



(51) International Patent Classification:
H04W 76/19 (2018.01)

(21) International Application Number:
PCT/CN2023/104253

(22) International Filing Date:
29 June 2023 (29.06.2023)

(25) Filing Language: English

(26) Publication Language: English

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH,

TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
- upon request of the applicant, before the expiration of the time limit referred to in Article 21(2)(a)



WO 2024/109059 A1

(54) Title: METHOD, DEVICE AND COMPUTER PROGRAM PRODUCT FOR WIRELESS COMMUNICATION

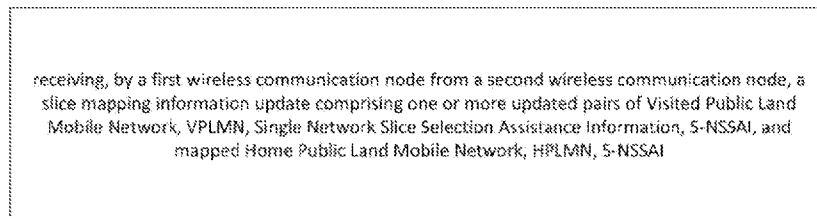


Fig. 9

(57) Abstract: A wireless communication method is disclosed. The method comprises receiving, by a first wireless communication node from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

**METHOD, DEVICE AND COMPUTER
PROGRAM PRODUCT FOR WIRELESS COMMUNICATION
TECHNICAL FIELD**

[0001] This document is directed generally to wireless communications, and in particular to 5th generation (5G) communications or 6th generation (6G) communications.

BACKGROUND

[0002] HPLMN (Home Public Land Mobile Network) and VPLMN (Visited Public Land Mobile Network) are essential concepts in the mobile network domain. HPLMN refers to the subscriber's home network where their primary subscription is held, responsible for services, billing, and authentication. VPLMN, on the other hand, is a network visited by the subscriber while roaming, typically operated by a different provider than their home network. It allows the subscriber to access services while being billed by their home operator. However, the mapping information between the VPLMN and HPLMN regarding NSSAI (Network Slice Selection Assistance Information) is still a topic to be discussed.

SUMMARY

[0003] This document relates to methods, systems, and computer program products for a wireless communication.

[0004] One aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: receiving, by a first wireless communication node from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[0005] Another aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: transmitting, by a second wireless communication node to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[0006] Another aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: receiving, by a

wireless communication terminal from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, wherein the updated configured NSSAI comprises one or more updated pairs of configured Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI and Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.

[0007] Another aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: transmitting, by a first wireless communication node to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

[0008] Another aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: receiving, by a second wireless communication node from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

[0009] Another aspect of the present disclosure relates to a wireless communication method. In an embodiment, the wireless communication method includes: receiving, by a wireless communication terminal from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

[0010] Another aspect of the present disclosure relates to a wireless communication node. In an embodiment, the wireless communication node includes a communication unit and a processor. The processor is configured to: receive, via the communication unit from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[0011] Another aspect of the present disclosure relates to a wireless communication node. In an embodiment, the wireless communication node includes a communication unit and a processor. The processor is configured to: transmit, via the communication unit to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single

Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[0012] Another aspect of the present disclosure relates to a wireless communication terminal. In an embodiment, the wireless communication terminal includes a communication unit and a processor. The processor is configured to: receive, via the communication unit from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, wherein the updated configured NSSAI comprises one or more updated pairs of configured Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI and Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.

[0013] Another aspect of the present disclosure relates to a wireless communication node. In an embodiment, the wireless communication node includes a communication unit and a processor. The processor is configured to: transmit, via the communication unit to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

[0014] Another aspect of the present disclosure relates to a wireless communication node. In an embodiment, the wireless communication node includes a communication unit and a processor. The processor is configured to: receive, via the communication unit from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

[0015] Another aspect of the present disclosure relates to a wireless communication terminal. In an embodiment, the wireless communication terminal includes a communication unit and a processor. The processor is configured to: receive, via the communication unit from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

[0016] Various embodiments may preferably implement the following features:

[0017] Preferably, the first wireless communication node receives from the second wireless communication node at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated

allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.

- [0018] Preferably, the first wireless communication node transmits to the second wireless communication node a response indicating an update of the one or more updated pairs of the VPLMN S-NSSAI and mapped HPLMN S-NSSAI being successful.
- [0019] Preferably, the first wireless communication node transmits to the second wireless communication node a subscription for a notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [0020] Preferably, the subscription comprises an identifier (e.g., an URI of the first wireless communication node) of the first wireless communication node to allow the second wireless communication node to transmit the notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the first wireless communication node.
- [0021] Preferably, the first wireless communication node receives from the second wireless communication node a response indicating a successful subscription for a notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [0022] Preferably, the first wireless communication node transmitted to a wireless communication terminal, based on the slice mapping information update, at least one of updated configured NSSAI or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [0023] Preferably, the slice mapping information update triggers the first wireless communication node to transmit, to a wireless communication terminal, at least one of updated configured NSSAI or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [0024] Preferably, the first wireless communication node transmits to the second wireless communication node at least one of Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the updated VPLMN S-NSSAI or a release indication for the PDU session.
- [0025] Preferably, the first wireless communication node receives from the second wireless communication node a response comprising SM information (e.g., N2 SM

information) to be transmitted to a third wireless communication node (e.g., an (R) AN) including at least one of the updated VPLMN S-NSSAI or the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI.

- [0026] Preferably, the first wireless communication node receives from the second wireless communication node a response comprising SM information (e.g., N1 SM information) to be transmitted to wireless communication terminal including a modification command message (e.g., PDU session modification command message) , and the modification command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [0027] Preferably, the cause value indicates that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI or indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [0028] Preferably, the first wireless communication node transmits to a third wireless communication node (e.g., an (R) AN) at least one of the updated VPLMN S-NSSAI or the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI.
- [0029] Preferably, the first wireless communication node transmits to a wireless communication terminal a modification command message (e.g., PDU session modification command message) , and the modification command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [0030] Preferably, the first wireless communication node receives from the second wireless communication node a response comprising a release command message (e.g., PDU session release command message) to be transmitted to a wireless communication terminal, and the release command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [0031] Preferably, the cause value indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [0032] Preferably, the first wireless communication node transmits to a wireless communication terminal a release command message (e.g., PDU session release command message) , and the release command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

- [0033] Preferably, the updated VPLMN S-NSSAI and the cause value are transmitted in a modification command message (e.g., PDU session modification command message) for a PDU session or transmitted in a release command message (e.g., PDU session release command message) for the PDU session.
- [0034] Preferably, the wireless communication terminal updates the S-NSSAI of a PDU session in response to the cause value indicating that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI, and the wireless communication terminal releases the S-NSSAI of a PDU session in response to the cause value indicating that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [0035] The present disclosure relates to a computer program product comprising a computer-readable program medium code stored thereupon, the code, when executed by a processor, causing the processor to implement a wireless communication method recited in any one of foregoing methods.
- [0036] The exemplary embodiments disclosed herein are directed to providing features that will become readily apparent by reference to the following description when taken in conjunction with the accompanying drawings. In accordance with various embodiments, exemplary systems, methods, devices and computer program products are disclosed herein. It is understood, however, that these embodiments are presented by way of example and not limitation, and it will be apparent to those of ordinary skill in the art who read the present disclosure that various modifications to the disclosed embodiments can be made while remaining within the scope of the present disclosure.
- [0037] Thus, the present disclosure is not limited to the exemplary embodiments and applications described and illustrated herein. Additionally, the specific order and/or hierarchy of steps in the methods disclosed herein are merely exemplary approaches. Based upon design preferences, the specific order or hierarchy of steps of the disclosed methods or processes can be re-arranged while remaining within the scope of the present disclosure. Thus, those of ordinary skill in the art will understand that the methods and techniques disclosed herein present various steps or acts in a sample order, and the present disclosure is not limited to the specific order or hierarchy presented unless expressly stated otherwise.
- [0038] The above and other aspects and their implementations are described in greater detail in the drawings, the descriptions, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0039] FIG. 1 shows a schematic diagram of a network according to an embodiment of the present disclosure.
- [0040] FIG. 2 shows a schematic diagram of a procedure according to an embodiment of the present disclosure.

[0041] FIG. 3 shows a schematic diagram of a procedure according to an embodiment of the present disclosure.

[0042] FIG. 4 shows a schematic diagram of a procedure according to an embodiment of the present disclosure.

[0043] FIG. 5 shows a schematic diagram of a procedure according to an embodiment of the present disclosure.

[0044] FIG. 6 shows a schematic diagram of a procedure according to an embodiment of the present disclosure.

[0045] FIG. 7 shows an example of a schematic diagram of a wireless communication terminal according to an embodiment of the present disclosure.

[0046] FIG. 8 shows an example of a schematic diagram of a wireless communication node according to an embodiment of the present disclosure.

[0047] FIGs. 9 to 14 show flowcharts of wireless communication methods according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0048] FIG. 1 shows a schematic diagram of 5G System (5GS) architecture according to some embodiments of the present disclosure.

[0049] In some embodiments, the 5GS architecture includes the following network functions (NFs) :

[0050] 1) UE (User Equipment) .

[0051] 2) RAN (Radio Access Network) .

[0052] 3) AMF (Access and Mobility Management Function) . This NF includes functionalities such as UE Mobility Management, Reachability Management, Connection Management, and Registration Management. The AMF terminates the RAN control plane (CP) interface N2 and the NAS (Non-Access Stratum) interface N1, provides NAS ciphering and integrity protection, and distributes the SM (Session Management) NAS to the proper SMFs (Session Management Functions) via N11 interface.

[0053] 4) UDM (Unified Data Management) . This NF manages the subscription profile for the UEs. The subscription data is stored in the Unified Data Repository (UDR) . The subscription information includes the network slice-related subscription data used for Mobility Management and Session Management. The AMF and SMF retrieve the subscription data from the UDM.

[0054] 5) NSSF (Network Slice Selection Function) . This NF supports the following functionality: selecting the set of Network Slice instances serving the UE; determining the Allowed NSSAI (Network Slice Selection Assistance Information) and, if needed, the mapping to the HPLMN (Home Public Land Mobile Network) S-NSSAIs (Single

Network Slice Selection Assistance Information) ; determining the configured NSSAI and, if needed, the mapping to the HPLMN S-NSSAIs; determining the AMF Set to be used to serve the UE, or, based on configuration, a list of candidate AMF (s) , possibly by querying the Network Repository Function (NRF) .

- [0055] 6) SMF (Session Management Function) . This NF includes the following functionalities: session establishment, modification, and release; UE IP address allocation and management; selection and control of user plane (UP) function, etc.
- [0056] 7) UPF (User Plane Function) . This NF serves as an anchor point for intra-/inter-radio access technology (RAT) mobility and as the external PDU (Packet Data Unit) session point of interconnect to the Data Network (DN) . The UPF also routes and forwards the data packet according to the indication from the SMF. It also buffers the downlink (DL) data when the UE is in idle mode.
- [0057] 8) NRF (Network Repository Function) . For the sake of clarity of the point-to-point diagrams, the NRF is not depicted. However, all depicted Network Functions can interact with the NRF as necessary. This NF supports a service discovery function. It receives an NF Discovery Request from NF instances and provides the information of the discovered NF instances to the NF instance. It maintains the NF profile of available NF instances and their supported services.
- [0058] In some embodiments of the present disclosure, in roaming scenarios, the VPLMN S-NSSAI is associated with the mapped HPLMN S-NSSAI. The manages the mapping information between the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI. The NF service consumer, such as AMF, may invoke NSSF service to retrieve the VPLMN S-NSSAI associated with the HPLMN S-NSSAI during EPS (Evolved Packet System) to 5GS Mobility Registration Procedure (Idle State) using the N26 interface or during EPS to 5GS handover procedure using the N26 interface or during idle state Mobility Registration Procedure in 5GS or during the handover procedure in 5GS.
- [0059] In some embodiments, when the mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI is changed, for example, if the VPLMN S-NSSAI associated with the mapped HPLMN S-NSSAI is no longer supported due to deployment implementation, another VPLMN S-NSSAI is associated with the HPLMN S-NSSAI. It might be unclear how the NSSF informs the AMF about the updated mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [0060] Some embodiments of the present disclosure provide methods to support the NSSF in notifying the NF service consumer, such as AMF, about the updated mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.

- [0061] In some embodiments, when the mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI is changed, for example, if the VPLMN S-NSSAI associated with the mapped HPLMN S-NSSAI is no longer supported due to deployment implementation, another VPLMN S-NSSAI is associated with the HPLMN S-NSSAI.
- [0062] In some embodiments of the present disclosure provide methods to proactively update the slice mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI) .
- [0063] Some aspects are provided in the paragraphs below, but the present disclosure is not limited thereto.
- [0064] Aspect 1 -Slice mapping information update by NSSF:
- [0065] This aspect provides a method to enable the NSSF to proactively update the slice mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the AMF. In some embodiments, the AMF may update the allowed NSSAI and/or configured NSSAI accordingly to the UE.
- [0066] Aspect 2 -Slice mapping information update during PDU Session modification procedure in local break-out roaming scenario:
- [0067] In this aspect, the AMF may provide the updated VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI) to the SMF for the existing PDU session in the local breakout roaming case. In some embodiments, the SMF decides to initiate the PDU session modification procedure and provides the new S-NSSAI to the (R) AN ((radio) access network) and provides the new S-NSSAI and a cause value to the UE.
- [0068] Aspect 3 –Slice mapping information update during PDU Session release procedure in local break-out roaming scenario:
- [0069] In this aspect, the AMF may provide the updated VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the SMF for the existing PDU session in the local breakout roaming case. In some embodiments, the SMF decides to initiate the PDU session release procedure and provides the new (e.g., updated) S-NSSAI and a cause value to the UE so that the UE can re-establish the PDU session on the new S-NSSAI.
- [0070] Aspect 4 –Slice mapping information update during PDU Session modification procedure in home-routed roaming scenario:
- [0071] In this aspect, the AMF may provide the updated VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the V-SMF (visited-SMF) for the existing PDU session in the home-routed roaming case. The V-SMF provides the new (e.g., updated) HPLMN S-NSSAI to the H-SMF (home-SMF) . The H-SMF or the V-SMF decides to initiate the PDU session modification procedure and provides the new S-NSSAI to the (R) AN and provides the new (e.g., updated) S-NSSAI and a cause value to the UE.

[0072] Aspect 5 –Slice mapping information update during PDU Session release procedure in home-routed roaming scenario:

[0073] In this aspect, the AMF may provide the updated VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the V-SMF for the existing PDU session in the home-routed roaming case. The V-SMF provides the new (e.g., updated) HPLMN S-NSSAI to the H-SMF. The H-SMF or the V-SMF decides to initiate the PDU session release procedure and provides the new (e.g., updated) S-NSSAI and a cause value to the UE so that the UE can re-establish the PDU session on the new S-NSSAI.

[0074] Details of Aspects 1 to 5 will be described in the following paragraphs, but the present disclosure is not limited thereto.

[0075] Aspect 1 -Slice mapping information update by NSSF

[0076] FIG. 2 shows a schematic diagram of a procedure according to an embodiment of the present disclosure. The procedure includes at least one of the following operations.

[0077] 1. AMF to NSSF:

[0078] In some embodiments, the AMF invokes an NSSF service to subscribe a notification of any changes in the mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, where the VPLMN S-NSSAI is supported by the AMF. In some embodiments, the AMF provides an identifier (e.g., a callback URI (Uniform Resource Identifier) to the NSSF so that the NSSF can use the identifier (e.g., the callback URI) to notify the updated mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the AMF.

[0079] In some embodiments, the NSSF service used to subscribe a notification of any changes in the mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI may be the Nnssf_NSSAIAvailability service, the Nnssf_NSSselection service, or a new service dedicated for the network slice mapping information.

[0080] 2. NSSF to AMF:

[0081] In some embodiments, the NSSF creates the required subscription and return to the AMF a response message containing an indication indicating the status of the created subscription.

[0082] 3. NSSF:

[0083] In some embodiments, the support of network slice in the serving PLMN is updated (e.g., the VPLMN S-NSSAI is no longer supported due to deployment implementation) , and the HPLMN S-NSSAI is mapped to another VPLMN S-NSSAI.

[0084] For example: VPLMN S-NSSAI 1 is mapped to HPLMN S-NSSAI A. For some reason VPLMN S-NSSAI 1 is no longer mapped to HPLMN S-NSSAI A and VPLMN S-NSSAI 2 is mapped to HPLMN S-NSSAI A. The NSSF provides VPLMN S-NSSAI 2 and the mapped HPLMN S-NSSAI A to the AMF.

[0085] 4. NSSF to AMF:

[0086] In some embodiments, the NSSF notifies the AMF that the network slice mapping information is updated. In some embodiments, the notification (e.g., a slice mapping information update) includes a subscription ID indicating a subscription which generates the notification. In some embodiments, the notification includes the updated network slice mapping information which includes one or more updated pairs of the updated VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI. In some embodiments, the NSSF may also provide at least one of the updated configured NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the VPLMN S-NSSAI) and/or the updated allowed NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI to the AMF.

[0087] 5. AMF to NSSF:

[0088] In some embodiments, the AMF updates the stored network slice mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI according to the received notification. In some embodiments, the AMF may also update at least one of: the allowed NSSAI (if received from the NSSF) stored by the AMF according to the updated configured NSSAI received from the NSSF and/or the configured NSSAI (if received from the NSSF) stored by the AMF according to the updated configured NSSAI received from the NSSF. In some embodiments, the AMF transmits a response to the NSSF, and the response indicates the update is successful.

[0089] 6. AMF to UE:

[0090] In some embodiments, the AMF may transmit to the UE at least one of: the updated allowed NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI and/or the updated configured NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI.

[0091] For example, the AMF may trigger the UE Configuration Update (UCU) procedure to provide at least one of the updated allowed NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI and/or the updated configured NSSAI including the updated mapping information between one or more updated pairs of the VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI to the UE.

[0092] Aspect 2 -Slice mapping information update during PDU Session modification procedure in local break-out roaming scenario

[0093] FIG. 3 shows a schematic diagram of a procedure according to an embodiment of the present disclosure. The procedure includes at least one of the following operations.

[0094] 1. AMF to SMF:

[0095] In some embodiments, in the local breakout roaming case, if there is an existing PDU session associated with the old VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, the AMF may provide the new (e.g., updated) VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) to the SMF for the PDU session. In some embodiments, the AMF may provide the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI to the SMF by triggering an SMF service, e.g., the Nsmf_PDUSession_UpdateSMContext service. In some embodiments, if the AMF determines that the current PDU session cannot be retained (e.g., the current V-SMF cannot support the new VPLMN S-NSSAI), the AMF may transmit an indication (e.g., a release PDU session indication) to release the PDU session to the SMF.

[0096] 2. SMF to UPF:

[0097] In some embodiments, if the SMF determines that the PDU session is retained, the SMF sends a message (e.g., an N4 Session Modification Request message) to the UPF to replace the old VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the old VPLMN S-NSSAI) with the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI). In some embodiments, the UPF stores the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI).

[0098] 3. SMF to AMF:

[0099] In some embodiments, the SMF may transmit a response to the AMF. In some embodiments, the response is transmitted through the Nsmf_PDUSession_UpdateSMContext Response. In some embodiments, the response may include at least one of: the new VPLMN S-NSSAI, the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI), and/or a cause value.

[0100] In some embodiments, the response may include first SM information (e.g., N1 SM container) to be provided to the UE and second SM information (e.g., N2 SM information) to be provided to the (R) AN.

[0101] In some embodiments, the second SM information (e.g., N2 SM information) may include at least one of a PDU Session ID, QFI (s), QoS Profile (s), the new VPLMN S-NSSAI and/or the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI).

- [0102] In some embodiments, the first SM information (e.g., N1 SM container) may carry the PDU Session Modification Command message. In some embodiments, the first SM information (e.g., N1 SM container) may carry at least one of a PDU Session ID, QoS rule (s) , the new VPLMN S-NSSAI, the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) , and/or a cause value (e.g., via the PDU Session Modification Command message) .
- [0103] In some embodiments, the cause value may indicate a PDU session change based on the new VPLMN S-NSSAI. In some embodiments, the cause value may indicate that the S-NSSAI of the PDU session is replaced with the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI. In some embodiments, the cause value may indicate that a PDU session re-establishment based on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI is required.
- [0104] For example, if the SMF determines that the PDU session is to be retained, the SMF includes the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI and a cause value indicating that the S-NSSAI of the PDU session is replaced with the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI in the second SM information (e.g., in the PDU Session Modification Command message provided to the UE) .
- [0105] As another example, if the PDU session is of SSC (Session and Service Continuity) mode 3 and if the SMF determines that the PDU session is to be re-established on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, the SMF includes the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI and a cause value indicating that a PDU session re-establishment on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI is required in the second SM information (e.g., in the PDU Session Modification Command message provided to the UE) .
- [0106] 4. AMF to (R) AN:
- [0107] In some embodiments, the AMF provides the second SM information (e.g., N2 SM information) including the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) to the (R) AN. In some embodiments, the (R) AN stores the received new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) for the PDU session.
- [0108] 5. AMF to UE:
- [0109] In some embodiments, the AMF provides the first SM information (e.g., N1 SM container) including the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) for the PDU session and a cause value to the UE. In some embodiments, the new VPLMN S-NSSAI and/or the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped

to the new VPLMN S-NSSAI) may be included in the PDU Session Modification Command message.

[0110] 6. UE:

[0111] In some embodiments, if the received cause value indicates that the S-NSSAI of the PDU session is replaced with the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI), the UE stores the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) for the PDU session. In some embodiments, if the cause value indicates that a PDU session re-establishment on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) is required, the UE re-establishes a new PDU session on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI). In some embodiments, the UE provides the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) in the PDU session establishment request message to the network (e.g., to the AMF).

[0112] Aspect 3 -Slice mapping information update during PDU Session release procedure in local break-out roaming scenario

[0113] FIG. 4 shows a schematic diagram of a procedure according to an embodiment of the present disclosure. The procedure includes at least one of the following operations.

[0114] 1. AMF to SMF:

[0115] In some embodiments, in the local breakout roaming case, if there is an existing PDU session associated with the old VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, the AMF may provide the new (e.g., updated) VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) to the SMF. In some embodiments, the AMF may provide the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI to the SMF by triggering an SMF service, e.g., the Nsmf_PDUSession_UpdateSMContext service. In some embodiments, if the AMF determines that the current PDU session cannot be retained (e.g., the current V-SMF cannot support the new VPLMN S-NSSAI), the AMF may transmit an indication (e.g., a release PDU session indication) to release the PDU session to the SMF.

[0116] 2. SMF to AMF:

[0117] In some embodiments, if the PDU session is of SSC mode 1 or SSC mode 2 and if the SMF determines that a new PDU session is to be established on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI), the SMF initiates a PDU session release procedure.

- [0118] In some embodiments, the SMF may transmit a response to the AMF. In some embodiments, the response is transmitted through the Nsmf_PDUSession_UpdateSMContext Response. In some embodiments, the response may include at least one of: the new VPLMN S-NSSAI, the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) , and/or a cause value.
- [0119] In some embodiments, the response may include first SM information (e.g., N1 SM container) to be provided to the UE.
- [0120] In some embodiments, the first SM information (e.g., N1 SM container) may carry the PDU Session Release Command message. In some embodiments, the first SM information (e.g., N1 SM container) may carry at least one of a PDU Session ID, QoS rule (s) , the new VPLMN S-NSSAI, the associated mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) , and/or a cause value (e.g., via the PDU Session Modification Command message) .
- [0121] In some embodiments, the cause value may indicate a PDU session change based on the new VPLMN S-NSSAI. For example, in some embodiments, the cause value may indicate that a PDU session re-establishment based on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI is required.
- [0122] 3. AMF to UE:
- [0123] In some embodiments, the AMF provides the first SM information (e.g., N1 SM container) including the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) for the PDU session and a cause value to the UE. In some embodiments, the new VPLMN S-NSSAI and/or the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) may be included in the PDU Session Release Command message.
- [0124] 4. UE:
- [0125] In some embodiments, if the cause value indicates that a PDU session re-establishment on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) is required, the UE re-establishes a new PDU session on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) . In some embodiments, the UE provides the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI (e.g., the HPLMN S-NSSAI mapped to the new VPLMN S-NSSAI) in the PDU session establishment request message to the network (e.g., to the AMF) .
- [0126] Aspect 4 -Slice mapping information update during PDU Session modification procedure in home-routed roaming scenario

[0127] FIG. 5 shows a schematic diagram of a procedure according to an embodiment of the present disclosure. The procedure includes at least one of the following operations.

[0128] 1. AMF to V-SMF:

[0129] In some embodiments, in the home-routed roaming case, if there is an existing PDU session associated with the old VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, the AMF provides the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the V-SMF by triggering V-SMF service, e.g., the Nsmf_PDUSession_Update SMContext service. In some embodiments, if the AMF determines that the current PDU session cannot be retained (e.g., the current V-SMF cannot support the new VPLMN S-NSSAI), the AMF includes a release PDU session indication.

[0130] 2. V-SMF to H-SMF:

[0131] In some embodiments, if a new mapped HPLMN S-NSSAI for the PDU session is received from the AMF, the V-SMF provides the new mapped HPLMN S-NSSAI to the H-SMF by invoking an H-SMF service. In some embodiments, the H-SMF service may be the Nsmf_PDUSession_Update Request service. In some embodiments, the Nsmf_PDUSession_Update Request service may include an SM (session management) context ID, (optional) old HPLMN S-NSSAI, new HPLMN S-NSSAI, and a release indication. In some embodiments, the V-SMF also forwards the PDU session release indication if the V-SMF receives it from the AMF.

[0132] 3. H-SMF to V-SMF:

[0133] In some embodiments, if the H-SMF determines to retain the PDU session, the H-SMF includes the new HPLMN S-NSSAI and a cause value indicating that the PDU session is to be retained on the new HPLMN S-NSSAI in e.g., the Nsmf_PDUSession_Update Request message to the V-SMF.

[0134] In some embodiments, if the PDU session is of SSC mode 3 and the H-SMF decides to establish a new PDU session on the new HPLMN S-NSSAI, the H-SMF includes the new HPLMN S-NSSAI and a cause value indicating that a new PDU session re-establishment on the new HPLMN S-NSSAI is required in e.g., the Nsmf_PDUSession_Update Request message to the V-SMF.

[0135] 4. H-SMF to H-UPF:

[0136] In some embodiments, if the old HPLMN S-NSSAI is replaced by the new HPLMN S-NSSAI and the PDU session is retained, the H-SMF updates the H-UPF with the new HPLMN S-NSSAI. In some embodiments, the H-UPF stores the new HPLMN S-NSSAI for the PDU session.

[0137] 5. V-SMF to AMF:

[0138] In some embodiments, if the PDU session is to be retained and only the old VPLMN S-NSSAI is replaced by the new VPLMN S-NSSAI, the V-SMF transmits a response to AMF through e.g., the Nsmf_PDUSession_UpdateSMContext Response. In some

embodiments, the response includes the N2 SM information and the N1 SM container. In some embodiments, the N2 SM information includes a PDU Session ID, QFI (s) , QoS Profile (s) , and/or S-NSSAI. In some embodiments, the N1 SM container includes a PDU Session Modification Command including a PDU Session ID, QoS rule (s) , S-NSSAI, and/or a cause value.

- [0139] In some embodiments, the N2 SM information carries information that the AMF may provide to the (R) AN. In some embodiments, the S-NSSAI in N2 SM information is set to the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI. In some embodiments, the N1 SM container carries the PDU Session Modification Command that the AMF may provide to the UE. In some embodiments, the V-SMF includes the new VPLMN S-NSSAI and possibly the associated mapped HPLMN S-NSSAI and a cause value indicating that the S-NSSAI of the PDU session is replaced with the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [0140] In some embodiments, if the PDU session is to be retained and only the HPLMN S-NSSAI is to be replaced by a new HPLMN S-NSSAI, the V-SMF includes the new HPLMN S-NSSAI and optionally the associated VPLMN S-NSSAI and a cause value indicating that the HPLMN S-NSSAI of the PDU session is replaced by the new HPLMN S-NSSAI in the PDU Session Modification Command message to the UE.
- [0141] In some embodiments, if the PDU session is to be retained and both VPLMN S-NSSAI and HPLMN S-NSSAI are replaced by the new VPLMN S-NSSAI and new HPLMN S-NSSAI, the V-SMF includes both the new VPLMN S-NSSAI and the new HPLMN S-NSSAI and a cause value indicating that both the VPLMN S-NSSAI and the HPLMN S-NSSAI of the PDU session are replaced by the new VPLMN S-NSSAI and new HPLMN S-NSSAI in the PDU Session Modification Command message to the UE. In some embodiments, the V-SMF sets the S-NSSAI in N2 SM information to the new VPLMN S-NSSAI and optionally the new HPLMN S-NSSAI sent to the (R)AN.
- [0142] In some embodiments, if a PDU session re-establishment on the new S-NSSAI is required, the V-SMF includes the new VPLMN S-NSSAI and/or the new HPLMN S-NSSAI and a cause value indicating that a PDU session re-establishment on the new VPLMN S-NSSAI and/or the new HPLMN S-NSSAI is required in the PDU Session Modification Command message to the UE.
- [0143] 6. AMF to (R) AN /UE:
- [0144] In some embodiments, the AMF provides the N2 SM information including the new VPLMN S-NSSAI and optionally the associated mapped HPLMN S-NSSAI to the (R) AN. In some embodiments, the (R) AN stores the received new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI for the PDU session.

- [0145] In some embodiments, the AMF provides the PDU Session Modification Command message including the new VPLMN S-NSSAI and/or the new mapped HPLMN S-NSSAI and a cause value to the UE.
- [0146] 7. UE:
- [0147] In some embodiments, if the cause value indicates that the S-NSSAI of the PDU session is replaced with the new VPLMN S-NSSAI and/or the mapped HPLMN S-NSSAI, the UE stores the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI for the PDU session. In some embodiments, if the cause value indicates that a PDU session re-establishment on the new VPLMN S-NSSAI and/or the mapped HPLMN S-NSSAI is required, the UE re-establishes a new PDU session on the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI. In some embodiments, the UE provides the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI in the PDU session establishment request message.
- [0148] Aspect 5 -Slice mapping information update during PDU Session release procedure in home-routed roaming scenario
- [0149] FIG. 6 shows a schematic diagram of a procedure according to an embodiment of the present disclosure. The procedure includes at least one of the following operations.
- [0150] 1. AMF to V-SMF:
- [0151] In some embodiments, in the home-routed roaming case, if there is an existing PDU session associated with the old VPLMN S-NSSAI and the mapped HPLMN S-NSSAI, the AMF provides the new VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the V-SMF by triggering V-SMF service, e.g., the Nsmf_PDUSession_Update SMContext service. In some embodiments, if the AMF determines that the current PDU session cannot be retained (e.g., the current V-SMF cannot support the new VPLMN S-NSSAI), the AMF includes a release PDU session indication.
- [0152] 2. V-SMF to H-SMF:
- [0153] In some embodiments, if a new mapped HPLMN S-NSSAI for the PDU session is received from the AMF, the V-SMF provides the new mapped HPLMN S-NSSAI to the H-SMF by invoking an H-SMF service. In some embodiments, the H-SMF service may be the Nsmf_PDUSession_Update Request service. In some embodiments, the Nsmf_PDUSession_Update Request service may include an SM (session management) context ID, (optional) old HPLMN S-NSSAI, new HPLMN S-NSSAI, and a release indication. In some embodiments, the V-SMF also forwards the PDU session release indication if the V-SMF receives it from the AMF.
- [0154] 3. H-SMF to V-SMF:
- [0155] In some embodiments, if the PDU session is of SSC mode 1 or SSC mode 2 and if the H-SMF determines that a new PDU session is to be established on the new mapped HPLMN S-NSSAI, the H-SMF initiates a PDU session release procedure.

[0156] In some embodiments, the H-SMF prepares the SM Release PDU Session Command message and initiates the PDU Session Release towards the UE by invoking e.g., the Nsmf_PDUSession_Update Request service operation towards the V-SMF. In some embodiments, the Nsmf_PDUSession_Update Request contains necessary information to build the SM Release PDU Session Command by the V-SMF towards the UE. In some embodiments, the H-SMF includes the new HPLMN S-NSSAI and a cause value indicating that a new PDU session re-establishment on the new HPLMN S-NSSAI is required.

[0157] 4. V-SMF to UE:

[0158] In some embodiments, the V-SMF transmits the PDU Session Release Command to the UE. In some embodiments, based on the received information from the H-SMF, the PDU Session Release Command message also includes the new HPLMN S-NSSAI and/or the new VPLMN S-NSSAI and a cause value indicating that a PDU session re-establishment on the new HPLMN S-NSSAI and/or the new VPLMN S-NSSAI is required.

[0159] 5. UE:

[0160] In some embodiments, if the cause value indicates that a PDU session re-establishment on the new VPLMN S-NSSAI and/or the new HPLMN S-NSSAI is required, the UE re-establishes a new PDU session based on the new VPLMN S-NSSAI and the new mapped HPLMN S-NSSAI. In some embodiments, the UE provides the new VPLMN S-NSSAI and the new mapped HPLMN S-NSSAI in the PDU session establishment request message to the network (e.g., to the AMF) .

[0161] In some embodiments of the present disclosure, an AMF performs at least one of the operations below.

[0162] The AMF sends a subscription of a notification of a slice mapping information update between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the NSSF, wherein:

[0163] in some embodiments, the subscription includes the callback URI with which the NSSF can notify the updated slice mapping information between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the AMF.

[0164] The AMF receives a response message from the NSSF indicating a successful subscription of the notification of the slice mapping information update between the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.

[0165] The AMF receives a notification from the NSSF including one or more updated pairs of the updated VPLMN S-NSSAI and the associated mapped HPLMN S-NSSAI and/or updated configured NSSAI and/or allowed NSSAI.

[0166] The AMF sends a response message to the NSSF to indicate a successful update of the slice mapping information.

- [0167] The AMF triggers a UCU procedure to provide at least one of the updated configured NSSAI and/or the updated allowed NSSAI to the UE.
- [0168] The AMF sends the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI and optionally a release indication to the SMF.
- [0169] The AMF receives a response message from the SMF, wherein:
- [0170] in some embodiments, the response message includes N2 SM information including new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI;
- [0171] in some embodiments, the response message includes a N1 SM container including a PDU session modification command message, and the PDU session modification command message includes the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI and a cause value; and
- [0172] in some embodiments, the cause value may indicate that the S-NSSAI of the PDU session is replaced by the new S-NSSAI or indicate that a PDU session re-establishment on the new S-NSSAI is required.
- [0173] The AMF provides a new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI to the RAN.
- [0174] The AMF sends a PDU session modification command message including the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI and a cause value to the UE.
- [0175] The AMF receives a response message from the SMF, wherein:
- [0176] in some embodiments, the response message includes a PDU session release command message including the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI and a cause value; and
- [0177] in some embodiments, the cause value may indicate that a PDU session re-establishment on the new S-NSSAI is required.
- [0178] The AMF sends a PDU session release command message including the new VPLMN S-NSSAI and optionally the mapped HPLMN S-NSSAI and a cause value to the UE.
- [0179] FIG. 7 relates to a diagram of a wireless communication terminal 30 according to an embodiment of the present disclosure. The wireless communication terminal 30 may be a tag, a mobile phone, a laptop, a tablet computer, an electronic book or a portable computer system and is not limited herein. The wireless communication terminal 30 may be used to implement the UE described in this disclosure. The wireless communication terminal 30 may include a processor 300 such as a microprocessor or Application Specific Integrated Circuit (ASIC), a storage unit 310 and a communication unit 320. The storage unit 310 may be any data storage device that stores a program code 312, which is accessed and executed by the processor 300. Embodiments of the storage code 312 include but are not limited to a subscriber

identity module (SIM) , read-only memory (ROM) , flash memory, random-access memory (RAM) , hard-disk, and optical data storage device. The communication unit 320 may a transceiver and is used to transmit and receive signals (e.g., messages or packets) according to processing results of the processor 300. In an embodiment, the communication unit 320 transmits and receives the signals via at least one antenna 322.

[0180] In an embodiment, the storage unit 310 and the program code 312 may be omitted and the processor 300 may include a storage unit with stored program code.

[0181] The processor 300 may implement any one of the steps in exemplified embodiments on the wireless communication terminal 30, e.g., by executing the program code 312.

[0182] The communication unit 320 may be a transceiver. The communication unit 320 may as an alternative or in addition be combining a transmitting unit and a receiving unit configured to transmit and to receive, respectively, signals to and from a wireless communication node.

[0183] In some embodiments, the wireless communication terminal 30 may be used to perform the operations of the UE described in this disclosure. In some embodiments, the processor 300 and the communication unit 320 collaboratively perform the operations described in this disclosure. For example, the processor 300 performs operations and transmit or receive signals, message, and/or information through the communication unit 320.

[0184] FIG. 8 relates to a diagram of a wireless communication node 40 according to an embodiment of the present disclosure. The wireless communication node 40 may be a satellite, a base station (BS) , a gNB, a network entity, a Domain Name System (DNS) server, a Mobility Management Entity (MME) , Serving Gateway (S-GW) , Packet Data Network (PDN) Gateway (P-GW) , a radio access network (RAN) , a next generation RAN (NG-RAN) , a data network, a core network, a communication node in the core network, or a Radio Network Controller (RNC) , and is not limited herein. In addition, the wireless communication node 40 may include (perform) at least one network function such as an access and mobility management function (AMF) , an NSSF, a session management function (SMF) , a V-SMF, an H-SMF, a user place function (UPF) , a policy control function (PCF) , an application function (AF) , etc. The wireless communication node 40 may be used to implement the node, the network, the network functions (e.g., the AMF, the NSSF, the SMF, the V-SMF, the H-SMF, etc.) , or the network node described in this disclosure. The wireless communication node 40 may include a processor 400 such as a microprocessor or ASIC, a storage unit 410 and a communication unit 420. The storage unit 410 may be any data storage device that stores a program code 412, which is accessed and executed by the processor 400. Examples of the storage unit 412 include but are not limited to a SIM, ROM, flash memory, RAM, hard-disk, and optical data storage device. The communication unit

420 may be a transceiver and is used to transmit and receive signals (e.g., messages or packets) according to processing results of the processor 400. In an example, the communication unit 420 transmits and receives the signals via at least one antenna 422.

[0185] In an embodiment, the storage unit 410 and the program code 412 may be omitted. The processor 400 may include a storage unit with stored program code.

[0186] The processor 400 may implement any steps described in exemplified embodiments on the wireless communication node 40, e.g., via executing the program code 412.

[0187] The communication unit 420 may be a transceiver. The communication unit 420 may as an alternative or in addition be combining a transmitting unit and a receiving unit configured to transmit and to receive, respectively, signals, messages, or information to and from a wireless communication node or a wireless communication terminal.

[0188] In some embodiments, the wireless communication node 40 may be used to perform the operations of the AMF, the NSSF, the SMF, the V-SMF, or the H-SMF described in this disclosure. In some embodiments, the processor 400 and the communication unit 420 collaboratively perform the operations described in this disclosure. For example, the processor 400 performs operations and transmit or receive signals through the communication unit 420.

[0189] A wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication method may be performed by using a wireless communication node (e.g., an AMF) . In an embodiment, the wireless communication node may be implemented by using the wireless communication node 40 described in this disclosure, but is not limited thereto.

[0190] Referring to FIG. 9, in an embodiment, the wireless communication method includes receiving, by a first wireless communication node from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[0191] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.

[0192] In some embodiments, the second wireless communication node used herein may indicate the NSSF described above.

[0193] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.

[0194] Another wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication method may be performed by using a wireless communication node (e.g., an NSSF) .

In an embodiment, the wireless communication node may be implemented by using the wireless communication node 40 described in this disclosure, but is not limited thereto.

- [0195] Referring to FIG. 10, in an embodiment, the wireless communication method includes transmitting, by a second wireless communication node to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.
- [0196] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.
- [0197] In some embodiments, the second wireless communication node used herein may indicate the NSSF described above.
- [0198] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.
- [0199] Another wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication method may be performed by using a wireless communication terminal (e.g., a UE) . In an embodiment, the wireless communication terminal may be implemented by using the wireless communication terminal 30 described in this disclosure, but is not limited thereto.
- [0200] Referring to FIG. 11, in an embodiment, the wireless communication method includes: receiving, by a wireless communication terminal from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, wherein the updated configured NSSAI comprises one or more updated pairs of configured Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI and Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [0201] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.
- [0202] In some embodiments, the wireless communication terminal used herein may indicate the UE described above.
- [0203] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.
- [0204] Another wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication

method may be performed by using a wireless communication node (e.g., an AMF) . In an embodiment, the wireless communication node may be implemented by using the wireless communication node 40 described in this disclosure, but is not limited thereto.

- [0205] Referring to FIG. 12, in an embodiment, the wireless communication method includes transmitting, by a first wireless communication node to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.
- [0206] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.
- [0207] In some embodiments, the second wireless communication node used herein may indicate the SMF described above.
- [0208] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.
- [0209] Another wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication method may be performed by using a wireless communication node (e.g., an SMF) . In an embodiment, the wireless communication node may be implemented by using the wireless communication node 40 described in this disclosure, but is not limited thereto.
- [0210] Referring to FIG. 13, in an embodiment, the wireless communication method includes receiving, by a second wireless communication node from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.
- [0211] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.
- [0212] In some embodiments, the second wireless communication node used herein may indicate the SMF described above.
- [0213] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.
- [0214] A wireless communication method is also provided according to an embodiment of the present disclosure. In an embodiment, the wireless communication method may be performed by using a wireless communication terminal (e.g., a UE) . In an embodiment, the wireless communication terminal may be implemented by using the wireless communication terminal 30 described in this disclosure, but is not limited thereto.
- [0215] Referring to FIG. 14, in an embodiment, the wireless communication method includes: receiving, by a wireless communication terminal from a first wireless

communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

- [0216] In some embodiments, the first wireless communication node used herein may indicate the AMF described above.
- [0217] In some embodiments, the wireless communication terminal used herein the present disclosure may indicate the UE described above.
- [0218] Details in this regard can be ascertained with reference to the paragraphs above, and will not be repeated herein.
- [0219] While various embodiments of the present disclosure have been described above, it should be understood that they have been presented by way of example only, and not by way of limitation. Likewise, the various diagrams may depict an example architectural or configuration, which are provided to enable persons of ordinary skill in the art to understand exemplary features and functions of the present disclosure. Such persons would understand, however, that the present disclosure is not restricted to the illustrated example architectures or configurations, but can be implemented using a variety of alternative architectures and configurations. Additionally, as would be understood by persons of ordinary skill in the art, one or more features of one embodiment can be combined with one or more features of another embodiment described herein. Thus, the breadth and scope of the present disclosure should not be limited by any one of the above-described exemplary embodiments.
- [0220] It is understood that, in the present disclosure, the term “and/or” or symbol “/” may include any and all combinations of one or more of the associated listed items. For example, A and/or B and/or C includes any and all combinations of one or more of A, B, and C, including A, B, C, A and B, A and C, B and C, and a combination of A and B and C. Likewise, A/B/C includes any and all combinations of one or more of A, B, and C, including A, B, C, A and B, A and C, B and C, and a combination of A and B and C.
- [0221] It is also understood that any reference to an element herein using a designation such as “first,” “second,” and so forth does not generally limit the quantity or order of those elements. Rather, these designations can be used herein as a convenient means of distinguishing between two or more elements or instances of an element. Thus, a reference to first and second elements does not mean that only two elements can be employed, or that the first element must precede the second element in some manner.
- [0222] Additionally, a person having ordinary skill in the art would understand that information and signals can be represented using any one of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits and symbols, for example, which may be referenced in the above

description can be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

- [0223] A skilled person would further appreciate that any one of the various illustrative logical blocks, units, processors, means, circuits, methods and functions described in connection with the aspects disclosed herein can be implemented by electronic hardware (e.g., a digital implementation, an analog implementation, or a combination of the two) , firmware, various forms of program or design code incorporating instructions (which can be referred to herein, for convenience, as "software" or a "software unit") , or any combination of these techniques.
- [0224] To clearly illustrate this interchangeability of hardware, firmware and software, various illustrative components, blocks, units, circuits, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware, firmware or software, or a combination of these techniques, depends upon the particular application and design constraints imposed on the overall system. Skilled artisans can implement the described functionality in various ways for each particular application, but such implementation decisions do not cause a departure from the scope of the present disclosure. In accordance with various embodiments, a processor, device, component, circuit, structure, machine, unit, etc. can be configured to perform one or more of the functions described herein. The term "configured to" or "configured for" as used herein with respect to a specified operation or function refers to a processor, device, component, circuit, structure, machine, unit, etc. that is physically constructed, programmed and/or arranged to perform the specified operation or function.
- [0225] Furthermore, a skilled person would understand that various illustrative logical blocks, units, devices, components and circuits described herein can be implemented within or performed by an integrated circuit (IC) that can include a general-purpose processor, a digital signal processor (DSP) , an application specific integrated circuit (ASIC) , a field programmable gate array (FPGA) or other programmable logic device, or any combination thereof. The logical blocks, units, and circuits can further include antennas and/or transceivers to communicate with various components within the network or within the device. A general-purpose processor can be a microprocessor, but in the alternative, the processor can be any conventional processor, controller, or state machine. A processor can also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other suitable configuration to perform the functions described herein. If implemented in software, the functions can be stored as one or more instructions or code on a

computer-readable medium. Thus, the steps of a method or algorithm disclosed herein can be implemented as software stored on a computer-readable medium.

[0226] Computer-readable media includes both computer storage media and communication media including any medium that can be enabled to transfer a computer program or code from one place to another. A storage media can be any available media that can be accessed by a computer. By way of example, and not limitation, such computer-readable media can include RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to store desired program code in the form of instructions or data structures and that can be accessed by a computer.

[0227] In this document, the term "unit" as used herein, refers to software, firmware, hardware, and any combination of these elements for performing the associated functions described herein. Additionally, for purpose of discussion, the various units are described as discrete units; however, as would be apparent to one of ordinary skill in the art, two or more units may be combined to form a single unit that performs the associated functions according to embodiments of the present disclosure.

[0228] Additionally, memory or other storage, as well as communication components, may be employed in embodiments of the present disclosure. It will be appreciated that, for clarity purposes, the above description has described embodiments of the present disclosure with reference to different functional units and processors. However, it will be apparent that any suitable distribution of functionality between different functional units, processing logic elements or domains may be used without detracting from the present disclosure. For example, functionality illustrated to be performed by separate processing logic elements, or controllers, may be performed by the same processing logic element, or controller. Hence, references to specific functional units are only references to a suitable means for providing the described functionality, rather than indicative of a strict logical or physical structure or organization.

[0229] Various modifications to the implementations described in this disclosure will be readily apparent to those skilled in the art, and the general principles defined herein can be applied to other implementations without departing from the scope of the claims. Thus, the disclosure is not intended to be limited to the implementations shown herein, but is to be accorded the widest scope consistent with the novel features and principles disclosed herein, as recited in the claims below.

Claims

- [Claim 1] A wireless communication method comprising:
receiving, by a first wireless communication node from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.
- [Claim 2] The wireless communication method of claim 1, wherein the first wireless communication node receives from the second wireless communication node at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [Claim 3] The wireless communication method of claim 1 or 2, wherein the first wireless communication node transmits to the second wireless communication node a response indicating an update of the one or more updated pairs of the VPLMN S-NSSAI and mapped HPLMN S-NSSAI being successful.
- [Claim 4] The wireless communication method of any of claims 1 to 3, wherein the first wireless communication node transmits to the second wireless communication node a subscription for a notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [Claim 5] The wireless communication method of claim 4, wherein the subscription comprises an identifier of the first wireless communication node to allow the second wireless communication node to transmit the notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the first wireless communication node.
- [Claim 6] The wireless communication method of any of claims 1 to 5, wherein the first wireless communication node receives from the second wireless communication node a response indicating a successful subscription for a notification of the slice mapping information update

comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.

[Claim 7] The wireless communication method of any of claims 1 to 6, wherein the first wireless communication node transmitted to a wireless communication terminal, based on the slice mapping information update, at least one of updated configured NSSAI or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.

[Claim 8] A wireless communication method comprising:
transmitting, by a second wireless communication node to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.

[Claim 9] The wireless communication method of claim 8, wherein the first wireless communication node receives from the second wireless communication node at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.

[Claim 10] The wireless communication method of claim 8 or 9, wherein the first wireless communication node transmits to the second wireless communication node a response indicating an update of the one or more updated pairs of the VPLMN S-NSSAI and mapped HPLMN S-NSSAI being successful.

[Claim 11] The wireless communication method of any of claims 8 to 10, wherein the first wireless communication node transmits to the second wireless communication node a subscription for a notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.

- [Claim 12] The wireless communication method of claim 11, wherein the subscription comprises an identifier of the first wireless communication node to allow the second wireless communication node to transmit the notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI to the first wireless communication node.
- [Claim 13] The wireless communication method of any of claims 8 to 12, wherein the first wireless communication node receives from the second wireless communication node a response indicating a successful subscription for a notification of the slice mapping information update comprising one or more updated pairs of the VPLMN S-NSSAI and the mapped HPLMN S-NSSAI.
- [Claim 14] The wireless communication method of any of claims 8 to 13, wherein the slice mapping information update triggers the first wireless communication node to transmit, to a wireless communication terminal, at least one of updated configured NSSAI or updated allowed NSSAI, the updated configured NSSAI comprises one or more updated pairs of configured VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [Claim 15] A wireless communication method comprising:
receiving, by a wireless communication terminal from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, wherein the updated configured NSSAI comprises one or more updated pairs of configured Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI and Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [Claim 16] A wireless communication method comprising:
transmitting, by a first wireless communication node to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

- [Claim 17] The wireless communication method of claim 16, wherein the first wireless communication node transmits to the second wireless communication node at least one of Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the updated VPLMN S-NSSAI or a release indication for the PDU session.
- [Claim 18] The wireless communication method of claim 16 or 17, wherein the first wireless communication node receives from the second wireless communication node a response comprising SM information to be transmitted to a third wireless communication node including at least one of the updated VPLMN S-NSSAI or the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI.
- [Claim 19] The wireless communication method of any of claims 16 to 18, wherein the first wireless communication node receives from the second wireless communication node a response comprising SM information to be transmitted to wireless communication terminal including a modification command message, and the modification command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [Claim 20] The wireless communication method of claim 19, wherein the cause value indicates that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI or indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [Claim 21] The wireless communication method of any of claims 16 to 20, wherein the first wireless communication node transmits to a third wireless communication node at least one of the updated VPLMN S-NSSAI or the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI.
- [Claim 22] The wireless communication method of any of claims 16 to 21, wherein the first wireless communication node transmits to a wireless communication terminal a modification command message, and the modification command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [Claim 23] The wireless communication method of any of claims 16 to 22, wherein the first wireless communication node receives from the second wireless communication node a response comprising a release

command message to be transmitted to a wireless communication terminal, and the release command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

- [Claim 24] The wireless communication method of claim 23, wherein the cause value indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [Claim 25] The wireless communication method of any of claims 16 to 24, wherein the first wireless communication node transmits to a wireless communication terminal a release command message, and the release command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [Claim 26] A wireless communication method comprising:
receiving, by a second wireless communication node from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.
- [Claim 27] The wireless communication method of claim 26, wherein the first wireless communication node transmits to the second wireless communication node at least one of Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the updated VPLMN S-NSSAI or a release indication for the PDU session.
- [Claim 28] The wireless communication method of claim 26 or 27, wherein the first wireless communication node receives from the second wireless communication node a response comprising SM information to be transmitted to a third wireless communication node including at least one of the updated VPLMN S-NSSAI or the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI.
- [Claim 29] The wireless communication method of any of claims 26 to 28, wherein the first wireless communication node receives from the second wireless communication node a response comprising SM information to be transmitted to wireless communication terminal including a modification command message, and the modification command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or

a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

- [Claim 30] The wireless communication method of claim 29, wherein the cause value indicates that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI or indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [Claim 31] The wireless communication method of any of claims 26 to 30, wherein the first wireless communication node receives from the second wireless communication node a response comprising a release command message to be transmitted to a wireless communication terminal, and the release command message comprises at least one of: the updated VPLMN S-NSSAI, the HPLMN S-NSSAI mapped to the updated VPLMN S-NSSAI, or a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [Claim 32] The wireless communication method of claim 31, wherein the cause value indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [Claim 33] A wireless communication method comprising:
receiving, by a wireless communication terminal from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.
- [Claim 34] The wireless communication method of claim 33, wherein the updated VPLMN S-NSSAI and the cause value are transmitted in a modification command message for a PDU session or transmitted in a release command message for the PDU session.
- [Claim 35] The wireless communication method of claim 33 or 34, wherein the cause value indicates that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI or indicates that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.
- [Claim 36] The wireless communication method of any of claims 33 to 35, wherein the wireless communication terminal updates the S-NSSAI of a PDU session in response to the cause value indicating that S-NSSAI of the PDU session is replaced by the updated VPLMN S-NSSAI, and the wireless communication terminal releases the S-NSSAI of a PDU session in response to the cause value indicating that a PDU session re-establishment based on the updated VPLMN S-NSSAI is required.

- [Claim 37] A wireless communication node, comprising:
a communication unit; and
a processor configured to: receive, via the communication unit from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.
- [Claim 38] The wireless communication node of claim 37, wherein the processor is further configured to perform a wireless communication method of any of claims 2 to 7.
- [Claim 39] A wireless communication node, comprising:
a communication unit; and
a processor configured to: transmit, via the communication unit to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI.
- [Claim 40] The wireless communication node of claim 39, wherein the processor is further configured to perform a wireless communication method of any of claims 9 to 14.
- [Claim 41] A wireless communication terminal, comprising:
a communication unit; and
a processor configured to: receive, via the communication unit from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI, wherein the updated configured NSSAI comprises one or more updated pairs of configured Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI and Home Public Land Mobile Network, HPLMN, S-NSSAI mapped to the configured VPLMN S-NSSAI, and the updated allowed NSSAI comprises one or more updated pairs of allowed VPLMN S-NSSAI and HPLMN S-NSSAI mapped to the allowed VPLMN S-NSSAI.
- [Claim 42] A wireless communication node, comprising:
a communication unit; and

a processor configured to: transmit, via the communication unit to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

[Claim 43] The wireless communication node of claim 42, wherein the processor is further configured to perform a wireless communication method of any of claims 17 to 25.

[Claim 44] A wireless communication node, comprising:
a communication unit; and
a processor configured to: receive, via the communication unit from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session.

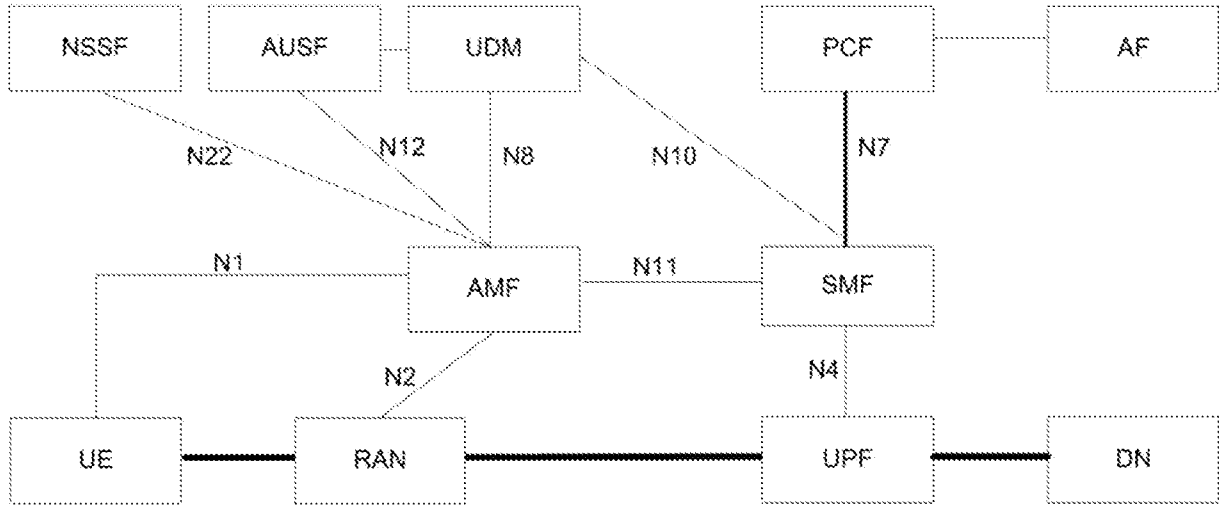
[Claim 45] The wireless communication node of claim 44, wherein the processor is further configured to perform a wireless communication method of any of claims 27 to 32.

[Claim 46] A wireless communication terminal, comprising:
a communication unit; and
a processor configured to: receive, via the communication unit from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI.

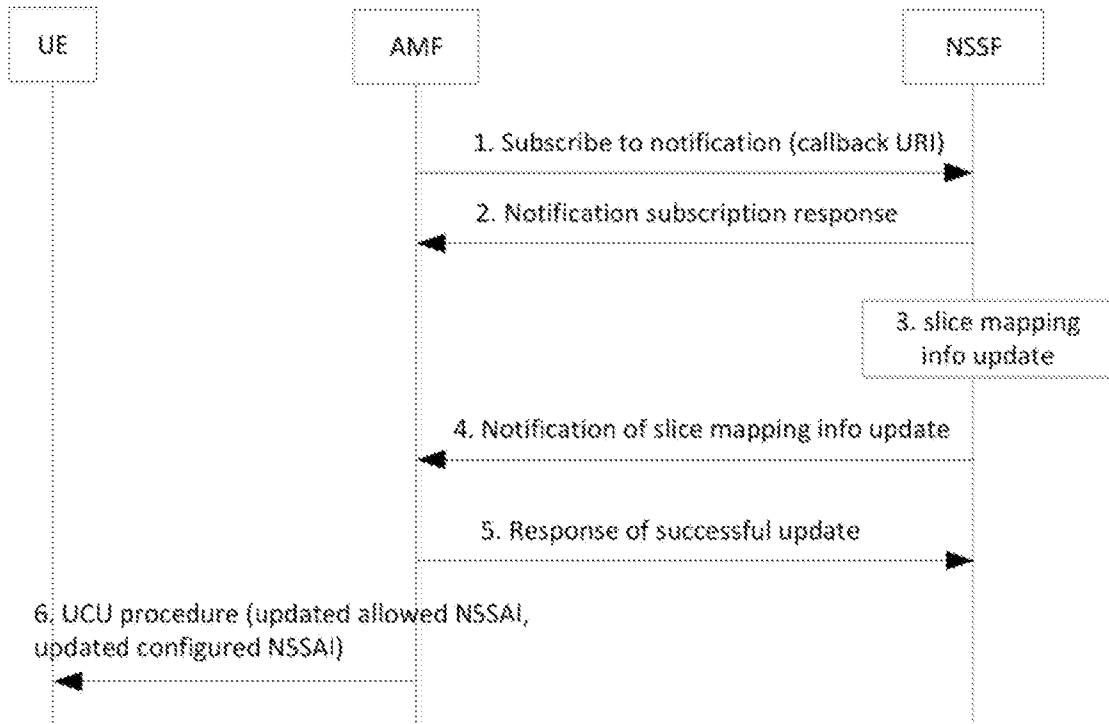
[Claim 47] The wireless communication terminal of claim 46, wherein the processor is further configured to perform a wireless communication method of any of claims 34 to 36.

[Claim 48] A computer program product comprising a computer-readable program medium code stored thereupon, the code, when executed by a processor, causing the processor to implement a wireless communication method recited in any one of claims 1 to 36.

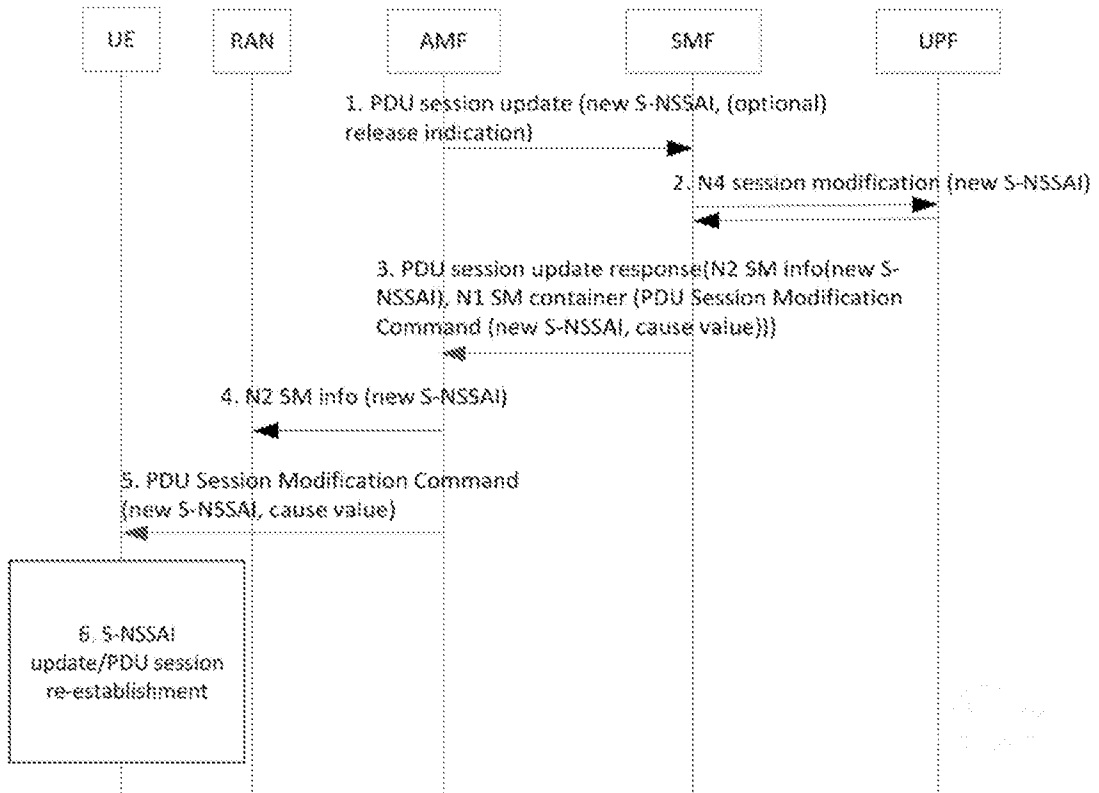
[Fig. 1]



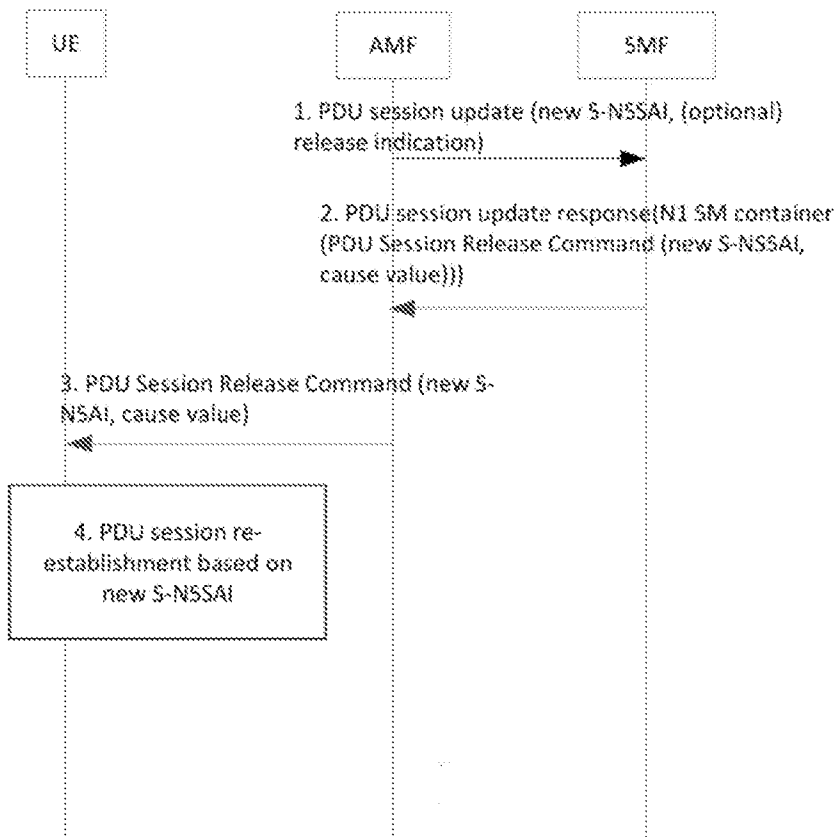
[Fig. 2]



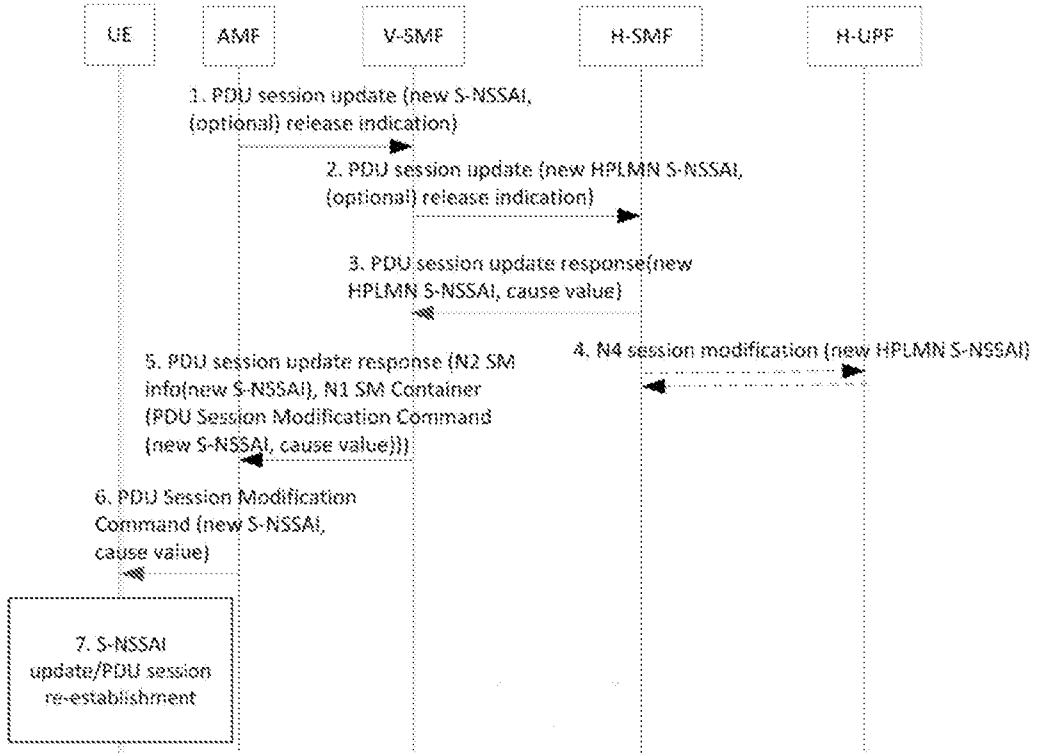
[Fig. 3]



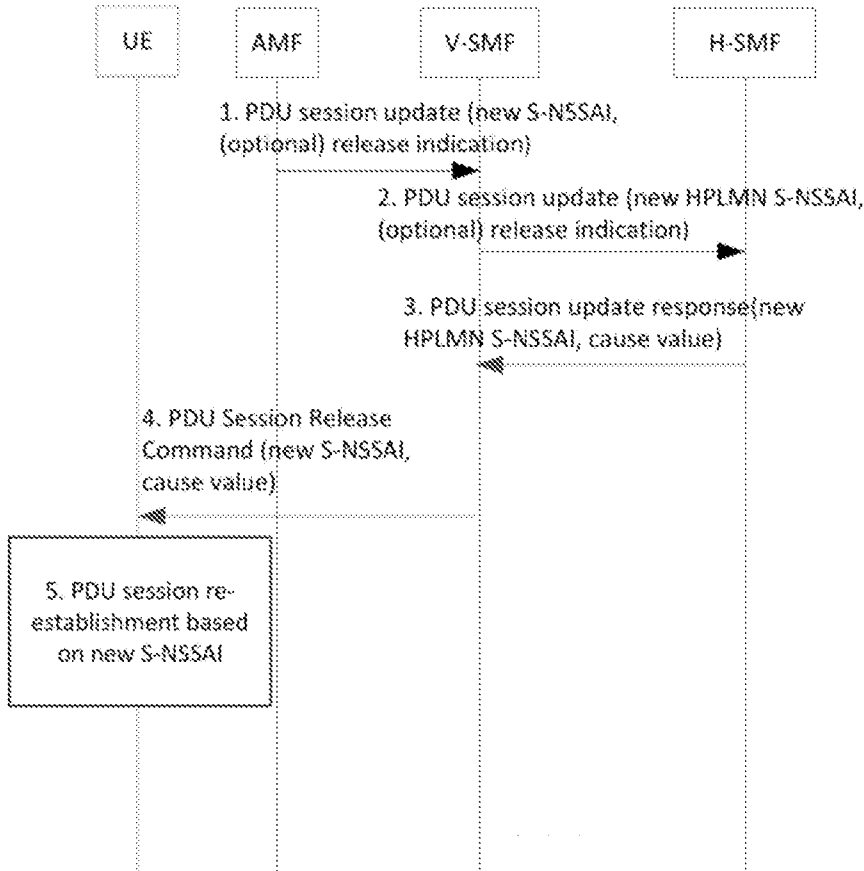
[Fig. 4]



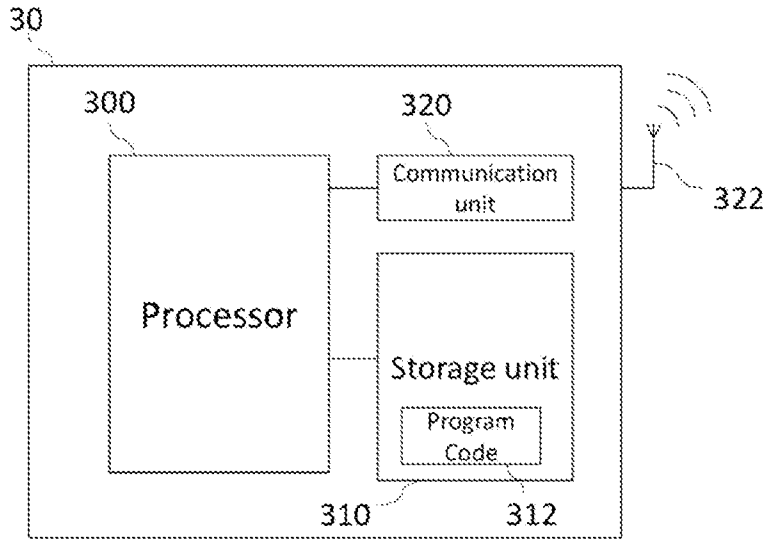
[Fig. 5]



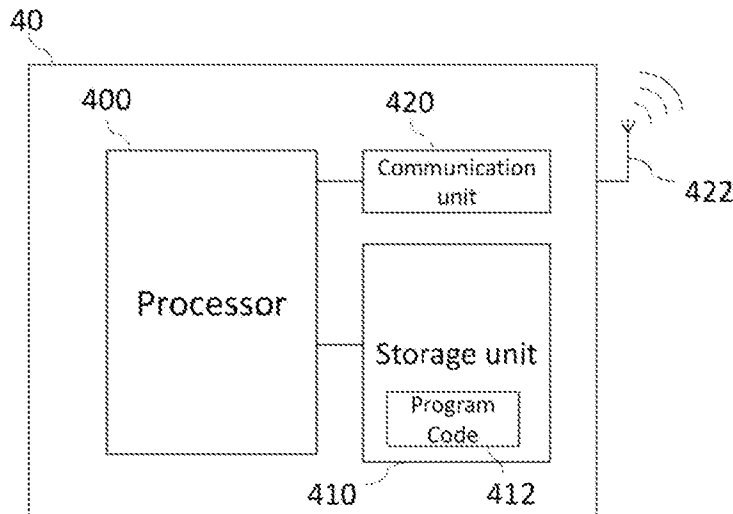
[Fig. 6]



[Fig. 7]



[Fig. 8]



[Fig. 9]

receiving, by a first wireless communication node from a second wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI

[Fig. 10]

transmitting, by a second wireless communication node to a first wireless communication node, a slice mapping information update comprising one or more updated pairs of Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and mapped Home Public Land Mobile Network, HPLMN, S-NSSAI

[Fig. 11]

receiving, by a wireless communication terminal from a first wireless communication node, at least one of updated configured Network Slice Selection Assistance Information, NSSAI, or updated allowed NSSAI

[Fig. 12]

transmitting, by a first wireless communication node to a second wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session

[Fig. 13]

receiving, by a second wireless communication node from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, for a Protocol Data Unit, PDU, session

[Fig. 14]

receiving, by a wireless communication terminal from a first wireless communication node, updated Visited Public Land Mobile Network, VPLMN, Single Network Slice Selection Assistance Information, S-NSSAI, and a cause value indicating a PDU session change based on the updated VPLMN S-NSSAI

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/104253

A. CLASSIFICATION OF SUBJECT MATTER		
H04W76/19(2018.01)i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC:H04W		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
VCN,3GPP,DWPL,ENTXT,ETSI,IETF:HPLMN, information, NSSAI, PDU, session, slice, VPLMN, updat+, pair?, map+, assist+, S-NSSAI, chang+		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 2019342761 A1 (HUAWEI TECHNOLOGIES CO., LTD.) 07 November 2019 (2019-11-07) description, paragraphs 58-337, and figures 1-13	1-48
X	US 2020359271 A1 (SAMSUNG ELECTRONICS CO., LTD.) 12 November 2020 (2020-11-12) description, paragraphs 53-122, and figures 1-11	1-48
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A	US 2020267554 A1 (QUALCOMM INCORPORATED) 20 August 2020 (2020-08-20) the whole document	1-48
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "D" document cited by the applicant in the international application "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
28 November 2023		06 December 2023
Name and mailing address of the ISA/CN		Authorized officer
CHINA NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088, China		HU, RuiXian Telephone No. (+86) 010-53961749

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	WO 2022259830 A1 (NEC CORPORAATION) 15 December 2022 (2022-12-15) the whole document	1-48
A	QUALCOMM INCORPORATED et al. "NSSAI Handling in Roaming Cases" 3GPP TSG-CT WG1 Meeting #120 C1-196396, 11 October 2019 (2019-10-11), the whole document	1-48

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