SESSION CONTEXT CONVERSION

Field

[001] The subject matter described herein relates to interworking between 5G and 4G.

Background

[002] As the cellular system including the 5G network supports an increasing number of devices and services including applications with a wide range of use cases and diverse needs with respect to bandwidth, latency, and reliability requirements, the cellular system may need to prioritize resources across the wireless access network and the core network (and/or for example, prioritizing across the control plane and the user plane) to support differentiation among different service data flows (SDFs). Moreover, the associated quality of service (QoS) requirements may need to be dynamic. The 3GPP document S2-182674 by Ericsson titled "Handling of mapped EPS QoS parameters in IWK with EPC" and the 3GPP document S2-174554 by Intel titled "QoS mapping for 5GC-EPC interworking" both disclose that the network maps a Session AMBR for 5G to an APN-AMBR for EPS.

Summary

[002a] In an aspect, the present disclosure refers to a method comprising: receiving, at a user equipment, while being served by a first system and during protocol data unit, PDU, session modification procedure, a PDU SESSION MODIFICATION COMMAND message including an access point name aggregate maximum bit rate value of a second system; and setting, at the user equipment, an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while

being served by the first system, when there is an inter-system change from the first system to the second system.

[002b] In another aspect, the present disclosure refers to a user equipment comprising: means for receiving, at the user equipment, while being served by a first system and during protocol data unit, PDU, session modification procedure, a PDU SESSION MODIFICATION COMMAND message including an access point name aggregate maximum bit rate value of a second system; and means for setting, at the user equipment, an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while being served by the first system, when there is an inter-system change from the first system to the second system.

[002c] In another aspect, the present disclosure refers to anon-transitory computer-readable storage medium comprising program code which when executed by at least one processor causes operations comprising: receiving, at a user equipment, while being served by a first system and during protocol data unit, PDU, session modification procedure, a PDU SESSION MODIFICATION COMMAND message including an access point name aggregate maximum bit rate value of a second system; and setting, at the user equipment, an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while being served by the first system, when there is an inter-system change from the first system to the second system.

[003] In some example ~~embodiment~~s, there may be provided a method that includes receiving, at a user equipment while being served by a first system and during protocol data unit

session establishment or modification procedure, a message including a default quality of service rule, the default quality of service rule including an access point name aggregate maximum bit rate value; and when there is an inter-system change from the first system to the second system, setting, at the user equipment, the access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value received while being served by the first system.

[004] In some variations, one or more of the features disclosed herein including the following features can optionally be included in any feasible combination. The first system may include a fifth generation core network, the second system may include a fourth generation evolved packet system, the inter-system change includes a change from an N1 interface to an S1

interface, and the access point name aggregate maximum bit rate value, maintains session continuity during the inter-system change. The message including the access point name aggregate maximum bit rate value may be received from a node in the first system. The node may include a packet data network gateway-control plane function, a session management function, and/or a packet data network gateway-control plane function co-located with the session management function. The user equipment may store the received default quality of service rule including the access point name aggregate maximum bit rate value session context management associated with the first system.

[005] In some example ~~embodiment~~s, there may be provided a method that includes determining, by a network node of a network, a default quality of service rule including an access point name aggregate maximum bit rate value associated with another network; and sending, by the network node, a message including the default quality of service rule to a user equipment during protocol data unit session establishment or modification procedure, the default quality of service rule including the access point name aggregate maximum bit rate value for the other network.

[006] In some variations, one or more of the features disclosed herein including the following features can optionally be included in any feasible combination. The network may include a fifth generation core network, and the other network may include a fourth generation evolved packet system. The network node may include a packet data network gateway-control plane function, a session management function, and/or a packet data network gateway-control plane function co-located with the session management function. The default quality of service rule including an access point name aggregate maximum bit rate value associated with the other network may be determined based on quality of service parameters for the first network and/or a session aggregate maximum bit rate.

CLAIMS

1. A method comprising:

receiving, at a user equipment (10), while being served by a first system and during protocol data unit, PDU, session ~~establishment or~~ modification procedure, a PDU SESSION MODIFICATION COMMAND message ~~including a default quality of service rule, the default quality of service rule~~ including an access point name aggregate maximum bit rate value of a second system; and

~~characterized in that~~

~~when there is an inter-system change from the first system to the second system,~~

setting, at the user equipment (10), an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while being served by the first system, when there is an inter-system change from the first system to the second system.

2. The method of claim 1, wherein the first system comprises a fifth generation core network, wherein the second system comprises a fourth generation evolved packet system, wherein the inter-system change includes a change from an N1 interface to an S1 interface, and wherein the access point name aggregate maximum bit rate value of the second system maintains session continuity during the inter-system change.

3. The method of any of claims 1-2, wherein the PDU SESSION MODIFICATION COMMAND message including the access point name aggregate maximum bit rate value of the second system is received from a node (400) in the first system.

4. The method of claim 3, wherein the node (400) comprises a packet data network gateway-control plane function, ~~(~~PGW-C~~)~~, a session management function, ~~(~~SMF~~)~~, and/or a packet data network gateway-control plane function co-located with the session management function (176).

5. The method of any of claims 1-4 further comprising:

storing, at the user equipment (10), the received ~~default quality of service rule including the~~ access point name aggregate maximum bit rate value of the second system as part of a PDU session context ~~management associated with the first system~~.

6. A~~n apparatus~~ user equipment (10) comprising:

means for receiving, at ~~a~~ the user equipment (10), while being served by a first system and during protocol data unit, PDU, session ~~establishment or~~ modification procedure, a PDU SESSION MODIFICATION COMMAND message ~~including a default quality of service rule, the default quality of service rule~~ including an access point name aggregate maximum bit rate value of a second system; and

~~characterized in that~~

~~when there is an inter-system change from the first system to the second system,~~

means for setting, at the user equipment (10), an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while being served by the first system, when there is an inter-system change from the first system to the second system.

7. The ~~apparatus~~ user equipment (10) of claim 6, wherein the first system comprises a fifth generation core network, wherein the second system comprises a fourth generation evolved packet system, wherein the inter-system change includes a change from an N1 interface to an S1 interface, and wherein the access point name aggregate maximum bit rate value of the second system maintains session continuity during the inter-system change.

8. The ~~apparatus~~ user equipment (10) of any of claims 6-7, wherein the PDU SESSION MODIFICATION COMMAND message including the access point name aggregate maximum bit rate value of the second system is received from a node (400) in the first system.

9. The ~~apparatus~~ user equipment (10) of claim 8, wherein the node (400)

comprises a packet data network gateway-control plane function, (PGW-C), a session management function, (SMF), and/or a packet data network gateway-control plane function co-located withthe session management function (176).

10. The apparatus user equipment (10) of any of claims 6-109, wherein the apparatus user equipment (10) further comprises means to at least:

means to store the received default quality of service rule including the access point name aggregate maximum bit rate value of the second system as part of a PDU session context management associated with the first system.

11. The apparatus of claims 6-10, wherein the apparatus comprises or is comprised in a user equipment (10).

12.11. A non-transitory computer-readable storage medium comprising program code which when executed by at least one processor causes operations comprising:

receiving, at a user equipment (10), while being served by a first system and during protocol data unit, PDU, session establishment or modification procedure, a PDU SESSION MODIFICATION COMMAND message including a default quality of service rule, the default quality of service rule including an access point name aggregate maximum bit rate value of a second system; and

characterized in that

when there is an inter-system change from the first system to the second system,

setting, at the user equipment (10), an access point name aggregate maximum bit rate value of a session management context for the second system to the received access point name aggregate maximum bit rate value, i.e. the access point name aggregate maximum bit rate value of the second system received in the PDU SESSION MODIFICATION COMMAND message while being served by the firstsystem, when there is an inter-system change from the first system to the second system.