METHOD AND APPARATUS FOR PROVIDING AN ALWAYS-ON ATTRIBUTE OF A PDU SESSION AND FOR PROVIDING INTERWORKING ASPECTS WITH RESPECT TO AN ALWAYS-ON PDU SESSION

TECHNICAL FIELD

[0001] An example embodiment relates generally to a method and apparatus for providing an always-on as an attribute of a Protocol Data Unit (PDU) session and for providing interworking aspects with respect to an always-on PDU session and, more particularly, for providing functionality enabling the determination of whether a PDU session can be an always-on PDU session or not to be decided by the network.

BACKGROUND

[0002] In 5th generation wireless systems (5G), user equipment (UE) cannot initiate a service request procedure while another service request procedure is ongoing. That is, a new service request procedure can be started only if the old service request procedure is completed. This restriction may cause some delay in services using a PDU session which is requested to be reactivated in the new service request procedure.

[0003] Since such delay can be problematic to delay-sensitive services, the "always-on PDU session" has been introduced. The always-on PDU session is a PDU session for which user-plane resources have to be activated during transition from 5GMM-IDLE mode to 5GMM-CONNECTED mode. Such a PDU session may be established based on indication from upper layers. However, current specification (i.e., 3GPP TS 24.501) does not provide any indication with regard to how the upper layers in the UE may be configured to provide an indication.

[0004] As such, the network control is missing from the always-on PDU session. In particular, the network does not know if a PDU session is an always-on PDU session or not and the network cannot set a PDU session to an always-on PDU session or non-always-on PDU session. Because an always-on PDU session may consume more network resources than a non-always-on PDU session, a solution in which network control of an always-on PDU session is introduced in the present application.

SUMMARY

[0005] In the current specification, the "always-on" property is not considered as an attribute of a PDU session. Examples of existing PDU session attributes are: SSC mode, PDU session type, DNN, S-NSSAI. The commonality should be maximized among these attributes. More specifically, the UE should be able to indicate to the network whether it requests a PDU session to be always-on or not via the PDU session establishment request message because the number of user's subscription check for deciding the always-on property can be minimized. That is, if the always-on property is not requested and the DNN is internet, an SMF can be configured to decide the PDU session to be non-always-on PDU session without checking user's subscription. However, it should not be misunderstood that the network can decide a PDU session to be always-on. The always-on determination may be made only if the UE has requested so. However, whether a PDU session can be an always-on PDU session or not, is decided by the network. Because an always-on PDU session is likely to require session continuity during an inter-system change, interworking aspects need to be specified. The current specification lacks those interworking aspects.

[0006] A method, apparatus and computer program product are provided in accordance with an example embodiment in order to provide and/or utilize an always-on as an attribute of a Protocol Data Unit (PDU) session and to provide interworking aspects with respect to an always-on PDU session. Moreover, a method, apparatus and computer program product are provided for providing functionality enabling the determination of whether a PDU session can be an always-on PDU session or not to be decided by the network.

[0007] In an aspect, a method for performing a service request procedure may be provided, the method comprising: receiving, from user equipment (UE), a protocol data unit (PDU) session establishment request message, the PDU session establishment request message configured to indicate a request to establish a new PDU session, the PDU session establishment request message comprise an always-on PDU session requested information element (IE), the always-on PDU session requested IE set to a value indicative of a request to establish a new-always on PDU session or the PDU session establishment request message does not comprise the always-on PDU session requested IE; and determining, based on local policies or configurations and in an instance in which the always-on PDU session requested IE is available, the always-on PDU session requested IE, whether the requested PDU session shall be established as an always-on PDU session.

In an aspect, method comprising: including an always-on protocol data unit (PDU) session requested information element (IE) in a PDU session establishment request message configured to indicate a request to establish a PDU session; setting the always-on PDU session requested IE in the PDU session establishment request message to a value indicative of a request to establish the PDU session as an always-on PDU session; causing transmission of the PDU session establishment request message; and receiving a PDU session establishment accept message comprising an always-on PDU session indication IE, wherein the always-on PDU session indication IE is set to a value indicative of "Always-on PDU session required" or to a value indicative of "Always-on PDU session not allowed". In an aspect, method comprising: receiving, from user equipment (UE), a protocol data unit (PDU) session modification request message, the PDU session modification request message configured to indicate a request to modify a PDU session corresponding to a PDN connection established when in S1 mode, after the first inter-system change from S1 mode to N1 mode, the PDU session modification request message comprising an information element (IE) set to a value indicative of a request for the PDU session to be an always-on protocol data unit (PDU) session; and based on local policies or configurations in a session management function (SMF) and, in an instance in which the always-on PDU session requested IE is available, the always-on PDU session requested IE, determining whether to modify the requested PDU session to be an always-on PDU session. In an aspect, there is a method comprising: including into a protocol data unit (PDU) session modification request message, an information element (IE) configured to indicate a request for the PDU session to be modified to be an always-on PDU session, the PDU session corresponding to a packet data network (PDN) connection established when in S1 mode, after the first inter-system change from S1 mode to N1 mode; setting the IE in the PDU session modification request message to a value indicative of the request for the PDU session to be modified to be an always-on PDU session; causing transmission of the PDU session modification request message; and receiving a PDU session modification command message comprising an always-on PDU session indication IE, wherein the always-on PDU session indication IE is set to a value indicative of "Always-on PDU session required" or to a value indicative of "Always-on PDU session not allowed".