



(51) International Patent Classification:

H04M 3/42 (2006.01) H04Q 3/66 (2006.01)
H04W 4/16 (2009.01) H04L 65/1016 (2022.01)

(21) International Application Number:

PCT/IN2024/050949

(22) International Filing Date:

27 June 2024 (27.06.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

202321044344 03 July 2023 (03.07.2023) IN

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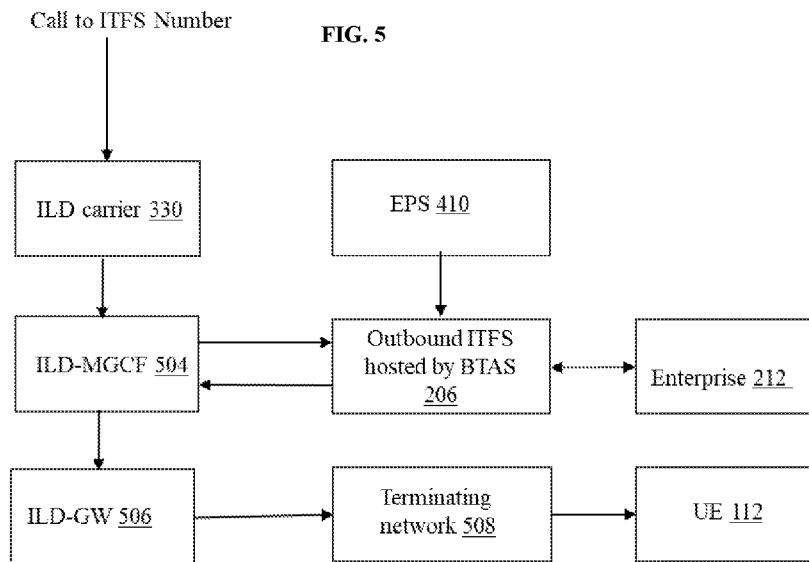
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(54) Title: SYSTEM AND METHOD FOR ROUTING AN INTERNATIONAL CALL



(57) Abstract: The present disclosure relates to a system (116) and a method (700) for routing an international call. The system (116) includes a Business Telephony Application Server (BTAS) (206). The BTAS (206) is configured to receive a call request transmitted by one of the ILD-SBC (604) and the ILD-MGCF (504) depending on inbound or outbound origination. The BTAS (206) is further configured to customize at least one parameter of a header associated with the call request. The BTAS (206) is further configured to return the call request to the ILD-SBC (604) and the ILD-MGCF (504) including the customized headers via the interface. Further, the BTAS (206) is configured to connect an international call between the enterprise (212) and a User Equipment (UE) (112) through the ILD-SBC (604) and the ILD-MGCF (504) based on the at least one customized parameter of the header associated with the call request.



(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

SYSTEM AND METHOD FOR ROUTING AN INTERNATIONAL CALL

FIELD OF THE INVENTION

[0001] The present invention generally relates to communication systems, and more particularly relates to managing call services provided on International Toll-Free Services (ITFS).

BACKGROUND OF THE INVENTION

[0002] In the modern business environment, enterprises rely on various modes of communication to support their operations, including but not limited to telephone, email, and internal messaging systems. Traditionally, these disparate modes of communication have been implemented by separate service providers, resulting in a lack of integration between the services. This disconnect often necessitates manual transfer of information by users from one service to another, leading to inefficiencies and potential errors.

[0003] Furthermore, certain services, such as Business Telephony Application Server (BTAS), have traditionally been delivered via on-premises solutions. This approach poses challenges for remote workers and those with high mobility, as they may not be able to access these services reliably or at all.

[0004] In the context of BTAS, the International Toll-Free Services (ITFS) have emerged as a solution for businesses to facilitate communication with customers or other businesses across borders. However, the implementation of ITFS has its own set of challenges. For instance, a customer can dial an ITFS number for free, but the business subscribing to the ITFS service bears all the charges for the calls. Moreover, the toll-free subscriber's physical location can affect the functionality and cost of the service.

[0005] Additionally, real-time update, creation, or deletion of ITFS service data can be complex due to the intricacies of the network. Similarly, real-time data reporting as requested by an admin of the enterprise can be challenging to implement.

[0006] Therefore, there is a need for an improved system and method for providing ITFS that addresses these challenges, particularly in terms of customization and integration with existing network infrastructure, support for both inbound and outbound ITFS, and real-time data management and reporting.

BRIEF SUMMARY OF THE INVENTION

[0007] One or more embodiments of the present disclosure provide a system and method for routing an international call.

[0008] In one aspect of the present invention, a system for routing an international call is disclosed. The system includes an International Long Distance (ILD) carrier communicably coupled to an International Long Distance-Session Border Controller (ILD-SBC) and an International Long Distance-Media Gateway Control Function (ILD-MGCF). The ILD carrier is configured to receive a call request initiated from a caller by dialing a designated number associated to an enterprise. The ILD carrier is further configured to route the call request to the ILD-SBC if the call request received is inbound and route the call to the ILD-MGCF if the call request received is outbound. The system further includes a Business Telephony Application Server (BTAS) communicably coupled to the ILD carrier, the ILD-SBC, the ILD-MGCF and the enterprise. The BTAS is configured to receive the call request transmitted by the ILD-SBC and the ILD-MGCF depending on the inbound or the outbound origination of the call request via an interface. The BTAS is configured to customize at least one parameter of a header associated with the call request. The BTAS is configured to return the call request to one of the ILD-SBC and the ILD-MGCF including the customized headers via the interface. The BTAS is configured to connect the international call between the enterprise and a relevant User Equipment (UE) through

one of the ILD-SBC and the ILD-MGCF based on the at least one customized parameter of the header associated with the call request.

[0009] In one embodiment, the BTAS is further configured to provide time-based routing, direct translation with priority routing, round robin routing, and load balancing routing.

[0010] In another embodiment, the interface between the BTAS and one of, the ILD-SBC and the ILD-MGCF is a customized interface for routing the international call, thereby eliminating usage of IP Multimedia Core Network Subsystem (IMS).

[0011] In another aspect of the present invention, a method for routing an international call is disclosed. The method includes the step of receiving by an International Long Distance (ILD) carrier a call request initiated from a caller by dialing a designated number associated to an enterprise. In one embodiment, jurisdiction of the caller includes at least one of international and domestic. In another embodiment, the designated number dialed by the caller includes at least one of, an International Toll-Free Services (ITFS) number and a Universal International Freephone Number (UIFN). The call request includes at least one of, Session Initiation Protocol (SIP) INVITE requests. The method includes the step of routing by the ILD carrier the call request to an International Long Distance-Session Border Controller (ILD-SBC) when the call request received is inbound and routing the call to an International Long Distance-Media Gateway Control Function (ILD-MGCF) when the call request received is outbound. The method further includes the step of receiving by a Business Telephony Application Server (BTAS) the call request transmitted by one of the ILD-SBC and the ILD-MGCF depending on inbound or outbound origination of the call request via an interface.

[0012] The method further includes the step of customizing by the BTAS at least one parameter of a header associated with the call request. In one embodiment, the at least one parameter customized includes at least one of, routing rules, end point

numbers behind International Toll-Free Services (ITFS) number and announcement files. The method further includes the step of returning by the BTAS the call request to one of the ILD-SBC and the ILD-MGCF including the customized headers via the interface. The method further includes the step of connecting by the BTAS the international call between the enterprise and a relevant User Equipment (UE) through one of the ILD-SBC and the ILD-MGCF based on the at least one customized parameter of the header associated with the call request. In one embodiment, the relevant UE is related to the caller. In one embodiment, customizing at least one parameter of a header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request.

[0013] The method further includes utilizing by the BTAS a via header from the call request to route the international call to the relevant UE through one of the respective ILD-SBC and the ILD-MGCF when a route header and a P-Served User header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request.

[0014] The method further includes dynamically customizing by the BTAS the at least one parameter based on to which relevant UE the call is required to be routed. The method further includes customizing by the BTAS the at least one parameter based on an input received from an admin of the enterprise via the UE in order to route the call to the relevant UE. In one embodiment, the BTAS supports configuration of ITFS numbers in all the international dialing patterns and formats such as at least one of, '00' and '+'. The BTAS is configured to extract recipient details from the call request, thereby enabling termination of the call to the relevant recipient.

[0015] Other features and aspects of this invention will be apparent from the following description and the accompanying drawings. The features and advantages described in this summary and in the following detailed description are not all-inclusive, and particularly, many additional features and advantages will be apparent to one of ordinary skill in the relevant art, in view of the drawings, specification, and

claims hereof. Moreover, it should be noted that the language used in the specification has been principally selected for readability and instructional purposes and may not have been selected to delineate or circumscribe the inventive subject matter, resort to the claims being necessary to determine such inventive subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] 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. Some drawings may indicate the components using block diagrams and may not represent the internal circuitry of each component. It will be appreciated by those skilled in the art that disclosure of such drawings includes disclosure of electrical components, electronic components or circuitry commonly used to implement such components.

[0017] **FIG. 1** is an exemplary block diagram of a communication system for routing an international call, according to one or more embodiments of the present disclosure;

[0018] **FIG. 2** is a block diagram of exemplary servers used for providing inbound and outbound calling services, according to one or more embodiments of the present disclosure;

[0019] **FIG. 3A** is a block diagram of exemplary servers used for providing the outbound calling service, according to one or more embodiments of the present disclosure;

[0020] **FIG. 3B** is a block diagram of exemplary servers used for providing the inbound calling service, according to one or more embodiments of the present disclosure;

[0021] FIG. 4 illustrates a system architecture in accordance with the present embodiment, according to one or more embodiments of the present disclosure;

[0022] FIG. 5 illustrates a block diagram of a system for managing an outbound call, according to one or more embodiments of the present invention;

[0023] FIG. 6 illustrates a block diagram of a system for managing an inbound call, according to one or more embodiments of the present invention; and

[0024] FIG. 7 shows a method flow diagram for routing an international call, according to one or more embodiments of the present invention.

[0025] The foregoing shall be more apparent from the following detailed description of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Some embodiments of the present disclosure, illustrating all its features, will now be discussed in detail. It must also be noted that as used herein and in the appended claims, the singular forms "a", "an" and "the" include plural references unless the context clearly dictates otherwise.

[0027] Various modifications to the embodiment will be readily apparent to those skilled in the art and the generic principles herein may be applied to other embodiments. However, one of ordinary skill in the art will readily recognize that the present disclosure including the definitions listed here below are not intended to be limited to the embodiments illustrated but is to be accorded the widest scope consistent with the principles and features described herein.

[0028] A person of ordinary skill in the art will readily ascertain that the illustrated steps detailed in the figures and here below are set out to explain the exemplary embodiments shown, and it should be anticipated that ongoing technological development will change the manner in which particular functions are performed.

These examples are presented herein for purposes of illustration, and not limitation. Further, the boundaries of the functional building blocks have been arbitrarily defined herein for the convenience of the description. Alternative boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed. Alternatives (including equivalents, extensions, variations, deviations, etc., of those described herein) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein. Such alternatives fall within the scope and spirit of the disclosed embodiments.

[0029] FIG. 1 is an exemplary block diagram of a communication system 100 for routing an international call, according to one or more embodiments of the present disclosure.

[0030] The communication system 100 includes a User Equipment (UE) 112, a network 114, and a system 116. The UE 112 aids a user to interact with the system 116 for transmitting a call request to an International Long Distance (ILD) carrier 330 (as shown in FIG. 3A) in response to a caller dialing a designated number associated to an enterprise 212 (as shown in FIG.2) via a user interface module. As used herein, the International Long Distance refers to voice or data communication services that connect individuals or businesses across different countries. The ILD involves the transmission of signals over long distances, often crossing international borders. The ILD carrier 330 refers to a service provider that offers long-distance communication services between countries or regions. The ILD carrier 330 specializes in facilitating voice calls, data transmission, and other forms of communication across international borders. The ILD carrier 330 typically has agreements with local carriers in different countries to establish connections and provide seamless communication services to their customers.

[0031] The terms “user”, “caller”, and “subscriber” are used interchangeably hereinafter. The UE 112 is one of, but not limited to, any electrical, electronic, electro-mechanical or an equipment and a combination of one or more of the above devices

such as virtual reality (VR) devices, augmented reality (AR) devices, laptop, general-purpose computer, desktop, personal digital assistant, tablet computer, mainframe computer, or any other computing device.

[0032] For the purpose of description and explanation, the description will further be explained with respect to a first UE **112a**, a second UE **112b**, and a third UE **112c**, and should nowhere be construed as limiting the scope of the present disclosure. Each of the first UE **112a**, the second UE **112b**, and the third UE **112c** may be a computer system which may include an external storage device, a bus, a main memory, a read-only memory, a mass storage device, communication port(s), and a processor. A person skilled in the art will appreciate that the computer system may include more than one processor and communication ports. The communication port(s) may be any of an RS-232 port for use with a modem-based dialup connection, a 10/100 Ethernet port, a Gigabit or 10 Gigabit port using copper or fiber, a serial port, a parallel port, or other existing or future ports. The communication port(s) may be chosen depending on a network, such a Local Area Network (LAN), a Wide Area Network (WAN), or any network to which the computer system connects.

[0033] In an additional embodiment, the network **114** includes, by way of example but not limitation, one or more of a wireless network, a wired network, an internet, an intranet, a public network, a private network, a packet-switched network, a circuit-switched network, an ad hoc network, an infrastructure network, a Public-Switched Telephone Network (PSTN), a cable network, a cellular network, a satellite network, a fiber optic network, or some combination thereof. The network **114** may include, but is not limited to, a Third Generation (3G), a Fourth Generation (4G), a Fifth Generation (5G), a Sixth Generation (6G), a New Radio (NR), a Narrow Band Internet of Things (NB-IoT), an Open Radio Access Network (O-RAN), and the like.

[0034] Each of the first UE **112a**, the second UE **112b**, and the third UE **112c** is configured to be communicably coupled with the system **116** via the network **114**. The system **116** includes a plurality of servers. The plurality of servers may include, but

not limited to, a first server **102** and a second server **104**. The plurality of servers include, by way of example but not limitation, one or more of a standalone server, a server blade, a server rack, a bank of servers, a server farm, hardware supporting a part of a cloud service or system, a home server, hardware running a virtualized server, one or more processors executing code to function as a server, one or more machines performing server-side functionality as described herein, at least a portion of any of the above, some combination thereof. In an embodiment, the entity may include, but is not limited to, a vendor, a network operator, a company, an organization, a university, a lab facility, a business enterprise, a defense facility, or any other facility that provides content.

[0035] **FIG. 2** is a block diagram of exemplary servers used for providing inbound and outbound calling services, according to one or more embodiments of the present disclosure. The first server **102** includes a memory **202**, one or more processors **204**, and a Business Telephony Application Server (BTAS) **206**.

[0036] As per the illustrated embodiment, the first server **102** is configured to host the BTAS **206**. The BTAS **206** is designated to handling and managing telephony applications within a business environment. It plays a crucial role in providing advanced telephony features, services, and integration capabilities for organizations. The BTAS **206** acts as a central hub for telephony-related applications, enabling businesses to streamline communication processes, enhance productivity, and improve customer interactions. The BTAS **206** is configured to receive a call request from the UE **112** and an enterprise **212** transmitted by the network **114** depending on the inbound or the outbound origination of the call request via an interface.

[0037] Further, the first server **102** includes the memory **202** and one or more processors **204**. The one or more processors (s) **204** coupled with the memory **202**. The memory may store instructions which when executed by the one or more processor (s) **204** may cause the system to perform offloading/onloading of broadcasting or multicasting content in network **114**. An exemplary representation of

the first server **102** for such purpose, in accordance with embodiments of the present disclosure. In an embodiment, the first server **102** may include one or more processor (s) **204**. The one or more processor (s) **204** may be implemented as one or more microprocessors, microcomputers, microcontrollers, edge or fog microcontrollers, digital signal processors, central processing units, logic circuitries, and/or any devices that process data based on operational instructions. Among other capabilities, the one or more processor (s) may be configured to fetch and execute computer-readable instructions stored in a memory of the system. The memory may be configured to store one or more computer-readable instructions or routines in a non-transitory computer readable storage medium, which may be fetched and executed to create or share data packets over a network service.

[0038] The memory **202** may comprise any non-transitory storage device including, for example, volatile memory such as Random-Access Memory (RAM), or non-volatile memory such as Electrically Erasable Programmable Read-only Memory (EPROM), flash memory, and the like. In an embodiment, the first server **102** may include an interface(s). The interface(s) may comprise a variety of interfaces, for example, interfaces for data input and output devices, referred to as input/output (I/O) devices, storage devices, and the like. The interface(s) may facilitate communication for the system. The interface(s) may also provide a communication pathway for one or more components of the system. Examples of such components include, but are not limited to, processing unit/engine(s) and a database. The processing unit/engine(s) may be implemented as a combination of hardware and programming (for example, programmable instructions) to implement one or more functionalities of the processing engine(s). In examples described herein, such combinations of hardware and programming may be implemented in several different ways. For example, the programming for the processing engine(s) may be processor executable instructions stored on a non-transitory machine-readable storage medium and the hardware for the processing engine(s) may comprise a processing resource (for example, one or more processor s), to execute such instructions. In the present examples, the machine-

readable storage medium may store instructions that, when executed by the processing resource, implement the processing engine(s). In such examples, the first server **102** may include the machine-readable storage medium storing the instructions and the processing resource to execute the instructions, or the machine-readable storage medium may be separate but accessible to the system and the processing resource. In other examples, the processing engine(s) may be implemented by electronic circuitry. In an aspect, a database may comprise data that may be either stored or generated as a result of functionalities implemented by any of the components of the processor or the processing engines.

[0039] The main memory may be random access memory (RAM), or any other dynamic storage device commonly known in the art. The read-only memory may be any static storage device(s) including, but not limited to, a Programmable Read Only Memory (PROM) chips for storing static information e.g., start-up or basic input/output system (BIOS) instructions for the processor. The mass storage device may be any current or future mass storage solution, which may be used to store information and/or instructions. The bus communicatively couples the processor with the other memory, storage, and communication blocks. The bus can be, e.g. a Peripheral Component Interconnect (PCI) / PCI Extended (PCI-X) bus, Small Computer System Interface (SCSI), universal serial bus (USB), or the like, for connecting expansion cards, drives, and other subsystems as well as other buses, such a front side bus (FSB), which connects the processor to the computer system. Optionally, operator and administrative interfaces, e.g. a display, a keyboard, and a cursor control device, may also be coupled to the bus to support direct operator interaction with the computer system. Other operator and administrative interfaces may be provided through network connections connected through the communication port(s). In no way should the aforementioned exemplary computer system limit the scope of the present disclosure.

[0040] The second server **104** includes a memory **208**, one or more processors **210**, and the enterprise **212**. The second server **104** is configured to host the enterprise **212**.

The enterprise **212** is configured to register with the BTAS **206** and is adapted to opt for services at the BTAS **206**. The services are at least one of, but not limited to, international calling services. The BTAS **206** is configured to connect an international call between the enterprise **212** and a relevant User Equipment (UE) **112** through the network **114**.

[0041] Further, the second server **104** includes the memory **208**, and the one or more processors **210**. Description with reference to working and operation of the memory **208** and the processor **210** as illustrated in the second server **104** is same or similar to the working and operation of the memory **202** and the processor **204** as illustrated in the first server **102** above. Hence, for the sake of brevity, similar description related to the working and operation of the memory **208** and the processor **210** as illustrated in the second server **104** has been omitted to avoid repetition. The limited description provided for the memory **208** and the processor **210** in the second server **104**, should not be construed as a limitation to the scope of the present embodiment with reference to the memory **202** and the processor **204** in the first server **102**, but should be read with the description as provided for the memory **202** and the processor **204** in the first server **102** above.

[0042] Referring to **FIG. 3A** and **FIG. 3B**, **FIGS. 3A** and **3B** are exemplary block diagrams of the first server **102** and the second server **104** used for providing inbound and outbound calling services, according to one or more embodiments of the present invention. More specifically, **FIG. 3A** is an exemplary illustration of the second server **104** for providing the outbound call from the enterprise **212** to a user, according to one or more embodiments of the present invention. Further, **FIG. 3B** is an exemplary illustration of the first server **102** for providing the inbound call from the user to the enterprise **212** and, according to one or more embodiments of the present invention.

[0043] As per the illustrated embodiment in **FIG. 3A**, the second server **104** is configured for providing the outbound call from the enterprise **212** to the user. The second server **104** is configured to host the enterprise **212** thereon. In one embodiment,

the enterprise **212** may be one of, but not limited to, an organization that has opted to avail one or more services to the user. The one or more services are at least one of, but not limited to, international calling services. The BTAS **206** in the first server **102** is configured for providing call routing capabilities from the enterprise **212** to the user. In one embodiment, the BTAS **206** may include one or more of a Private Branch Exchange (PBX), a Session Border Controller (SBC), and/or other telephony aspects. In another embodiment, the BTAS **206** includes multiple call routing algorithms such as a time-based routing, a direct translation with priority routing, a call redirect, an IVR-based routing, a round robin routing, a load balancing routing, an origin-based routing, and a uniform call distribution. Let us consider for example, the caller from the enterprise **212** can connect to the user in international destinations free of cost without having to activate International Subscriber Dialing (ISD) facility. In one embodiment, the enterprise **212** may select the call routing algorithm which needs to be implemented in the BTAS **206** or across all BTASs **206**. Accordingly, the BTAS **206** implements the specified call routing algorithm, allowing for dynamic and efficient handling, and forwarding of incoming calls to the appropriate agents or destinations.

[0044] As per the illustrated embodiment in **FIG. 3B**, the first server **102** for providing the inbound call from the user to the enterprise **212**. In one embodiment, the International Toll-Free Service (ITFS) inbound enables single unique ITFS number in an international location from the user to the enterprise **212** situated in a domestic network, for example India, through the BTAS **206**. The BTAS **206** in the first server **102** is configured for providing the call routing capabilities to connect the call from the user to the enterprise **212**. The BTAS **206** in the first server **102** includes multiple call routing algorithms such as a time-based routing, a direct translation with priority routing, a call redirect, an IVR-based routing, a round robin routing, a load balancing routing, an origin-based routing, and a uniform call distribution.

[0045] Accordingly, the BTAS **206** implements the specified call routing algorithm, allowing for dynamic and efficient handling, and forwarding of incoming calls to the

appropriate agents or destinations. By doing so, the system **116** as disclosed in the present disclosure is able to advantageously improve call completion rates, optimize resource utilization, and enhance overall efficiency of call routing in the BTAS **206**.

[0046] Further, the BTAS **206** is configured to utilize routing rules and policies to determine how to route the call from the UE **112**. In one embodiment, the routing rules and the policies are predefined by at least one of plurality of service providers. The routing rules include customizing at least one parameter of a header associated with the call request generated by the user for the call from the BTAS **206** to the enterprise **212**. The routing rules and the policies are configured to be stored in a data store **214**.

[0047] The data store **214** may be a database or other data store associated with a software platform. The routing rules can identify the enterprise **212** to route the call from the enterprise **212** to a relevant UE **112**. The user or admin of the enterprise **212** which places the call to the international user via the UE and is opted for placing international toll-free calls, which further connects to the BTAS **206**, and the BTAS **206** routes the call to the international user based on the routing rules stored at the data store **214**. Likewise, the BTAS **206** receives the call from the international user and routes the call from the BTAS **206** to the enterprise **212** based on the routing rules stored at the data store **214**.

[0048] The data store **214** is one of, but is not limited to, one of a centralized database, a cloud-based database, a commercial database, an open-source database, a distributed database, an end-user database, a graphical database, a No-Structured Query Language (NoSQL) database, an object-oriented database, a personal database, an in-memory database, a document-based database, a time series database, a wide column database, a key value database, a search database, a cache databases, and so forth. The foregoing examples of data store **214** types are non-limiting and may not be mutually exclusive e.g., a database can be both commercial and cloud-based, or both relational and open-source, etc.

[0049] As mentioned earlier in **FIG. 1**, the first UE **112a** includes one or more primary processors **310** communicably coupled to the ILD carrier **330**. The one or more primary processors **310** are coupled with a memory **320** storing instructions which are executed by the one or more primary processors **310**. Execution of the stored instructions by the one or more primary processors **310** enables the first UE **112a** to transmit the call request to the ILD carrier **330** in response to the caller dialing the designated number associated to the enterprise **212** via the interface. The execution of the stored instructions by the one or more primary processors **310** further enables the first UE **112a** to transmit the call request from the user via the interface module to the network **114**.

[0050] Referring to **FIG. 4**, **FIG. 4** illustrates a system **116** architecture in accordance to the present embodiment. The system **116** is implemented as a Session initiation protocol (SIP) application server for enterprise/business solutions, which would be integrated with an IMS Core. The system **116** enables a network-based telephony and a web communication from and to a client of a customer. The system **116** provides services like SIP trunking and an IP Centrex service for business customers, which are integrated with an IMS core Network **114** and other application servers to provide a supplementary service like a CUG, a short code dialing and the conferencing etc.

[0051] In particular, the system **116** includes a (SIP) zone, a representational state transfer (REST) zone, and a diameter zone. The SIP zone enables the client of the customer, such as the customer A or B, to send and receive calls over the network **114** using SIP requests and responses. The web zone integrates a telephony data with the application server to enable telephony-based traffic access to software services run by the application server.

[0052] In one embodiment, the REST zone includes an Operations and Business Support Systems (OSS/BSS) **408**, a load balancer **411** for handling call load balancing, an Evolved Packet System (EPS) **410**, and an Element Management System (EMS)

404. The system **116** interacts with a Media Resource Function (MRF) **414**, a Caller Ring Back Tone (CRBT) **416**, a Diameter Routing Agent (DRA) **418** is connected to an Online Charging System (OCS) **420** via a diameter interface, and a Mobile Number Portability (MNP) **422** using the SIP. Through an IP Multimedia System (IMS) core **406**, a VoLTE service **402** is completed.

[0053] In particular, the OSS/BSS **408** is the combination of Business and Operations Support Systems. The OSS manages the network **114** and the BSS refers to a set of software programs that allows the BTAS **206** to manage and streamline all call services provided to the user. The load balancer **411** refers to efficiently receiving the call request transmitted by one of an ILD-SBC **604** (as shown in FIG.6) and an ILD-MGCF (as shown in FIG.5) depending on the inbound or the outbound origination of the call request via an interface.

[0054] The EPS **410** manages the transfer of data packets related to call requests between the UE **112** and the external packet data networks **114**, such as the internet. The EMS **404** refers to Element Management System which manages a network element such as the BTAS **206** in the network **114**. The MRF **414** is responsible for carrying out a variety of processing tasks on media streams associated with one or more services. These tasks may include coordination and distribution of voice traffic associated with a conference service, playing of announcements to the user, etc.

[0055] In one embodiment, an Enterprise Provisioning Server (EPS) **410** is a centralized entity which interacts with all the BTAS **206** and has the intelligence to route provisioning request towards the designated BTAS **206**. The EPS **410** is configured for facilitating the enterprise **212** to provision the ITFS number at the BTAS **206** with all additional parameters required to render ITFS. The parameters may include, but may not be limited to, routing algorithms, end point numbers behind ITFS number, announcement files, and the like. Particularly, the EPS **410** provides restful API for the user to receive data requests, such as create, update, and delete, and send the same to the BTAS **206** for data provisioning.

[0056] In particular, the DRA 418 provides a real-time routing capability to ensure that the service request initiated by the users are routed among the first server 102 and the second server 104. The CRBT 416 platform is an advanced telecommunications service that allows users of the UE 112 to personalize the ring-back tone heard by a caller. The OCS 420 is responsible for facilitating real-time interactions with users, ensuring that the users are charged accurately for the consumed one or more services. The MNP 422 is a service that allows a cellphone or smartphone user to change telecom carrier and keep the same phone number. The IMS 406 is a standardized architectural framework for delivering an IP multimedia communication service such as voice, video and text.

[0057] Overall, the present invention significantly improves the integration of the at least one of plurality of servers with the system 116 for various telephony services. By leveraging multiple protocols and intelligent traffic management, the invention enhances flexibility, load balancing, and service continuity. These advantages result in a more efficient and reliable telephony system, improves call completion rates, optimizes resource utilization, and enhances overall efficiency of call routing in the BTAS 206.

[0058] FIG. 5 illustrates a block diagram of a system 116 for managing the outbound call by the BTAS 206, according to one or more embodiments of the present invention.

[0059] In one embodiment, the ILD carrier 330 is configured to receive the call request initiated from the caller by dialing the designated number associated to the enterprise 212 by using the interface module in the UE 112 through a terminating network 508. In one example, the terminating network 508 is JIO network. In one embodiment, the user interface module may include a messaging module, a voicemail module, and the like. In one embodiment, jurisdiction of the caller includes at least one of, international and domestic. In one embodiment, the designated number dialed by the caller includes at least one of, an International Toll-Free Services (ITFS)

number and a Universal International Freephone Number (UIFN). In one embodiment, the call request includes at least one of, Session Initiation Protocol (SIP) INVITE requests. The relevant UE **112** is related to the caller.

[0060] In one embodiment, the call is interfaced with the ILD carrier **330**. The ILD carrier **330** is communicably coupled to the ILD-Media Gateway Control Function **504** (ILD-MGCF). The ILD carrier **330**, the ILD-MGCF **504**, and the enterprise **212** are communicably coupled to the BTAS **206**. The BTAS **206** is configured to receive the call request transmitted by the ILD-MGCF **504**. In an embodiment, the call request is routed to the ILD-MGCF **504** when the call request received is outbound. The Media Gateway Control Function (MGCF) is a component within the telecommunications network that controls the setup, coordination, and termination of media gateway resources in support of voice or multimedia sessions. The ILD-MGCF **504** is optimized for managing and controlling the international long-distance calls within the telecommunications network. It ensures efficient routing and handling of voice traffic that crosses international boundaries, typically between different network operators or service providers. The ILD-MGCF **504** implies the MGCF specifically designed or configured to handle and control media sessions related to international long-distance communications. The ILD-MGCF **504** is configured to route the call from the enterprise **212** to the user through the terminating network **508**.

[0061] The ILD-MGCF **504** is configured to interface directly with the BTAS **206**. Typically, the ILD-MGCF **504** cannot be interfaced directly with the BTAS **206**. The ITFS number is translated by the BTAS **206** from the ITFS number to a valid and routable E.164 number. From there, the call request is passed through the terminating network **508**. If the call is not terminated, it is connected with the UE **112**. As shown, the BTAS **206** is communicatively coupled to the enterprise **212** for the call routing. The tasks and features may include, but may not be limited to, activating/ deactivating ITFS, implementing different call routing algorithms, classifying information as blacklisted or whitelisted, and announcing files.

[0062] The ILD-MGCF **504** is provided to transition data between two different domains within the terminating network **508** via an ILD-Gateway (ILD-GW) **506**. An interface between the BTAS **206** and the ILD-MGCF **504** is a customized interface for routing the international call, thereby eliminating usage of IP Multimedia Core Network Subsystem (IMS) **406**. The interface between the BTAS **206** and the ILD-MGCF **504** is not a standard IP Multimedia Subsystem Service Control (ISC) interface, but a customized and enhanced version to support this unique interaction. In an embodiment, the ILD-GW **506** facilitates routing and management of international long-distance calls. The ILD-GW **506** is responsible for handling the transition of calls between domestic and international networks, managing the protocols involved, and ensuring the proper routing of calls to their destination across international borders. The ILD-MGCF **504** is communicably coupled to the terminating network **508** via the ILD-GW **506** to connect the call to the relevant UE **112**.

[0063] Further, the BTAS **206** is configured to dynamically customize at least one parameter of a header associated with the call request based on to which relevant UE the call is required to be routed. In one embodiment, the at least one parameter customized includes at least one of, routing rules, end point numbers behind International Toll-Free Services (ITFS) number and announcement files. In one embodiment, customizing at least one parameter of a header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request. The BTAS **206** is configured to customize the at least one parameter based on an input received from the admin of the enterprise **212** via the UE **112** in order to route the call to the relevant UE. Let us consider for example, the admin of the enterprise **212** needs to update the announcement files in the BTAS **206**. After updating, the updated announcement files are received by the relevant UE **112** of the user after the at least one parameter of the header associated with the call request through the terminating network **508**.

[0064] The BTAS **206** is configured to return the call request to the ILD-MGCF **504** including the customized headers via the interface. In one implementation, Session

Initiation Protocol (SIP) INVITE Request Handling is performed by the BTAS **206**. The SIP INVITE request contains a "Route" header and a "P-Served-User" header. The Route header is employed in the SIP messages to control the routing of the request or response. It contains a list of SIP URIs (Uniform Resource Identifiers) or addresses that represent the route or path that the SIP message takes to reach its destination.

[0065] The P-Served-User header includes a SIP header used in VoIP communication. The P-Served-User header carries information about the request of the user being sent or the call being established. The P-Served-User header is typically added by a SIP server to identify the user being served by the server. In SIP communications, the P-Served-User header helps in routing calls correctly, managing the services based on user profiles, and ensuring proper handling of calls within a VoIP network. It is especially important in scenarios where services or features are customized or tailored based on individual user preferences or service subscriptions. The SIP is a signaling protocol commonly employed for initiating, modifying, and terminating real-time sessions involving video, voice, messaging, and other communication services.

[0066] In one embodiment, the BTAS **206** utilizes a "via" header to route the international call to the relevant UE **112** through the ILD-MGCF **504** when the Route header and the P-Served User header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request. The standard headers are specific fields within a protocol's message format that carry standardized information according to the protocol's specifications. The standard headers are essential for communication between different network elements, ensuring interoperability and proper functioning of the communication system. In the SIP, the standard headers include but not limited to, From, To, Call-ID, Via, Route, Contact, Content-Type, Content-Length, and many others. These headers carry information such as caller identities, session identifiers, routing paths, content-related details, and the like.

[0067] In one embodiment, in an interaction request, the standard headers are used in a customized manner to loopback the call towards the ILD-MGCF 504. As the interface between the BTAS 206 and the ILD-MGCF 504 are not the standard interface, the standard headers are not standard either, and rather, are received in accordance with the interface. The SIP request may not include all standard headers that would have been received, in case, if the interface was standard. Based on the headers, the calls are routed to the UE 112.

[0068] Furthermore, the BTAS 206 is configured to connect the international call between the enterprise 212 and the relevant User Equipment (UE) 112 through one of the ILD-SBC 604 and the ILD-MGCF 504 based on the at least one customized parameter of the header associated with the call request. In an embodiment, customizing at least one parameter of the header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request.

[0069] In one embodiment, an Enterprise Provisioning Server (EPS) 410 is a centralized entity which interacts with all the BTAS 206 and has the intelligence to route provisioning request towards the BTAS 206. The EPS 410 is configured for facilitating the enterprise 212 to provision the ITFS number at the BTAS 206 with all additional parameters required to render ITFS. The parameters may include, but may not be limited to, routing algorithms, end point numbers behind ITFS number, announcement files, and the like. Particularly, the EPS 410 provides restful API for user to receive data requests, such as create, update, and delete, and send the same to the BTAS 206 for data provisioning.

[0070] In one embodiment, the BTAS 206 manages all call requests with ITFS dialing number as terminating calls, extracting the served user from the "request_uri" of the INVITE. This ensures that the call is correctly terminated at the intended recipient, enhancing the reliability and accuracy of call routing. Support for MACD Requests: the BTAS 206 is designed to support Modification, Addition, Creation, and

Deletion (MACD) requests received from Operations Support Systems/Business Support Systems (OSS/BSS) **408**. This provides a high degree of flexibility and control over the telephony system, allowing for dynamic adjustments to meet operational needs.

[0071] In an alternate embodiment, the BTAS **206** supports the configuration of international toll-free numbers in all international formats, including those prefixed with '00' and '+'. This ensures compatibility with all international toll-free dialing patterns, enhancing the system's global usability.

[0072] In one embodiment, the BTAS **206** provides several advanced call routing features. The call routing features include, but is not limited to, the time-based routing, the direct translation with priority routing, the round robin, and the load balancing.

[0073] With respect to time-based routing: This feature allows for dynamic routing of calls to multiple destinations based on the time of day, day of the week, and date of the year. For example, during business hours, calls could be routed to a company's main office, while after-hours calls could be directed to an answering service.

[0074] With respect to direct translation with priority routing: This feature translates the B-party number from a list of numbers in a top-down manner if the call attempt to the top number fails. For example, if a call to the first number on the list fails, the system will automatically attempt to connect to the next number on the list.

[0075] With respect to round robin: This feature distributes calls among a pool of numbers in a round-robin fashion, ensuring an even distribution of calls and preventing any single number from becoming overloaded.

[0076] With respect to load balancing: This feature allows calls to be routed to multiple locations based on their call handling capacity. This is particularly useful for distributed call centers, as it ensures that no single location becomes overwhelmed

with calls. For example, if one call center is nearing its capacity, this feature would start routing incoming calls to a different location with available capacity.

[0077] FIG. 6 illustrates a block diagram of a system 116 for managing the inbound call, according to one or more embodiments of the present invention; and

[0078] In one embodiment, the ILD carrier 330 is communicably coupled to the ILD-SBC 604. The ILD carrier 330, the ILD-SBC 604, and the enterprise 212 are communicably coupled to the BTAS 206. The BTAS 206 is configured to receive the call request transmitted by the ILD-SBC 604. The ILD-SBC 604, which is the Session Border Controller (SBC) is a network device that controls the signaling and media streams involved in setting up, and conducting communication sessions, such as voice calls over IP networks. It acts as a gateway between different networks, enforcing security policies, and providing functions like protocol translation, call admission control, and network address translation (NAT). The ILD-SBC 604 is specifically designed or optimized for managing international long-distance calls within the network 114. It may include features tailored for interconnection between different operators or service providers, as well as handling roaming scenarios where subscribers use services outside their home network.

[0079] In an embodiment, the call request is routed to the ILD-SBC 604 when the call request received is inbound. The ILD-SBC 604 is configured to interface directly with the BTAS 206. Typically, the ILD-SBC 604 cannot be interfaced directly with the BTAS 206. The ITFS number is translated by the BTAS 206 from the ITFS number to a valid and routable E.164 number. From there, the call request is passed through the terminating network 508. If the call is not terminated, it is connected with the UE 112. The BTAS 206 is communicatively coupled to the enterprise 212 for call routing. The tasks and features may include, but may not be limited to, activating/ deactivating ITFS, implementing different call routing algorithms, classifying information as blacklisted or whitelisted, and announcing files. The session border controller is

provided to transition data between two different domains within the terminating network **508**.

[0080] The ILD-SBC **604** implies the Session Border Controller specifically designed or configured to handle and optimize the secure and efficient flow of Voice over Internet Protocol (VoIP) sessions across international long-distance networks to manage the signaling and media streams involved in VoIP communications. It acts as a border element between different IP networks, ensuring the secure and efficient flow of voice and multimedia sessions. Let us consider for example, the enterprise **212** deploys a Session Border Controller with features tailored for international long-distance communication scenarios. The ILD-SBC **604** supports a wide range of signaling protocols to ensure interoperability with various networks worldwide. The ILD-SBC **604** is configured to connect the call from the user to the enterprise **212** through the terminating network **508** via the ILD-GW **506**.

[0081] The ILD-SBC **604** is provided to transition data between two different domains within the terminating network **508**. The interface between the BTAS **206** and the ILD-SBC **604** is the customized interface for routing the international call, thereby eliminating usage of IP Multimedia Core Network Subsystem (IMS) **406**. The interface between the BTAS **206** and the ILD-SBC **604** is not a standard IP Multimedia Subsystem Service Control (ISC) interface, but a customized and enhanced version to support this unique interaction.

[0082] In an embodiment, the ILD-Gateway (ILD-GW) **506** facilitates routing and management of international long-distance calls. The ILD-GW **506** is responsible for handling the transition of calls between domestic and international networks, managing the protocols involved, and ensuring the proper routing of calls to their destination across international borders. The UE **112** of the user initiates the request to connect the inbound call from the user to the ILD-SBC **604** within the terminating network **508** via the ILD-GW **506**.

[0083] Further, the BTAS 206 is configured to dynamically customize at least one parameter of a header associated with the call request based on to which relevant UE the call is required to be routed. In one embodiment, the at least one parameter customized includes at least one of, routing rules, end point numbers behind International Toll-Free Services (ITFS) number and announcement files. In one embodiment, customizing at least one parameter of a header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request. The BTAS 206 is configured to customize the at least one parameter based on an input received from the admin of the enterprise 212 via the UE 112 in order to route the call to the relevant UE. Let us consider for example, the admin of the enterprise 212 needs to update the announcement files in the BTAS 206. The updated announcement files are received by the relevant UE 112 after the at least one parameter of the header associated with the call request through the terminating network 508.

[0084] The BTAS 206 is configured to return the call request to the ILD-SBC 604 including the customized headers via the interface. In one implementation, Session Initiation Protocol (SIP) INVITE Request Handling is performed by the BTAS 206. The SIP INVITE request received at the BTAS 206 may not contain the "Route" header and the "P-Served-User" header typically present in the interface. The route header is employed in SIP messages to control the routing of the request or response. It contains a list of SIP URIs (Uniform Resource Identifiers) or addresses that represent the route or path that the SIP message should take to reach its destination.

[0085] The P-Served-User header includes a SIP header used in VoIP communication. The P-Served-User header carries information about the request of the user being sent or the call being established. The P-Served-User header is typically added by a SIP server to identify the user being served by the server. In SIP communications, the P-Served-User header helps in routing calls correctly, managing the services based on user profiles, and ensuring proper handling of calls within a VoIP network. It is especially important in scenarios where services or features are customized or tailored based on individual user preferences or service subscriptions.

The SIP is a signaling protocol commonly employed for initiating, modifying, and terminating real-time sessions involving video, voice, messaging, and other communication services.

[0086] In one embodiment, the BTAS **206** utilizes the "via" header to route the international call to the relevant UE **112** through the ILD-MGCF **504** when the route header and the P-Served User header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request.

[0087] Furthermore, the BTAS **206** is configured to connect the international call between the enterprise **212** and the relevant User Equipment (UE) **112** through the ILD-SBC **604** based on the at least one customized parameter of the header associated with the call request. In an embodiment, customizing at least one parameter of the header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request.

[0088] In one embodiment, an Enterprise Provisioning Server (EPS) **410** is the centralized entity which interacts with all the BTAS **206** and has the intelligence to route provisioning request towards the designated BTAS **206**. The EPS **410** is configured for facilitating the enterprise **212** to provision the ITFS number at the BTAS **206** with all additional parameters required to render ITFS. The parameters may include, but may not be limited to, routing algorithms, end point numbers behind ITFS number, announcement files, and the like. Particularly, the EPS **410** provides restful API for user to receive data requests, such as create, update, and delete, and send the same to the BTAS **206** for data provisioning.

[0089] In one embodiment, the BTAS **206** manages all call requests with ITFS dialing number as terminating calls, extracting the served user from the "request_uri" of the INVITE. This ensures that the call is correctly terminated at the intended recipient, enhancing the reliability and accuracy of call routing. Support for MACD Requests: the BTAS **206** is designed to support Modification, Addition, Creation, and

Deletion (MACD) requests received from Operations Support Systems/Business Support Systems (OSS/BSS) **408**. This provides a high degree of flexibility and control over the telephony system, allowing for dynamic adjustments to meet operational needs. In an alternate embodiment, the BTAS **206** supports the configuration of international toll-free numbers in all international formats, including those prefixed with '00' and '+'. This ensures compatibility with all international toll-free dialing patterns, enhancing the system's global usability.

[0090] Further, the call routing flow, call placement features, call handling by the BTAS **206**, and the request headers are described with reference to **FIG. 5**. For the brevity of the specification, the description has not been reiterated.

[0091] **FIG. 7** is a flow chart of a method **700** for routing an international call, according to one or more embodiments of the present invention.

[0092] At step **705**, the method **700** includes the step of receiving, by the one or more processors **204**, the call request initiated from the caller by dialing the designated number associated to the enterprise **212** by the interface module in the UE **112**. In one example, the terminating network **508** is JIO network. In one embodiment, the user interface module may include a messaging module, a voicemail module, and the like. In an embodiment, jurisdiction of the caller includes at least one of, international and domestic. In an embodiment, the designated number dialed by the caller includes at least one of, the International Toll-Free Services (ITFS) number and the Universal International Freephone Number (UIFN). In one embodiment, the call request includes at least one of, Session Initiation Protocol (SIP) INVITE requests. The relevant UE **112** is related to the caller.

[0093] At step **710**, the method **700** includes the step of routing, by the one or more processors **204**, the call request to the International Long Distance Session Border Controller (ILD-SBC) **604** when the call request received is inbound and routing the call to the International Long Distance Media Gateway Control Function (ILD-

MGCF) **504** when the call request received is outbound. The interface between the BTAS **206** and one of, the ILD-SBC **604** and the ILD-MGCF **504** is the customized interface for routing the international call, thereby eliminating usage of IP Multimedia Core Network Subsystem (IMS) **306**. The interface between the BTAS **206** and the ILD-MGCF **504**/ the ILD-SBC **604** is not the standard IP Multimedia Subsystem Service Control (ISC) interface, but a customized and enhanced version to support this unique interaction.

[0094] At step **715**, the method **700** includes the step of receiving, by the one or more processors **204**, the call request transmitted by one of, the ILD-SBC **604** and the ILD-MGCF **504** depending on inbound or outbound origination of the call request via an interface by the BTAS **206**. The BTAS **206** is configured to extract recipient details from the call request, thereby enabling termination of the call to the relevant recipient. In an embodiment, recipient details may include, at least one of the mobile number, the user ID, and the date and time of the call. The BTAS **206** supports configuration of ITFS numbers in all the international dialing patterns and formats such as at least one of, '00' and '+'.

[0095] At step **720**, the method **700** includes the step of customizing, by the one or more processors **204**, at least one parameter of a header associated with the call request. In an embodiment, the at least one parameter customized includes at least one of, routing rules, end point numbers behind International Toll-Free Services (ITFS) number and announcement files. In one embodiment, the at least one parameter is dynamically customized by the BTAS **206** based on to which relevant UE **112** the call is required to be routed. In an alternate embodiment, the at least one parameter is customized by the BTAS **206** based on the input received from the admin of the enterprise **212** via the UE **112** in order to route the call to the relevant UE **112**.

[0096] At step **725**, the method **700** includes the step of returning, by the one or more processors **205**, the call request to one of the ILD-SBC **604** and the ILD-MGCF **504** including the customized headers via the interface. In one implementation,

Session Initiation Protocol (SIP) INVITE Request Handling is performed by the BTAS **206**. The SIP INVITE request received at the BTAS **206** may not contain the "Route" header and the "P-Served-User" header typically present in the interface. In such scenarios, the BTAS **206** utilizes the "via" header to route the international call to the relevant UE **112** through one of the respective ILD-SBC **604** and the ILD-MGCF **504** when the route header and the p-served user header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request.

[0097] Further, the method includes, utilizing, by the BTAS **206**, a via header from the call request to route the international call to the relevant UE **112**, through one of the respective ILD-SBC **604** and the ILD-MGCF **504** when the route header and the P-Served User header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request.

[0098] At step **730**, the method **700** includes the step of connecting, by the one or more processors **205**, the international call between the enterprise **212** and the relevant User Equipment (UE) **112** through one of the ILD-SBC **604** and the ILD-MGCF **504** based on the at least one customized parameter of the header associated with the call request. In an embodiment, customizing at least one parameter of the header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request.

[0099] In one implementation, the BTAS **206** manages all call requests with ITFS dialing number as terminating calls, extracting the served user from the "request_uri" of the INVITE. This ensures that the call is correctly terminated at the intended recipient, enhancing the reliability and accuracy of call routing. Support for MACD Requests: the BTAS **206** is designed to support Modification, Addition, Creation, and Deletion (MACD) requests received from Operations Support Systems/Business Support Systems (OSS/BSS) **308**. This provides a high degree of flexibility and control over the telephony system, allowing for dynamic adjustments to meet operational needs.

[00100] The present invention further discloses a non-transitory computer-readable medium having stored thereon computer-readable instructions. The computer-readable instructions are executed by a processor **205**. The processor **205** is configured to receive a call request initiated from a caller by dialing a designated number associated to an enterprise **212**. The processor **205** is further configured to route the call request to an International Long Distance Session Border Controller (ILD-SBC) **604** when the call request received is inbound and routing the call to an International Long Distance Media Gateway Control Function (ILD-MGCF) **504** when the call request received is outbound. The processor **205** is further configured to customize at least one parameter of a header associated with the call request. The processor **205** is further configured to return the call request to one of the ILD-SBC **604** and the ILD-MGCF **504** including the customized headers via the interface. The processor **205** is further configured to connect the international call between the enterprise **212** and a relevant UE **112** through one of the ILD-SBC **604** and the ILD-MGCF **504** based on the at least one customized parameter of the header associated with the call request.

[00101] A person of ordinary skill in the art will readily ascertain that the illustrated embodiments and steps in description and drawings (FIG.1-6) are set out to explain the exemplary embodiments shown, and it should be anticipated that ongoing technological development will change the manner in which particular functions are performed. These examples are presented herein for purposes of illustration, and not limitation. Further, the boundaries of the functional building blocks have been arbitrarily defined herein for the convenience of the description. Alternative boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed. Alternatives (including equivalents, extensions, variations, deviations, etc., of those described herein) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein. Such alternatives fall within the scope and spirit of the disclosed embodiments.

[00102] The present disclosure incorporates technical advancement of allowing the enterprise to extend its reach to other countries and thereby provide ITFS service and ensuring ease of connectivity for the UE and the enterprise. The ITFS outbound service enables customers in one country to make toll-free calls that can be terminated in another country. Using this ITFS service callers from a country avail direct access mechanism to international destinations without having to activate ISD facility. The BTAS provides flexible and easy to use provisioning interface which allows the enterprise to update/create/delete one or more parameters of their ITFS, which gets reflected in real-time independent of the complexity of network Support for real time data reporting as requested by the admin of the enterprise.

[00103] The present invention offers multiple advantages over the prior art and the above listed are a few examples to emphasize on some of the advantageous features. The listed advantages are to be read in a non-limiting manner.

REFERENCE NUMERALS

- [00104] Communication system- 100;
- [00105] First server – 102;
- [00106] Second server – 104;
- [00107] User Equipment- 112;
- [00108] Network-114;
- [00109] System 116;
- [00110] Memory of first server- 202;
- [00111] Processor of first server - 204;
- [00112] BTAS- 206;
- [00113] Memory of second server - 208;
- [00114] Processor of second server - 210;
- [00115] Enterprise- 212;
- [00116] Data store – 214;
- [00117] Primary processors -310;
- [00118] Memory Unit of User Equipment – 320;
- [00119] ILD carrier -330;
- [00120] Volte service – 402;
- [00121] EMS-404;
- [00122] IMS- 406;
- [00123] OSS/BSS- 408;
- [00124] EPS- 410;
- [00125] Load Balancer – 411;

- [00126] MRF – 414;
- [00127] CRBT- 416;
- [00128] DRA- 418;
- [00129] OCS- 420;
- [00130] MNP-422;
- [00131] ILD-MGCF- 504;
- [00132] ILD-GW- 506;
- [00133] Terminating Network- 508;
- [00134] ILD-SBC- 604.

We Claim:

1. A method (700) for routing an international call, the method (700) comprises the steps of:
 - receiving, by one or more processors (204), a call request initiated from a caller by dialling a designated number associated to an enterprise (212);
 - routing, by the one or more processors (204), the call request to an International Long Distance Session Border Controller (ILD-SBC) (604) when the call request received is inbound and routing the call to an International Long Distance Media Gateway Control Function (ILD-MGCF) (504) when the call request received is outbound;
 - receiving, by the one or more processors (204), the call request transmitted by one of, the ILD-SBC (604) and the ILD-MGCF (504) depending on inbound or outbound origination of the call request via an interface;
 - customizing, by the one or more processors (204), at least one parameter of a header associated with the call request;
 - returning, by the one or more processors (204), the call request to one of the ILD-SBC (604) and the ILD-MGCF (504) including the customized headers via the interface; and
 - connecting, by the one or more processors (204), the international call between the enterprise (212) and a relevant User Equipment (UE) (112) through one of the ILD-SBC (604) and the ILD-MGCF (504) based on the at least one customized parameter of the header associated with the call request.
2. The method (700) as claimed in claim 1, wherein jurisdiction of the caller includes at least one of, international and domestic.
3. The method (700) as claimed in claim 1, wherein the number dialled by the caller includes at least one of, an International Toll-Free Services (ITFS) number and a Universal International Freephone Number (UIFN).

4. The method (700) as claimed in claim 1, wherein the call request includes at least one of, Session Initiation Protocol (SIP) INVITE request.
5. The method (700) as claimed in claim 1, wherein the at least one parameter customized includes at least one of, routing rules, end point numbers behind International Toll-Free Services (ITFS) number and announcement files.
6. The method (700) as claimed in claim 1, wherein the relevant UE (112) is related to the caller.
7. The method (700) as claimed in claim 1, wherein the method (700) further comprises the steps of:
 - utilizing, by the BTAS (206), a via header from the call request to route the international call to the relevant UE (112), through one of the respective ILD-SBC (604) and the ILD-MGCF (504) when a Route header and a P-Served User header are not present in the call request, thereby ensuring routing the call in the absence of standard headers in the call request.
8. The method (700) as claimed in claim 1, wherein customizing at least one parameter of a header associated with the call request includes one of, updating, editing, adding, and deleting information from the call request.
9. The method (700) as claimed in claim 1, wherein customizing, by the BTAS (206), at least one parameter of the header associated with the call request includes at least one of the steps of:
 - dynamically customizing, by the BTAS (206), the at least one parameter, based on to which relevant UE (112) the call is required to be routed; and

customizing, by the BTAS (206), the at least one parameter, based on an input received from an admin of the enterprise (212) via the UE (112) in order to route the call to the relevant UE (112).

10. The method (700) as claimed in claim 1, wherein the BTAS (206) supports configuration of ITFS numbers in all the international dialling patterns and formats such as at least one of, '00' and '+'.
11. The method (700) as claimed in claim 1, wherein the BTAS (206) is configured to extract recipient details from the call request, thereby enabling termination of the call to the relevant recipient.
12. A User Equipment (UE) (112), comprising:
 - one or more processors (210) communicatively coupled to an International Long Distance (ILD) carrier (330), the one or more processors (210) coupled with a memory (220), wherein said memory (220) stores instructions which when executed by the one or more processors (210) causes the UE (112) to:
 - transmit, a call request to an International Long Distance (ILD) carrier (330) in response to a caller dialling a designated number associated to an enterprise (212) via a user interface module,
 - wherein a Business Telephony Application Server (BTAS) (206) is further configured to perform the method as claimed in claim 1.
13. A system (116) for routing an international call, the system (116) comprising:
 - an International Long Distance Session Border Controller (ILD-SBC) (604);
 - an International Long Distance Media Gateway Control Function (ILD-MGCF) (504);
 - at least one enterprise (212);

an International Long Distance (ILD) carrier (330) communicably coupled to the ILD-SBC (604) and the ILD-MGCF (504), the ILD carrier (330) configured to:

receive, a call request initiated from a caller by dialling a designated number associated to the enterprise (212);

route, the call request to the ILD-SBC (604) when the call request received is inbound and routing the call to the ILD-MGCF (504) when the call request received is outbound;

a Business Telephony Application Server (BTAS) (206) communicably coupled to the ILD carrier (330), ILD-SBC (604), ILD-MGCF (504) and the enterprise (212), the BTAS (206) configured to:

receive, the call request transmitted by one of, the ILD-SBC (604) and the ILD-MGCF (504) depending on the inbound or the outbound origination of the call request via an interface;

customize, at least one parameter of a header associated with the call request;

return, the call request to one of the ILD-SBC (604) and the ILD-MGCF (504) including the customized headers via the interface; and

connect, the international call between the enterprise (212) and a relevant User Equipment (UE) (112) through one of the ILD-SBC (604) and the ILD-MGCF (504) based on the at least one customized parameter of the header associated with the call request.

14. The system (116) as claimed in claim 13, wherein the BTAS (206) is further configured to provide:

time-based routing;

direct translation with priority routing;

round robin routing; and

load balancing routing.

15. The system (116) as claimed in claim 13, wherein the interface between the BTAS (206) and one of, ILD-SBC (604) and ILD-MGCF (504) is a customized interface for routing the international call, thereby eliminating usage of IP Multimedia Core Network Subsystem (IMS) (406).
16. A non-transitory computer-readable medium having stored thereon computer-readable instructions that, when executed by a processor (205), causes the processor (205) to:
 - receive, a call request initiated from a caller by dialling a designated number associated to an enterprise (212);
 - route, the call request to an International Long Distance Session Border Controller (ILD-SBC) (604) when the call request received is inbound and routing the call to an International Long Distance Media Gateway Control Function (ILD-MGCF) (504) when the call request received is outbound;
 - receive, the call request transmitted by one of, the ILD-SBC (604) and the ILD-MGCF (504) depending on the inbound or the outbound origination of the call request via an interface;
 - customize, at least one parameter of a header associated with the call request;
 - return, the call request to one of the ILD-SBC (604) and the ILD-MGCF (504) including the customized headers via the interface; and
 - connect, the international call between the enterprise (212) and a relevant User Equipment (UE) (112) through one of the ILD-SBC (604) and the ILD-MGCF (504) based on the at least one customized parameter of the header associated with the call request.

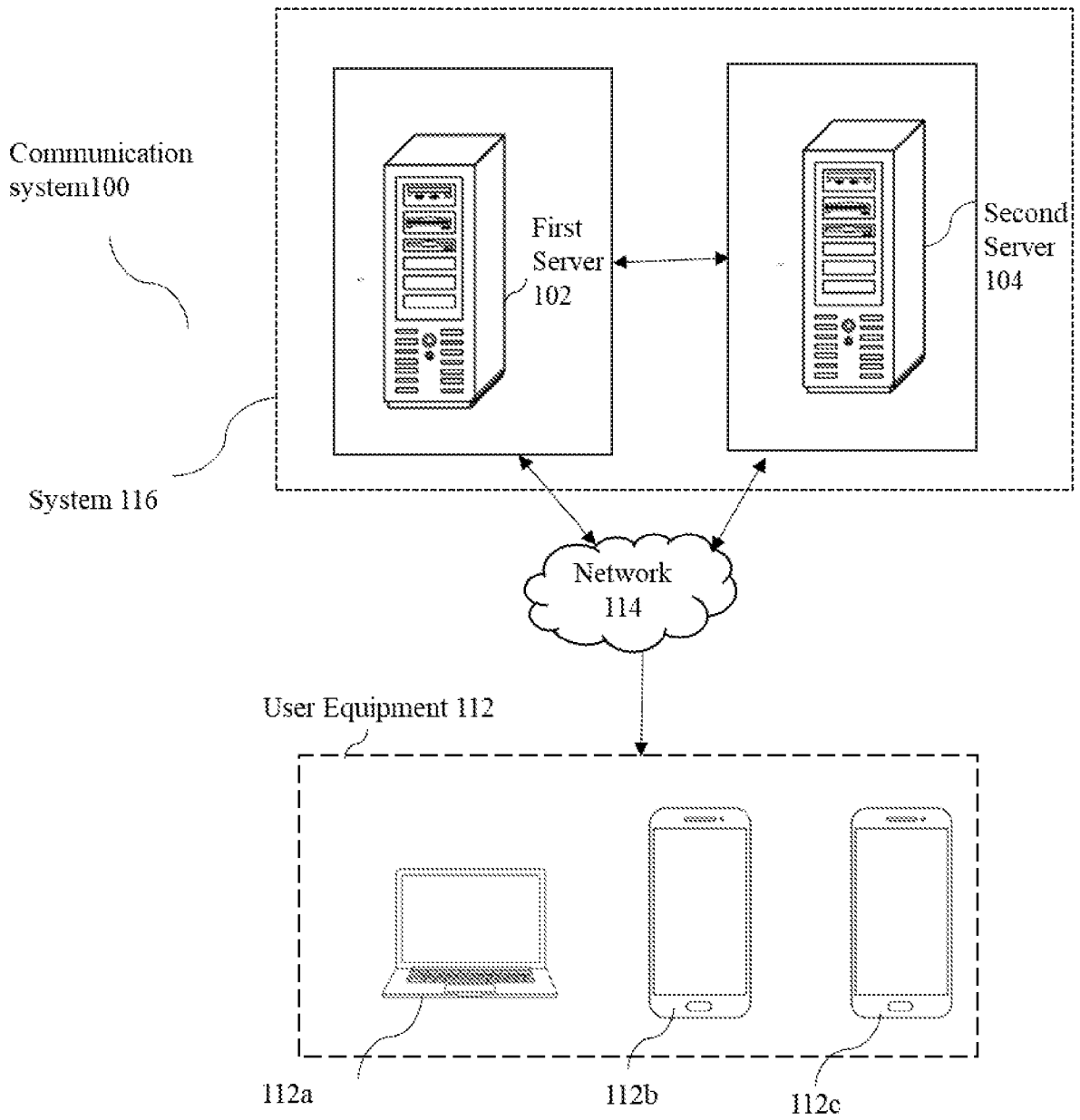
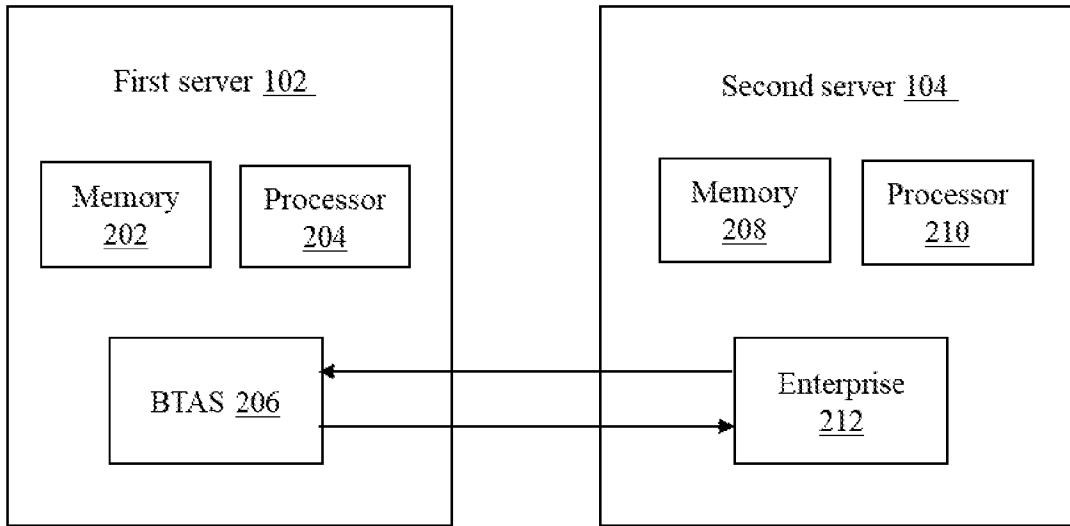


FIG. 1



116

FIG. 2

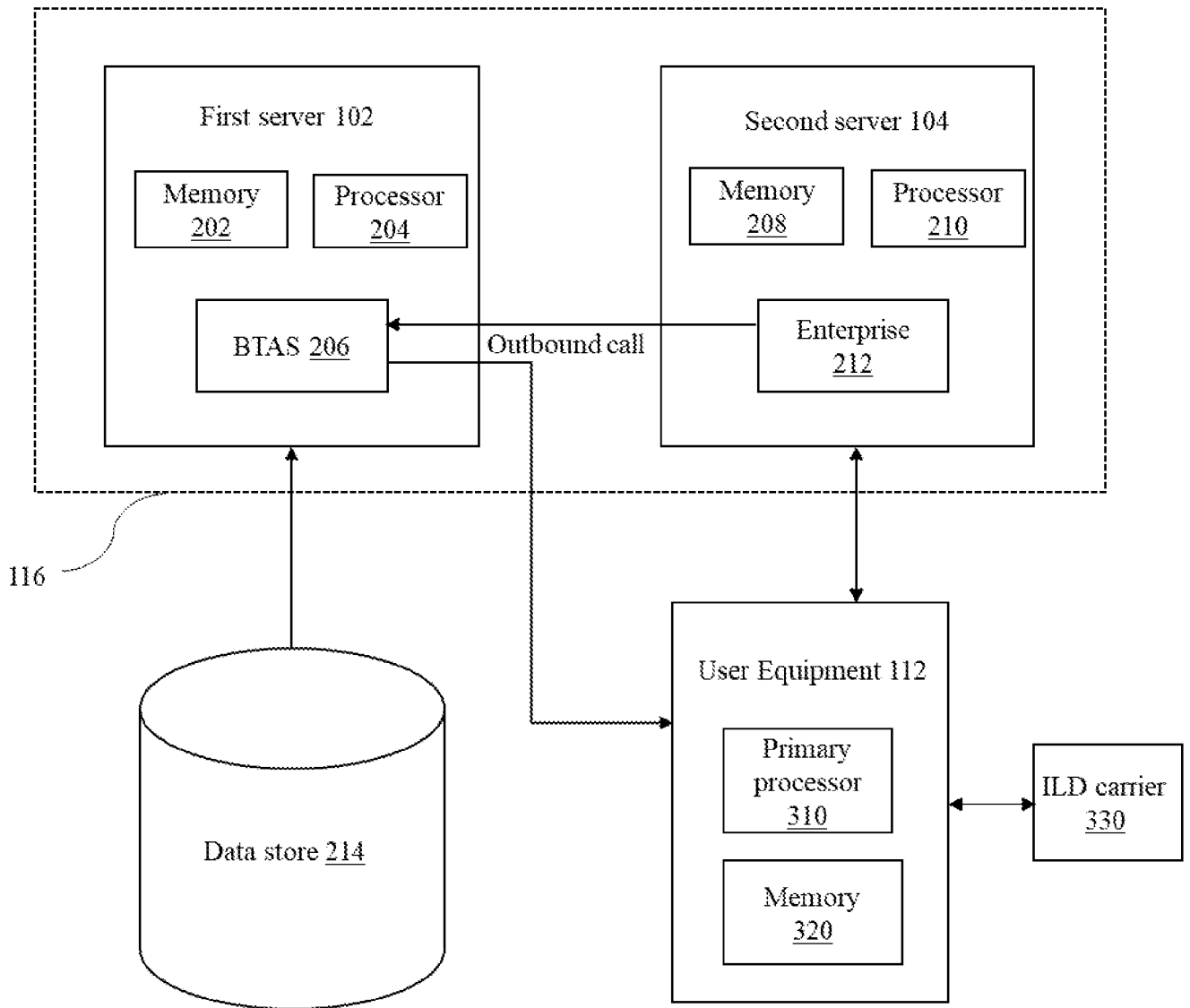


FIG. 3A

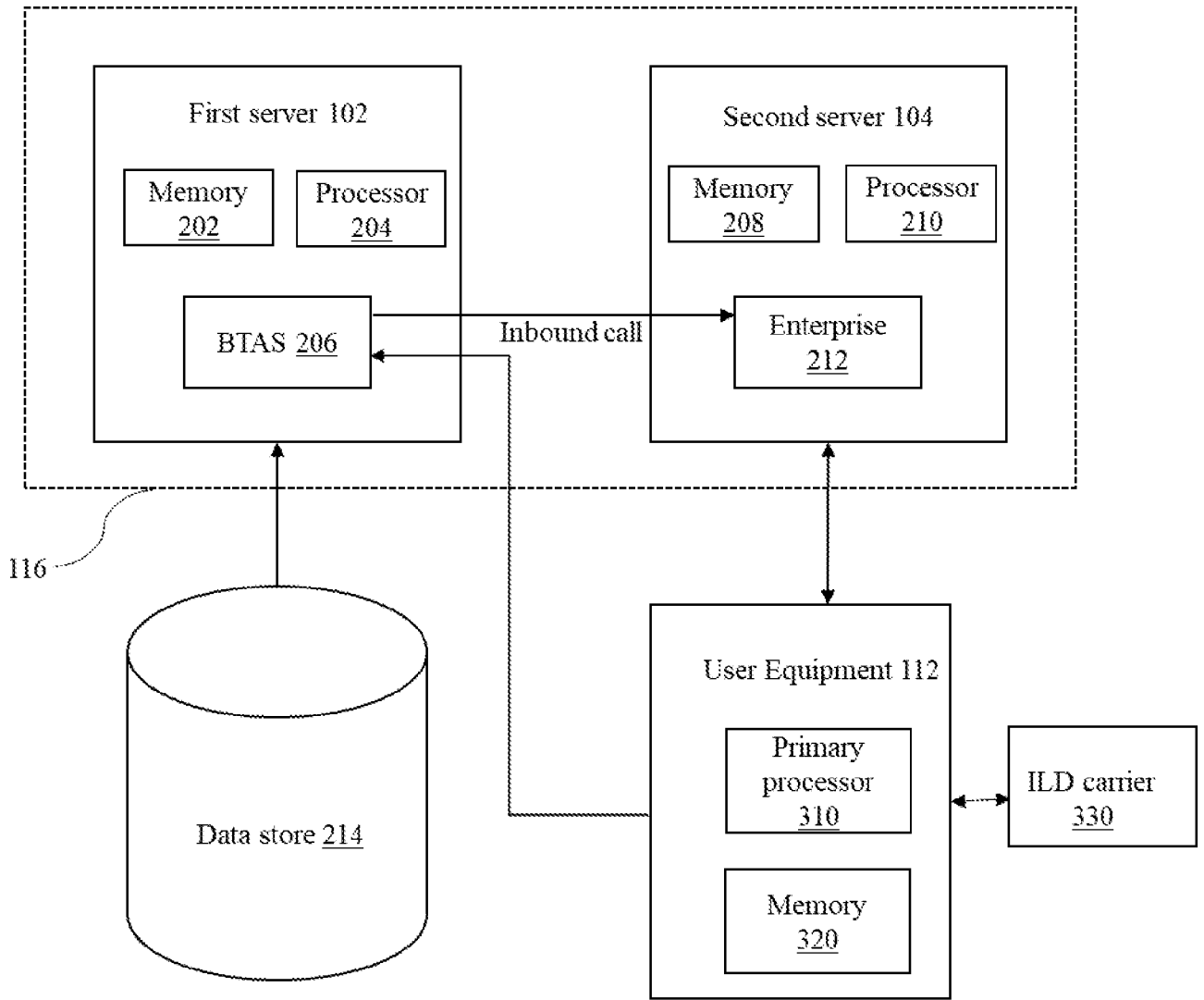


FIG. 3B

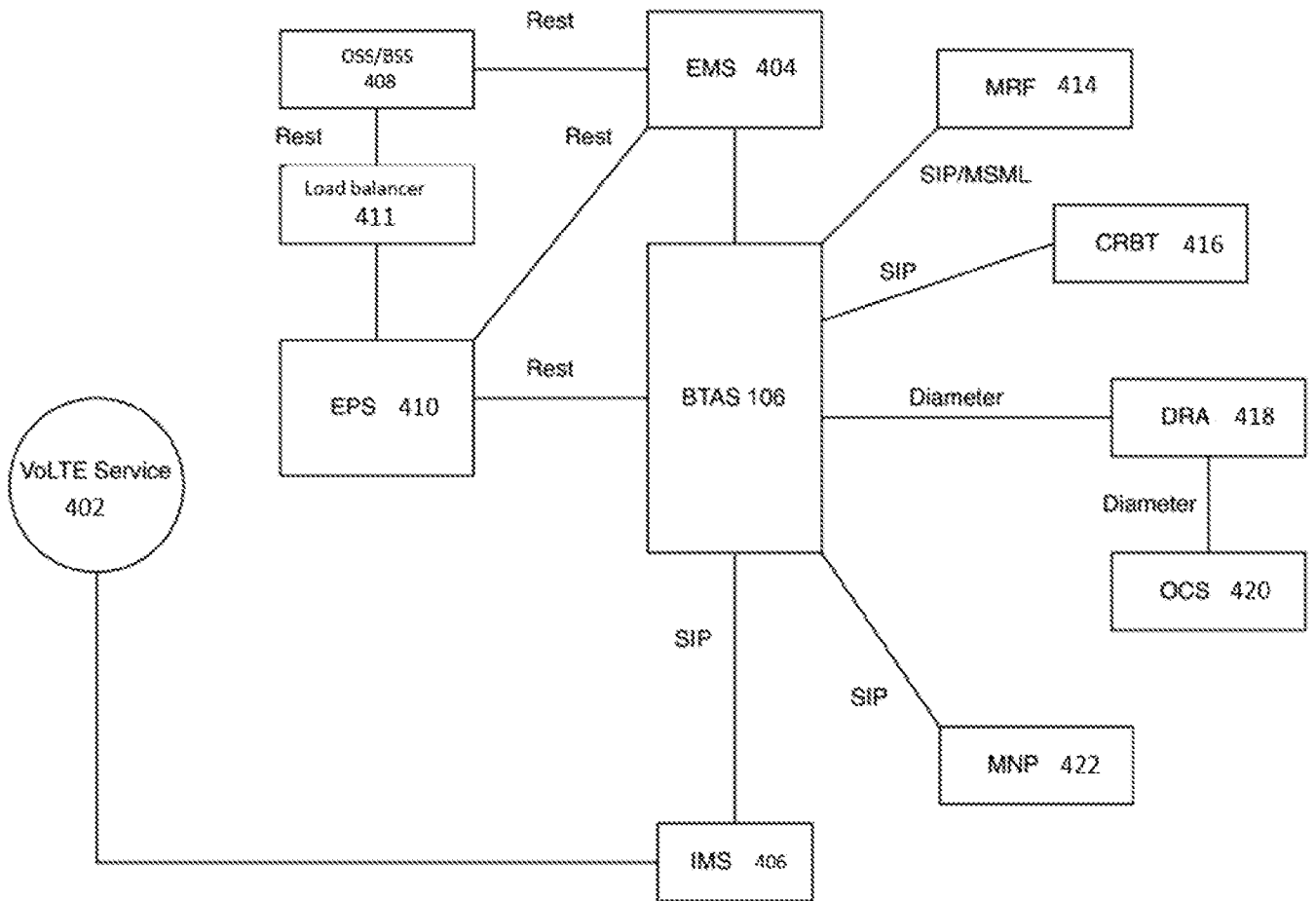


FIG. 4

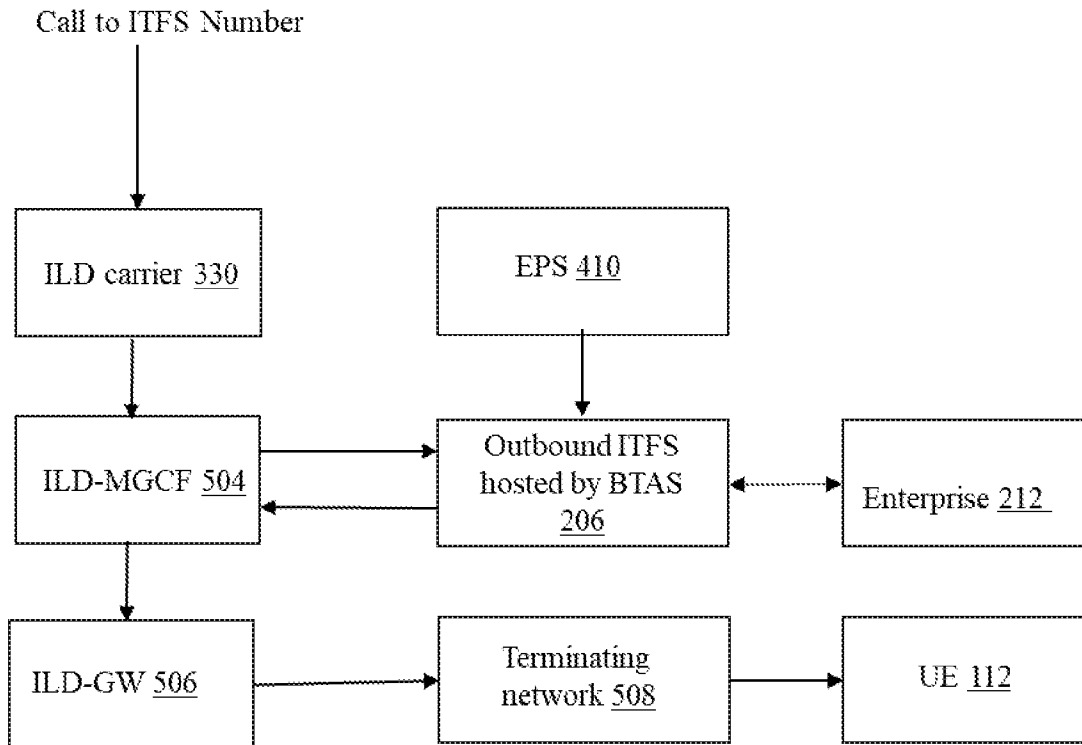


FIG. 5

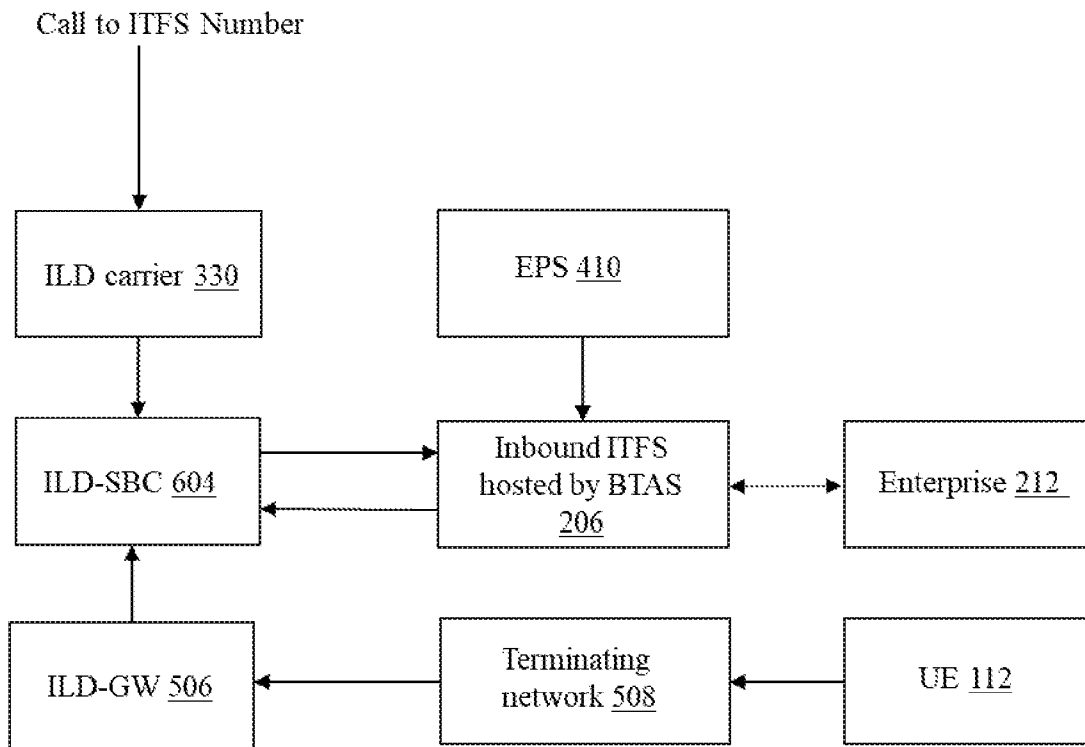


FIG. 6

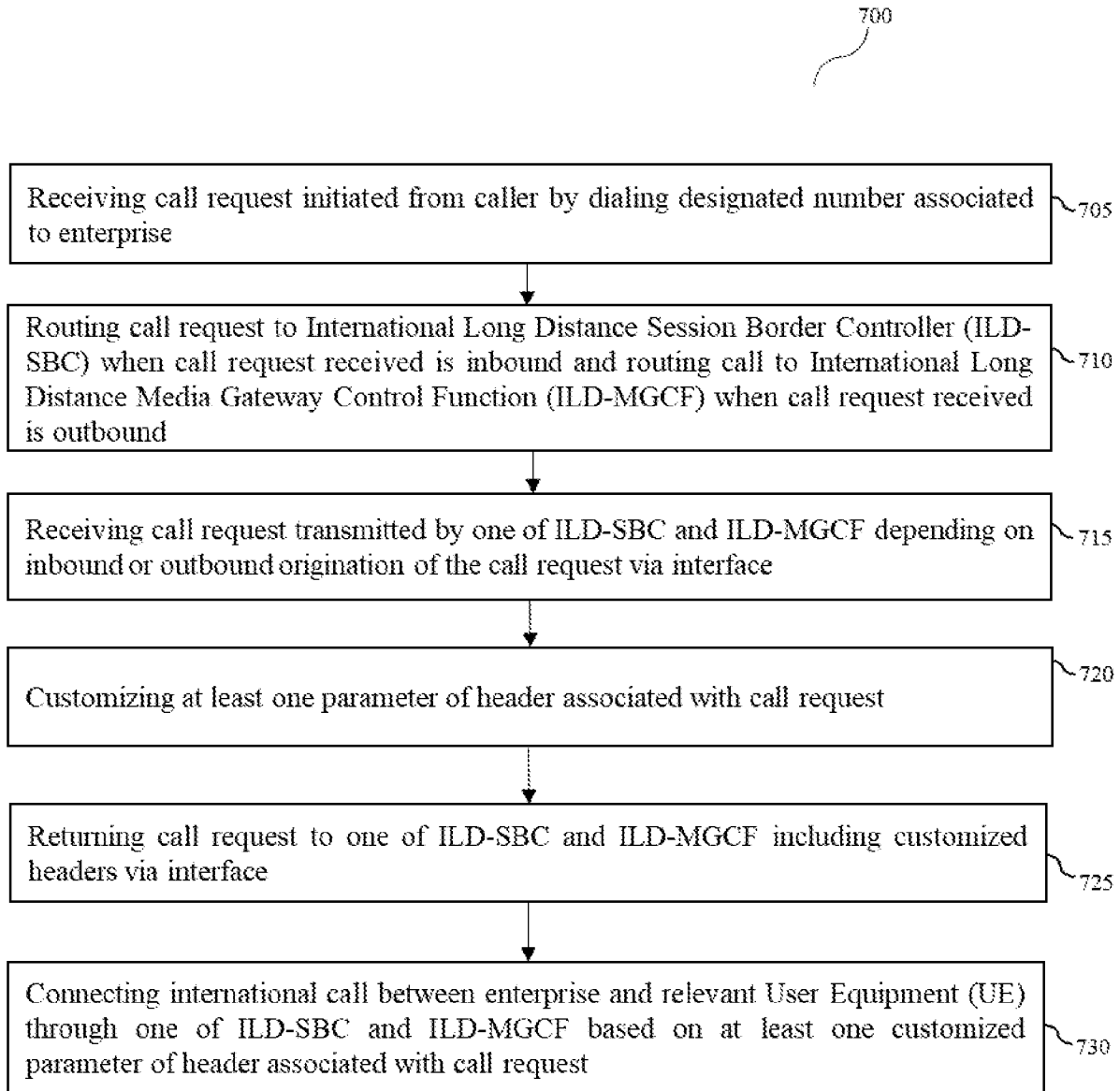


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2024/050949

A. CLASSIFICATION OF SUBJECT MATTER H04M3/42, H04W4/16, H04Q3/66, H04L65/1016 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, H04M, H04W, H04Q		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US20230006923A1 (T MOBILE INNOVATIONS LLC) 05 January 2023 (05-01-2023) para 0005, 0049, 0073, claims 21, 26, 27	1-16
Y	US20050058270A1 (AT&T INTELLECTUAL PROPERTY I LP) 17 March 2005 (17-03-2005) para 0062, 0069, 0134, claims 1, 6	1-16
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"D" document cited by the applicant in the international application</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 28-10-2024		Date of mailing of the international search report 28-10-2024
Name and mailing address of the ISA/ Indian Patent Office Plot No.32, Sector 14, Dwarka, New Delhi-110075 Facsimile No.		Authorized officer Jay Kamal Patel Telephone No. +91-1125300200

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2024/050949

Citation	Pub.Date	Family	Pub.Date
US 20230006923 A1	05-01-2023	US 11394642 B1	19-07-2022
US 20050058270 A1	17-03-2005	US 8401167 B2	19-03-2013