**SA WG2 Meeting #162 S2-2405265**

**April 15 – April 19 , 2024, Changsha revision of S2-2404740**

**Source: China Telecom**

**Title: KI#1.4, New Sol: Policy for DualSteer steering and switching**

**Document for: Approval**

**Agenda Item: 19.13**

**Work Item / Release: FS\_MASSS/Rel-19**

*Abstract of the contribution:* *This paper proposes a new Solution to address key issue #1.4 of the FS\_MASSS.*

# 1 Discussion

This paper proposes a new Solution to address Key Issue #1.4 of the FS\_MASSS.

# 2 Proposal

It is proposed to include the following changes in TR 23.700-54 V0.2.0.

\* \* \* 1st Change \* \* \*

# 6 Solutions

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of DualSteer Solutions to Key Issues

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Key Issues for DualSteer | | | |
| Solution# | <Key Issue #1.1> | <Key Issue #1.2> | <Key Issue #1.3> | <Key Issue #1.4> |
| #X | X |  |  | X |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

\* \* \* 2nd Change \* \* \* (All new text)

6.1.X Solution #X: Policy for DualSteer steering and switching

6.1.X.1 Description

This solution addressed Key Issue #1.4 “Policy enhancement for DualSteer”.

Policy for steering:

During the registration procedure of the DualSteer device, the AMF may initiate UE Policy Association procedure to provide policies (e.g. URSP rule) for DualSteer traffic steering. In the UE policy association procedure, AM-PCF can retrieve the DualSteer related subscription data from UDR, e,g, DNN and S-NSSAI specific parameter assigned for DualSteer. In the DualSteer related subscription data, the DNN and S-NSSAI are different for the two SUPIs of DualSteer device. Then the PCF can include the combination of DNN and S-NSSAI in the Dualsteer policy (e.g. URSP rule). After receiving the policies, the device can establish the PDU Session that supports DualSteer and steer the service data flow to the PDU Session for different SUPIs.

For the non-simultaneous transmission case, the DualSteer policies for only one SUPI of the DualSteer device will be used, i.e. the DualSteer PDU Session for steering can only be established on one access. For the simultaneous transmission case, the DualSteer PDU Session for different service can be established on both accesses based on the received steering policies.

Policy for switching:

After the establishment of PDU Session for DualSteer, some specific service data may be steered over one 3GPP access. The PCF can decide whether to update the policy to guide the switching of the service data, i.e. trigger the device to establish DualSteer PDU Session for switching or potential switching, based on the network condition, or/and application data and DualSteer Subscription data.

For the case that the policy may be influenced by application data, considering the requirement of some specific service, e.g. large bandwidth, the application can provide guidance to the network for DualSteer policy (e.g. URSP rule) determination via NEF, the PCF can decide whether to trigger the switching based on the application data and the DualSteer Pair Subscription data. This case is mainly applied to simultaneous transmission.

Editor’s Note: Regarding the policy for switching, how to manage the coordination of switching action on the network side and the device side is FFS.

Structure of Subscription data for DualSteer Pair:

To associate two subscriptions/SUPIs for DualSteer, the term “DualSteer Pair” may be introduce to indicate two SUPIs that share the same subscription profile and has corresponding subscription data stored in UDM/UDR as in Table 6.1.x.1for example:

Table 6.1.x.1: DualSteer Pair Subscription data types

| Subscription data type | Field | Description |
| --- | --- | --- |
| DualSteer Pair | DualSteer Pair Identifier | Identifies the pair of SUPIs that share the same subscription profile that supports DualSteer. |
|  | SUPI list | Corresponding SUPI list, i.e., 2 SUPIs |
| DualSteer Pair Data | DualSteer Pair Identifier | Identifiers of the DualSteer Pair that the DualSteer Pair Data belongs to. |
|  | DualSteer data | (NOTE 1) |
| NOTE 1: The content of DualSteer data is subject to the solutions to other KIs on DualSteer, considering the subscription information related to access and mobility, session management, and policy aspects, for example the DNN an S-NSSAI specific parameters to support DualSteer. | | |

In this solution, DualSteer Pair ID can be used to retrieve DualSteer data from UDR, so that PCF can make policy decision for DualSteer based on the DualSteer data and/or the application influence information.

Structure of UE Policy for DualSteer Pair:



Table 6.1.x.2: URSP Rule

| Information name | Description | Category | PCF permitted to modify | Scope |
| --- | --- | --- | --- | --- |
| Rule Precedence | Determines the order the URSP rule is enforced in the DualSteer device | Mandatory | Yes | UE context |
| **Traffic descriptor**  (maybe the same as the Traffic descriptor in Table 6.6.2.1-2 in TS23.503) | This part defines the Traffic descriptor components for the URSP rule. | Mandatory |  |  |
| **List of Route Selection Descriptors** | A list of Route Selection Descriptors. | Mandatory |  |  |
| Route Selection Descriptor Precedence | Determines the order in which the Route Selection Descriptors are to be applied. | Mandatory | Yes | UE context |
| **Route selection components** | *This part defines the route selection components* | Mandatory |  |  |
| Network Slice Selection | Either a single value or a list of values of S-NSSAI(s). | Optional | Yes | UE context |
| DNN Selection | Either a single value or a list of values of DNN(s). | Optional | Yes | UE context |
| DualSteer service indication | Indicates if the traffic of the matching application is to be steered or switched via a PDU session. | Optional | Yes | UE context |
|  | | | | |

6.1.X.2 Procedures

##### 6.1.X.2.1 Procedures for Policy for DualSteer Traffic Steering



Figure 6.1.x.1-1 Policy for DualSteer traffic steering

1. The DualSteer device uses SUPI1 to send registration request including DualSteer capability and UE Policy Container to AMF-1 over 3GPP aceess1.
2. The AMF-1 establishes UE Policy Association with the PCF when a UE Policy Container is received from the UE.
3. The AMF-1 sends a Npcf\_UEPolicyControl Create Request with SUPI1 and the capability of DualSteer device to PCF. PCF retrieves UE context policy control subscription data for SUPI1 which may contain DualSteer Pair ID.

NOTE 1: An indication of UE support for DualSteer needs to be added to UE context policy control subscription data. If this SUPI supports DualSteer, the DualSteer Pair ID will be involved in the UE context policy control subscription data in UDR.

1. After receiving the DualSteer Pair ID, PCF sends Nudr\_DM\_Query including Data key “DualSteer Pair ID”, Data Set “subscription data” and Data Subset “DualSteer Pair data” to retrieve DualSteer data from UDR.
2. PCF generates UE policy based on the received DualSteer data, e.g. DNN and S-NSSAI specific parameter assigned for DualSteer, and send Npcf\_UEPolicyControl Create Response to AMF-1.
3. The remaining registration procedure described in clause 4.2.2.2 of TS23.502.
4. The UE policy association procedure for SUPI2 is the same as SUPI1 as described above.
5. When the DualSteer device detects a new application, it follows the received traffic steering rule to associates all the application flows to the DualSteer PDU Session of SUPI1 or SUPI2

NOTE 2：If the new application does not match any traffic descriptor in the Dualsteer Rule, or only one of the DualSteer Pair is registered, the UE will handle the application according to current URSP rule.

##### 6.1.X.2.2 Procedures for Policy for DualSteer Traffic Switching



Figure 6.1.x.1-2 Policy for DualSteer traffic switching

1. After the establishment of PDU Session for DualSteer, some specific service data may be steered on 3GPP access-1 as in clause 6.1.X.2.1.
2. According to network situation change or service requirement from AF, PCF may decide whether to update the policy to guide the switching of the service data, i.e. switching from 3GPP access-1 (e.g. E-UTRAN) to 3GPP access-2 (e.g. NG-RAN).

For cases that are influenced by service requirement, AF may send guidance to UDR for UE policy (e.g. DualSteer rule) determination via NEF. And then, PCF may receive the update on the AF guidance information once it has subscribed to the information using Nudr\_DM\_Subscribe. Based on the received guidance information and the DualSteer data from UDR, PCF may decide whether to update the policy.

1. The policy generated by PCF is sent to DualSteer device by UE Configuration Update procedure described in clause 4.2.4.3 of TS23.502.
2. Based on the policy, device may decide to switch the traffic of the service data to an existing PDU Session over 3GPP access-2, or initiate a new PDU Session for switching if there is no proper existing PDU Session over the other access.

If a new PDU Session for switching is needed, the anchor UPF which should be the same with the UPF used in the PDU Session before switching needs to be selected during the establishment procedure.

NOTE 3：The selection of the same SMF and UPF in the PDU Session establishment procedure depends on other solutions in the TR23.700-54.

6.1.X.3 Impacts on services, entities and interfaces

PCF:

* Generating PCC rules for DualSteer service based on DualSteer data and/or application data

UDM/UDR:

- Providing DualSteer related subscription data to PCF for DualSteer related policy.

**\* \* \* \* End of Changes \* \* \* \***