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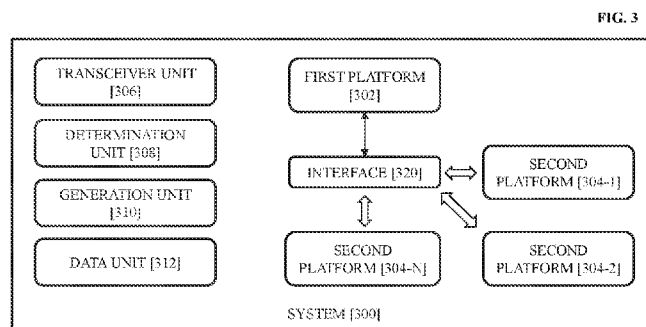
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(54) Title: METHOD AND SYSTEM FOR GENERATING AN INTERFACE BETWEEN PLATFORMS



(57) Abstract: The present disclosure relates to a method [400] and a system [300] for generating an interface [320] between a first platform [302] and at least one second platform [304]. The present disclosure encompasses: a transceiver unit [306] configured to receive, at the first platform [302], from the at least one second platform [304], a request for a set of data. Further, a determination unit [308] to determine a set of parameters related to the at least one second platform [304]. Further, a generation unit [310] to generate the interface [320] based on the received set of parameters. The transceiver unit [306] is further configured to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data.

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METHOD AND SYSTEM FOR GENERATING AN INTERFACE BETWEEN PLATFORMS

TECHNICAL FIELD

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[0001] Embodiments of the present disclosure generally relate to network performance management systems. More particularly, embodiments of the present disclosure relate to methods and systems for generating an interface between a first platform and at least one second platform.

10 BACKGROUND

[0002] The following description of the related art is intended to provide background information pertaining to the field of the disclosure. This section may include certain aspects of the art that may be related to various features of the present disclosure. However, it should be
15 appreciated that this section is used only to enhance the understanding of the reader with respect to the present disclosure, and not as admissions of the prior art.

[0003] Wireless communication technology has rapidly evolved over the past few decades, with each generation bringing significant improvements and advancements. The first generation
20 of wireless communication technology was based on analog technology and offered only voice services. However, with the advent of the second generation (2G) technology, digital communication and data services became possible, and text messaging was introduced. The third generation (3G) technology marked the introduction of high-speed internet access, mobile video calling, and location-based services. The fourth generation (4G) technology revolutionized
25 wireless communication with faster data speeds, better network coverage, and improved security. Currently, the fifth generation (5G) technology is being deployed, promising even faster data speeds, low latency, and the ability to connect multiple devices simultaneously. With each generation, wireless communication technology has become more advanced, sophisticated, and capable of delivering more services to its users.

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[0004] Response extension handling in 4G and 5G networks especially, based on vendor-specific implementations have many limitations, especially interoperability issues may arise, which may result in compatibility challenges between network elements, especially leading to

reduced service quality. Operators may face difficulties in managing a heterogeneous network environment with multiple vendors, making it harder to ensure seamless communication.

[0005] Thus, there exists an imperative need in the art to overcome the above-stated disadvantages.

OBJECTS OF THE DISCLOSURE

[0006] Some of the objects of the present disclosure, which at least one embodiment disclosed herein satisfies are listed herein below.

[0007] It is an object of the present disclosure to provide a system and a method for generating an interface between a first platform and at least one second platform.

[0008] It is yet another object of the present disclosure to provide a solution that is capable of handling multiple NR-Extensions in response to providing location requests for multiple LMF and ESMLC vendors.

SUMMARY

[0009] This section is provided to introduce certain aspects of the present disclosure in a simplified form that are further described below in the detailed description. This summary is not intended to identify the key features or the scope of the claimed subject matter.

[0010] An aspect of the present disclosure relates to a method for generating an interface between a first platform and at least one second platform. The method comprises receiving, by a transceiver unit at the first platform, from the at least one second platform, a request for a set of data. The method further comprises determining, by a determination unit connected at least to the transceiver unit, a set of parameters related to the at least one second platform. The set of parameters comprises at least a configuration of the interface as supported by the at least one second platform, and at least a predefined format for the set of data as supported by the at least one second platform. The method further comprises generating, by a generation unit connected at least to the determination unit, the interface based on the received set of parameters. The method

further comprises providing, by the transceiver unit, at the generated interface, to the at least one second platform, access to the set of data.

[0011] In an exemplary aspect of the present disclosure, the set of data comprises location data of a user equipment associated with the platform.

[0012] In an exemplary aspect of the present disclosure, the first platform is associated with a gateway mobile location center (GMLC).

[0013] In an exemplary aspect of the present disclosure, the at least one second platform is associated with at least one of a Location Mobility Function (LMF) module, and an Evolved Serving Mobile Location Centre (ESMLC) module.

[0014] In an exemplary aspect of the present disclosure, the step of providing, by the transceiver unit, at the generated interface, to the at least one second platform, access to the set of data, comprises: transmitting, by the transceiver unit, to a network function associated with the first platform, request for the set of data; receiving, by the transceiver unit, from the network function, the set of data; transforming, by a data unit connected at least to the transceiver unit, the set of data to the predefined format; and transmitting, by the transceiver unit, the transformed set of data to the generated interface.

[0015] Another aspect of the present disclosure relates to a system for generating an interface between a first platform and at least one second platform. The system comprises a transceiver unit configured to receive, at the first platform, from the at least one second platform, a request for a set of data. The system further comprises a determination unit connected at least to the transceiver unit, the determination unit configured to determine a set of parameters related to the at least one second platform. The set of parameters comprises at least a configuration of the interface as supported by the at least one second platform, and at least a predefined format for the set of data as supported by the at least one second platform. The system further comprises a generation unit connected at least to the determination unit, the generation unit configured to generate the interface based on the received set of parameters. The transceiver unit is further configured to provide, at the generated interface, to the at least one second platform, access to the set of data.

[0016] Yet another aspect of the present disclosure relates to a non-transitory computer-readable storage medium, storing instructions for generating an interface between a first platform and at least one second platform, the storage medium comprising executable code, which, when executed by one or more units of a system, causes: a transceiver unit to receive, at the first platform, from the at least one second platform, a request for a set of data; a determination unit to determine a set of parameters related to the at least one second platform, wherein the set of parameters comprises at least a configuration of the interface as supported by the at least one second platform, and at least a predefined format for the set of data as supported by the at least one second platform; a generation unit to generate the interface based on the received set of parameters; and the transceiver unit to further provide, at the generated interface, to the at least one second platform, access to the set of data.

DESCRIPTION OF THE DRAWINGS

[0017] The accompanying drawings, which are incorporated herein, and constitute a part of this disclosure, illustrate exemplary embodiments of the disclosed methods and systems in which like reference numerals refer to the same parts throughout the different drawings. Components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Also, the embodiments shown in the figures are not to be construed as limiting the disclosure, but the possible variants of the method and system according to the disclosure are illustrated herein to highlight the advantages of the disclosure. It will be appreciated by those skilled in the art that disclosure of such drawings includes disclosure of electrical components or circuitry commonly used to implement such components.

[0018] FIG. 1 illustrates an exemplary block diagram representation of 5th generation core (5GC) network architecture.

[0019] FIG. 2 illustrates an exemplary block diagram of a computing device upon which the features of the present disclosure may be implemented, in accordance with exemplary implementations of the present disclosure.

[0020] FIG. 3 illustrates an exemplary block diagram of a system for generating an interface between a first platform and at least one second platform, in accordance with exemplary implementations of the present disclosure.

[0021] FIG. 4 illustrates an exemplary flow diagram of a method for generating the interface between the first platform and the at least one second platform, in accordance with exemplary implementations of the present disclosure.

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[0022] FIG. 5 illustrates an exemplary system architecture for generating an interface between a first platform and a second platform in accordance with exemplary implementations of the present disclosure.

10 [0023] The foregoing shall be more apparent from the following more detailed description of the disclosure.

DETAILED DESCRIPTION

15 [0024] In the following description, for the purposes of explanation, various specific details are set forth in order to provide a thorough understanding of embodiments of the present disclosure. It will be apparent, however, that embodiments of the present disclosure may be practiced without these specific details. Several features described hereafter may each be used independently of one another or with any combination of other features. An individual feature may
20 not address any of the problems discussed above or might address only some of the problems discussed above.

[0025] The ensuing description provides exemplary embodiments only, and is not intended to limit the scope, applicability, or configuration of the disclosure. Rather, the ensuing description of
25 the exemplary embodiments will provide those skilled in the art with an enabling description for implementing an exemplary embodiment. It should be understood that various changes may be made in the function and arrangement of elements without departing from the spirit and scope of the disclosure as set forth.

30 [0026] Specific details are given in the following description to provide a thorough understanding of the embodiments. However, it will be understood by one of ordinary skill in the art that the embodiments may be practiced without these specific details. For example, circuits, systems, processes, and other components may be shown as components in block diagram form in order not to obscure the embodiments in unnecessary detail.

[0027] Also, it is noted that individual embodiments may be described as a process which is depicted as a flowchart, a flow diagram, a data flow diagram, a structure diagram, or a block diagram. Although a flowchart may describe the operations as a sequential process, many of the operations may be performed in parallel or concurrently. In addition, the order of the operations may be re-arranged. A process is terminated when its operations are completed but could have additional steps not included in a figure.

[0028] The word “exemplary” and/or “demonstrative” is used herein to mean serving as an example, instance, or illustration. For the avoidance of doubt, the subject matter disclosed herein is not limited by such examples. In addition, any aspect or design described herein as “exemplary” and/or “demonstrative” is not necessarily to be construed as preferred or advantageous over other aspects or designs, nor is it meant to preclude equivalent exemplary structures and techniques known to those of ordinary skill in the art. Furthermore, to the extent that the terms “includes,” “has,” “contains,” and other similar words are used in either the detailed description or the claims, such terms are intended to be inclusive—in a manner similar to the term “comprising” as an open transition word—without precluding any additional or other elements.

[0029] As used herein, a “processing unit” or “processor” or “operating processor” includes one or more processors, wherein processor refers to any logic circuitry for processing instructions. A processor may be a general-purpose processor, a special purpose processor, a conventional processor, a digital signal processor, a plurality of microprocessors, one or more microprocessors in association with a Digital Signal Processing (DSP) core, a controller, a microcontroller, Application Specific Integrated Circuits, Field Programmable Gate Array circuits, any other type of integrated circuits, etc. The processor may perform signal coding data processing, input/output processing, and/or any other functionality that enables the working of the system according to the present disclosure. More specifically, the processor or processing unit is a hardware processor.

[0030] As used herein, “a user equipment”, “a user device”, “a smart-user-device”, “a smart-device”, “an electronic device”, “a mobile device”, “a handheld device”, “a wireless communication device”, “a mobile communication device”, “a communication device” may be any electrical, electronic and/or computing device or equipment, capable of implementing the features of the present disclosure. The user equipment/device may include, but is not limited to, a mobile phone, smart phone, laptop, a general-purpose computer, desktop, personal digital

assistant, tablet computer, wearable device or any other computing device which is capable of implementing the features of the present disclosure. Also, the user device may contain at least one input means configured to receive an input from unit(s) which are required to implement the features of the present disclosure.

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[0031] As used herein, “storage unit” or “memory unit” refers to a machine or computer-readable medium including any mechanism for storing information in a form readable by a computer or similar machine. For example, a computer-readable medium includes read-only memory (“ROM”), random access memory (“RAM”), magnetic disk storage media, optical
10 storage media, flash memory devices or other types of machine-accessible storage media. The storage unit stores at least the data that may be required by one or more units of the system to perform their respective functions.

[0032] As used herein “interface” or “user interface” refers to a shared boundary across which
15 two or more separate components of a system exchange information or data. The interface may also refer to a set of rules or protocols that define communication or interaction of one or more modules or one or more units with each other, which also includes the methods, functions, or procedures that may be called.

[0033] All modules, units, components used herein, unless explicitly excluded herein, may be software modules or hardware processors, the processors being a general-purpose processor, a special purpose processor, a conventional processor, a digital signal processor (DSP), a plurality of microprocessors, one or more microprocessors in association with a DSP core, a controller, a microcontroller, Application Specific Integrated Circuits (ASIC), Field Programmable Gate Array
20 circuits (FPGA), any other type of integrated circuits, etc.

[0034] As used herein the transceiver unit includes at least one receiver and at least one transmitter configured respectively for receiving and transmitting data, signals, information, or a combination thereof between units/components within the system and/or connected with the
25 system.

[0035] As discussed in the background section, the current known solutions have several shortcomings. The present disclosure aims to overcome the above-mentioned and other existing problems in this field of technology by providing a method and a system of aims to overcome the

above-mentioned and other existing problems in this field of technology. In the present disclosure, the GMLC is capable of handling multiple NR-Extensions in response to providing location requests for multiple LMF and ESMLC vendors.

5 **[0036]** **FIG. 1** illustrates an exemplary block diagram representation of network architecture, in accordance with exemplary implementation of the present disclosure. As shown in figure 1, the network architecture [100] includes a user equipment (UE) [102], a radio access network (RAN) [104], an access and mobility management function (AMF) [106], a Session Management Function (SMF) [108], a Service Communication Proxy (SCP) [110], an Authentication Server Function (AUSF) [112], a Network Slice Specific Authentication and Authorization Function (NSSAAF) [114], a Network Slice Selection Function (NSSF) [116], a Network Exposure Function (NEF) [118], a Network Repository Function (NRF) [120], a Policy Control Function (PCF) [122], a Unified Data Management (UDM) [124], an application function (AF) [126], a User Plane Function (UPF) [128], a data network (DN) [130], wherein all the components are assumed to be
10 connected to each other in a manner as obvious to the person skilled in the art for implementing features of the present disclosure.
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[0037] Radio Access Network (RAN) [104] is the part of a mobile telecommunications system that connects user equipment (UE) [102] to the core network (CN) and provides access to different
20 types of networks (e.g., 5G network). It consists of radio base stations and the radio access technologies that enable wireless communication.

[0038] Access and Mobility Management Function (AMF) [106] is a network function responsible for managing access and mobility aspects, such as UE registration, connection, and
25 reachability. It also handles mobility management procedures like handovers and paging.

[0039] Session Management Function (SMF) [108] is a network function responsible for managing session-related aspects, such as establishing, modifying, and releasing sessions. It coordinates with the User Plane Function (UPF) for data forwarding and handles IP address
30 allocation and QoS enforcement.

[0040] Service Communication Proxy (SCP) [110] is a network function in the network that facilitates communication between other network functions by providing a secure and efficient messaging service. It acts as a mediator for service-based interfaces.

[0041] Authentication Server Function (AUSF) [112] is a network function, responsible for authenticating UEs during registration and providing security services. It generates and verifies authentication vectors and tokens.

5 **[0042]** Network Slice Specific Authentication and Authorization Function (NSSAAF) [114] is a network function that provides authentication and authorization services specific to network slices. It ensures that UEs can access only the slices for which they are authorized.

10 **[0043]** Network Slice Selection Function (NSSF) [116] is a network function responsible for selecting the appropriate network slice for a UE based on factors such as subscription, requested services, and network policies.

15 **[0044]** Network Exposure Function (NEF) [118] is a network function that exposes capabilities and services of the network to external applications, enabling integration with third-party services and applications.

20 **[0045]** Network Repository Function (NRF) [120] is a network function that acts as a central repository for information about available network functions and services. It facilitates the discovery and dynamic registration of network functions.

[0046] Policy Control Function (PCF) [122] is a network function responsible for policy control decisions, such as QoS, charging, and access control, based on subscriber information and network policies.

25 **[0047]** Unified Data Management (UDM) [124] is a network function that centralizes the management of subscriber data, including authentication, authorization, and subscription information.

30 **[0048]** Application Function (AF) [126] is a network function that represents external applications interfacing with the network to access network capabilities and services.

[0049] User Plane Function (UPF) [128] is a network function responsible for handling user data traffic, including packet routing, forwarding, and QoS enforcement.

[0050] Data Network (DN) [130] refers to a network that provides data services to user equipment (UE) in a telecommunications system. The data services may include but are not limited to Internet services, private data network related services.

[0051] The network architecture also comprises a plurality of interfaces for connecting the network functions with a network entity for performing the network functions. The NSSF [116] is connected with the network entity via the interface denoted as (N_{nssf}) interface in the figure. The NEF [118] is connected with the network entity via the interface denoted as (N_{nef}) interface in the figure. The NRF [120] is connected with the network entity via the interface denoted as (N_{nrf}) interface in the figure. The PCF [122] is connected with the network entity via the interface denoted as (N_{pcf}) interface in the figure. The UDM [124] is connected with the network entity via the interface denoted as (N_{udm}) interface in the figure. The AF [126] is connected with the network entity via the interface denoted as (N_{af}) interface in the figure. The NSSAAF [114] is connected with the network entity via the interface denoted as (N_{nssaaf}) interface in the figure. The AUSF [112] is connected with the network entity via the interface denoted as (N_{ausf}) interface in the figure. The AMF [106] is connected with the network entity via the interface denoted as (N_{amf}) interface in the figure. The SMF [108] is connected with the network entity via the interface denoted as (N_{smf}) interface in the figure. The SMF [108] is connected with the UPF [128] via the interface denoted as (N_4) interface in the figure. The UPF [128] is connected with the RAN [104] via the interface denoted as (N_3) interface in the figure. The UPF [128] is connected with the DN [130] via the interface denoted as (N_6) interface in the figure. The RAN [104] is connected with the AMF [106] via the interface denoted as (N_2). The AMF [106] is connected with the RAN [104] via the interface denoted as (N_1). The UPF [128] is connected with other UPF [128] via the interface denoted as (N_9). The interfaces such as N_{nssf} , N_{nef} , N_{nrf} , N_{pcf} , N_{udm} , N_{af} , N_{nssaaf} , N_{ausf} , N_{amf} , N_{smf} , N_9 , N_6 , N_4 , N_3 , N_2 , and N_1 can be referred to as a communication channel between one or more functions or modules for enabling exchange of data or information between such functions or modules, and network entities.

[0052] FIG. 2 illustrates an exemplary block diagram of a computing device [200] upon which one or more features of the present disclosure may be implemented, in accordance with an exemplary implementation of the present disclosure. In an implementation, the computing device

[200] may also implement a method for generating an interface between a first platform and at least one second platform, utilising a system, or one or more sub-systems, provided in the network. In another implementation, the computing device [200] itself implements the method for generating an interface between a first platform and the at least one second platform, using one or more units configured within the computing device [200], wherein said one or more units are capable of implementing the features as disclosed in the present disclosure.

[0053] The computing device [200] may include a bus [202] or other communication mechanism(s) for communicating information, and a hardware processor [204] coupled with bus [202] for processing said information. The hardware processor [204] may be, for example, a general-purpose microprocessor. The computing device [200] may also include a main memory [206], such as a random-access memory (RAM), or other dynamic storage device, coupled to the bus [202], for storing information and instructions to be executed by the processor [204]. The main memory [206] also may be used for storing temporary variables or other intermediate information during execution of the instructions to be executed by the processor [204]. Such instructions, when stored in a non-transitory storage media accessible to the processor [204], render the computing device [200] into a special purpose device that is customized to perform operations according to the instructions. The computing device [200] further includes a read only memory (ROM) [208] or other static storage device coupled to the bus [202] for storing static information and instructions for the processor [204].

[0054] A storage device [210], such as a magnetic disk, optical disk, or solid-state drive is provided and coupled to the bus [202] for storing information and instructions. The computing device [200] may be coupled via the bus [202] to a display [212], such as a cathode ray tube (CRT), Liquid crystal Display (LCD), Light Emitting Diode (LED) display, Organic LED (OLED) display, etc., for displaying information to a user of the computing device [200]. An input device [214], including alphanumeric and other keys, touch screen input means, etc. may be coupled to the bus [202] for communicating information and command selections to the processor [204]. Another type of user input device may be a cursor controller [216], such as a mouse, a trackball, or cursor direction keys, for communicating direction information and command selections to the processor [204], and for controlling cursor movement on the display [212]. The cursor controller [216] typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the cursor controller [216] to specify positions in a plane.

[0055] The computing device [200] may implement the techniques described herein using customized hard-wired logic, one or more ASICs or FPGAs, firmware, and/or program logic which, in combination with the computing device [200], causes or programs the computing device [200] to be a special-purpose device. According to one implementation, the techniques herein are performed by the computing device [200] in response to the processor [204] executing one or more sequences of one or more instructions contained in the main memory [206]. The one or more instructions may be read into the main memory [206] from another storage medium, such as the storage device [210]. Execution of the one or more sequences of the one or more instructions contained in the main memory [206] causes the processor [204] to perform the process steps described herein. In alternative implementations of the present disclosure, hard-wired circuitry may be used in place of, or in combination with, software instructions.

[0056] The computing device [200] also may include a communication interface [218] coupled to the bus [202]. The communication interface [218] provides two-way data communication coupling to a network link [220] that is connected to a local network [222]. For example, the communication interface [218] may be an integrated services digital network (ISDN) card, cable modem, satellite modem, or a modem to provide a data communication connection to a corresponding type of telecommunication line. In another example, the communication interface [218] may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, the communication interface [218] sends and receives electrical, electromagnetic, or optical signals that carry digital data streams representing different types of information.

[0057] The computing device [200] can send and receive data, including program code, messages, etc. through the network(s), the network link [220] and the communication interface [218]. In an example, a server [230] might transmit a requested code for an application program through the Internet [228], the ISP [226], the local network [222], the host [224] and the communication interface [218]. The received code may be executed by the processor [204] as it is received, and/or stored in the storage device [210], or other non-volatile storage for later execution.

[0058] **FIG. 3** illustrates an exemplary block diagram of a system [300] for generating an interface [320] between a first platform [302] and the at least one second platform [304], in accordance with the exemplary implementations of the present disclosure. In an embodiment, the at least one second platform [304] comprises one or more second platforms ([304-1], [304-2] ...

[304-N]). Herein, the at least one second platform ([304-1], [304-2] ... [304-N]) is individually, and collectively, interchangeably referred to as the at least one second platform [304]. The system [300] comprises at least one transceiver unit [306], at least one determination unit [308], at least one generation unit [310], and at least one data unit [312]. Also, all of the components / units of the system [300] are assumed to be connected to each other unless otherwise indicated below. As shown in the figures all units shown within the system [300] should also be assumed to be connected to each other. Also, in Figure 3 only a few units are shown, however, the system [300] may comprise multiple such units or the system [300] may comprise any such numbers of said units, as required to implement the features of the present disclosure. Further, in an implementation, the system [300] may be present in a user device/user equipment [102] to implement the features of the present disclosure. The system [300] may be a part of the user device [102]/or may be independent of but in communication with the user device [102] (may also referred herein as a UE). In another implementation, the system [300] may reside in a server or a network entity. In yet another implementation, the system [300] may reside partly in the server/ network entity and partly in the user device.

[0059] The system [300] is configured for generating the interface [320] between the first platform [302] and the at least one second platform [304], with the help of the interconnection between the components/units of the system [300].

[0060] Further, in accordance with the present disclosure, it is to be acknowledged that the functionality described for the various components/units can be implemented interchangeably. While specific embodiments may disclose a particular functionality of these units for clarity, it is recognized that various configurations and combinations thereof are within the scope of the disclosure. The functionality of specific units as disclosed in the disclosure should not be construed as limiting the scope of the present disclosure. Consequently, alternative arrangements and substitutions of units, provided they achieve the intended functionality described herein, are considered to be encompassed within the scope of the present disclosure.

[0061] The transceiver unit [306] is configured to receive, at the first platform [302], from the at least one second platform [304], a request for a set of data. In an embodiment, the set of data comprises location data of a user equipment (UE) associated with the platform. The UE referred to herein may be a user device associated with a user to interact with the system [300]. The UE may include, without limitations, smartphones, laptops, desktops, computers, tablets, or any other

device that may be capable of communicating between a plurality of platforms that may relate to the network.

[0062] Further, the set of data mentioned herein may be associated with a set of information related to the location of the UE. The set of data may include, without limitations, at least one of a latitude and longitude coordinates of the UE, a time stamp denoting the exact time period at which the set of data was captured, an accuracy data showcasing the precision in the location coordinates, and an international mobile equipment identity (IMEI) number. It is to be noted that the set of data may further relate to any other set of information or data known to the person skilled in the art.

[0063] Furthermore, the first platform [302] is associated with a gateway mobile location center (GMLC). The GMLC is a network function that is responsible for managing location – based services of the UE. The GMLC may facilitate communication of the location data between the network and other external applications or services.

[0064] In addition, the at least one second platform [304] is associated with at least one of a Location Mobility Function (LMF) module, and an Evolved Serving Mobile Location Centre (ESMLC) module. Herein, the LMF is a network function that may handle the management of a geographical location of the UE within the network. In simple words, the LMF module is involved in location services of the UE within the network.

[0065] Further, the ESMLC module is a network function that may determine the location of the UE based on the set of data received from the network. The ESMLC module may utilize one or more methods such as the triangulation method, or a time difference of arrival (TDOA) to accurately determine the location of the UE. It is to be noted that the one or more methods may involve any other methods that may be known to a person skilled in the art, to determine the location of the UE. The ESMLC module is further responsible for communicating the location data of the UE to the other external applications or services that may require the location data of the UE.

[0066] In an implementation of the present disclosure, the transceiver unit [306] may receive the request to the set of data from the at least one second platform [304]. The request received at the first platform [302] may include at least one of an identification of the UE (such as the IMEI

or an IMSI number), of which the location data is needed at the second platform [304], at least one of a type of location data (such as a real-time location data or a historic location data), and at least a context which may describe the reason to request the location data of the UE. It is to be noted that the request may include any other details which may describe the nature and cause of the request and the above-mentioned details in any order may not limit the scope of the present disclosure.

[0067] In an embodiment, the first platform [302] and the second platform [304] may be configured differently from each other to facilitate direct exchange of data. For instance, the first platform [302] and the second platform [304] may be associated with different entities, such as vendors, service operators, etc. and may be required to receive and/or process data in a predefined format that is not compatible with each other.

[0068] For ease of understanding, the above mentioned context is explained via an exemplary scenario: consider an event, where a user may require making an emergency call (suppose 098.....602 for animal rescue) from their UE to seek assistance for rescuing a stuck animal. In such a case, the emergency service platform is the second platform [304], and the network operator platform of the UE may be the first platform [302]. Further, in such a scenario, the emergency service platform (associated with the LMF module or ESMLC module) may send the request to the network operator platform of the UE, in view of obtaining accurate location data of the user. The request may include the necessary details (such as the IMEI or IMSI number, real time data and a proper context in relation to the animal which is to be rescued). Further, the transceiver unit [306] connected to the GMLC may receive the request and may perform one or more actions to process the location data of the UE.

[0069] In order to facilitate data exchange between the first platform [302] and the second platform [304], the interface [320] may be provided. The determination unit [308] is connected at least to the transceiver unit [306]. The determination unit [308] is configured to determine a set of parameters related to the at least one second platform [304]. The set of parameters mentioned herein may refer to a specific criteria or settings that is applicable to the interface [320] for initiating the communication between the first platform [302] and the second platform [304], or for exchanging data between the first platform [302] and the second platform [304]. The interface [320] may refer to a means for allowing communication between the first platform [302] and the at least one second platform [304]. In an implementation of the present disclosure, the interface

[320] facilitates the communication between the first platform [302] (associated with the GMLC) and the second platform [304] (associated with LMF or ESLMC).

[0070] Furthermore, the set of parameters comprises at least a configuration of the interface [320] as supported by the at least one second platform [304], and a predefined format for the set of data as supported by the at least one second platform [304]. The configuration of the interface may include at least one of a protocol {such as hypertext transfer protocol (HTTP), hypertext transfer protocol secure (HTTPS), message queuing telemetry transport (MQTT), etc.}, at least one authentication keys {such as an application programming interface (API) key, an open authentication (OAuth) key, a java script object notation (JSON) key}, at least one a security encryption {such as transport layer security (TLS) encryption, or a secure sockets layer (SSL) encryption}, and similar that is known to a person skilled in the art.

[0071] Furthermore, the set of parameters comprises a predefined format of the set of data as supported by the second platform [304]. Herein, the predefined set of parameters may include at least one of a predefined format of data structure {such as JSON format, an extensible markup language (XML) format, a comma-separated values (CSV) format}, a predefined format of data encoding, a predefined unit of measurement with a corresponding time zones, and similar that is known to a person skilled in the art. The determination unit [308] may process the set of parameters to ensure that the set of data to be transferred from the first platform [302] to the second platform [304] may meet all the requirements as required in communication between the platforms.

[0072] For ease of understanding, the above mentioned context is explained via the exemplary scenario: considering the same event, wherein post receiving the request at the transceiver unit [306], the determination unit [308] at the first platform [302] may inspect the predefined format for the set of data that is accessible by the second platform [304], such as the second platform [304] may require data transmission over HTTPS, the location data must be in JSON format, and the data request is to identified by the API key. Further, based on the mentioned format, the determination unit [308] may ensure the compatibility of the first platform [302] with the second platform [304], prior proceeding to further action.

[0073] The generation unit [310] is connected at least to the determination unit [308]. The generation unit [310] is configured to generate the interface [320] based on the received set of parameters. The generation unit [310] generates the interface [320] based on the requirements

related to any one or more of the configuration parameters for setting up the interface [320], and the predefined data format.

[0074] The transceiver unit [306] is further configured to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data. Post generation of the interface [320], the transceiver unit [306] may further provide access to the second platform [304] to allow the second platform [304] to fetch the set of data.

[0075] Further, to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data, the transceiver unit [306] is configured to transmit to a network function associated with the first platform [302], request for the set of data. The transceiver unit [306] firstly sends the request to the network function that is associated with the first platform [302] and may contain the location data of the UE. The request may further comprise a requirement of any additional data (such as the IMEI number of UE or any other information known in the art) apart from the location data of the UE.

[0076] The transceiver unit [306] is further configured to receive, from the network function, the set of data. Post receiving the request, the network function may now process the request and may further provide the set of data that has been required in the request.

[0077] The data unit [312] is connected at least to the transceiver unit [306], and is configured to transform the set of data to the predefined format. Further, in an event, the set of data may not be in a pre-defined format or a format that is compatible with the second platform [304]. The data unit [312] is configured to transform the received set of data into the predefined format as required by the second platform [304].

[0078] The transceiver unit [306] is further configured to transmit the transformed set of data to the generated interface [320]. Post transforming the set of data to the predefined format, the transceiver unit [306] may now transfer the set of data to the second platform [304] via the interface [320] generated by the generation unit [310].

[0079] In an implementation, the first platform [302] (such as GMLC) may receive the request from at the at least one second platform [304] such as (E-SMLC) for fetching the set of data (such as the location data) from the first platform [302]. Further, the first platform [302] based on the

compatibility of the second platform [304] may generate the interface [320] (such as SL_g interface) for establishing a connection with the at least one second platform [304], via a mobility management entity (MME). Further, the SL_g interface may allow the second platform [304] to access the set of the data from the first platform [302].

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[0080] FIG. 4 illustrates an exemplary flow diagram of a method [400] for generating the interface [320] between the first platform [302] and the at least one second platform [304], in accordance with exemplary implementations of the present disclosure. In an implementation the method [400] is performed by the system [300]. Further, in an implementation, the system [300] may be present in a server device to implement the features of the present disclosure. Also, as shown in FIG. 4, the method [400] starts at step [402].

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[0081] At step [404], the method [400] comprises receiving, by the transceiver unit [306] at the first platform [302], from the at least one second platform [304], the request for the set of data.

[0082] At step [406], the method [400] comprises determining, by the determination unit [308], the set of parameters related to the at least one second platform [304]. Further, the set of parameters comprises at least the configuration of the interface [320] as supported by the at least one second platform [304], and the predefined format for the set of data as supported by the at least one second platform [304].

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[0083] At step [408], the method [400] comprises generating, by the generation unit [310], the interface [320] based on the received set of parameters.

[0084] At step [410], the method [400] comprises providing, by the transceiver unit [306], at the generated interface [320], to the at least one second platform [304], access to the set of data.

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[0085] The step of providing, by the transceiver unit [306], at the generated interface [320], to the at least one second platform [304], access to the set of data comprises transmitting, by the transceiver unit [306], to a network function associated with the first platform [302], request for the set of data. The above referenced step further comprises receiving, by the transceiver unit [306], from the network function, the set of data. The above referenced step further comprises transforming, by a data unit [312] connected at least to the transceiver unit [306], the set of data to

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the predefined format. The above referenced step further comprises transmitting by the transceiver unit [306], the transformed set of data to the generated interface [320].

[0086] The method [400] herein terminates at the step [412].

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[0087] FIG. 5 illustrates an exemplary block diagram of a system architecture [500] for generating an interface between a first platform [302] and at least one second platform [304], in accordance with exemplary embodiments of the present disclosure. The system architecture [500] includes a location information management (LIM) client [502], a gateway mobile location center (GMLC) [504], an access mobility function (AMF) [106], a location mobility function (LMF) [506], a multi access location mobility function (MA LMF) [508], an evolved serving mobile location centre (ESMLC) [510], a mobility management entity (MME) [512]. The embodiment of FIG. 5 shows the system architecture [500] comprising the LIM client [502]. However, the system architecture may comprise a location services (LCS) client (not shown in figure) alternative to, or in addition to the LIM client [502]. The LCS client may be configured to support location determination functionality of the GMLC [504].

[0088] The LIM client [502] may represent an external entity that may send the location request to the GMLC [504], in view of obtaining location data of a user equipment (UE).

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[0089] Further, the GMLC [504] may further manage the incoming location requests. The GMLC may receive location requests from one or more external entities or clients and may forward the location request to one or more network functions and post receiving the location data from the one or more network functions, the GMLC [504] may further send the location data to the external entities or clients.

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[0090] The AMF [106] is a network function in the network that may handle the mobility and session management of the UE. The AMF [106] herein may interact with other network functions to retrieve the location data of the UE.

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[0091] The LMF [506] further interacts with the AMF [106] and other network functions or entities to calculate the location of UE.

[0092] The MA LMF [508] is a part of LMF [506] that may include multi-access networks. The MA LMF [508] are utilized in an event, when the UE is simultaneously connected with different types of networks.

5 **[0093]** The ESMLC [510] are responsible for providing location information of UE. The ESMLC [510] may interact with the MME [512] to obtain location data of the UE.

[0094] The MME [512] may track and manage the location of UE and may further provide the data or information to the ESMLC [510].

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[0095] Further, the system architecture [500] for generating the interface between the first platform [302] and the second platform [304] may work in the following steps: -

[0096] At step [5A], the LIM client [502] may send a request requiring the location data of the UE, to the GMLC [504].

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[0097] In an implementation, the GMLC [504] may further perform a plurality of security checks for the LIM client [502] in view of authenticating the LIM client [502]. The plurality of security check may include verifying at least one of: a client type, an external identity (identifier used by the client), an authentication data, a session related identity, an internal identity, a client name, a client name type and similar to authenticate the LIM client [502], prior sharing any location data or any form of data to the LIM client [502].

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[0098] At step [5B], the GMLC [504] post receiving the request, may forward the request to either the AMF [106] or the MME [512], based on the network type (such as the request is forwarded to the AMF [106] if the network type is 5G, and the request is forwarded to the MME [512] if the network type is 4G). The GMLC [504] may be further associated with configurations [514] which may assist the GMLC [504] in forwarding the request to the appropriate network functions.

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[0099] At step [5C], in an event, the request is forwarded to the AMF [106], then the AMF [106] may forward the request to the LMF [506] or MA LMF [508] based on the configuration of the network.

[0100] Further, in an event, the request is forwarded to the MME [512], then the MME [512] may forward the request to the ESMLC [510] or MA ESMLC [516].

[0101] At step [5D], the LMF [506]/ MA LMF [508] or ESMLC [510]/ MA ESMLC [516] may now calculate or retrieve the location data of the UE.

[0102] At step [5E], the LMF [506]/ MA LMF [508] or ESMLC [510]/ MA ESMLC [516], post calculating or retrieving the location data may now further transfer the location data to the AMF [106] or the MME [512].

[0103] At step [5F], the GMLC [504] may receive the location data from the AMF [106] or the MME [512] and may further forward the location data to the LIM client [502].

[0104] Yet another aspect of the present disclosure relates to a non-transitory computer-readable storage medium, storing instructions for generating an interface [320] between a first platform [302] and at least one second platform [304], the storage medium comprising executable code, which, when executed by one or more units of a system, causes: a transceiver unit [306] to receive, at the first platform [302], from the at least one second platform [304], a request for a set of data; a determination unit [308] to determine a set of parameters related to the at least one second platform [304], wherein the set of parameters comprises at least a configuration of the interface as supported by the at least one second platform [304], and at least a predefined format for the set of data as supported by the at least one second platform [304]; a generation unit to generate the interface based on the received set of parameters; and the transceiver unit [306] to further provide, at the generated interface, to the at least one second platform [304], access to the set of data.

[0105] As is evident from the above, the present disclosure provides a technically advanced solution for generating an interface between platforms. In the present disclosure, the GMLC is capable of handling multiple NR-Extensions in response to providing location requests for multiple LMF and ESMLC vendors.

[0106] While considerable emphasis has been placed herein on the disclosed implementations, it will be appreciated that many implementations can be made and that many changes can be made to the implementations without departing from the principles of the present

disclosure. These and other changes in the implementations of the present disclosure will be apparent to those skilled in the art, whereby it is to be understood that the foregoing descriptive matter to be implemented is illustrative and non-limiting.

We Claim:

1. A method for generating an interface [320] between a first platform [302] and at least one second platform [304], the method comprising:
 - receiving, by a transceiver unit [306] at the first platform [302], from the at least one second platform [304], a request for a set of data;
 - determining, by a determination unit [308] connected at least to the transceiver unit [306], a set of parameters related to the at least one second platform [304], wherein the set of parameters comprises at least a configuration of the interface [320] as supported by the at least one second platform [304], and a predefined format for the set of data as supported by the at least one second platform [304];
 - generating, by a generation unit [310] connected at least to the determination unit [308], the interface [320] based on the received set of parameters; and
 - providing, by the transceiver unit [306], at the generated interface [320], to the at least one second platform [304], access to the set of data.
2. The method as claimed in claim 1, wherein the set of data comprises location data of a user equipment associated with the platform.
3. The method as claimed in claim 1, wherein the first platform [302] is associated with a gateway mobile location centre (GMLC).
4. The method as claimed in claim 1, wherein the at least one second platform [304] is associated with at least one of a Location Mobility Function (LMF) module, and an Evolved Serving Mobile Location Centre (ESMLC) module.
5. The method as claimed in claim 1, wherein the step of providing, by the transceiver unit [306], at the generated interface [320], to the at least one second platform [304], access to the set of data comprises:
 - transmitting, by the transceiver unit [306], to a network function associated with the first platform [302], request for the set of data;
 - receiving, by the transceiver unit [306], from the network function, the set of data;
 - transforming, by a data unit [312] connected at least to the transceiver unit [306], the set of data to the predefined format; and

- transmitting, by the transceiver unit [306], the transformed set of data to the generated interface [320].

5 6. A system for generating an interface [320] between a first platform [302] and at least one second platform [304], the system comprising:

- a transceiver unit [306] configured to receive, at the first platform [302], from the at least one second platform [304], a request for a set of data;
- a determination unit [308] connected at least to the transceiver unit [306], the determination unit [308] configured to determine a set of parameters related to the at least one second platform [304], wherein the set of parameters comprises at least a configuration of the interface [320] as supported by the at least one second platform [304], and a predefined format for the set of data as supported by the at least one second platform [304];
- a generation unit [310] connected at least to the determination unit [308], the generation unit [310] configured to generate the interface [320] based on the received set of parameters; and
- the transceiver unit [306] configured to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data.

20 7. The system as claimed in claim 6, wherein the set of data comprises location data of a user equipment associated with the platform.

25 8. The system as claimed in claim 6, wherein the first platform [302] is associated with a gateway mobile location center (GMLS).

 9. The system as claimed in claim 6, wherein the at least one second platform [304] is associated with at least one of a Location Mobility Function (LMF) module, and an Evolved Serving Mobile Location Centre (ESMLC) module.

30 10. The system as claimed in claim 6, wherein, to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data:

- the transceiver unit [306] is configured to:

- transmit, to a network function associated with the first platform [302], request for the set of data; and
- receive, from the network function, the set of data;
- a data unit [312], connected at least to the transceiver unit [306], is configured to transform, the set of data to the predefined format; and
- the transceiver unit [306] is configured to transmit the transformed set of data to the generated interface [320].

11. A non-transitory computer-readable storage medium, storing instructions for generating an interface [320] between a first platform [302] and at least one second platform [304], the storage medium comprising executable code which, when executed by one or more units of a system, causes:

- a transceiver unit [306] to receive, at the first platform [302], from the at least one second platform [304], a request for a set of data;
- a determination unit [308] to determine a set of parameters related to the at least one second platform [304], wherein the set of parameters comprises at least a configuration of the interface [320] as supported by the at least one second platform [304], and a predefined format for the set of data as supported by the at least one second platform [304];
- a generation unit [310] to generate the interface [320] based on the received set of parameters; and
- the transceiver unit [306] to provide, at the generated interface [320], to the at least one second platform [304], access to the set of data.

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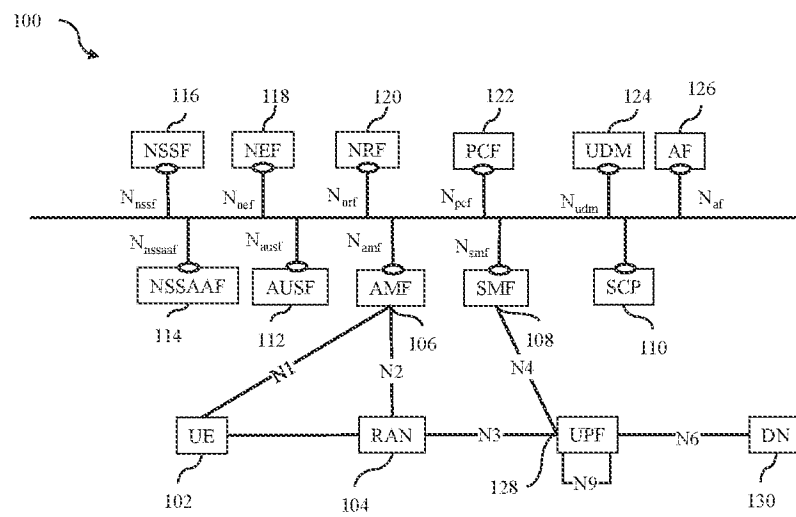


FIG. 1

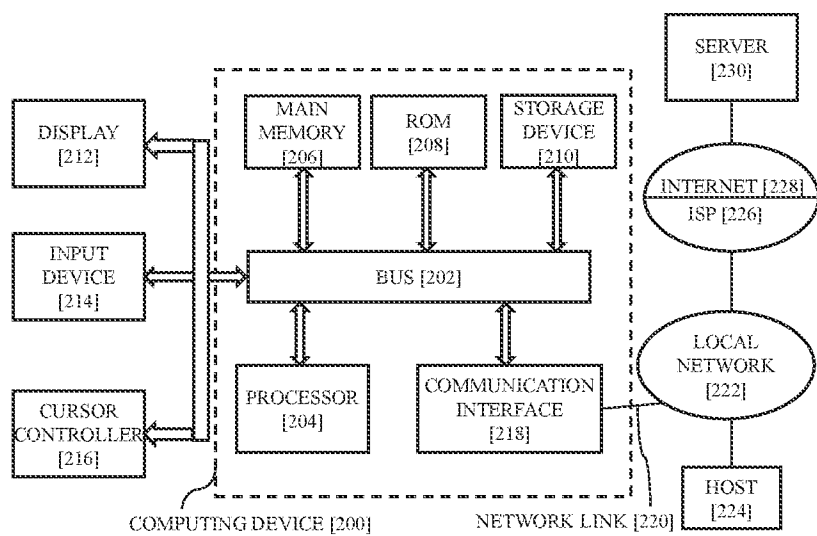


FIG. 2

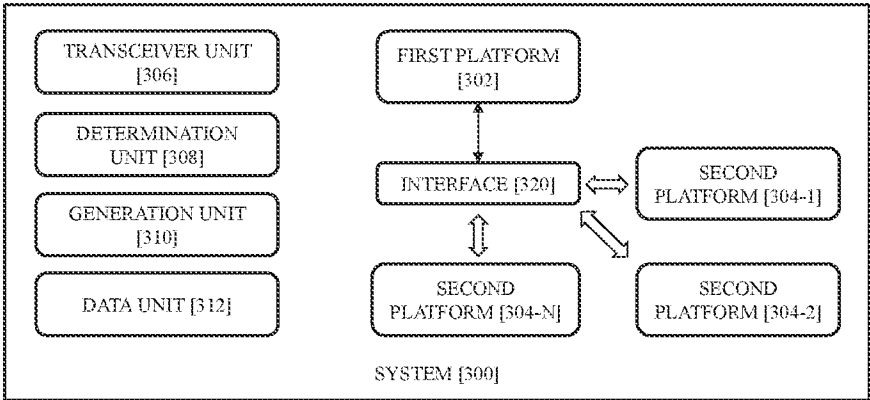


FIG. 3

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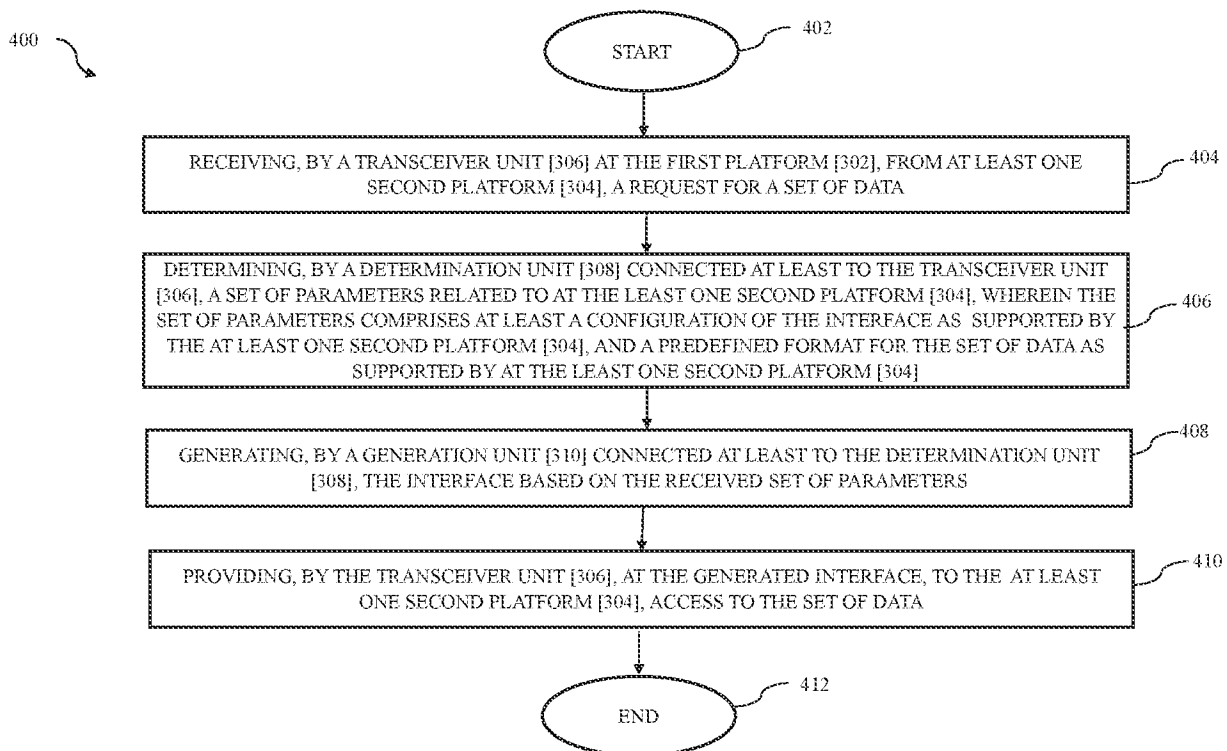


FIG. 4

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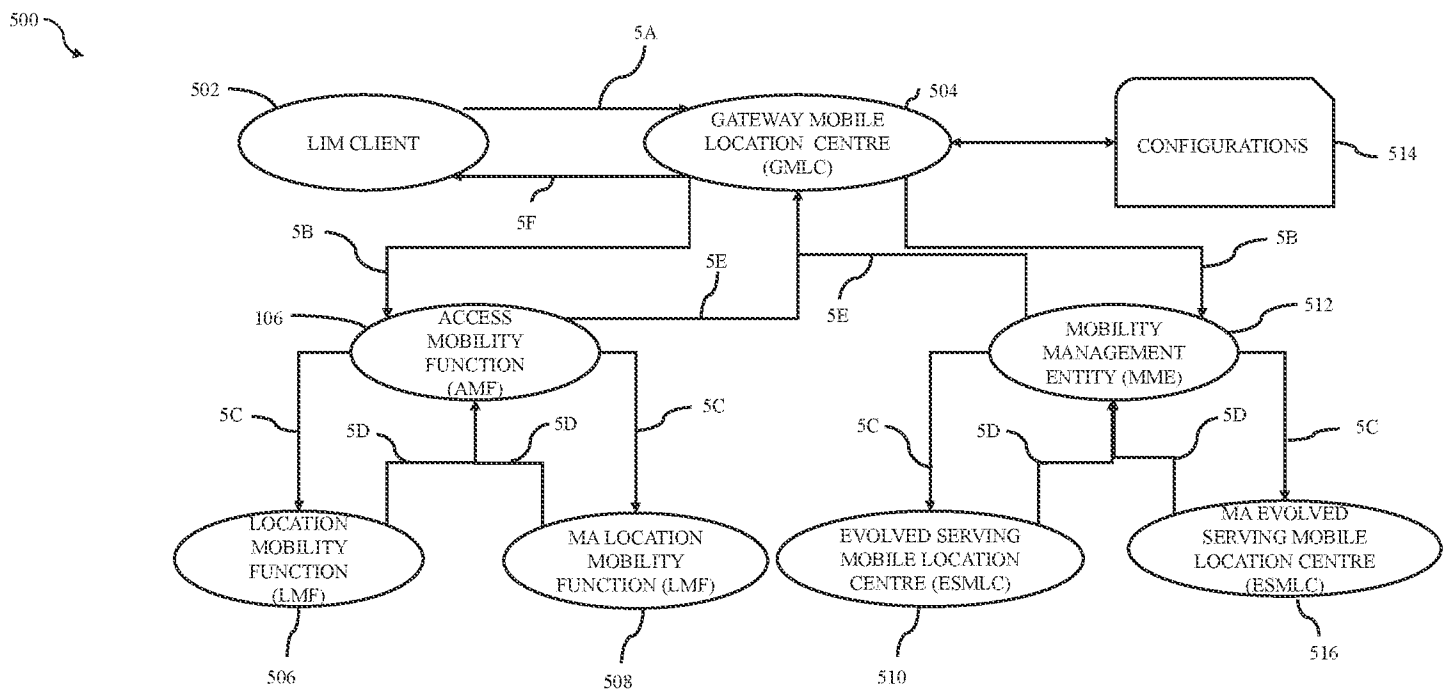


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2024/051600

A. CLASSIFICATION OF SUBJECT MATTER

H04L69/08, H04L12/66, H04L67/12 Version=2024.01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

PatSeer, IPO Internal Database

Keywords: Interface, GMLC, LMF, ESMLC, location, format, configuration.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US20050130673A1 [SIEMENS COMMUNICATIONS INC.] 16 June 2005 (16-06-2005) Abstract; paragraphs [0010]-[0011], [0014]-[0016], [0021]-[0026], [0045], [0074]-[0081]; claims 1-18; figures 1-3. -----	1-11
A	ETSI TS 129 171 V9.2.0 (2010-10) - Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Location Services (LCS); LCS Application Protocol (LCS-AP) between the Mobile Management Entity (MME) and Evolved Serving Mobile Location Centre (E-SMLC); SLs interface; (3GPP TS 29.171 version 9.2.0 Release 9) 31 October 2010 (31-10-2010) Sections 4, 5, 6 & 7.	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

31-12-2024

Date of mailing of the international search report

31-12-2024

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