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Contents

Foreword

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

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  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- 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 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.

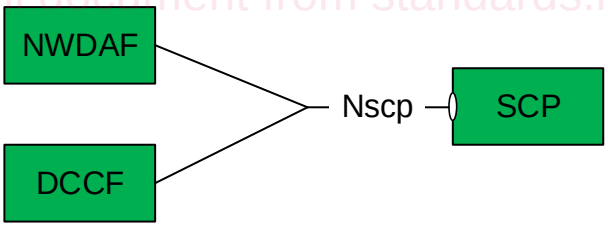

Figure 4.1-1: Reference model – SCP

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.

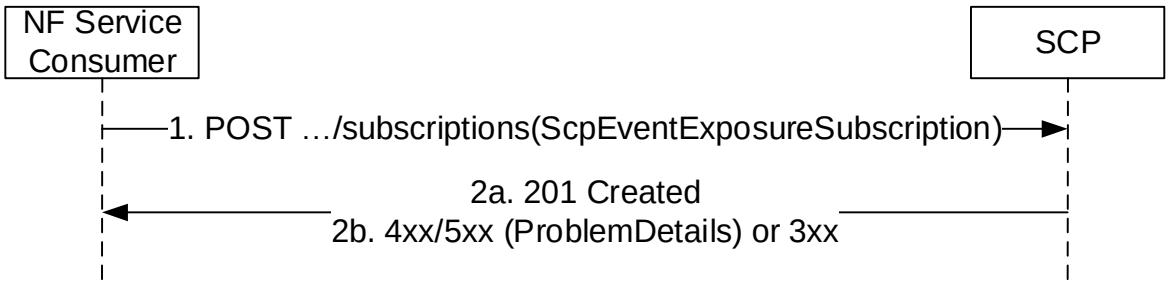

Figure 5.2.2.2.2-1: Subscription of NF service consumer to SCP Event Exposure

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.

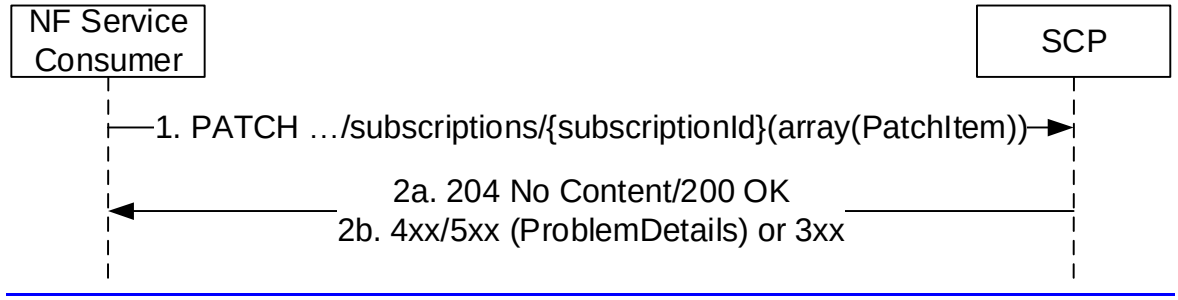

Figure 5.2.2.2.3-1: Modification of subscription for SCP Event Exposure

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, it indicates that the SCP has accepted the requested expiry time.

"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.

NOTE: In this release of the specification, the payload contains only one item, i.e. expiry time. In this release, if the expiry time included is in the request and the expiry time determined by SCP is equal to the value of the expiry time in the request, a payload is not needed to be returned and "204 No Content" is returned.

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.

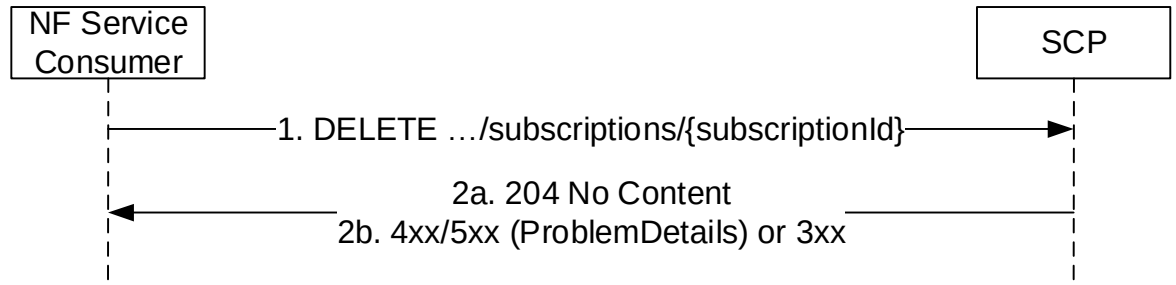

Figure 5.2.2.3.1-1: Unsubscribe Service Operation for SCP Event Exposure

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.