

provides access for the UE to a core network (CN), which then provides access for the UE to other UEs and/or a data network such as a packet data network (e.g., Internet).

TS 23.501 goes on to define a 5G Service-Based Architecture (SBA) which models services as network functions (NFs) that communicate with each other using representational state transfer application programming interfaces (Restful APIs).

Furthermore, 5G Technical Specification (TS) 33.501, V15.4.0, entitled “Technical Specification Group Services and System Aspects; Security Architecture and Procedures for the 5G System,” the disclosure of which is incorporated by reference herein in its entirety, further describes security management details associated with a 5G network.

Network performance is an important consideration in any communication system. For example, processing of control plane messages received by the core network from user equipment can have a significant impact on network performance. However, management of such communications presents several challenges in existing 5G approaches.

Summary

Illustrative embodiments provide improved techniques for user data transport over a control plane in a communication system using designated payload container types.

1. For example, in one illustrative embodiment, a method comprises determining a size of user data to be transmitted over a control plane from user equipment to at least one network entity of a communication system . The method also comprises, in response to determining that the size of the user data to be transmitted is below at least a threshold for small data transport, generating a control plane message comprising the user data to be transmitted in a payload container dedicated to transport of small user data over the control plane, hereinafter referred to as small data container . The method further comprises transmitting the generated control plane message from the user equipment to the at least one network entity of the communication system. In an aspect, there is a user equipment (202) comprising:

at least one processor (212);

at least one memory (216) including executable program code;

the at least one memory (216) and the executable program code being configured to, with the at least one processor (212), cause the user equipment (202) at least to:

determine a size of user data to be transmitted over a control plane from the user equipment to at least one network entity of a communication system;

in response to determining that the size of the user data to be transmitted is below at least a threshold for small data transport, generate a control plane message comprising

the user data to be transmitted in a small data container over the control plane, wherein the threshold for small data transport is configured to have a value of 254 octets;

in response to determining that the size of the user data is above the threshold for small data transport and below a threshold for large data transport, generate a control plane message comprising the user data to be transmitted and specifying a large data container dedicated to transport of large user data over the control plane; and

transmit the generated control plane message from the user equipment to the at least one network entity of the communication system,

wherein generating the control plane message comprises:

generating a payload container information element of a first format in response to determining that the size of the user data to be transmitted is below the threshold for large data transport and above the threshold for small data transport, wherein the payload container information element of the first format comprises two octets comprising an indication of a length of the user data to be transmitted, and

generating a payload container information element of a second format in response to determining that the size of the user data to be transmitted is below the threshold for large data transport and below the threshold for small data transport, wherein the payload container information element of the second format comprises one octet comprising an indication of a length of the user data to be transmitted. According to an aspect, there is a method comprising:

determining a size of user data to be transmitted over a control plane from user equipment to at least one network entity of a communication system;

in response to determining that the size of the user data to be transmitted is below at least a threshold for small data transport, generating a control plane message comprising the user data to be transmitted in a small data container over the control plane, wherein the threshold for small data transport is configured to have a value of 254 octets;

in response to determining that the size of the user data is above the threshold for small data transport and below a threshold for large data transport, generating a control plane message comprising the user data to be transmitted and specifying a large data container dedicated to transport of large user data over the control plane; and

transmitting the generated control plane message from the user equipment to the at least one network entity of the communication system,

wherein generating the control plane message comprises:

generating a payload container information element of a first format in response to determining that the size of the user data to be transmitted is below the threshold for large data

transport and above the threshold for small data transport, wherein the payload container information element of the first format comprises two octets comprising an indication of a length of the user data to be transmitted, and

2. generating a payload container information element of a second format in response to determining that the size of the user data to be transmitted is below the threshold for large data transport and below the threshold for small data transport, wherein the payload container information element of the second format comprises one octet comprising an indication of a length of the user data to be transmitted. According to an aspect, there is a computer program product comprising a non-transitory computer-readable storage medium having embodied therein executable program code that when executed by a processor operatively coupled to the computer-readable storage medium cause the processor to perform steps of:

determining a size of user data to be transmitted over a control plane from user equipment to at least one network entity of a communication system;

in response to determining that the size of the user data to be transmitted is below at least a threshold for small data transport, generating a control plane message comprising the user data to be transmitted in a small data container over the control plane, wherein the threshold for small data transport is configured to have a value of 254 octets;

in response to determining that the size of the user data is above the threshold for small data transport and below a threshold for large data transport, generating a control plane message comprising the user data to be transmitted and specifying a large data container dedicated to transport of large user data over the control plane; and

transmitting the generated control plane message from the user equipment to the at least one network entity of the communication system,

wherein generating the control plane message comprises:

generating a payload container information element of a first format in response to determining that the size of the user data to be transmitted is below the threshold for large data transport and above the threshold for small data transport, wherein the payload container information element of the first format comprises two octets comprising an indication of a length of the user data to be transmitted, and

generating a payload container information element of a second format in response to determining that the size of the user data to be transmitted is below the threshold for large data transport and below the threshold for small data transport, wherein the payload container

information element of the second format comprises one octet comprising an indication of a length of the user data to be transmitted.

In another illustrative embodiment, a method comprises determining a size of user data to be transmitted from at least one network entity of a communication system over a control plane to the user equipment. The method also comprises, in response to determining that the size of the user data to be transmitted is below at least a threshold for small data transport,