

METHOD FOR QOS CAPABILITY NEGOTIATION BETWEEN A USER EQUIPMENT
AND A SESSION MANAGEMENT FUNCTION IN A 5G SYSTEM

Field

[0001] The subject matter described herein relates to cellular networks.

Background

[0002] 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 be dynamic. As such, flexible and efficient QoS control mechanisms may enable establishment, modification, and/or enforcement of the QoS requirements, examples of which include maximum bit rate, guaranteed bit rate, priority level, packet delay budget, packet loss rate, and/or other QoS parameters.

Summary

[0003] Methods and apparatus, including computer program products, are provided for session management. In a first aspect, the present disclosure provides a method including forming, by a user equipment, a session establishment message including an indication of at least one session management capability supported by the user equipment, the session management capability being reflective quality of service; sending, by the user equipment, the session establishment message including the indication towards a session management function; and receiving, by the user equipment and from the

session management function, a response indicative of whether the session management function and/or a

corresponding network supports the at least one session management capability to enable the user equipment to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the user equipment and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

[0003a] In a second aspect, the present disclosure provides an apparatus comprising: at least one processor; and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least: form a session establishment message including an indication of at least one session management capability supported by the apparatus, the session management capability being reflective quality of service; send the session establishment message including the indication towards a session management function; and receive, from the session management function, a response indicative of whether the session management function and/or a corresponding network supports the at least one session management capability to enable the apparatus to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the apparatus and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

[0003b] In a third aspect, the present disclosure provides a non-transitory computer-readable medium including program code which when executed causes operations comprising the method steps according to the first aspect.

[0003c] In a fourth aspect, the present disclosure provides method comprising: receiving, at a session management function node and from a user equipment, the

session establishment message including an indication of at least one session management capability supported by the user equipment, the session management capability being reflective quality of service; and sending, by the session management function node and to the user equipment, a response indicative of whether the session management function and/or a corresponding network supports the at least one session management capability to enable the user equipment to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the user equipment and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

[0003d] In a fifth aspect, the present disclosure provides an apparatus comprising: at least one processor; and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least to perform the method according to the fourth aspect.

[0003e] In a sixth aspect, the present disclosure provides a non-transitory computer-readable medium including program code which when executed causes operations comprising the method according to the second aspect

[0004] In some variations, one or more of the features disclosed herein including the following features can optionally be included in any feasible combination. The session establishment message may include a packet data unit session establishment request, wherein the session establishment message includes the indication, a packet data unit session identifier, and a packet data unit type. The indication may include an information element comprising at least one bit, wherein a value of the at least one bit indicates whether the at least one session management capability is supported by the user equipment. The the at least one session management

capability supported by the user equipment may include support for reflective quality of service, and wherein the value of the at least one bit indicates whether the reflective quality of service is supported by the user equipment. The response may include a timer value for a timer associated with the reflective quality of service, wherein the timer value is indicative of whether the session management function supports the at least one session management capability comprising the reflective quality of service. The user equipment may receive at least one downlink packet marked to indicate that the at least one packet is subject to the reflective quality of service, and derive, based on the at least one downlink packet, at least one quality of service rule for use on at least one uplink packet. The user equipment may receive at least one downlink packet not marked to indicate that the at least one packet is subject to the reflective quality of service, and remove at least one quality of service rule, when the timer expires. The response may include a packet data unit session management information and/or at least one quality of service rule authorized

WHAT IS CLAIMED

1. A method comprising:

forming, by a user equipment, a session establishment message including an indication of at least one session management capability supported by the user equipment, the session management capability being reflective quality of service;

sending, by the user equipment, the session establishment message including the indication towards a session management function ; and

receiving, by the user equipment and from the session management function, a response indicative of whether the session management function and/or a corresponding network supports the at least one session management capability to enable the user equipment to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the user equipment and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

2. The method of claim 1, wherein the session establishment message comprises a packet data unit session establishment request, wherein the session establishment message includes the indication, a packet data unit session identifier, and a packet data unit type.

3. The method of any of claims 1-2, wherein the indication comprises an information element comprising at least one bit, wherein a value of the at least one bit indicates whether the at least one session management capability is supported by the user equipment.

4. The method of claim 3, wherein the value of the at least one bit indicates whether the reflective quality of service is supported by the user equipment.

5. The method of any of claims 1-4, wherein the response includes a packet data unit session establishment accept.

6. The method of any of claims 1-5, wherein the response includes session management information.

7. The method of any of claims 1-6, wherein the at least one quality of service rule authorized for the user equipment comprises at least one uplink packet filter.

8. The method of any of claims 1-7 further comprising:
receiving, by the user equipment, at least one downlink packet marked to indicate that the at least one packet is subject to the reflective quality of service; and
deriving, by the user equipment and based on the at least one downlink packet, at least one quality of service rule for use on at least one uplink packet.

9. The method of any of claims 1-8 further comprising:
receiving, by the user equipment, at least one downlink packet not marked to indicate that the at least one packet is subject to the reflective quality of service; and
removing, by the user equipment, at least one quality of service rule, when the timer expires.

10. An apparatus comprising:
at least one processor; and
at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least:

form a session establishment message including an indication of at least one session management capability supported by the apparatus, the session management capability being reflective quality of service;

send the session establishment message including the indication towards a session management function; and

receive, from the session management function, a response indicative of whether the session management function and/or a corresponding network supports the at least one session management capability to enable the apparatus to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the apparatus and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

11. The apparatus of claim 10, wherein the computer program code configured to, with the at least one processor, cause the apparatus to perform the method of any one of claims 2 to 9.

12. A non-transitory computer-readable medium including program code which when executed causes operations comprising the method steps of any one of claims 1 to 9.

13. A method comprising:

receiving, at a session management function node and from a user equipment, the session establishment message including an indication of at least one session management capability supported by the user equipment, the session management capability being reflective quality of service; and

sending, by the session management function node and to the user equipment, a response indicative of whether the session management function and/or a corresponding network supports

the at least one session management capability to enable the user equipment to operate in accordance with the at least one session management capability, wherein the response includes at least one quality of service rule authorized for the user equipment and a timer value for a timer associated with the reflective quality of service, the timer value being indicative of whether the session management function supports the reflective quality of service.

14. The method of claim 13, further comprising the methods of any one of claims 2 to 6.

15. An apparatus comprising:
at least one processor; and
at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least perform the method of claim 13 or claim 14.

16. A non-transitory computer-readable medium including program code which when executed causes operations comprising the method of claim 13 or claim 14.