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Contents

| | |
|--|----|
| Intellectual Property Rights | 2 |
| Legal Notice | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 6 |
| 1 Scope | 7 |
| 2 References | 7 |
| 3 Definitions, symbols and abbreviations | 8 |
| 3.1 Definitions | 8 |
| 3.2 Abbreviations | 9 |
| 4 Reference architecture..... | 9 |
| 5 Signalling Flows for the Policy Framework..... | 13 |
| 5.1 AM Policy Association Management..... | 13 |
| 5.1.1 AM Policy Association Establishment | 13 |
| 5.1.2 AM Policy Association Modification | 14 |
| 5.1.2.1 AM Policy Association Modification initiated by the AMF | 14 |
| 5.1.2.1.1 AM Policy Association Modification initiated by the AMF without AMF relocation | 14 |
| 5.1.2.1.2 AM Policy Association Modification with old PCF during AMF relocation | 15 |
| 5.1.2.2 AM Policy Association Modification initiated by the PCF | 16 |
| 5.1.3 AM Policy Association Termination | 17 |
| 5.1.3.1 AM Policy Association Termination initiated by the AMF | 17 |
| 5.1.3.2 AM Policy Association Termination initiated by the PCF | 18 |
| 5.2 SM Policy Association Management..... | 20 |
| 5.2.1 SM Policy Association Establishment | 20 |
| 5.2.2 SM Policy Association Modification | 21 |
| 5.2.2.1 General | 21 |
| 5.2.2.2 SM Policy Association Modification initiated by the PCF | 21 |
| 5.2.2.2.1 Interactions between SMF, PCF and CHF..... | 21 |
| 5.2.2.2.2 Interactions between PCF, AF and UDR..... | 22 |
| 5.2.2.2.2.1 AF Session Establishment..... | 22 |
| 5.2.2.2.2.2 AF Session Modification | 24 |
| 5.2.2.2.2.3 AF Session Termination | 25 |
| 5.2.2.3 SM Policy Association Modification initiated by the SMF | 26 |
| 5.2.3 SM Policy Association Termination..... | 29 |
| 5.2.3.1 SM Policy Association Termination initiated by the SMF..... | 29 |
| 5.2.3.2 SM Policy Association Termination initiated by the PCF | 31 |
| 5.3 Spending Limit Procedures | 31 |
| 5.3.1 General..... | 31 |
| 5.3.2 Initial Spending Limit Report Request | 31 |
| 5.3.3 Intermediate Spending Limit Report Request..... | 32 |
| 5.3.4 Final Spending Limit Report Request..... | 33 |
| 5.3.5 Spending Limit Report..... | 33 |
| 5.3.6 Subscription termination request by CHF..... | 34 |
| 5.4 Network Data Analytics Procedures | 35 |
| 5.4.1 General..... | 35 |
| 5.4.2 Network data analytics Subscribe/Unsubscribe | 35 |
| 5.4.3 Network data analytics info request..... | 36 |
| 5.5 Service Capability Exposure Procedures..... | 37 |
| 5.5.1 General..... | 37 |
| 5.5.2 Management of Packet Flow Descriptions | 37 |
| 5.5.2.1 AF-initiated PFD management procedure..... | 37 |
| 5.5.2.2 PFD management towards SMF | 38 |
| 5.5.2.2.1 PFD retrieval | 38 |
| 5.5.2.2.2 PFD management | 39 |

| | | |
|-----------|---|----|
| 5.5.3 | Traffic influence procedures | 40 |
| 5.5.3.1 | General | 40 |
| 5.5.3.2 | AF requests targeting an individual UE address | 41 |
| 5.5.3.3 | AF requests targeting PDU Sessions not identified by an UE address..... | 42 |
| 5.5.4 | Negotiation for future background data transfer procedure | 45 |
| 5.6 | UE Policy Association Management | 46 |
| 5.6.1 | UE Policy Association Establishment | 46 |
| 5.6.1.1 | General | 46 |
| 5.6.1.2 | Non-roaming | 47 |
| 5.6.1.3 | Roaming | 49 |
| 5.6.2 | UE Policy Association Modification | 51 |
| 5.6.2.1 | UE Policy Association Modification initiated by the AMF | 51 |
| 5.6.2.1.1 | General | 51 |
| 5.6.2.1.2 | Non-roaming | 51 |
| 5.6.2.1.3 | Roaming | 52 |
| 5.6.2.2 | UE Policy Association Modification initiated by the PCF..... | 53 |
| 5.6.2.2.1 | General | 53 |
| 5.6.2.2.2 | Non-roaming | 54 |
| 5.6.2.2.3 | Roaming | 55 |
| 5.6.3 | UE Policy Association Termination | 56 |
| 5.6.3.1 | UE Policy Association Termination initiated by the AMF | 56 |
| 5.6.3.1.1 | General | 56 |
| 5.6.3.1.2 | Non-roaming | 57 |
| 5.6.3.1.3 | Roaming | 58 |
| 5.6.3.2 | UE Policy Association Termination initiated by the PCF..... | 58 |
| 5.6.3.2.1 | General | 58 |
| 5.6.3.2.2 | Non-roaming | 59 |
| 5.6.3.2.3 | Roaming | 60 |
| 6 | Binding Mechanism | 61 |
| 6.1 | Overview | 61 |
| 6.2 | Session Binding..... | 61 |
| 6.3 | PCC rule Authorization | 62 |
| 6.4 | QoS flow binding | 62 |
| 7 | QoS Parameters Mapping..... | 64 |
| 7.1 | Overview | 64 |
| 7.2 | QoS parameter mapping Functions at AF | 65 |
| 7.2.1 | Introduction..... | 65 |
| 7.2.2 | AF supporting Rx interface..... | 66 |
| 7.2.3 | AF supporting N5 interface | 66 |
| 7.3 | QoS parameter mapping Functions at PCF | 66 |
| 7.3.1 | Introduction..... | 66 |
| 7.3.2 | PCF Interworking with an AF supporting Rx interface | 66 |
| 7.3.3 | PCF Interworking with an AF supporting N5 interface..... | 73 |
| 7.4 | QoS parameter mapping Functions at SMF | 80 |
| 8 | PCF addressing..... | 80 |
| 8.1 | General | 80 |
| 8.2 | PCF discovery and selection by the AMF | 80 |
| 8.3 | PCF discovery and selection by the SMF..... | 81 |
| 8.4 | PCF discovery and selection by the AF..... | 81 |
| 8.4.1 | General..... | 81 |
| 8.4.2 | Binding Support Function (BSF) | 81 |
| 8.5 | BSF procedures | 82 |
| 8.5.1 | General..... | 82 |
| 8.5.2 | Binding information Creation | 82 |
| 8.5.3 | Binding information Deletion | 83 |
| 8.5.4 | Binding information Retrieval | 83 |
| 8.5.5 | Proxy BSF..... | 83 |
| 8.5.5.1 | General | 83 |
| 8.5.5.2 | Rx Session Establishment | 84 |
| 8.5.5.3 | Rx Session Modification | 84 |

| | | |
|-------------------------------|-------------------------------------|-----------|
| 8.5.5.3.1 | AF-initiated | 84 |
| 8.5.5.4 | Rx Session Termination | 85 |
| 8.5.5.4.1 | AF-initiated | 85 |
| 8.5.5.4.2 | PCF-initiated | 86 |
| 8.5.6 | Redirect BSF..... | 86 |
| 8.5.6.1 | General | 86 |
| 8.5.6.2 | Rx Session Establishment | 87 |
| Annex A (informative): | DRA and BSF coexistence..... | 88 |
| Annex B (informative): | Change history | 89 |
| History | | 92 |

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Foreword

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1 Scope

The present document specifies detailed call flows of Policy and Charging Control (PCC) over the Npcf, Nsmf, Namf, Nudr, Nnef, Nchf, Nbsf and Nnwdaf service-based interfaces and their relationship with the flow level signalling in 5G system.

NOTE: The call flows depicted in this Technical Specification do not cover all traffic cases.

The stage 2 definition and procedures of PCC are contained in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4]. The 5G System Architecture is defined in 3GPP TS 23.501 [2].

Detailed stage 3 procedures are provided in 3GPP TS 29.507 [7], 3GPP TS 29.508 [8], 3GPP TS 29.512 [9], 3GPP TS 29.514 [10], 3GPP TS 29.520 [11], 3GPP TS 29.519 [12], 3GPP TS 29.521 [22], 3GPP TS 29.594 [23], 3GPP TS 29.522 [24], 3GPP TS 29.551 [25], 3GPP TS 29.525 [31] and 3GPP TS 29.554 [26].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [5] and 3GPP TS 29.501 [6].

The present specification also describes the PCC reference architectures for non-roaming and roaming scenarios in 5G system.

The present specification also describes the mapping of QoS parameters at AF, PCF and SMF.

The present specification also describes the session binding at PCF and the QoS flow binding at SMF.

The present specification also describes the PCF addressing.

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 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".
- [5] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [6] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [7] 3GPP TS 29.507: "5G System; Access and Mobility Policy Control Service; Stage 3".
- [8] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".
- [9] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [10] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [11] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

- [12] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository Service for Policy Data, Application Data and Structured Data for Exposure; Stage 3".
- [13] 3GPP TS 23.203: "Policies and Charging control architecture; Stage 2".
- [14] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".
- [15] 3GPP TS 29.201: "Representational State Transfer (REST) reference point between Application Function (AF) and Protocol Converter (PC)".
- [16] IETF RFC 4566: "SDP: Session Description Protocol".
- [17] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS) Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".
- [18] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".
- [19] 3GPP TS 26.234: "End-to-end transparent streaming service; Protocols and codecs".
- [20] 3GPP2 C.S0046-0 v1.0: "3G Multimedia Streaming Services".
- [21] 3GPP2 C.S0055-A v1.0: "Packet Switched Video Telephony Services (PSVT/MCS)".
- [22] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".
- [23] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".
- [24] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".
- [25] 3GPP TS 29.551: "5G System; Packet Flow Description Management Service; Stage 3".
- [26] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".
- [27] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".
- [28] 3GPP TS 32.240: "Charging management; Charging architecture and principles".
- [29] IETF RFC 6733: "Diameter Base Protocol".
- [30] 3GPP TS 29.213: "Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping".
- [31] 3GPP TS 29.525: "UE Policy Control Service; Stage 3".
- [32] 3GPP TS 29.518: "Access and Mobility Management Services; Stage 3".
- [33] 3GPP TS 24.501: " Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

| | |
|---------|---|
| 5GC | 5G Core Network |
| 5QI | 5G QoS Identifier |
| AF | Application Function |
| AMBR | Aggregate Maximum Bit Rate |
| AMF | Access and Mobility Management Function |
| ARP | Allocation and Retention Priority |
| AW | Average Window |
| BSF | Binding Support Function |
| CHF | Charging Function |
| LBO | Local Breakout |
| MBR | Maximum Bitrate |
| MPD | Media Presentation Description |
| MPS | Multimedia Priority Service |
| NEF | Network Exposure Function |
| NRF | Network Repository Function |
| NWDAF | Network Data Analytics Function |
| PCC | Policy and Charging Control |
| PCF | Policy Control Function |
| PDB | Packet Delay Budget |
| PER | Packet Error Rate |
| PFD | Packet Flow Description |
| PFDF | Packet Flow Description Function |
| PL | Priority Level |
| QNC | QoS Notification Control |
| QoS | Quality of Service |
| SDP | Session Description Protocol |
| SEPP | Security Edge Protection Proxy |
| SMF | Session Management Function |
| S-NSSAI | Single Network Slice Selection Assistance Information |
| UDR | Unified Data Repository |
| UPF | User Plane Function |
| UPSI | UE policy section identifier |

4 Reference architecture

The policy framework functionality in 5G is comprised by the functions of the Policy Control Function (PCF), the policy and charging enforcement functionality supported by SMF and UPF, the access and mobility policy enforcement functionality supported by the AMF, the Network Data Analytics Function (NWDAF), the Network Exposure Function (NEF), the Charging Function (CHF), the Unified Data Repository (UDR) and the Application Function (AF). For the roaming scenario, the Security Edge Protection Proxy (SEPP) is deployed between the V-PCF and H-PCF. 3GPP TS 23.503 [4] specifies the 5G policy framework stage 2 functionality.

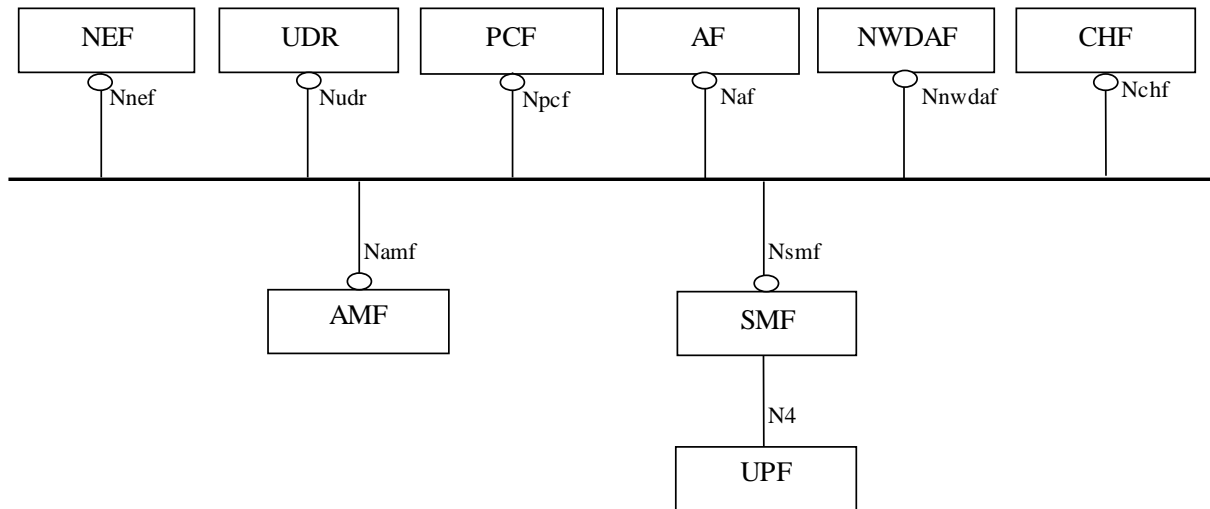


Figure 4.1-1a: Overall non-roaming 5G Policy framework architecture (service based representation)

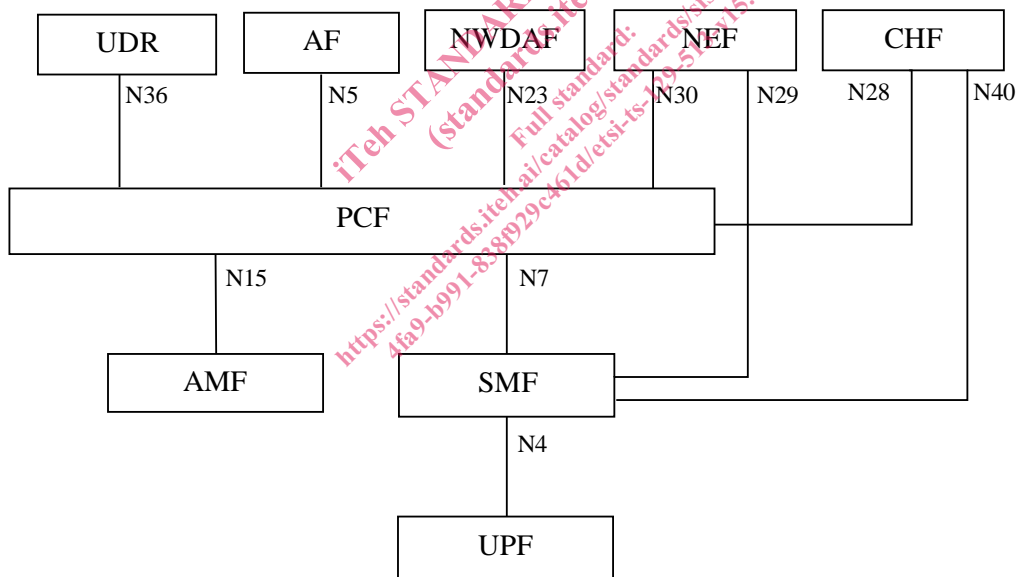


Figure 4.1-1b: Overall non-roaming 5G Policy framework architecture (reference point representation)

NOTE 1: The N4 interface is not part of the Policy Framework architecture but shown in the figures for completeness.

The Nchf service for online and offline charging consumed by the SMF is defined in 3GPP TS 32.240 [28].

The Nchf service for Spending Limit Control consumed by the PCF is defined in 3GPP TS 29.594 [23].

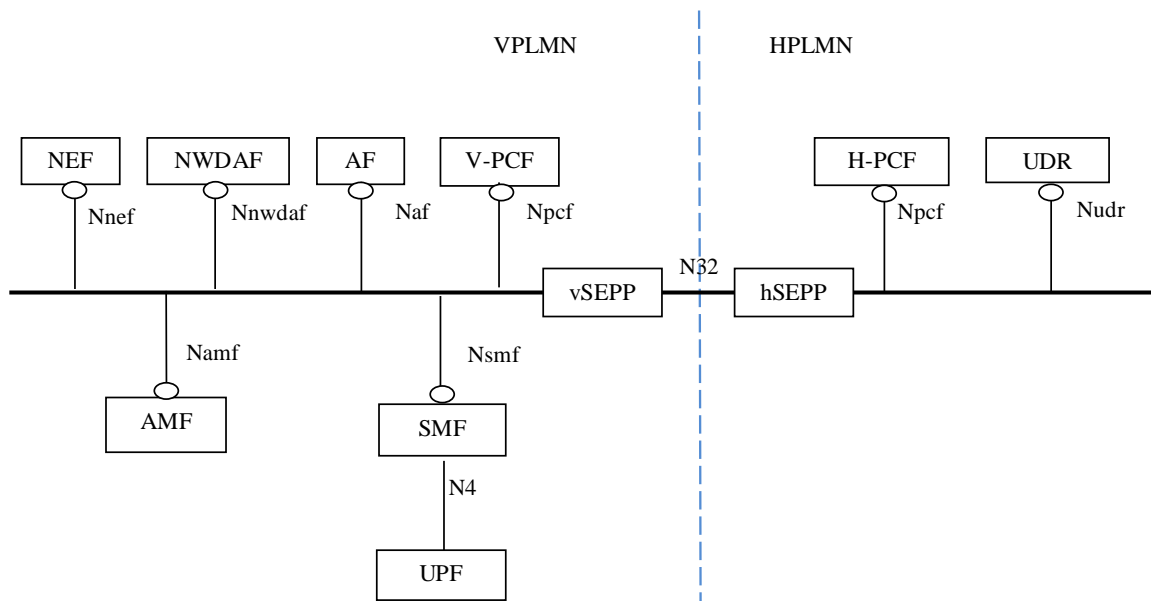


Figure 4.1-2a: Overall roaming policy framework architecture - LBO (service based representation)

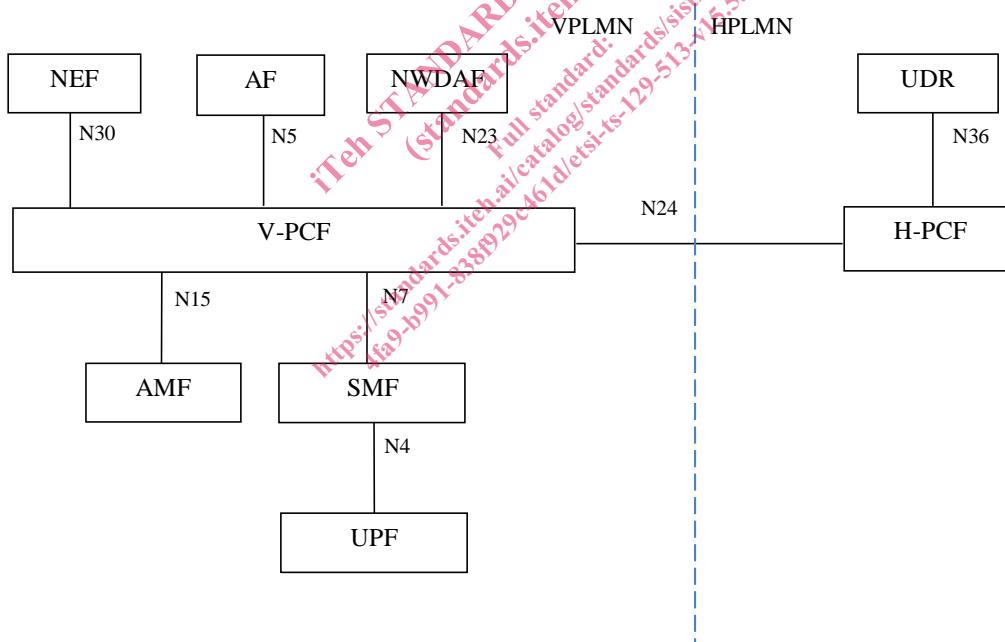


Figure 4.1-2b: Overall roaming policy framework architecture - LBO (reference point representation)

NOTE 2: In the LBO scenario, the PCF in the VPLMN may interact with the AF in order to generate PCC rules for services delivered via the VPLMN. The PCF in the VPLMN uses locally configured policies according to the roaming agreement with the HPLMN operator as input for PCC rule generation. The PCF in VPLMN has no access to subscriber policy information from the HPLMN to retrieve input for PCC Rule generation. The interactions between the PCF in the VPLMN and the PCF in the HPLMN through the Npcf service based interface enables the PCF in the HPLMN to provision UE policies to the PCF in the VPLMN, as described in 3GPP TS 23.503 [4] subclause 5.2.5.

NOTE 3: In the LBO scenario, AF requests targeting a DNN (and slice) and / or a group of UEs are stored in the UDR by the NEF. The PCF in the VPLMN subscribes to and get notification from the UDR in the VPLMN for those AF requests. Details are defined in subclause 5.6.7 of 3GPP TS 23.501 [2].

NOTE 4: For the sake of clarity, SEPPs are not depicted in the roaming reference point architecture figures.

NOTE 5: N4 and N32 are not service based interfaces.

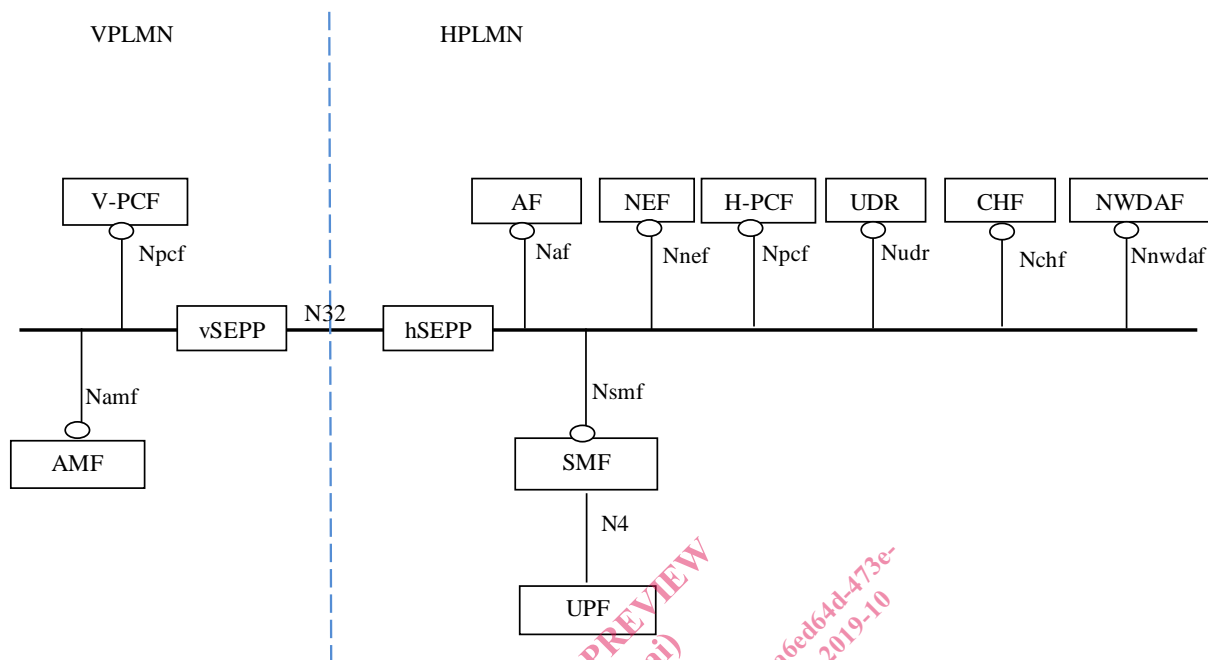


Figure 4.1-3a: Overall roaming policy framework architecture - home routed scenario (service based representation)

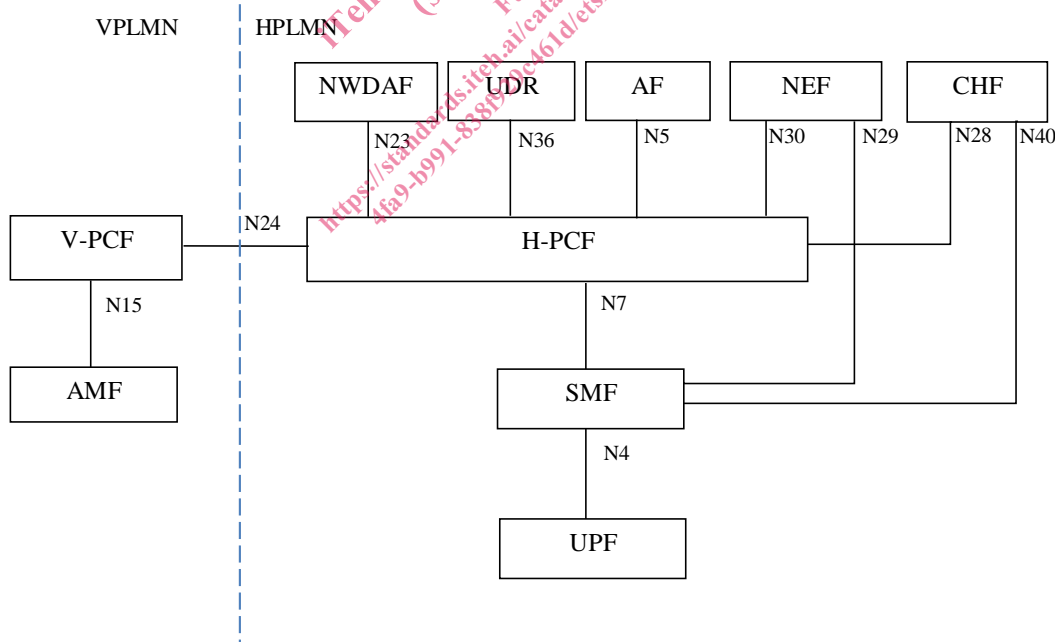


Figure 4.1-3b: Overall roaming policy framework architecture - home routed scenario (reference point representation)

NOTE 6: For the sake of clarity, SEPPs are not depicted in the roaming reference point architecture figures.

NOTE 7: N4 and N32 are not service based interfaces.