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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

where:

- x the first digit:
 - 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.

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1 Scope

The present document specifies the stage 3 protocol and data model for the Nnrf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the NRF.

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

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP 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] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".
- [7] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [8] ECMA-262: "ECMAScript® Language Specification", <https://www.ecma-international.org/ecma-262/5.1/>.
- [9] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [10] OpenAPI Initiative, "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [11] IETF RFC 7807: "Problem Details for HTTP APIs".
- [12] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [13] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".
- [14] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".
- [15] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [16] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [17] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".
- [18] IETF RFC 4122: "A Universally Unique Identifier (UUID) URN Namespace".
- [19] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".
- [20] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

- [21] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".
- [22] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [23] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [24] IETF RFC 7515: "JSON Web Signature (JWS)".
- [25] IETF RFC 7519: "JSON Web Token (JWT)".
- [26] W3C HTML 4.01 Specification, <https://www.w3.org/TR/2018/SPSD-html401-20180327/>.
- [27] 3GPP TS 23.527: "5G System; Restoration Procedures; Stage 2".
- [28] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".
- [29] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
- [30] IETF RFC 1952: "GZIP file format specification version 4.3".
- [31] 3GPP TR 21.900: "Technical Specification Group working methods".
- [32] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".
- [33] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".
- [34] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".
- [35] 3GPP TS 29.517: "Application Function Event Exposure Service".
- [36] 3GPP TS 29.503: "Unified Data Management Services".
- [37] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".
- [38] IANA: "SMI Network Management Private Enterprise Codes",
<http://www.iana.org/assignments/enterprise-numbers>.
- [39] Semantic Versioning Specification: <https://semver.org>.
- [40] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".
- [41] IETF RFC 7694: "Hypertext Transfer Protocol (HTTP) Client-Initiated Content-Encoding".
- [42] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".
- [43] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services".
- [44] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [45] 3GPP TS 23.380: "IMS Restoration Procedures".
- [46] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G data connectivity domain charging; Stage 2".
- [47] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [48] 3GPP TS 23.540: "5G System; Technical realization of Service Based Short Message Service; Stage 2".

3 Definitions 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 the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5GC	5G Core Network
CEF	Charging Enablement Function
CH	Credentials Holder
CHF	Charging Function
DCS	Default Credentials Server
IPUPS	Inter-PLMN User Plane Security
MBS	Multicast/Broadcast Service
MB-SMF	Multicast/Broadcast Session Management Function
NF	Network Function
NRF	NF Repository Function
NWDAF	Network Data Analytics Function
PFD	Packet Flow Description
SNPN	Stand-alone Non-Public Network
SSM	Source Specific IP Multicast (address)
TNGF	Trusted Non-3GPP Gateway Function
TSCTSF	Time Sensitive Communication and Time Synchronization Function
TWIF	Trusted WLAN Interworking Function
W-AGF	Wireline Access Gateway Function

4 Overview

The Network Function (NF) Repository Function (NRF) is the network entity in the 5G Core Network (5GC) supporting the following functionality:

- Maintains the NF profile of available NF instances and their supported services;
- Maintains the SCP profile of available SCP instances;
- Maintains the SEPP profile of available SEPP instances;
- Allows other NF or SCP instances to subscribe to, and get notified about, the registration in NRF of new NF instances of a given type or of SEPP instances. It also allows SCP instances to subscribe to, and get notified about, the registration in NRF of new SCP instances;
- Supports service discovery function. It receives NF Discovery Requests from NF or SCP instances, and provides the information of the available NF instances fulfilling certain criteria (e.g., supporting a given service);
- Support SCP discovery function. It receives NF Discovery Requests for SCP profiles from other SCP instances, and provides the information of the available SCP instances fulfilling certain criteria (e.g., serving a given NF set);
- Support SEPP discovery function. It receives NF Discovery Requests for SEPP profiles from other NF or SCP instances, and provides the information of the available SEPP instances fulfilling certain criteria (e.g. supporting connectivity with a remote PLMN).