**3GPP SA WG2 Meeting #162 S2-2404xxx**

**Changsha, April 15 – April 19, 2024**

**Source: Ericsson**

**Title: Identifying devices behind UE/5G-RG via Device Information Profile server**

**Document for: Approval**

**Agenda Item: xx.x**

**Work Item / Release: FS\_UIA\_ARC / Rel-19**

*Abstract of the contribution: A solution for identifying of devices behind UE/5G-RG is proposed, where a client program updates the information of the devices behind UE/5G-RG on a server and the subscriber identifies the QoS profile for each of the devices via an interface to the server. Upon connecting the device to 5GC, the server requests for differentiated QoS for the device.*

\* \* \* Start of Changes \* \* \* \*

# 6 Solutions

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |  |
| --- | --- | --- |
| Solutions |  |  |
|  | <Key Issue #1> | <Key Issue #2> | <Key Issue #3> | <Key Issue #4> |
| #1 | X | X | X |  |
| #2 | X |  |  |  |
| #3 | X | X |  |  |
| #4 | X |  |  |  |
| #5 | X | X |  |  |
| #6 | X |  |  |  |
| #7 | X |  |  |  |
| #8 |  | X |  |  |
| #9 |  | X |  |  |
| #10 |  | X | X |  |
| #11 |  | X | X |  |
| #12 |  | X | X |  |
| #13 |  | X |  |  |
| #14 |  | X |  |  |
| #15 |  |  | X |  |
| #16 |  |  | X |  |
| #Y |  |  |  | x |

\* \* \* Next Change (all new text) \* \* \* \*

## 6.Y Solution #Y: Identifying non-3GPP devices behind a UE or 5G-RG via Server control

### 6.Y.1 Key Issue mapping

This solution addresses KI#4.

### 6.Y.2 Description

#### 6.Y.2.0 General

This solution is based on storing the device information in a server via a client program that runs in the UE/5G-RG. Then, the subscriber/admin of UE/5G-RG can log into the server and select the desired QoS profiles for each device. The device information is provided to the PCF via NEF and PCF provides relevant policies to enable differentiated policy and charging for each device.

#### 6.Y.2.1 Device Information Profile

The **Device Information Profile (DIP)** for each UE/5G-RG contain the following elements:

1. **Traffic descriptors**: For each device behind UE/5G-RG this is used to detect its traffic for differentiated QoS provisioning and charging and may include:
	1. **IPv6 address**: For IPv6 traffic
	2. **IPv4 address+port number**: For IPv4 traffic
	3. **MAC address**: For Ethernet
2. **Device descriptors:** For each device behind UE/5G-RG, the device descriptor is used to uniquely identify a device behind UE/5G-RG. The device descriptor should be accessible to DIP client upon device connection and is used by the subscriber to identify the device. For example, device host name or device credentials from an AAA server can be used for this purpose
3. **QoS descriptors:** For each device behind UE/5G-RG this field identifies the requested QoS for the device.

NOTE: For IPv4 connectivity, when NAT is used, the UE/5G-RG should assign a port number to each device.

#### 6.Y.2.3 Architecture

Figure 6.Y.2.3.1 and figure 6.Y.2.3.2 describe the solution architecture for roaming and non-roaming cases.



Figure 6.Y.2.3.1: High-level roaming architecture



Figure 6.Y.2.3.2: High-level non-roaming architecture

NOTE: in case of 5G-RG, the DIP client may reside in Auto-Configuration Server (ACS).

#### 6.Y.2.4 Solution Description

The following, describes a high-level procedure for the solution:

1. The UE/5G-RG’s subscriber connects to the DIP server to determine QoS descriptors for the devices behind UE/5G-RG. The list of connected devices (traffic descriptors and device descriptors) is provided by the DIP client and the subscriber can choose the desired QoS e.g., from a drop-down menu.

NOTE: the DIP client can find the traffic descriptors and host name for each device via the host table from DHCP server.

1. After the PDU session establishment, the DIP server to requests for differentiated QoS for the connected device.
2. PCF makes use of DIP information in the policy decisions and creating PCC rules to provide differentiated QoS.

#### 6.Y.2.5 Authentication and Authorization

Regarding Authentication and authorization, the following apply:

- The DIP server is responsible to authenticate the UE/5G-RG subscriber.

- It is the responsibility of the subscriber to ensure that the device descriptor corresponds to the correct device behind UE/5G-RG. There is a risk of using device hostname as device descriptor since it can be changed. The Subscriber can use history of MAC--hostname pairs in 5G-RG/UE to ensure that the host name is not changed (not applicable for randomized MAC), or prevent change of hostnames through setting device policies or management. Alternatively, the device may be authenticated via an AAA server.

- It is the responsibility of UE/5G-RG subscriber to ensure that the device descriptor is unique.

### 6.Y.3 Procedures

Figure 6.Y.3.1 describes the procedure for provisioning the device information profile to the DIP server and figure 6.Y.3.2 describes how this information is used by the 5GC to enable differentiated QoS for each device behind 5G-RG/UE.



Figure 6.Y.3.1: Provisioning of device information profile

Step 1: The user logs into DIP server.

Step 2: The DIP server contacts the DIP client within the 5G-RG/UE and requests the device information.

Step 3: The DIP client obtains the device and traffic descriptors for each device behind the 5G-RG/UE.

Note: the DIP client can collect device and traffic descriptors e.g., from the DHCP server or a AAA server

Step 4: The DIP client updates the device and traffic descriptors in the DIP server.

Step 5. The user selects a QoS descriptor for all/some of the devices (e.g., from a drop down menu).



Figure 6.Y.3.2: Provisioning QoS and Charging differentiation.

Step 1: The non-3GPP device is connected to 5G-RG/UE

Step 2. If needed, the 5G-RG/UE establishes a new PDU session to transfer device data.

Step 3. DIP client is notified that a new device is connected and notifies DIP server

Step 4. The DIP server requests a QoS differentiation for the connected device.

Step 5. Differentiated QoS is provisioned for the device in UP.

Note: Differentiated charging can be done by identifying the traffic of each device via the traffic descriptors (provided by the DIP server) in charging reports.

### 6.Y.4 Impacts

DIP Server: A new server outside 5GC, which is deployed and operated by the operator.

UE/5G-RG: Supporting a client program to update the device information profile in DIP server.

Editor’s note: the complete list of impacts is FFS.

\* \* \* End of Change \* \* \* \*