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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 Nscp Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SCP.

The 5G System stage 2 architecture and procedures are specified in TS 23.501 [2], TS 23.288 [14], and TS 23.502 [3].

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 9113: "HTTP/2".
- [12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [13] IETF RFC 9457: "Problem Details for HTTP APIs".
- [14] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".
- [15] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".
- [16] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [17] 3GPP TS 29.122: "T8 reference point for Northbound APIs".
- [18] 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].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and 3GPP TS 23.501 [2] and the following apply. An abbreviation defined in the present document or 3GPP TS 23.501 [2] takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1]. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TS 23.501 [2].

| | |
|-----|-----------------------------|
| SCP | Service Communication Proxy |
|-----|-----------------------------|

4 Overview

4.1 Introduction

Within the 5GC, the SCP offers services to the NWDAF and DCCF via the Nscp service based interface (see 3GPP TS 23.501 [2], 3GPP TS 23.502 [3], 3GPP TS 23.288 [14]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SCP and the scope of the present specification.

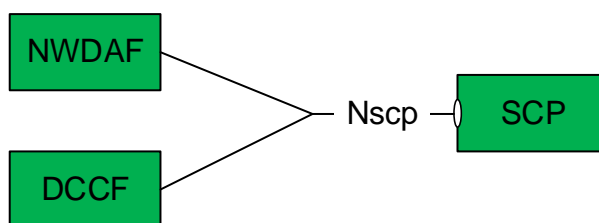


Figure 4.1-1: Reference model – SCP

5 Services offered by the SCP

5.1 Introduction

The table 5.1-1 shows the SCP services and SCP service operations:

Table 5.1-1 List of SCP Services

| Service Name | Service Operations | Operation Semantics | Example Consumer(s) |
|--------------------|--------------------|---------------------|---------------------|
| Nscp_EventExposure | Subscribe | Subscribe/Notify | NWDAF, DCCF |
| | Unsubscribe | Subscribe/Notify | NWDAF, DCCF |
| | Notify | Subscribe/Notify | NWDAF, DCCF |

Table 5.1-2 summarizes the corresponding APIs defined for this specification.

Table 5.1-2: API Descriptions

| Service Name | Clause | Description | OpenAPI Specification File | apiName | Annex |
|--------------------|--------|----------------------------|---------------------------------|---------|-------|
| Nscp_EventExposure | 6.1 | SCP Event Exposure Service | TS29570_Nscp_EventExposure.yaml | nscp-ee | A.2 |

5.2 Nscp_EventExposure Service

5.2.1 Service Description

5.2.1.1 General

The Nscp_EventExposure service enables the SCP to expose real-time event data related to network signaling and performance to other NFs (e.g. NWDAF and DCCF) for analytics and monitoring.

5.2.1.2 Events supported by the service

The following event type(s) are supported by the Nscp_EventExposure Service:

Event: SERVICE_SIGNALLING_CHARACTERISTICS:

An NF subscribes to this event type to receive the SCP reports of the observed rate (i.e. number per time interval) of several types of signalling messages received and sent by NF instance(s) or NF service instance(s), the percentage of failed transactions, NF or NF service overload control information, SCP reselection reasons, NF service connection status, and various delay and performance metrics.

This event implements the "Service Signalling Characteristics Information" as described in clause 5.2.29 of 3GPP TS 23.502 [3] and Table 6.22.2-8 of 3GPP TS 23.288 [14].

Target: NF type, NF service instance, NF instance, NF set or NF service name.

Report Type: Periodic Report, One-Time Report.

Input in the subscription: target ID, optional filters, e.g. reporting threshold (in terms of absolute transaction or deviation from average, or in terms of a minimum percentage failed transactions), time window.

Notification: Event type, time stamp, and optionally: one or more of the following types of information:

- Per NF instance, See Table 6.22.2-8 of 3GPP TS 23.288 [14].
 - Number of successful responses related to SCP egress interface associated to their initial requests during a time interval.
 - Number of failed responses related to SCP egress interface associated to their initial requests during a time interval.
 - Distribution of reasons for failed responses related to SCP egress interface associated to their initial requests, e.g. the number of failed responses due to time-outs, the number of failed responses due to server errors, the number of failed responses due to consumer errors.

- Connection status: The connection status between SCP and NF service instance.
- SCP reselection statistics: Reselection reasons with their occurrence counts.
- Overload control information indicating the current overload of the NF and NF Service(s).
- Average response time: Average time taken to get response from NF service instance after SCP sent the request.

5.2.2 Service Operations

5.2.2.1 Introduction

The Nscp_EventExposure service defines three service operations:

- Notify: The SCP sends notifications to subscribed consumers, providing event data and related information.
- Subscribe: A network function (NF) subscribes to receive notifications for specific events, with the option to define filtering or subscription parameters.
- Unsubscribe: An NF unsubscribes from a previously established event notification subscription.

These operations allow consumers to manage the receipt of event data related to network signaling and performance.

5.2.2.2 Subscribe

5.2.2.2.1 General

See Table 5.1-1 for an overview of the service operations supported by the Nscp_EventExposure service.

5.2.2.2.2 Creation of a subscription

This procedure allows NF Service Consumer to subscribe by using HTTP POST method with the URI of subscriptions collection.

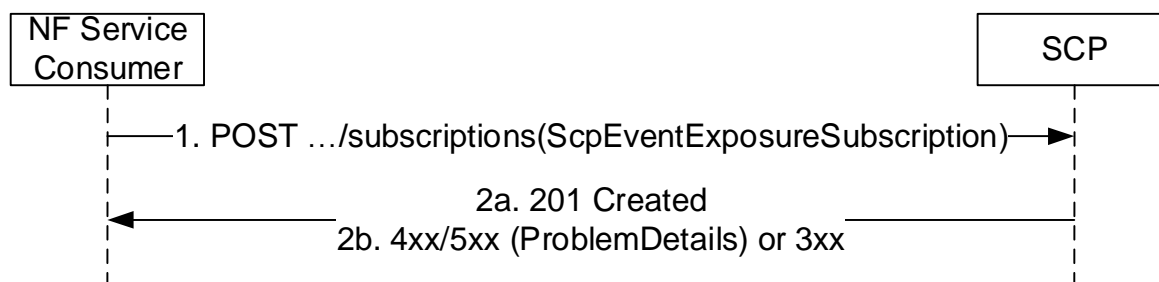


Figure 5.2.2.2.2-1: Subscription of NF service consumer to SCP Event Exposure

1. The NF Service Consumer shall send an HTTP POST request to the resource URI associated with the subscription collection.
- 2a. On success, "201 Created" shall be returned. The response body shall include a HTTP Location header including the subscription ID together with the status code 201 indicating the requested resource is created in the response message.
- 2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body should contain a ProblemDetails structure indicating appropriate additional error information.

5.2.2.2.3 Modification of a subscription

This procedure allows NF Service Consumer to modify an existing subscription by using HTTP PATCH method with the URI of the individual subscription resource.

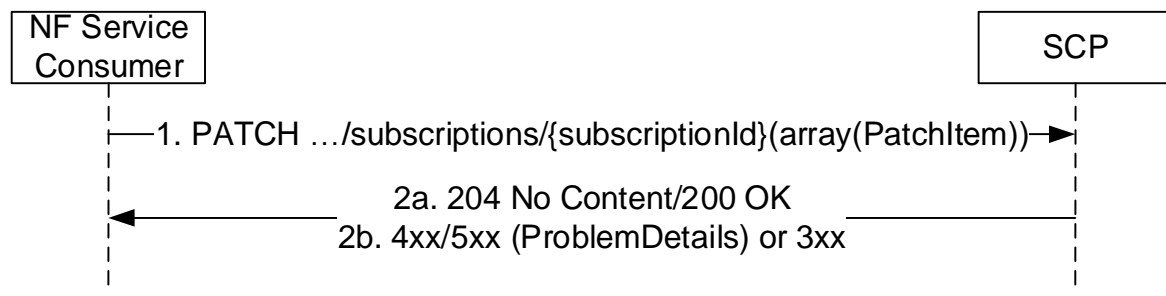


Figure 5.2.2.3-1: Modification of subscription for SCP Event Exposure

1. The NF Service Consumer shall send a PATCH request to modify a subscription resource in the SCP.

2a. On success,

"204 No Content" shall be returned, if there is no payload in the response. If the request included an expiry time and "204 No Content" is returned, then the requested expiry time shall be accepted by the SCP.

"200 OK" shall be returned and include a response body of type `ScpEventExposureSubsResp` if a payload needs to be returned. When returning a "200 OK" response, if the request included an expiry time, then the response based on operator policies and taking into account the expiry time included in the request, shall contain an expiry time (i.e. a future timestamp), as determined by the SCP, after which the subscription becomes invalid. If an expiry time was included in the request, then the expiry time returned in the response should be less than or equal to that value.

2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.3.3.1-3 shall be returned. For a 4xx/5xx response, the message body contains a `ProblemDetails` structure indicating appropriate additional error information.

5.2.2.3 Unsubscribe

5.2.2.3.1 General

This procedure allows NF Service Consumer to delete an existing subscription by using the HTTP DELETE method with the URI of the individual subscription resource to be deleted.

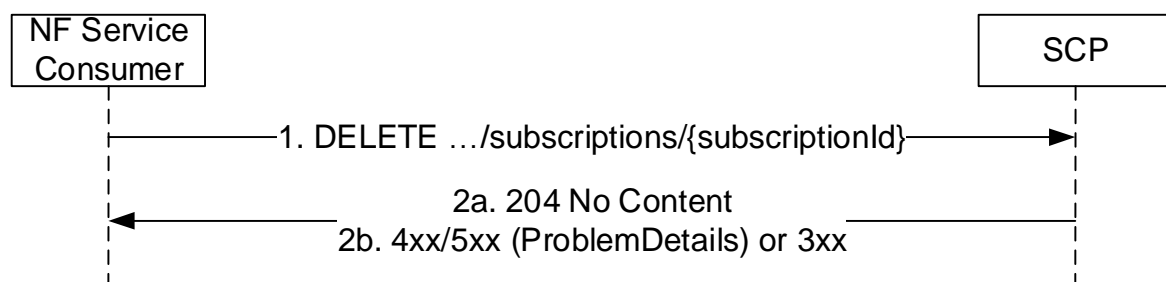


Figure 5.2.2.3.1-1: Unsubscribe Service Operation for SCP Event Exposure

1. The NF consumer shall send a DELETE request to the SCP to delete the subscription.

2a. On success, "204 No content" shall be returned by the NF Service Consumer.

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.1.3.3.3.2-3 shall be returned. For a 4xx/5xx response, the message body should contain a `ProblemDetails` structure indicating appropriate additional error information.

5.2.2.4 Notify

5.2.2.4.1 General

The Notify service operation is used to allow the NF service consumer to get notifications from SCP.

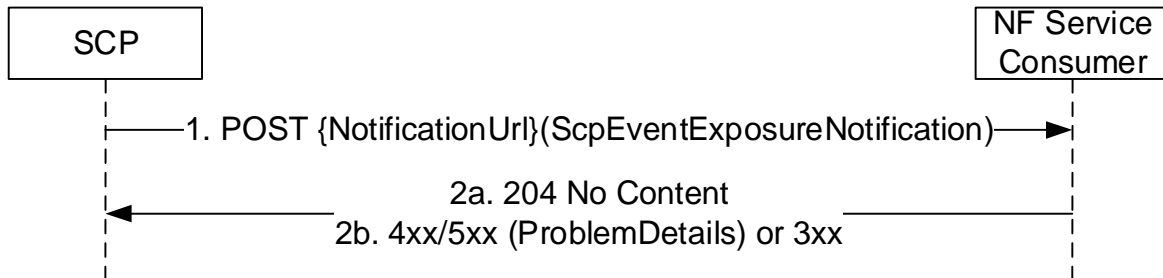


Figure 5.2.2.4.1-1: Notification for SCP Event Exposure

1. The SCP shall send a POST request to the NF Service Consumer with the information on Notification target address. The request body shall include Event specific parameters and notification correlation ID, if received.

2a. On success, "204 No content" shall be returned by the NF Service Consumer.

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.1.5.2.3.1-2 shall be returned. For a 4xx/5xx response, the message body should contain a ProblemDetails structure indicating appropriate additional error information.

6 API Definitions

6.1 Nscp_EventExposure Service API

6.1.1 Introduction

The Nscp_EventExposure shall use the Nscp_EventExposure API.

The API URI of the Nscp_EventExposure 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 " nscp-ee".
- 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 9113 [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 Nscp_ee 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 9457 [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 Nscp_EventExposure API.

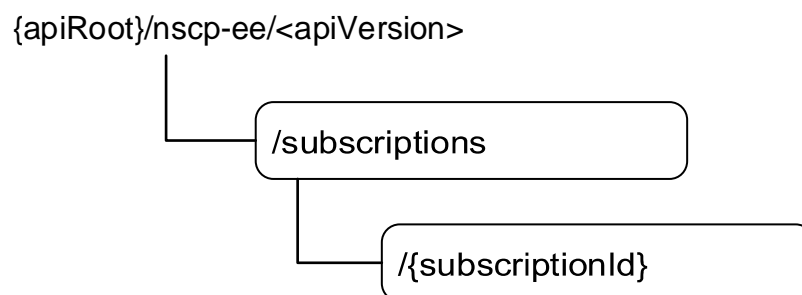


Figure 6.1.3.1-1: Resource URI structure of the Nscp_EventExposure API

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) |
|----------------------------|--|---------------------------------|--|
| subscriptions (Collection) | /subscriptions | POST | Mapped to the service operation subscribe, when to create a subscription |
| subscriptionId (Document) | /subscriptions/{subscriptionId} | PATCH | Modify the subscription identified by {subscriptionId} |
| | | DELETE | Delete the subscription identified by {subscriptionId} |

6.1.3.2 Resource: subscriptions (Collection)

6.1.3.2.1 Description

This resource represents a collection of subscriptions created by NF service consumers of Nscp_EventExposure service.

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

6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nscp-ee/<apiVersion>/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 |
|------------------------------|---|-------------|---|
| ScpEventExposureSubscription | M | 1 | SCP Event Exposure Subscription to be created |

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 |
|--|---|-------------|---------------------------|---|
| ScpEventExposureSubsResp | M | 1 | 201 Created | Represents successful creation of an SCP Subscription |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| 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, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.2.3.1-4: 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}/nscp-ee/<apiVersion>/subscriptions/{subscriptionId} |

Table 6.1.3.2.3.1-5: 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 service instance within the same SCP. |

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 service instance within the same SCP. |

6.1.3.3 Resource: subscriptionId (Document)

6.1.3.3.1 Description

This resource represents an individual of subscription created by NF service consumers of Nscp_EventExposure service.

This resource is modelled as the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

6.1.3.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|----------------|-----------|--|
| apiRoot | string | See clause 6.1.1 |
| subscriptionId | string | Represents the identity of a specific subscription |

6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 PATCH

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the PATCH method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structure and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the PATCH Request Body on this resource

| Data type | P | Cardinality | Description |
|------------------|---|-------------|---|
| array(PatchItem) | M | 1..N | It contains the list of changes to be made to the subscription, according to the JSON PATCH format specified in IETF RFC 6902 [15]. |

Table 6.1.3.3.3.1-3: Data structures supported by the PATCH Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| n/a | | | 204 No Content | Represents a successful update on SCP Event Exposure Subscription |
| ScpEventExposureSubs Resp | M | 1 | 200 OK | Represents successful modification of an SCP Subscription. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| NOTE: 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, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). | | | | |

Table 6.1.3.3.3.1-4: 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 service instance within the same SCP. |

Table 6.1.3.3.3.1-5: 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 service instance within the same SCP. |

6.1.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.2-1: URI query parameters supported by the DELETE method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.2-3.

Table 6.1.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 6.1.3.3.2-3: 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. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |

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, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).

Table 6.1.3.3.2-4: 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 service instance within the same SCP. |

Table 6.1.3.3.2-5: 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 service instance within the same SCP |

6.1.4 Custom Operations without associated resources

6.1.4.1 Overview

There are no custom operations without associated resources supported on Nscp_EventExposure Service.

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) |
|---------------------------------|-------------------|---------------------------------|---------------------------------|
| SCP Event Exposure Notification | {notificationUri} | POST | |

6.1.5.2 SCP Event Exposure Notification

6.1.5.2.1 Description

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

6.1.5.2.2 Target URI

The Callback URI "{notificationUri}" 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 |
|-----------------|---|
| notificationUri | String formatted as URI with the Callback Uri |

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 |
|------------------------------|---|-------------|---|
| ScpEventExposureNotification | M | 1 | Represents the notification to be delivered |

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 | |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. (NOTE) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. (NOTE) |
| 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 6.1.5.2.3.1-3: 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 to which the notification should be sent. |

Table 6.1.5.2.3.1-4: 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 to which the notification should be sent |

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 Nscp_EventExposure service based interface protocol.

Table 6.1.6.1-1: Nscp_EventExposure specific Data Types

| Data type | Clause defined | Description | Applicability |
|------------------------------|----------------|--|---------------|
| ScpEventExposureSubscription | 6.1.6.2.2 | Represents an event subscription resource to SCP | |
| ScpEventExposureNotification | 6.1.6.2.3 | Represents an event notification. | |
| ScpEventExposureSubsResp | 6.1.6.2.4 | Represent the SCP Event Exposure Response | |
| ScpEventFilter | 6.1.6.2.5 | | |
| ScpEventReport | 6.1.6.2.6 | | |
| FailureCauseOccurrence | 6.1.6.2.7 | | |
| ScpSignallingInfo | 6.1.6.2.8 | SCP signalling information | |
| ScpEventFilterConfig | 6.1.6.2.9 | Event filter | |
| ReselectionStat | 6.1.6.2.10 | Reselection statistics | |
| FailureCause | 6.1.6.3.3 | | |
| ScpEventType | 6.1.6.3.4 | | |
| ReselectionReason | 6.1.6.3.5 | Reselection reason | |
| ConnectionStatus | 6.1.6.3.6 | Connection status | |

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

Table 6.1.6.1-2: Nscp_EventExposure re-used Data Types

| Data type | Reference | Comments | Applicability |
|---------------------|---------------------|--|---------------|
| ServiceName | 3GPP TS 29.510 [10] | Service Name | |
| NFType | 3GPP TS 29.510 [10] | NF type | |
| DateTime | 3GPP TS 29.571 [16] | Date time | |
| DurationSec | 3GPP TS 29.571 [16] | Duration in seconds | |
| NfInstanceId | 3GPP TS 29.571 [16] | Identifier (UUID) of the NF Instance. The hexadecimal letters of the UUID should be formatted by the sender as lower-case characters and shall be handled as case-insensitive by the receiver. | |
| NfSetId | 3GPP TS 29.571 [16] | NF Set ID | |
| UInteger | 3GPP TS 29.571 [16] | Unsigned Integer | |
| Uri | 3GPP TS 29.571 [16] | URI | |
| OverloadControlInfo | 3GPP TS 29.571 [16] | Overload Control information | |
| TimeWindow | 3GPP TS 29.122 [17] | Time window | |
| RecurTime | 3GPP TS 29.503 [18] | Recurring time | |

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: ScpEventExposureSubscription

Table 6.1.6.2.2-1: Definition of type ScpEventExposureSubscription

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|-----------------------|---|-------------|--|---------------|
| eventList | array(ScpEventFilter) | M | 1..N | Describes the events to be subscribed in subscription request or the events successfully subscribed for this subscription in subscription response. | |
| eventNotifyUri | Uri | M | 1 | Identifies the recipient of notifications sent by SCP for this subscription. | |
| notifyCorrelationId | string | M | 1 | Identifies the notification correlation ID. The SCP shall include this ID in the notifications. The value of this IE shall be unique per subscription for a given NF service consumer. | |
| expiry | DateTime | O | 0..1 | When present, this IE shall represent the UTC time after which the subscribed event(s) shall stop generating report and the subscription becomes invalid. | |

6.1.6.2.3 Type: ScpEventExposureNotification

Table 6.1.6.2.3-1: Definition of type ScpEventExposureNotification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|------------------------|---|-------------|---|---------------|
| notifyCorrelationId | string | M | 1 | This IE shall indicate the notification correlation Id provided by the NF service consumer during event subscription. This parameter can be useful if the NF service consumer uses a common call-back URI for multiple subscriptions. | |
| reportList | array(ScpEvent Report) | C | 1..N | This IE shall be present if an event is reported. When present, this IE represents the event reports to be delivered. | |

6.1.6.2.4 Type: ScpEventExposureSubsResp

Table 6.1.6.2.4-1: Definition of type ScpEventExposureSubsResp

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|---|---------------|
| expiryTime | DateTime | O | 0..1 | When present, it shall indicate the expiration time of the subscription, as determined by the operator's policy. The NF consumer shall renew or re-subscribe before expiration if continued event notifications are required. | |

6.1.6.2.5 Type: ScpEventFilter

Table 6.1.6.2.5-1: Definition of type ScpEventFilter

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|------------------------------|---|-------------|---|---------------|
| eventType | ScpEventType | M | 1 | The SCP event type to be reported. | |
| timeWindow | RecurTime | O | 0..1 | When present, it shall indicate the data collection window. | |
| filterConfigs | array(ScpEvent FilterConfig) | O | 1..N | List of filter configurations associated with this eventType. | |

6.1.6.2.6 Type: ScpEventReport

Table 6.1.6.2.6-1: Definition of type ScpEventReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|--------------------------|---|-------------|--|---------------|
| eventType | ScpEventType | M | 1 | Indicates the type of the event which triggers the report. | |
| timeStamp | DateTime | M | 1 | This IE shall indicate the time in UTC when the event report was generated. | |
| scpSignallingInfoList | array(ScpSignallingInfo) | O | 1..N | Per-service instance statistics including SCP/NF behavior and overload. See table 6.22.2-8 of 3GPP TS 23.288 [14] and clause 5.2.29 of 3GPP TS 23.502 [3]. | |

6.1.6.2.7 Type: FailureCauseOccurrence

Table 6.1.6.2.7-1: Definition of type FailureCauseOccurrence

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|--------------|---|-------------|---|---------------|
| cause | FailureCause | M | 1 | Reasons of failed responses of NF Service(s). | |
| count | UInteger | M | 1 | Number of the failed responses due to the reason provided in "cause". | |

6.1.6.2.8 Type: ScpSignallingInfo

Table 6.1.6.2.8-1: Definition of type ScpSignallingInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------------|---|-------------|--|---------------|
| serviceInstanceid | string | C | 0..1 | This IE shall be present if available. When present it shall identify the NF service instance for which the statistics are reported. (NOTE) | |
| nfInstanceid | NfInstanceid | C | 0..1 | NF Instance ID hosting the NF service instance. The IE shall be present when available. (NOTE) | |
| serviceName | ServiceName | O | 0..1 | Identifies the name of the NF service (e.g., Namf-Comm, Nudm-SDM) for which the statistics apply. (NOTE) | |
| nfType | NFType | O | 0..1 | Identifies the NF type of The NF instance for which the statistics are reported. (NOTE) | |
| nfSetid | NfSetid | O | 0..1 | Identifies the NF set of the NF instance for which the statistics are reported. (NOTE) | |
| rcvRequestCount | UInteger | O | 0..1 | Number of requests received by SCP from the NF service instance. | |
| sentRequestCount | UInteger | O | 0..1 | Number of requests sent by the SCP to the NF service instance. | |
| successfulResponseCount | UInteger | O | 0..1 | Number of successful responses received from this NF service instance. | |
| failureResponseCount | UInteger | O | 0..1 | Total number of failed responses received from this NF service instance. | |
| failureCauseStats | array(FailureCauseOccurrence) | O | 1..N | Breakdown of failure causes for this NF service instance. | |
| scpFailureCount | UInteger | O | 0..1 | Number of failures generated by the SCP before reaching the NF (e.g. unreachable NF). | |
| scpFailureCauseStats | array(FailureCauseOccurrence) | O | 0..1 | Breakdown of SCP-side failure causes targeting this NF service instance. | |
| reselectionCount | UInteger | O | 0..1 | Number of times SCP reselect NF instance | |
| reselectionStatList | array(ReselectionStat) | O | 1..N | List of reasons of SCP reselecting NF instance producer with their occurrence counts. Each entry pairs a ReselectionReason with the corresponding number of reselections performed by the SCP. | |
| connectionStatus | ConnectionStatus | O | 0..1 | Connection status between SCP and the NF service instance (e.g., ACTIVE, INACTIVE). | |
| avgResponseTimeToNF | UInteger | O | 0..1 | Average time in units of milliseconds between SCP sending the request to the NF instance and SCP receiving the response from the NF instance. The requests for which no response from the NF instance is received are ignored for calculating the average time in this IE. | |
| overloadControlInfo | OverloadControlInfo | O | 0..1 | Contains overload control metrics (e.g., reduction percentage, validity period) for the reported NF service instance, as defined in clause 6.4 and 5.2.3.2.9 of 3GPP TS 29.500 [4]. The SCP may send this information based on the 3gpp-Sbi-Oci header when overload mitigation is active towards the NF (service) instance. | |

NOTE: At least one of the following identifiers serviceInstanceId, nfInstanceId, serviceName, nfType or nfSetId shall be present.

6.1.6.2.9 Type: ScpEventFilterConfig

Table 6.1.6.2.9-1: Definition of type ScpEventFilterConfig

| Attribute name | Data type | P | Cardinality | Description |
|-----------------------|---------------------|---|-------------|---|
| nfType | NFType | O | 0..1 | When present, this IE shall indicate the type of target NF for which the event is subscribed. This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| targetNfSetId | NfSetId | O | 0..1 | When present, this IE shall contain the identifier of the target NF Set for the event reports. This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| targetNfIdList | array(NfInstanceId) | O | 1..N | When present, this IE shall contain the NF instance identifiers of the target NFs for the event report. This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| serviceNameList | array(ServiceName) | O | 1..N | When present, it shall indicate the NF service name(s) for which the event will be reported. This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| serviceInstanceIdList | array(string) | O | 1..N | When present, it shall indicate the NF service instance(s) for which the event will be reported. This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| reportingThreshold | UInteger | O | 0..1 | This IE shall indicate the threshold on the number of transactions for reporting. When present in the subscription request, it indicates that the subscriber requests a report when the number of transactions exceeds this absolute threshold, This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |
| devFromAveTh | UInteger | O | 0..1 | This IE shall indicate the threshold on deviation from average number of the transactions for reporting. When present in the subscription request, it indicates that the subscriber requests a report when the difference of the number of transactions with the average number of transactions exceeds this threshold, This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTIC S". |

| | | | | |
|-----------|----------|---|------|--|
| failureTh | UInteger | O | 0..1 | <p>This IE shall indicate the threshold on percentage of failure events for reporting.</p> <p>When present in the subscription request, it indicates that the subscriber requests a report when percentage of failure transactions exceeds this threshold,</p> <p>This IE may be present if the eventType is "SERVICE_SIGNALLING_CHARACTERISTICS".</p> |
|-----------|----------|---|------|--|

6.1.6.2.10 Type: ReselectionStat

Table 6.1.6.2.10-1: Definition of type ReselectionStat

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|-------------------|---|-------------|---|---------------|
| reselectionReason | ReselectionReason | M | 1 | Reason for SCP reselection of an NF service instance, as defined in clause 6.3.1.0 of 3GPP TS 23.501 [2]. | |
| count | UInteger | M | 1 | Number of times the SCP performed reselection due to the given reason within the reporting interval. | |

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 |
|-----------|-----------------|-------------|---------------|
| n/a | | | |

6.1.6.3.3 Enumeration: FailureCause

Table 6.1.6.3.3-1: Enumeration FailureCause

| Enumeration value | Description |
|-------------------------|---|
| "TIME_OUT" | Time-out |
| "SERVER_ERROR" | Server error |
| "CLIENT_ERROR" | Client error |
| "OTHER_FAILURE_REASONS" | Other failure reasons which are not explicitly listed |

6.1.6.3.4 Enumeration: ScpEventType

Table 6.1.6.3.4-1: Enumeration ScpEventType

| Enumeration value | Description |
|--------------------------------------|---|
| "SERVICE_SIGNALLING_CHARACTERISTICS" | An NF subscribes to this event to receive the SCP reports of the observed rate of different types of signalling messages received and sent by different NF instance(s), the percentage of failed transactions, as described in clause 5.2.29.2.1 of 3GPP TS 23.502 [3]. |

6.1.6.3.5 Enumeration: ReselectionReason

Table 6.1.6.3.5-1: Enumeration ReselectionReason

| Enumeration value | Description |
|----------------------------|--|
| "TARGET_NF_UNREACHABLE" | The original NF instance could not be reached due to network or service unavailability. |
| "LOAD_BASED_RESELECTION" | The reselection was triggered due to overload or high load conditions on the target NF instance. |
| "SERVICE_INSTANCE_FAILURE" | The reselection occurred due to a failure at the specific NF service instance (e.g., timeout or repeated failed transactions). |
| "UNSPECIFIED" | For any reason not covered by an explicit value above. |

6.1.6.3.6 Enumeration: ConnectionStatus

Table 6.1.6.3.6-1: Enumeration ConnectionStatus

| Enumeration value | Description |
|-------------------|--|
| "ACTIVE" | The SCP currently has an active connection to the NF service instance. |
| "INACTIVE" | The SCP currently does not have an active connection to the NF service instance. |

6.1.7 Error Handling

6.1.7.1 General

For the Nscp_EventExposure 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 Nscp_EventExposure API.

6.1.7.2 Protocol Errors

Protocol Error Handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

6.1.7.3 Application Errors

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

Table 6.1.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
| n/a | | |

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nscp_EventExposure 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 |
|----------------|--------------|-------------|
| n/a | | |

6.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nscp_EventExposure 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 Nscp_EventExposure 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 Nscp_EventExposure service.

The Nscp_EventExposure API defines scopes for OAuth2 authorization as specified in 3GPP TS 33.501 [8];

Table 6.1.9-1: OAuth2 scopes defined in Nscp_EventExposure API

| Scope | Description |
|-----------|---------------------------------------|
| "nscp-ee" | Access to the Nscp_EventExposure API. |

6.1.10 HTTP redirection

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

An SCP that reselects a different SCP producer instance will return the NF Instance ID of the new SCP 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 SCP redirects a service request to a different SCP using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new SCP 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 Nscp_EventExposure API

```

openapi: 3.0.0
info:
  title: Nscp_EventExposure
  version: 1.0.0
  description: |
    SCP Event Exposure Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.570 V19.1.0; Service Communication Proxy Services.
  url: http://www.3gpp.org/ftp/Specs/archive/29_series/29.570/
servers:
- url: '{apiRoot}/nscp-ee/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501
security:
- {}
- oAuth2ClientCredentials:
  - nscp-ee
paths:
  /subscriptions:
    post:
      summary: Nscp_EventExposure Subscribe service Operation
      tags:
        - Subscriptions(Collection)
      operationId: CreateSubscription
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ScpEventExposureSubscription'
            required: true
      responses:
        '201':
          description: Subscription Created
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure
                {apiRoot}/nscp-ee/<apiVersion>/subscriptions/{subscriptionId}
              required: true
              schema:
                type: string
          content:

```

```

    application/json:
      schema:
        $ref: '#/components/schemas/ScpEventExposureSubsResp'
  '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'
  '501':
    $ref: 'TS29571_CommonData.yaml#/components/responses/501'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  onScpEventExposureNotification:
    '{$request.body#/subscription/notificationUri}':
      post:
        summary: SCP Event Exposure Notification
        requestBody:
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ScpEventExposureNotification'
            required: true
        responses:
          '204':
            description: Successful acknowledgement
          '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'

/subscriptions/{subscriptionId}:
  patch:

```

```

summary: Nscp_EventExposure Subscribe Modify service Operation
tags:
  - Individual subscription (Document)
operationId: ModifySubscription
parameters:
  - name: subscriptionId
    in: path
    required: true
    description: Unique ID of the subscription to be modified
    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: Subscription modified successfully
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ScpEventExposureSubsResp'
  '204':
    description: Expected response to a successful subscription modification
  '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'
  '501':
    $ref: 'TS29571_CommonData.yaml#/components/responses/501'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    description: Unexpected error

delete:
summary: Nscp_EventExposure Unsubscribe service Operation
tags:
  - Individual subscription (Document)
operationId: DeleteSubscription
parameters:
  - name: subscriptionId
    in: path
    required: true
    description: Deletion of Subscription
    schema:
      type: string
responses:
  '204':
    description: Subscription deleted successfully
  '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:
    description: Unexpected error

```

```

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nscp-ee: Access to the Nscp_EventExposure API

```

```

  schemas:
#
# STRUCTURED TYPES
#

```

```

ScpEventExposureSubscription:
  description: Describes an event to be subscribed
  type: object
  properties:
    eventList:
      type: array
      items:
        $ref: '#/components/schemas/ScpEventFilter'
      minItems: 1
    eventNotifyUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    notifyCorrelationId:
      type: string
    expiry:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  required:
    - eventList
    - eventNotifyUri
    - notifyCorrelationId

```

```

ScpEventFilter:
  description: Describes an SCP event
  type: object
  properties:
    eventType:
      $ref: '#/components/schemas/ScpEventType'
    timeWindow:
      $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/RecurTime'
    filterConfigs:
      type: array
      items:
        $ref: '#/components/schemas/ScpEventFilterConfig'
      minItems: 1
  required:
    - eventType

```

```

ScpEventFilterConfig:
  description: Describes an SCP event filters
  type: object
  properties:
    nfType:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
    targetNfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    targetNfIdList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      minItems: 1
    serviceNameList:
      type: array
      items:
        $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/ServiceName'
      minItems: 1
    serviceInstanceIdList:
      type: array
      items:
        type: string
      minItems: 1
    reportingThreshold:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    devFromAveTh:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    failureTh:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

ScpEventExposureNotification:
  description: Represents an event notification
  type: object
  properties:
    notifyCorrelationId:
      type: string
    reportList:
      type: array
      items:
        $ref: '#/components/schemas/ScpEventReport'
      minItems: 1

ScpEventExposureSubsResp:
  description: Represents SCP Event Exposure Subscription Response
  type: object
  properties:
    expiryTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

ScpEventReport:
  description: Describes an SCP report triggered due to a subscription to an SCP event
  type: object
  properties:
    eventType:
      $ref: '#/components/schemas/ScpEventType'
    timeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    scpSignallingInfoList:
      type: array
      items:
        $ref: '#/components/schemas/ScpSignallingInfo'
      minItems: 1
  required:
    - eventType
    - timeStamp

FailureCauseOccurrence:
  description: The number of times that a failure happened due to a particular cause
  type: object
  properties:

```

```

    cause:
      $ref: '#/components/schemas/FailureCause'
    count:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  required:
  - cause
  - count

ScpSignallingInfo:
  description:
    Per service instance statistics including SCP and NF statistics behavior and overload.
  type: object
  properties:
    serviceInstanceId:
      type: string
    nfInstanceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    serviceName:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/ServiceName'
    nfType:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
    nfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    rcvRequestCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    sentRequestCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    successfulResponseCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    failureResponseCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    failureCauseStats:
      type: array
      items:
        $ref: '#/components/schemas/FailureCauseOccurrence'
      minItems: 1
    scpFailureCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    scpFailureCauseStats:
      type: array
      items:
        $ref: '#/components/schemas/FailureCauseOccurrence'
      minItems: 1
    reselectionCount:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    reselectionStatList:
      type: array
      items:
        $ref: '#/components/schemas/ReselectionStat'
      minItems: 1
    connectionStatus:
      $ref: '#/components/schemas/ConnectionStatus'
    avgResponseTimeToNF:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    overloadControlInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/OverloadControlInfo'

ReselectionStat:
  description: The number of times that a reselection happened due to a particular reason
  type: object
  properties:
    reselectionReason:
      $ref: '#/components/schemas/ReselectionReason'
    count:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  required:
  - reselectionReason
  - count

#
# ENUMERATIONS
#

FailureCause:

```

description: Describes the reasons for failed responses related to SCP egress interface
anyOf:
- type: string
enum:
- TIME_OUT
- SERVER_ERROR
- CLIENT_ERROR
- OTHER_FAILURE_REASONS
- type: string

ScpEventType:
description: Describes the supported event types of Nscp_EventExposure Service
anyOf:
- type: string
enum:
- SERVICE_SIGNALLING_CHARACTERISTICS
- type: string

ReselectionReason:
description: Describes the reasons for SCP reselection
anyOf:
- type: string
enum:
- TARGET_NF_UNREACHABLE
- LOAD_BASED_RESELECTION
- SERVICE_INSTANCE_FAILURE
- UNSPECIFIED
- type: string

ConnectionStatus:
description: Describes the connection status
anyOf:
- type: string
enum:
- ACTIVE
- INACTIVE
- type: string

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2025-02 | CT4#127 | C4-250147 | | | | Rel-19 Skeleton of new TS on Service Communication Proxy (SCP) Services | 0.1.0 |
| 2025-02 | CT4#127 | C4-250148 | | | | Rel-19 Abbreviations clause of new TS on Service Communication Proxy (SCP) Services | 0.1.0 |
| 2025-02 | CT4#127 | C4-250418 | | | | Rel-19 Overview for the SCP service | 0.1.0 |
| 2025-02 | CT4#127 | C4-250419 | | | | Rel-19 PCR on Services offered by the SCP | 0.1.0 |
| 2025-02 | CT4#127 | C4-250640 | | | | Rel-19 PCR on API Definition of new SCP Service | 0.1.0 |
| 2025-04 | CT4#128 | C4-251129 | | | | Pseudo-CR on correction of definition and abbreviation clauses | 0.2.0 |
| 2025-04 | CT4#128 | C4-251435 | | | | Pseudo-CR on event exposure service description | 0.2.0 |
| 2025-04 | CT4#128 | C4-251437 | | | | Pseudo-CR on removing template guideline texts | 0.2.0 |
| 2025-04 | CT4#128 | C4-251499 | | | | Pseudo-CR on service data types used in Subscribe service operation | 0.2.0 |
| 2025-05 | CT4#129 | C4-252222 | | | | Pseudo-CR on corrections in the OpenAPI | 0.3.0 |
| 2025-05 | CT4#129 | C4-252297 | | | | Pseudo-CR on Restructure ScpEventFilter to Support Multiple Configurations | 0.3.0 |
| 2025-05 | CT4#129 | C4-252298 | | | | Pseudo-CR on Spec Cleanup: Template Text Removal and Event Name Correction | 0.3.0 |
| 2025-06 | CT#108 | CP-251040 | | | | TS presented for information | 1.0.0 |
| 2025-08 | CT4#130 | C4-253495 | | | | Pseudo-CR on Corrections to SCP Event Exposure Data Definitions, API Versioning, and OpenAPI | 1.1.0 |
| 2025-08 | CT4#130 | C4-253517 | | | | Pseudo-CR on SCP Event Exposure Data Types and Alignment with SA2 Requirements | 1.1.0 |
| 2025-09 | CT#109 | CP-252184 | | | | TS presented for approval | 2.0.0 |
| 2025-09 | CT#109 | | | | | Approved in TSG CT#109 | 19.0.0 |
| 2025-12 | CT#110 | CP-253150 | 0001 | | F | Correction of OpenAPI | 19.1.0 |
| 2025-12 | CT#110 | CP-253152 | 0002 | 2 | F | Correction to data type | 19.1.0 |
| 2025-12 | CT#110 | CP-253183 | 0003 | 3 | F | Correction of SCP event report | 19.1.0 |
| 2025-12 | CT#110 | CP-253150 | 0004 | | F | Alignment of event name with stage-2 | 19.1.0 |
| 2025-12 | CT#110 | CP-253150 | 0005 | | F | Clarification on expiry time handling during subscription modification | 19.1.0 |
| 2025-12 | CT#110 | CP-253150 | 0006 | 1 | F | Correction of Report Type and clarification of reporting scope | 19.1.0 |
| 2025-12 | CT#110 | CP-253167 | 0009 | | F | API version and External doc update | 19.1.0 |

History

| Version | Date | Status |
|----------------|---------------|---------------|
| V19.0.0 | January 2026 | Publication |
| V19.1.0 | February 2026 | Publication |
| | | |
| | | |
| | | |