      additionalProperties:
        $ref: '#/components/schemas/MediaInstructions'
      minProperties: 1

```

```

MediaInstructions:
  description: The media instructions for a specific media flow.
  type: object
  required:
    - mediaId
    - mediaResourceType
  properties:
    mediaId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MediaIdRm'
    associatedMediaId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MediaId'
    mediaResourceType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MediaResourceType'
    mediaInstruction:
      $ref: '#/components/schemas/MediaInstruction'
    dcMediaSpecification:
      $ref: '#/components/schemas/DcMediaSpecification'
    arMediaSpecification:
      $ref: '#/components/schemas/ArMediaSpecification'
    mediaProcessingUrl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    audioVideoReNegotiationInd:
      $ref: '#/components/schemas/AudioVideoReNegotiationInd'
    mdc2AudioEndpoint:
      $ref: '#/components/schemas/Mdc2AudioVideoEndpoint'

```

```
mdc2VideoEndpoint:
  $ref: '#/components/schemas/Mdc2AudioVideoEndpoint'
avatarMedia:
  $ref: 'TS29176_Nmf_MRM.yaml#/components/schemas/AvatarMedia'

DcMediaSpecification:
  description: The data channel media specification information.
  type: object
  required:
    - streams
    - mediaProxyConfig
  properties:
    mediaProxyConfig:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MediaProxy'
    replaceHttpUrls:
      description: >
        Contains a list of replacement HTTP URLs. The streamId
        attribute within the ReplaceHttpRequest data type is the key of the map.
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ReplaceHttpRequest'
      minProperties: 1
    mdc1EndpointDcsf:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MdcEndpoint'
    mdc1EndpointMf:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MdcEndpoint'
    mdc2EndpointInfo:
      $ref: '#/components/schemas/Mdc2EndpointInfo'
    streams:
      description: >
        Contains a data channel mapping and configuration information. The streamId
        attribute within the DcStream data type is the key of the map.
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DcStream'
      minProperties: 1
    bdcUsedBy:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BdcUsedBy'
    appBindingInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AppBindingInfo'
    qosHintInfo:
      $ref: 'TS29175_Nimsas_SessionEventControl.yaml#/components/schemas/QosHintInfo'
    interworkingInfo:
      $ref: '#/components/schemas/InterworkingInstruction'
    dcIwkInd:
      type: boolean
      default: false

ArMediaSpecification:
  description: The AR media specification information.
  type: object
  required:
    - mediaProcessingSpec
  properties:
    mediaProcessingSpec:
      type: string

Mdc2EndpointInfo:
  description: Represents the negotiated MDC2 media endpoint information.
  type: object
  properties:
    mdc2Protocol:
      $ref: 'TS29176_Nmf_MRM.yaml#/components/schemas/Mdc2Protocol'
    mdc2EndpointDcsf:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MdcEndpoint'
    mdc2EndpointMf:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MdcEndpoint'

AudioVideoReNegotiationInd:
  description: The audio/video media re-negotiation indication information.
  type: object
  required:
    - reNegotiation
  properties:
    reNegotiation:
```

```
    type: boolean
  mediaConnSide:
    $ref: '#/components/schemas/MediaConnSide'
  mediaDirection:
    $ref: '#/components/schemas/SendRecvMode'
```

```
InterworkingInstruction:
  description: The interworking instruction of data channel transcoding.
  type: object
  required:
    - transcodeMode
  properties:
    transcodeMode:
      $ref: '#/components/schemas/TranscodeMode'
    addTransInfo:
      type: string
```

```
Mdc2AudioVideoEndpoint:
  description: The audio or video media endpoint information in MDC2 interface.
  type: object
  properties:
    mdc2AVEndpointDcAs:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Endpoint'
    mdc2AVEndpointMf:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Endpoint'
    audioVideoMedia:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AudioVideoMedia'
```

ENUMS

```
MediaInstruction:
  description: The media instruction for handling a specific media flow.
  anyOf:
    - type: string
      enum:
        - TERMINATE_MEDIA
        - ORIGINATE_MEDIA
        - TERMINATE_AND_ORIGINATE_MEDIA
        - UPDATE_MEDIA
        - DELETE_MEDIA
        - REJECT_MEDIA
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
```

```
MediaConnSide:
  description: The audio or video media connection side.
  anyOf:
    - type: string
      enum:
        - BOTH
        - TERMINATING_SIDE
        - ORIGINATING_SIDE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
```

```
SendRecvMode:
  description: The send and receive mode of media stream.
  anyOf:
    - type: string
      enum:
        - SENDRECV
        - SENDONLY
        - RECVONLY
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
```

```
TranscodeMode:
  description: The mode of the transcoding.
  anyOf:
```

- type: string
 - enum:
 - DC_TO_VIDEO
- type: string
 - description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

A.4 Nimsas_ImsSessionManagement API

openapi: 3.0.0

```

info:
  title: 'IMS AS ImsSessionManagement Service'
  version: 1.0.1
  description: |
    Nimsas_ImsSessionManagement Service.
    © 2026, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.175 V19.5.0; IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application
    Server (AS) Services; Stage 3
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.175'

servers:
  - url: '{apiRoot}/nimsas-ism/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:
  - {}
  - oAuth2ClientCredentials:
      - nimsas-ism

paths:
  /ims-sessions:
    post:
      summary: Create IMS Session
      operationId: ImsSessionCreate
      tags:
        - IMS Sessions (Collection)
      requestBody:
        description: Creates a new Individual IMS Session resource.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsSessionInfo'
      responses:
        '201':
          description: >
            The creation of an Individual IMS Session resource is confirmed and
            a representation of that resource is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ImsSessionInfo'
          headers:
            Location:
              description: >
                The URI of the newly created resource, according to the structure:
                {apiRoot}/nimsas-ism/<apiVersion>/ims-sessions/{sessionId}.
              schema:
                type: string
        '307':
          description: Temporary Redirect
          content:
            application/json:
              schema:

```

```

      $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '308':
    description: Permanent Redirect
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29571_CommonData.yaml#/components/responses/406'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '501':
    $ref: 'TS29571_CommonData.yaml#/components/responses/501'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/ims-sessions/{sessionId}:
  patch:
    summary: modify the IMS session
    operationId: ImsSessionModify
    tags:
      - IMS Session Modification
    parameters:
      - name: sessionId
        in: path
        description: Identifies an individual IMS session.
        required: true
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
      - name: supported-features
        in: query
        description: Features required to be supported by the target NF
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    requestBody:
      content:
        application/json-patch+json:
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
            minItems: 1
          required: true
    responses:
      '200':
        description: Successful update on the IMS session.
        content:
          application/json:
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchResult'

```

```

'204':
  description: >
    No content, IMS AS accepts the request change which is to
    delete the existing media.
'307':
  description: Temporary Redirect
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
  headers:
    Location:
      description: The URI pointing to the resource located on the redirect target IMS AS.
      schema:
        type: string
'308':
  description: Permanent Redirect
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
  headers:
    Location:
      description: The URI pointing to the resource located on the redirect target IMS AS.
      schema:
        type: string
'400':
  $ref: 'TS29571_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29571_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
'409':
  $ref: 'TS29571_CommonData.yaml#/components/responses/409'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29571_CommonData.yaml#/components/responses/415'
'422':
  description: Unprocessable Entity
  content:
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
'429':
  $ref: 'TS29571_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
put:
  summary: Update an existing Individual IMS Session resource.
  operationId: ImsSessionUpdate
  tags:
    - Individual IMS Session (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsSessionInfo'
  responses:
    '200':
      description: >
        OK. The Individual IMS Session resource is successfully updated and a representation
        of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsSessionInfo'

```

```

'204':
  description: >
    No Content. The Individual IMS Session Management resource is
    successfully updated and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'409':
  $ref: 'TS29122_CommonData.yaml#/components/responses/409'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: delete the IMS session
  operationId: ImsSessionDelete
  tags:
    - IMS Session Deletion
  parameters:
    - name: sessionId
      in: path
      description: Identifies an individual IMS session.
      required: true
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
  responses:
    '204':
      description: No content, successful delete of the resource identified by sessionId.
    '307':
      description: Temporary Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: The URI pointing to the resource located on the redirect target IMS AS.
          schema:
            type: string
    '308':
      description: Permanent Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: The URI pointing to the resource located on the redirect target IMS AS.
          schema:
            type: string
    '400':
      $ref: 'TS29571_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29571_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29571_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29571_CommonData.yaml#/components/responses/404'

```

```

    '429':
      $ref: 'TS29571_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29571_CommonData.yaml#/components/responses/500'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/ims-sessions/event-subscriptions:
  post:
    # This is a pseudo operation, NF service consumers shall NOT invoke this method!
    summary: Nimsas_ImsSessionManagement Subscribe service operation, pseudo operation
    tags:
      - IMS Session Event Subscriptions (Collection)
    operationId: Subscribe
    requestBody:
      required: true
      content:
        application/json:
          # Unspecified schema for the JSON body, since this is not used by consumer or producer.
          schema: {}
    responses:
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

callbacks:
  eventNotification:
    '{$request.body#/notifUri}':
      # The notification URI of the Service Consumer to receive the IMS session events.
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ImsSessionEventNotification'
        responses:
          '204':
            description: No Content, notification was succesfull.
          '307':
            description: Temporary Redirect
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
            headers:
              Location:
                description: >
                  The URI pointing to the resource located on the redirect target NF
                  service consumer.
                required: true
                schema:
                  type: string
          '308':
            description: Permanent Redirect
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
            headers:
              Location:
                description: >
                  The URI pointing to the resource located on the redirect target NF
                  service consumer.
                required: true
                schema:
                  type: string
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29571_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'

```

```
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29571_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29571_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
```

components:

```
securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nimsas-ism: Access to the Nimsas_ImsSessionManagement API.
```

schemas:

STRUCTURED DATA TYPES

```
ImsSessionInfo:
  description: The IMS session information and the media list used in the IMS session.
  type: object
  required:
    - sessionInfo
    - mediaInfoSet
  properties:
    sessionInfo:
      $ref: '#/components/schemas/SessionInfoSM'
    mediaInfoSet:
      description: Includes a list of media related information.
      type: array
      items:
        $ref: '#/components/schemas/MediaInfoExternal'
      minItems: 1
    sessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
    notifUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    notifCorrelationId:
      type: string

SessionInfoSM:
  description: The session information to be used.
  type: object
  required:
    - callingId
    - calledId
  properties:
    callingId:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    calledId:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

MediaInfoExternal:
  description: The media information used in the external created or updated IMS session.
  type: object
  required:
    - mediaType
    - mediaCorrectionId
  properties:
    mediaType:
      $ref: 'TS29175_Nimsas_SessionEventControl.yaml#/components/schemas/MediaType'
    mediaCorrectionId:
      type: string
    dcMediaParas:
```

```

    description: The information of the created data channel media.
    type: array
    items:
      $ref: '#/components/schemas/DcMediaPara'
    minItems: 1

```

DcMediaPara:

```

description: The parameters of the IMS DC media.
type: object
required:

```

```

  - dcType

```

properties:

dcType:

```

  $ref: '#/components/schemas/DcType'

```

adcType:

```

  $ref: '#/components/schemas/AdcType'

```

appBindingInfo:

```

  $ref: 'TS29571_CommonData.yaml#/components/schemas/AppBindingInfo'

```

targetIds:

```

  description: Represents the public identity(ies) of the IMS Subscriber the DC is

```

```
targeted.

```

```

  type: array

```

```

  items:

```

```

    $ref: '#/components/schemas/TargetIdInfo'

```

```

  minItems: 1

```

targetId:

```

  $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

```

mdc2EndpointInfo:

```

  $ref: 'TS29175_Nimsas_MediaControl.yaml#/components/schemas/Mdc2EndpointInfo'

```

ImsSessionEventNotification:

```

description: The IMS Session event notification.

```

```

type: object

```

```

required:

```

```

  - sessionId

```

```

  - eventType

```

```

  - notifCorrelationId

```

properties:

sessionId:

```

  $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'

```

eventType:

```

  $ref: '#/components/schemas/ImsSessionEventType'

```

notifCorrelationId:

```

  type: string

```

mediaInfoSet:

```

  description: Includes a list of media related information.

```

```

  type: array

```

```

  items:

```

```

    $ref: '#/components/schemas/MediaInfoExternal'

```

```

  minItems: 1

```

callingIdentity:

```

  $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

```

calledIdentity:

```

  $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

```

failureReason:

```

  type: string

```

TargetIdInfo:

```

description: The public identity(ies) of the IMS Subscriber the DC is targeted.

```

```

type: object

```

```

properties:

```

callingIdentity:

```

  $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

```

calledIdentity:

```

  $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'

```

ENUMS

DcType:

```

description: The type of data channel.

```

```

anyOf:

```

```

  - type: string

```

```

  enum:

```

```

    - BDC

```

- ADC
- type: string
- description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

AdcType:

description: The type of the application data channel.

anyOf:

- type: string
- enum:
 - P2P
 - P2A
 - P2A2P
- type: string
- description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

ImsSessionEventType:

description: The IMS session event type for which the notification is generated.

anyOf:

- type: string
- enum:
 - SESSION_ESTABLISHMENT_SUCCESS
 - SESSION_ESTABLISHMENT_FAILURE
 - MEDIA_CHANGE_SUCCESS
 - MEDIA_CHANGE_FAILURE
 - SESSION_TERMINATION
- type: string
- description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

A.5 Nimsas_ImSEE API

openapi: 3.0.0

info:

title: 'IMS AS ImSeeExposure Service'

version: 1.0.1

description: |
 Nimsas_ImSEE Service.
 © 2026, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
 All rights reserved.

externalDocs:

description: >
 3GPP TS 29.175 V19.5.0; IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application Server (AS) Services; Stage 3

url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.175'

servers:

- url: '{apiRoot}/nimsas-ee/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:

- {}
- oAuth2ClientCredentials:
 - nimsas-ee

paths:

/subscriptions:

post:

summary: Subscribe to IMS Event

operationId: ImsEventSubscribe

tags:

- IMS Event Subscriptions (Collection)

requestBody:

```

description: Creates a new Individual IMS Event Subscription resource.
required: true
content:
  application/json:
    schema:
      $ref: '#/components/schemas/ImsEventsSubscription'
responses:
  '201':
    description: >
      Successful creation of the Individual IMS Event Subscription resource,
      when the IMS AS needs to return information in the response.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImsEventsSubscriptionCreated'
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource, according to the structure:
          {apiRoot}/nimsas-ee/<apiVersion>/subscriptions/{subscriptionId}.
        schema:
          type: string
  '307':
    description: Temporary Redirect
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '308':
    description: Permanent Redirect
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29571_CommonData.yaml#/components/responses/406'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '501':
    $ref: 'TS29571_CommonData.yaml#/components/responses/501'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  eventNotification:
    '{$request.body#/notificationURI}':
      # The notification URI is assigned within the Individual IMS Event Subscription.
      post:
        requestBody:
          required: true
          content:

```

```

    application/json:
      schema:
        type: array
        items:
          $ref: '#/components/schemas/ImsEventsNotification'
        minItems: 1
  responses:
    '204':
      description: No Content, the receipt of the Notification is acknowledged.
    '307':
      description: Temporary Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: >
            The URI pointing to the resource located on the redirect target NF
            service consumer.
          required: true
          schema:
            type: string
    '308':
      description: Permanent Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: >
            The URI pointing to the resource located on the redirect target NF
            service consumer.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29571_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29571_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29571_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29571_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29571_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29571_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29571_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29571_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29571_CommonData.yaml#/components/responses/500'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  get:
    summary: Retrieve the subscription information
    operationId: GetSubscriptionInfo
    tags:
      - Subscription information retrieval
    parameters:
      - name: subscriptionId
        in: path
        description: Individual IMS event subscription Identity
        required: true
        schema:
          type: string
    responses:
      '200':
        description: >

```

A response body containing representation of the Individual IMS Event Subscription resource.

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImsEventsSubscription'
    '307':
      description: Temporary Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: The URI pointing to the resource located on the redirect target IMS AS.
          schema:
            type: string
    '308':
      description: Permanent Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: The URI pointing to the resource located on the redirect target IMS AS.
          schema:
            type: string
    '400':
      $ref: 'TS29571_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29571_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29571_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29571_CommonData.yaml#/components/responses/404'
    '405':
      $ref: 'TS29571_CommonData.yaml#/components/responses/405'
    '406':
      $ref: 'TS29571_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29571_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29571_CommonData.yaml#/components/responses/500'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  put:
    summary: Update IMS Event Subscription
    operationId: ImsEventSubsModify
    tags:
      - IMS Event Subscription Modification
    parameters:
      - name: subscriptionId
        in: path
        description: Individual IMS event subscription Identity
        required: true
        schema:
          type: string
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsEventsSubscription'
      required: true
    responses:
      '200':
        description: >
          Successful update of the subscription, when the IMS AS needs
          to return information in the response.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsEventsSubscriptionCreated'
      '204':

```

```

    description: No content
  '307':
    description: Temporary Redirect
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '308':
    description: Permanent Redirect
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '409':
    $ref: 'TS29571_CommonData.yaml#/components/responses/409'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    description: Unexpected error
patch:
  summary: Partial update IMS Event Subscription
  operationId: ImsEventSubsPartialModify
  tags:
    - IMS Event Subscription Partial Modification
  parameters:
    - name: subscriptionId
      in: path
      description: Individual IMS event subscription Identity
      required: true
      schema:
        type: string
  requestBody:
    content:
      application/json-patch+json:
        schema:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
          minItems: 1
      required: true
  responses:
    '200':
      description: >
        Successful update of the subscription, when the IMS AS needs
        to return information in the response.
      content:
        application/json:
          schema:

```

```

        $ref: '#/components/schemas/ImsEventsSubscriptionCreated'
'204':
  description: No content
'307':
  description: Temporary Redirect
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
  headers:
    Location:
      description: The URI pointing to the resource located on the redirect target IMS AS.
      schema:
        type: string
'308':
  description: Permanent Redirect
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
  headers:
    Location:
      description: The URI pointing to the resource located on the redirect target IMS AS.
      schema:
        type: string
'400':
  $ref: 'TS29571_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29571_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29571_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29571_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
delete:
  summary: delete
  operationId: ImsEventSubsDelete
  tags:
    - IMS Event Subscription Deletion
  parameters:
    - name: subscriptionId
      in: path
      description: Individual IMS event subscription Identity
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No content
    '307':
      description: Temporary Redirect
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
      headers:
        Location:
          description: The URI pointing to the resource located on the redirect target IMS AS.
          schema:
            type: string
    '308':
      description: Permanent Redirect
      content:

```

```

    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
    headers:
      Location:
        description: The URI pointing to the resource located on the redirect target IMS AS.
        schema:
          type: string
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  OAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nimsas-ee: Access to the Nimsas_ImSEE API.

```

schemas:

STRUCTURED DATA TYPES

```

ImsEventsSubscription:
  description: Represents an Individual IMS Event Subscription resource.
  type: object
  required:
    - eventList
  properties:
    eventList:
      description: >
        the IMS events to be subscribed or successfully subscribed in a
        subscription response within the referenceId converted from integer
        to string is the key of the map.
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEventConfiguration'
      minProperties: 1
    subscriberId:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    anyUeInd:
      type: boolean
    subscriptionId:
      type: string
    imsReportingOptions:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsReportingOptions'
    notificationURI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    notificationCorrelationId:
      type: string

```

```

ImsEventsNotification:
  description: Notifications about Individual Events.
  type: object
  required:
    - eventNotifications
    - notificationCorrelationId

```

```

    properties:
      eventNotifications:
        description: Notifications about Individual Events.
        type: array
        items:
          $ref: '#/components/schemas/EventNotification'
        minItems: 1
      notificationCorrelationId:
        type: string

EventNotification:
  description: The notification information for a specific event.
  type: object
  required:
    - event
    - subscriberId
    - timestamp
  properties:
    event:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEvent'
    referenceId:
      $ref: 'TS29503_Nudm_EE.yaml#/components/schemas/ReferenceId'
    subscriberId:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    timestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    eventReport:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEventReportInfo'
    sessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'

ImsEventsSubscriptionCreated:
  description: >
    Represents the subscription of the created/modified IMS event subscriptiona and
    the immediate reports
  type: object
  required:
    - imsEventsSubscription
  properties:
    imsEventsSubscription:
      $ref: '#/components/schemas/ImsEventsSubscription'
    eventReports:
      description: >
        Contains the associated status to the event(s) being requested if
        the status associated to at least one of the requested event(s)
        is available at the time of subscription.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEventReport'
      minItems: 1

```

ENUMS

A.6 Nimsas_ImsParameterProvision API

openapi: 3.0.0

info:

```

title: 'IMS AS ImsParameterProvision Service'
version: 1.0.0
description: |
  Nimsas_ImsParameterProvision Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.

```

externalDocs:

```

description: >
  3GPP TS 29.175 V19.4.0; IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application
  Server (AS) Services; Stage 3
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.175'

```

servers:

```

- url: '{apiRoot}/nimsas-ipp/v1'
  variables:

```

```

    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:
  - {}
  - OAuth2ClientCredentials:
      - nimsas-ipp

paths:
  /{imsUeId}/ims-pp-data-store/{afInstanceId}:
    put:
      summary: Creates or updates the parameter provisioning data entry.
      operationId: CreateUpdatePpDataEntry
      tags:
        - ImsParameterProvisioningDataEntry
      parameters:
        - name: imsUeId
          in: path
          description: Contains the IMS public identity.
          required: true
          schema:
            type: string
            pattern: '^(impu-sip\:[a-zA-Z0-9_\-.!~*()&=+$,;?\/\+])\@[A-Za-z0-9]+([A-Za-z0-9]+\.)+[a-z]{2,}|impu-tel\:[0-9]{5,15})$'
        - name: afInstanceId
          in: path
          description: Contains the AF instance identity.
          required: true
          schema:
            type: string
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsPpDataEntry'
            required: true
      responses:
        '201':
          description: >
            Created, a representation of the created ImsParameterProvisioningDataEntry resource
            is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ImsPpDataEntry'
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure:
                {apiRoot}/nhss-ims-uecm/v1/{imsUeId}/imsas-registration
              required: true
              schema:
                type: string
        '200':
          description: >
            OK, a representation of the updated ImsParameterProvisioningDataEntry resource
            is returned..
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ImsPpDataEntry'
        '204':
          description: No content, the ImsParameterProvisioningDataEntry resource is updated.
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '411':

```

```

    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'

delete:
  summary: Delete the parameter provisioning data entry.
  operationId: DeletePpDataEntry
  tags:
    - ImsParameterProvisioningDataEntry
  parameters:
    - name: imsUeId
      in: path
      description: Contains the IMS public identity.
      required: true
      schema:
        type: string
        pattern: '^(\impu-sip\:[a-zA-Z0-9_\-.!~*()&=+$,;?\/]+)\@[A-Za-z0-9]+([-A-Za-z0-9
9]+)\.)+[a-z]{2,}|\impu-tel\:[0-9]{5,15})$'
    - name: afInstanceId
      in: path
      description: Contains the AF instance identity.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No content, the ImsParameterProvisioningDataEntry resource is deleted.
    '307':
      $ref: 'TS29571_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29571_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29571_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29571_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29571_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29571_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29571_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29571_CommonData.yaml#/components/responses/500'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nimsas-ipp: Access to the Nimsas_ImsParameterProvision API

  schemas:

# Structured data types

  ImsPpDataEntry:

```

description: Contains the IMS parameter provision data i.e. the RCD properties.
type: object
properties:
 rcdProp:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/RcdProperties'

Annex B (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2023-04	CT4#115e	C4-231514				TS skeleton	0.0.0
2023-04	CT4#115e	C4-231551				Inclusion of pCRs agreed at CT4#115e, including C4-231214, C4-231217, C4-231224, C4-231225, C4-231514, C4-231515, C4-231516, C4-231517.	0.1.0
2023-05	CT4#116	C4-232553				Inclusion of pCRs agreed at CT4#116, including C4-232142, C4-232145, C4-232504, C4-232505.	0.2.0
2023-09	CT4#117	C4-233810				Inclusion of pCRs agreed at CT4#117, including C4-233250, C4-233254, C4-233255, C4-233256, C4-233700, C4-233701, C4-233704, C4-233856.	0.3.0
2023-10	CT4#118	C4-234583				Inclusion of pCRs agreed at CT4#118, including C4-234172, C4-234174, C4-234175, C4-234177, C4-234545, C4-234547.	0.4.0
2023-12	CT4#119	C4-235660				Inclusion of pCRs agreed at CT4#119, including C4-235221, C4-235464, C4-235465, C4-235466, C4-235467, C4-235468, C4-235471.	0.5.0
2023-12	CT#102	CP-233022				TS presented for information	1.0.0
2024-03	CT4#121	C4-240852				Inclusion of pCRs agreed at CT4#121, including C4-240405, C4-240406, C4-240407, C4-240409, C4-240410, C4-240470, C4-240704, C4-240705, C4-240708, C4-240716.	1.1.0
2024-03	CT#103	CP-240025				TS presented for approval	2.0.0
2024-03	CT#103					TS approved in CT#103	18.0.0
2024-06	CT#104	CP-241044	0001		F	Support of SDP attributes a=3gpp-bdc-used-by and a=3gpp-req-app	18.1.0
2024-06	CT#104	CP-241044	0002	1	F	Correction on the Nimsas_MediaControl service	18.1.0
2024-06	CT#104	CP-241044	0003	1	F	Correction on the Nimsas_SessionEventControl service	18.1.0
2024-06	CT#104	CP-241044	0004		F	Correction on the Nimsas_MediaControl OpenAPI	18.1.0
2024-06	CT#104	CP-241044	0006	1	F	Update the presence condition and cardinality for mediaProxyConfig	18.1.0
2024-06	CT#104	CP-241044	0007	1	F	Update the DcMediaSpecification for Nimsas_SessionEventControl Service API	18.1.0
2024-06	CT#104	CP-241044	0008	1	F	Update the DcMediaSpecification Datatype for MdcEndpoint	18.1.0
2024-06	CT#104	CP-241044	0009	1	F	Update the SessionEventNotificationUri for session event notification	18.1.0
2024-06	CT#104	CP-241044	0010	1	F	Report the media HOLD to DCSF	18.1.0
2024-06	CT#104	CP-241044	0011	2	F	Add the Media re-negotiation indication to Nimsas_MediaControl API to support AR	18.1.0
2024-06	CT#104		0012		F	29.175 Rel-18 API version and External doc update	18.1.0
2024-09	CT#105	CP-242048	0013		F	Corrections and Updates to Notify Service Operation	18.2.0
2024-09	CT#105	CP-242048	0014		F	Remove the SecuritySetup in clause 6.1.6.1	18.2.0
2024-09	CT#105	CP-242048	0015	1	F	Update the sessionInfo description for Nimsas_SessionEventControl API	18.2.0
2024-12	CT#106	CP-243027	0017		F	DC resource release due to a CANCEL request	19.0.0
2024-12	CT#106	CP-243027	0023	1	F	Remove the MRF	19.0.0
2024-12	CT#106	CP-243027	0020	1	F	Report the QoS info to DCSF	19.0.0
2024-12	CT#106	CP-243068	0032		F	API version and External doc update	19.0.0
2024-12	CT#106	CP-243045	0019	1	B	Supporting of network initiated IMS Data Channel	19.0.0
2024-12	CT#106	CP-243045	0022	1	B	Support of interworking with MTSI client	19.0.0
2024-12	CT#106	CP-243045	0025		D	Update the description of EventInitiator data type	19.0.0
2024-12	CT#106	CP-243045	0027		B	Support of the specific PSI within Called ID for standalone DC	19.0.0
2024-12	CT#106	CP-243045	0021	2	B	Definition of Nimsas_ImsSessionManagement Service	19.0.0
2024-12	CT#106	CP-243045	0030	1	B	Definition of Nimsas_ImsEE Service	19.0.0
2024-12	CT#106	CP-243045	0024	2	F	Event Notification for PS Data Off Status	19.0.0

2024-12	CT#106	CP-243045	002 8	2	B	Support of IMS AS Event Exposure Service	19.0.0
2024-12	CT#106	CP-243069	003 3		F	API version and External doc update	19.0.0
2025-03	CT#107	CP-250047	004 3	1	B	Clarification on the MediaInfo of the IMS session management service	19.1.0
2025-03	CT#107	CP-250047	004 0	1	B	Support of avatar communication	19.1.0
2025-03	CT#107	CP-250047	004 4	1	B	Add Nimsas_ImsPP service to support 3rd party identity information	19.1.0
2025-03	CT#107	CP-250047	003 4	2	B	Notify Service Operation of Nimsas_SessionManagement API	19.1.0
2025-03	CT#107	CP-250047	003 9	2	B	Update Nimsas_ImsSessionManagement service	19.1.0
2025-03	CT#107	CP-250047	003 5	2	B	Update the service description for terminating BDC establishment without DC SDP	19.1.0
2025-03	CT#107	CP-250047	003 6	2	B	Update the Nimsas_SessionEventControl service to support Network Capability exposure	19.1.0
2025-03	CT#107	CP-250047	003 7	2	B	Update the description of callingIdentity for Nimsas_SessionEventControl service	19.1.0
2025-03	CT#107	CP-250047	003 8	2	B	Update the Nimsas_SessionEventControl service to support PS Data Off status report	19.1.0
2025-03	CT#107	CP-250047	004 5	2	B	Corrections on service name and HTTP method	19.1.0
2025-03	CT#107	CP-250047	004 6	5	B	Nimsas_EE subscribe operation	19.1.0
2025-03	CT#107	CP-250137	004 7		F	API version and External doc update	19.1.0
2025-06	CT#108	CP-251049	005 2	1	A	Correction on the MediaInstructions data type for AR media	19.2.0
2025-06	CT#108	CP-251049	006 1	2	A	Clarify the calling and called party identity	19.2.0
2025-06	CT#108	CP-251049	006 5	3	A	Removal of Media in Nimsas_SessionEventControl	19.2.0
2025-06	CT#108	CP-251068	005 0		D	Editorial modification on the description of AdcType	19.2.0
2025-06	CT#108	CP-251068	005 8		F	Definition of media correlation ID	19.2.0
2025-06	CT#108	CP-251068	005 9		B	Usage of common data types in IMS event exposure	19.2.0
2025-06	CT#108	CP-251068	004 8	1	B	Update SessionEventControl Service to Notify Operation from External Party	19.2.0
2025-06	CT#108	CP-251068	005 3	1	F	Update Nimsas_ImsSessionManagement service	19.2.0
2025-06	CT#108	CP-251068	005 4	1	B	Updates the Nimsas_MediaControl service to support DC multiplexing	19.2.0
2025-06	CT#108	CP-251068	005 5	1	B	Update the MediaProxy value	19.2.0
2025-06	CT#108	CP-251068	005 7	1	F	Update the application errors for Nimsas_ImsEE service	19.2.0
2025-06	CT#108	CP-251068	006 3	1	B	Remove the temporarily defined mediaInfoExternal	19.2.0
2025-06	CT#108	CP-251068	006 9		F	Correction on Nimsas_ImsEE service	19.2.0
2025-06	CT#108	CP-251068	006 6	1	F	Corrections on PS Data Off	19.2.0
2025-06	CT#108	CP-251068	006 7	1	B	Add Nimsas_ImsEE OpenAPI	19.2.0
2025-06	CT#108	CP-251068	006 8	1	B	Add Nimsas_ImsSessionManagement OpenAPI	19.2.0
2025-06	CT#108	CP-251068	007 0	1	F	Correction on Nimsas_ImsSessionManagement	19.2.0
2025-06	CT#108	CP-251079	007 2		F	API version and External doc update	19.2.0
2025-09	CT#109	CP-252033	008 5	2	A	Missing condition for mediaInstruction	19.3.0
2025-09	CT#109	CP-252050	007 9		B	Nimsas_ImsPP_Delete service operation definition	19.3.0
2025-09	CT#109	CP-252050	008 0		B	Nimsas_ImsParameterProvision API: "201 Created" and "204 No Content" responses	19.3.0
2025-09	CT#109	CP-252050	008 6		B	Update the service operation description	19.3.0
2025-09	CT#109	CP-252050	008 9		B	Remove the editor note for Nimsas_ImsEE Service	19.3.0

2025-09	CT#109	CP-252050	009 0		B	Remove the editor note in overview	19.3.0
2025-09	CT#109	CP-252050	007 3	1	F	Correction on the data channel multiplexing	19.3.0
2025-09	CT#109	CP-252050	007 7	1	B	Nimsas_ImsParameterProvision API: removal of EN on RCD	19.3.0
2025-09	CT#109	CP-252050	008 1	1	F	Nimsas_ImsParameterProvision: correction on the Public User Identity	19.3.0
2025-09	CT#109	CP-252050	007 8	1	D	Nimsas_ImsParameterProvision API: editorial corrections	19.3.0
2025-09	CT#109	CP-252050	008 2	1	B	Nimsas_ImsParameterProvision API: specification of the OpenAPI file	19.3.0
2025-09	CT#109	CP-252050	008 3	2	B	Instruction on transcoding for interworking	19.3.0
2025-09	CT#109	CP-252050	007 6	2	F	Correction on the SessionId attribute description	19.3.0
2025-09	CT#109	CP-252050	009 2	2	F	Add PUT operation in Nimsas_ImsSessionManagement_Update	19.3.0
2025-09	CT#109	CP-252050	009 1	2	B	Add DC interworking indication in DcMediaSpecification	19.3.0
2025-09	CT#109	CP-252176	009 3		F	API version and External doc update	19.3.0
2025-12	CT#110	CP-253142	009 6	1	A	Update the presence condition of arMediaSpecification	19.4.0
2025-12	CT#110	CP-253142	010 4	1	A	Update the data type to MediaIdRm	19.4.0
2025-12	CT#110	CP-253155	010 0		F	Correction on Nimsas_ImsEE service operation	19.4.0
2025-12	CT#110	CP-253155	009 4	1	F	API specification file name	19.4.0
2025-12	CT#110	CP-253155	009 8	1	F	Add 404 Not Found application error in Nimsas_ImsEE notification	19.4.0
2025-12	CT#110	CP-253155	010 1	2	F	Correction on the attribute notifUri and notifCorrectionId in ImsSessionInfo	19.4.0
2025-12	CT#110	CP-253155	010 9		F	Correction on Nimsas_ImsEE service operation	19.4.0
2025-12	CT#110	CP-253155	010 5	1	F	Update on ImsSessionEventNotification for IMS session management API	19.4.0
2025-12	CT#110	CP-253155	010 6	1	B	Audio/video support in the MDC2 interface	19.4.0
2025-12	CT#110	CP-253155	010 7	1	B	Update error handling for IMS session management	19.4.0
2025-12	CT#110	CP-253155	010 8	1	B	Update PUT method on Individual IMS Session Resource	19.4.0
2025-12	CT#110	CP-253155	011 0	1	F	Correction on Nimsas_ImsSM service operation	19.4.0
2025-12	CT#110	CP-253155	009 9	2	F	Add an application error for Nimsas_ImsSM_update operation	19.4.0
2025-12	CT#110	CP-253155	009 7	4	B	Add the multiAppBindingInfo attribute to DcMediaSpec	19.4.0
2025-12	CT#110	CP-253167	011 2		F	API version and External doc update	19.4.0
2026-03	CT#111	CP-260032	011 4		F	Reference ID	19.5.0
2026-03	CT#111	CP-260032	011 3	1	F	Presence Condition of Notification Correlation ID	19.5.0
2026-03	CT#111	CP-260032	011 6	2	F	Update abbreviations and attribute description of ImsSessionInfo	19.5.0
2026-03	CT#111	CP-260040	011 7		F	API version and External doc update	19.5.0

History

Version	Date	Status
V19.3.0	January 2026	Publication
V19.4.0	February 2026	Publication
V19.5.0	March 2026	Publication