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(71) Applicant: **JIO PLATFORMS LIMITED** [IN/IN]; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN).

(72) Inventors: **BHATNAGAR, Aayush**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **BISHT, Sandeep**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **KANWER, Suman Singh**; OFFICE-101, SAFFRON, NR. CENTRE

POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **MISHRA, Ankur**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **KSHIRSAGAR, Pankaj**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **JHA, Shaileshkumar Gunvantray**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN). **GODARA, Rohtas**; OFFICE-101, SAFFRON, NR. CENTRE POINT, PANCHWATI 5 RASTA, AMBAWADI, GUJARAT, AHMEDABAD 380006 (IN).

(74) Agent: **JAPHET, Chinthan**; K Law (Krishnamurthy and Co.), 4th Floor, Prestige Takt, No 23, Kasturba Road Cross, Bangalore, Bangalore 560 001 (IN).

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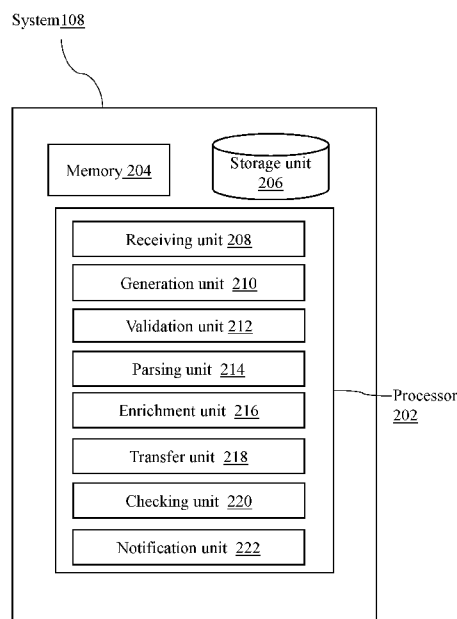


FIG. 2

(57) Abstract: The present invention relates to a system (108) and a method (500) for requesting the call back service. The method (500) includes steps of, receiving, a request pertaining to the callback service via a customer application hosted in at least one of the first User Equipment (UE) (102). Thereafter, validating the generated token and extracting an Application Programming Interface (API) key from the token. Furthermore, parsing, based on the API key, a customer plan and access control policy. Thereafter, enriching, the request in response to the customer application being registered for the call back service. Furthermore transferring, the request to at least one instance (110) based on which a call is connected between the at least one of the first UE (102) and a second UE (112) at a time slot indicated as per the request for the call back service.

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SYSTEM AND METHOD FOR REQUESTING A CALL BACK SERVICE

FIELD OF THE INVENTION

[0001] The present invention relates to the field of wireless communication systems, more particularly relates to a method and system for requesting a call back service and the call flow thereof

BACKGROUND OF THE INVENTION

[0002] In general, customer care is the process of building an emotional connection with your customers, whereas customer service is simply the advice or assistance your business provides them. Customer service is important because it inspires customer loyalty and makes employees' jobs easier. This, in turn, helps businesses grow. By providing great customer service, organizations can recover customer acquisition costs, retain talent, and foster brand loyalty. Customer service is important because it's the direct connection between your customers and your business. It retains customers and extracts more value from them. By providing satisfaction driven customer service, businesses can recoup customer acquisition costs.

[0003] It may happen so that a customer wants to connect with a customer care service but not instantly and at some predetermined time when the customer is free or when the customer has the information required for the call handy, etc. For example, the customer is at work and would want to schedule a customer care call after 6 pm or between 6pm and 7 pm, or 9am and 10 am, etc.

[0004] In current customer services, when a customer requests a call back over a chat application or via email or a bot chat, the customer is not committed an exact time slot or time at which the customer will receive the call from the customer care. Further the customer is not given an option to choose a time / time slot of his liking for the call. Once a request for the call is submitted, the customer in this case just waits to receive the call from an unknown number. Sometimes the wait is just too long and the customer might just miss the call.

[0005] Therefore, it is desired is desired that the customer care service calls are managed in a more efficient manner and create better customer experience. The customer should be able to connect to the customer care when the customer wants and should not be kept waiting for the call even to happen at any random time.

SUMMARY OF THE INVENTION

[0006] One or more embodiments of the present disclosure provide a method and system for requesting a call back service.

[0007] In one aspect of the present invention, a method for requesting a call back service is disclosed. The method includes the step of receiving, by one or more processors, a request pertaining to the call back service via a customer application hosted in an at least one of a first User Equipment (UE). The method further includes the step of generating, by the one or more processors, a token in response to validation of the customer application. The method further includes the step of validating, by the one or more processors, the token and an Application Programming Interface (API) key extracted from the token. The method further includes the step of parsing, by the one or more processors, based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider. The method further includes the step of enriching, by the one or more processors, the request pertaining to the call back service in response to the customer application being registered for the call back service. The method further includes the step of transferring, by the one or more processors, the request received from the at least one UE to at least one instance of a plurality of instances, wherein on receipt of the request at the at least one instance, a call is connected between the at least one of the first UE and a second UE at a time slot indicated as per the request for the call back service.

[0008] In one embodiment, each of the at least one of the first UE comprises at least one customer application configured to raise the request for the call back service.

[0009] In another embodiment, the request comprises the time slot at which the call back is requested by the at least one of the first UE.

[0010] In yet another embodiment, upon enrichment, the method comprises the step of, generating, by the one or more processors, a session identifier for the request received from each of the at least one of the first UE.

[0011] In yet another embodiment, upon receiving the request, the method comprises the step of checking, by the one or more processor, an Application Programming Interface (API) related information of the request, the API related information comprises at least a user identifier, a password, and a DLS handshake

[0012] In yet another embodiment, the method comprises the step of notifying, by the one or more processors, the at least one of the first UE on receipt of the request pertaining to the callback service at the at least one instance.

[0013] In another aspect of the present invention, a system for requesting a call back service is disclosed. The system includes a receiving unit configured to receive, a request pertaining to the call back service via a customer application hosted in at least one of the first User Equipment (UE). The system further includes a generation unit configured to generate, a token in response to validation of the customer application. The system further includes a validation unit configured to validate, the token and an Application Programming Interface (API) key extracted from the token. The system further includes a parsing unit configured to parse, based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider. The system further an enrichment unit configured to enrich, the request pertaining to the call back service in response to the customer application being registered for the call back service. The system further includes a transfer unit configured to transfer, the request received from the at least one UE to at least one instance of a plurality of instances, wherein on receipt of the request at the at least one instance, a call is connected between the at least one of the

first UE and the second UE at a time slot indicated as per the request for the call back service.

[0014] In another aspect of the present invention, a User Equipment (UE) is disclosed. One or more primary processors communicatively coupled to one or more processors. The one or more primary processors coupled with a memory. The memory stores instructions which when executed by the one or more primary processors causes the UE to transmit a request pertaining to the callback service to the one or more processors.

[0015] In yet another aspect of the present invention, a non-transitory computer-readable medium having stored thereon computer-readable instructions that, when executed by a processor. The processor is configured to receive, a request pertaining to the call back service via a customer application hosted in an at least one of the first User Equipment (UE). The processor is further configured to generate, a token in response to validation of the customer application. The processor is further configured to validate, the token and an Application Programming Interface (API) key extracted from the token. The processor is further configured to parse, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider based on the API key. The processor is further configured to enrich, the request pertaining to the call back service \ in response to the customer application being registered for the call back service. The processor is further configured to transfer, the request received from the at least one UE to at least one instance of a plurality of instances, wherein on receipt of the request at the at least one instance, a call is connected between the at least one of the first UE and the second UE at a time slot indicated as per the request for the call back service.

[0016] 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

[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. 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.

[0018] **FIG. 1** is an exemplary block diagram of an environment for requesting a call back service, according to one or more embodiments of the present invention;

[0019] **FIG. 2** is an exemplary block diagram of a system for requesting a call back service, according to one or more embodiments of the present invention;

[0020] **FIG. 3** is an exemplary flow diagram of the system of **FIG. 2**, according to one or more embodiments of the present invention;

[0021] **FIG. 4** is an exemplary signal flow diagram illustrating the flow for requesting a call back service, according to one or more embodiments of the present disclosure; and

[0022] FIG. 5 is a flow diagram of a method for requesting a call back service, according to one or more embodiments of the present invention.

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

DETAILED DESCRIPTION OF THE INVENTION

[0024] 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.

[0025] 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.

[0026] 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.

[0027] The present disclosure describes a call back service requested by a customer from a third party such as a customer care at a predefined time or a predefined time slot which is scheduled by the customer to get the call from the customer care. The invention provides a business with a calling feature that allow their customers to reach their customer care by submitting their contact number and the predefined time slot to get a call back at the predefined time or within the predefined time slot scheduled by the customer. The invention provides easy and secure integration of Application Programming Interfaces (APIs) and notification on call back for call status. The invention allows the customer care to monitor and get log of each request pertaining to the call back service.

[0028] In one embodiment, the call back service is implemented on any application for the customer related to the business which is used by the customer so that the customer reaches the customer care of the respective application related to the business. In particular, the call back service is a calling feature that can be implemented on any application for customer to reach the business to get connected on the chosen time slot. The call back service ensures secured onboarding of the customers, a safe journey of a request/API call pertaining to the call back service, call back Uniform Resource Locator (URL) mapping for the customer, customer stickiness support for each API call and round robin request distribution among a plurality of network element instances.

[0029] Referring to **FIG. 1**, **FIG. 1** illustrates an exemplary block diagram of an environment **100** for requesting a call back service, according to one or more embodiments of the present invention. The environment **100** includes, a first User Equipment (UE) **102**, a server **104**, a network **106**, a system **108**, a network element instance **110**, and a third party UE **112**. The UE **102** aids a customer to interact with the system **108** by transmitting a call request to the system **108**.

[0030] For the purpose of description and explanation, the description will be explained with respect to the first **102**, or to be more specific the first UE **102** includes

and will be explained with respect to a primary UE **102a**, a secondary UE **102b**, and a tertiary UE **102c**, and should nowhere be construed as limiting the scope of the present disclosure. Each of the at least one of the first UE **102** namely the primary UE **102a**, the secondary UE **102b**, and the tertiary UE **102c** is configured to connect to the server **104** via the network **106**. Each of the at least one of the first UE **102** pertains to the customer requesting the call back service.

[0031] In an embodiment, each of the primary UE **102a**, the secondary UE **102b**, and the tertiary UE **102c** 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, a general-purpose computer, desktop, personal digital assistant, tablet computer, mainframe computer, or any other computing device.

[0032] However, each of the at least one of the primary UE **102a**, the secondary UE **102b**, and the tertiary UE **102c** pertaining to the customer requesting the call back service is hereinafter referred to as the first UE **102** without deviating from the scope of the present disclosure.

[0033] The environment **100** includes a second UE **112**. The second UE **112** is related to a third party from which the first UE **102** is requesting the call back service. The third party is at least one of but not limited to, the customer care, a service provider, a network operator, and a support team. In an embodiment, the third party is provided with the second UE **112** which is configured to connect to the server **104** via the network **106**.

[0034] The network **106** 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 **106** 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.

[0035] The network **106** may also include, by way of example but not limitation, at least a portion of one or more networks having one or more nodes that transmit, receive, forward, generate, buffer, store, route, switch, process, or a combination thereof, etc. one or more messages, packets, signals, waves, voltage or current levels, some combination thereof, or so forth. The network **106** may also include, 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, a VOIP or some combination thereof.

[0036] The environment **100** includes the server **104** accessible via the network **106**. The server **104** may 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, a processor 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 side, a defense facility side, or any other facility that provides service.

[0037] The environment **100** includes a network element instance **110** pertaining to a plurality of network element instances which is communicably coupled to the server **104** via the network **106**. The network element instance **110** pertains to is at least one of, a Telephony Application Server (TAS) or a Business Telephony

Application Server (BTAS). The BTAS deals with voice related use cases. The at least one of, the network element instance **110** is an Application Programming Interface (API) provider which is responsible for managing call flows for making the call back within the predefined time slot as requested by the customer. In an embodiment, the environment **100** includes a plurality of network elements instances from which at least one network element instance **110** is selected based on the availability of the at least one the network element instance **110**.

[0038] The environment **100** further includes the system **108** communicably coupled to the server **104**, the network element instance **110**, the first UE **102**, and the second UE **112** via the network **106**. The system **108** is adapted to be embedded within the server **104** or is embedded as the individual entity.

[0039] Operational and construction features of the system **108** will be explained in detail with respect to the following figures.

[0040] FIG. 2 is an exemplary block diagram of the system **108** for requesting a call back service, according to one or more embodiments of the present invention.

[0041] As per the illustrated and preferred embodiment, the system **108** for requesting a callback service, the system **108** includes one or more processors **202**, a memory **204**, and a storage unit **206**. The one or more processors **202** includes a receiving unit **208**, a generation unit **210**, a validation unit **212**, a parsing unit **214**, an enrichment unit **216**, a transfer unit **218**, a checking unit **220** and a notification unit **222**. The one or more processors **202**, hereinafter referred to as the processor **202**, may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, single board computers, and/or any devices that manipulate signals based on operational instructions. However, it is to be noted that the system **108** may include multiple processors as per the requirement and without deviating from the scope of the

present disclosure. Among other capabilities, the processor **202** is configured to fetch and execute computer-readable instructions stored in the memory **204**.

[0042] As per the illustrated embodiment, the processor **202** is configured to fetch and execute computer-readable instructions stored in the memory **204** as the memory **204** is communicably connected to the processor **202**. The memory **204** is 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 for the call back service. The memory **204** may include any non-transitory storage device including, for example, volatile memory such as RAM, or non-volatile memory such as disk memory, EPROMs, FLASH memory, unalterable memory, and the like.

[0043] As per the illustrated embodiment, the storage unit **206** is configured to store records pertaining to the call back service. The storage unit **206** is one of, but not limited to, 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 storage unit **206** types are non-limiting and may not be mutually exclusive e.g., the database can be both commercial and cloud-based, or both relational and open-source, etc.

[0044] Initially, a request is transmitted by the customer via the first UE **102** to avail the call back service. The first UE **102** includes at least one customer application configured to raise the request for the call back service. In particular, the request comprises a time slot at which the call back is requested by the first UE **102** of the customer.

[0045] In an embodiment, the receiving unit **208** of the processor **202** is configured to receive the request pertaining to the call back service via at least one of, a customer

application hosted in the first UE **102** of the customer. In an alternate embodiment, the request is an Application Programming Interface (API) call initiated by the customer to receive the call back from the second UE **112**.

[0046] In an embodiment, the API call includes at least one of, but not limited to, a Representational State Transfer (REST) based API with a calling feature which allows the customer to connect with the third party at the time slot provided by the customer. The Representational State Transfer (REST) is a software architecture that imposes conditions on how an API should work. The REST was initially created as a guideline to manage communication on a complex network like the internet.

[0047] In an embodiment, upon receiving the request, the checking unit **220** of the processor **202** is configured to check the API related information of the request. In particular, the API related information includes, at least, but not limited to, a user identifier, a password, and a handshake such as (Direct Link Setup) DLS handshake. The handshaking is the process in order to establish rules for communication when a first UE **102** attempts to communicate with another device.

[0048] In an embodiment, the checking unit **220** of the processor **202** is configured to validate the customer application. In particular, for validation the checking unit **220** checks whether the request pertaining to the call back service is received from the valid customer application in order to provide the call back service. For example, let us assume, the system **108** includes a predefined list of customer applications for which the call back service is provided, so the checking unit **220** will check whether the request received from the customer application is among the predefined list of the customer applications included in the system **108**. Based on checking, if the request is received from the customer application is among the predefined list of the customer applications, then the customer application is inferred as the valid customer application.

[0049] In an embodiment, the generation unit **210** of the processor **202** is configured to generate a token in response to validation of the customer application. The token is generated by the generation unit **210** to authenticate the customer.

[0050] In an embodiment, the validation unit **212** of the processor **202** is configured to validate the token and an Application Programming Interface (API) key extracted from the validated token in order to validate the API key. In particular, the validation unit **212** validates the generated token by at least one of, but not limited to, parsing the token, verifying the token signature, and validating the claims that are stored in the token. In particular, the claims are the contents of the token. For example, the claims in the token becomes the API or a contract between an OpenID Connect (OIDC) provider and a client. In particular, the OIDC enables secure and a standardized authentication in one or more applications, particularly a web and the customer application. Further, the validation unit **212** extracts the API key from the validated token and validates the API key. The API key is a unique identifier that authenticates requests associated with the call back service. The API key is validated by at least one of, but not limited to, checking for a match between the API key extracted from validated token with a similar API key which is prestored in the storage unit **206**. In one embodiment, the validation unit **212** validates the token and the API key in order to authenticate the customer.

[0051] In an embodiment, the parsing unit **214** of the processor **202** is configured to parse a customer plan and access control policy based on the validated API key. In particular, the customer plan and the access control policy pertains to the subscription plan of the customer which is checked by the parsing unit **214** to determine if the customer application is registered for the call back service with a service provider.

[0052] In an embodiment, the enrichment unit **216** of the processor **202** is configured to enrich the request in response to the customer application being registered for the call back service. In some cases, the request is not included with data which is required to provide the call service to the customer based on which the

enrichment unit **216** modifies or add the required data in the request pertaining to the call back service. For example, the enrichment unit **214** adds historical data pertaining to the usage of the call back service by the user due to which the third party identify the user preferences and enhance the overall user experience.

[0053] In an embodiment, subsequent to the enrichment, the generation unit **210** of the processor **202** is configured to generate a session identifier for the request received from the first UE **102** utilizing the network element instance **110**. In particular, the generation unit **210** generates the session identifier in order to establish the call between the first UE **102** of the customer and the second UE **112** of the third party utilizing the network element instance **110** within the time slot provided in the received request. The session identifier is a unique identification number that is generated by the generation unit **218**. This unique identification number includes at least one of, but not limited to, a number code, a numerical code, or an alphanumeric code. The session identifier is also known as a session token which is assigned to the user for the duration of a session established between the user and the third party.

[0054] In an embodiment, in order to establish the call, the network element instance **110** is selected based on the availability of at least one of, the network element instance **110** among the plurality of network element instances. The selection of the at least one network element instance **110** is performed in a round robin manner.

[0055] In an embodiment, the transfer unit **218** of the processor **202** is configured to transfer, the request received from the first UE **102** to the least one network element instance **110** which is selected based on the availability. Further, upon reception of the request at the selected network element instance **110**, a call is connected between the first UE **102** of the customer and the second UE **112** of the third party at the time slot indicated as per the request for the callback service

[0056] In an embodiment, the notification unit **222** of the processor **202** is configured to notify to the customer via the first UE **102** related to at least one of, but

not limited to, receipt of the request pertaining to the callback service at the network element instance **110**. Further, subsequent to the establishing the call between the first UE **102** of the customer and the second UE **112** of the third party, the notification unit **222** notifies the customer about a successful call back service and a failed call back service.

[0057] In one embodiment, the processor **202** provides the data pertaining to the monitoring, Key Performance Indicators (KPIs) and logs of each request pertaining to the call back service to the third party by which the third party improves the customer experience of the call back service. In particular, the processor **202** monitors the call back service performance which allows the third party to be proactive so that if there is any issue in the call back service then the third party can resolve the issue before the issue impacts the user. The processor **202** monitors the call back service performance by tracking one or more performance metrics such as at least one of, but not limited to, a resource consumption in order to provide the call back service to the user and a response time pertaining to providing the call back service to the user. For example, the one or more performance metrics are success indicators that demonstrates how well the call back service is functioning.

[0058] The receiving unit **208**, the generation unit **210**, the validation unit **212**, the parsing unit **214**, the enrichment unit **216**, the transfer unit **218**, the checking unit **220** and the notification unit **222** in an exemplary embodiment, are implemented as a combination of hardware and programming (for example, programmable instructions) to implement one or more functionalities of the processor **202**. In the examples described herein, such combinations of hardware and programming may be implemented in several different ways. For example, the programming for the processor **202** may be processor-executable instructions stored on a non-transitory machine-readable storage medium and the hardware for the processor may comprise a processing resource (for example, one or more processors), to execute such instructions. In the present examples, the memory **204** may store instructions that, when executed by the processing resource, implement the processor **202**. In such

examples, the system **108** may comprise the memory **204** storing the instructions and the processing resource to execute the instructions, or the memory **204** may be separate but accessible to the system **108** and the processing resource. In other examples, the processor **202** may be implemented by electronic circuitry.

[0059] **FIG. 3** illustrates an exemplary block diagram of an architecture for the system **108**, according to one or more embodiments of the present invention. More specifically, **FIG. 3** illustrates the system **108** for requesting a call back service. It is to be noted that the embodiment with respect to **FIG. 3** will be explained with respect to the first UE **102** for the purpose of description and illustration and should nowhere be construed as limited to the scope of the present disclosure.

[0060] **FIG. 3** shows communication between the first UE **102**, the system **108**, the network element instance **110** and the second UE **112**. For the purpose of description of the exemplary embodiment as illustrated in **FIG. 3**, the first UE **102**, the network element instance **110** and the second UE **112** uses network protocol connection to communicate with the system **108**. In an embodiment, the network protocol connection is the establishment and management of communication between the first UE **102**, the system **108**, the network element instance **110**, and the second UE **112** over the network **106** (as shown in **FIG. 1**) using a specific protocol or set of protocols. The network protocol connection includes, but not limited to, Session Initiation Protocol (SIP), System Information Block (SIB) protocol, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), File Transfer Protocol (FTP), Hypertext Transfer Protocol (HTTP), Simple Network Management Protocol (SNMP), Internet Control Message Protocol (ICMP), Hypertext Transfer Protocol Secure (HTTPS) and Terminal Network (TELNET).

[0061] In an embodiment, the first UE **102** includes a primary processor **302**, a memory **304**, and a user interface **306**. In alternate embodiments, the first UE **102** may include more than one primary processor **302** as per the requirement of the network **106**. The primary processor **302**, may be implemented as one or more microprocessors,

microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, single board computers, and/or any devices that manipulate signals based on operational instructions.

[0062] In an embodiment, the primary processor **302** is configured to fetch and execute computer-readable instructions stored in the memory **304**. The memory **304** 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 manage request pertaining to the call back service. The memory **304** may include any non-transitory storage device including, for example, volatile memory such as RAM, or non-volatile memory such as disk memory, EPROMs, FLASH memory, unalterable memory, and the like.

[0063] In an embodiment, the user interface **306** of the first UE **102** includes a variety of interfaces, for example, a graphical user interface, a web user interface, a Command Line Interface (CLI), and the like. The user interface module **306** is configured to allow the customer to transmit request pertaining to the call back service. The first UE **102** transmits the request pertaining to the call back service to the processor **202** via the user interface **306**.

[0064] For example, initially when the customer care calls the customer and let us assume due to any reason the customer was not able to pick up the call. Thereafter, if the customer wants to connect with the customer care in order to get any service or to get information regarding a query, the customer uses the call back service in which the customer schedules the time slot via the user interface **306** so that the customer care would call back to the customer within the scheduled time slot. The customer transmits the request pertaining to the call back service via the first UE **102** to the processor **202** of the system **108**.

[0065] Further, the processor **202** receives the request which includes information of the customer such as a phone number, time slot for the call back and authenticates

the customer by verifying at least one of, but not limited to, tokens, API keys, user ID, and passwords which are included in the request pertaining to the call back service. Subsequent to the authentication of the customer, the processor **202** checks for the valid subscriptions plans and the access control policies related to the customer. Thereafter, if the processor **202** determines that the customer is valid with the active subscription plan and the access control policies, the processor **202** selects at least one network element **110** and creates the session identifier to establish the call back between the first UE **102** of the customer and the second UE **112** of the customer care within the time slot. The request is transferred to select at least one network element **110** which utilizes the session identifier to make the call back that establishes communication between the second UE **112** of the customer care and the first UE **102** of the customer within the time slot. Advantageously, the customer receives the call back from the customer care within the time slot as per requested by the customer.

[0066] **FIG. 4** is a signal flow diagram illustrating the flow for requesting the call back service, according to one or more embodiments of the present disclosure.

[0067] At step **402**, using the UE **102** the customer transmits the request pertaining to the call back service to the processor **202** of the system **108**. The request includes the time slot in which the customer is expecting to receive the call back from the third party.

[0068] At step **404**, processor **202** of the system **108** receives the request and generates the token. Further, the API key is extracted from the token and the extracted API key is validated. Thereafter, the customers plan and access control policies are checked. If the token, the API key, the customers plan and access control policy are valid, then the request is accepted, or else the request is rejected. Furthermore, the request enrichment is done, then the enriched request is transferred to the network element instance **110** based on the availability of the network element instance **110**.

[0069] At step **406**, once the enriched request is reached at the network element instance **110**, the network element instance **110** utilizes the session identifier generated

by the processor **202** to initiate the call back. The network element instance **110** transmits the call back request to the third party to establish the call between the third party and the customer.

[0070] At step **408**, the network element instance **110** receives response related to the call back from the third party. Further, the network element **110** establishes the call within the time slot provided by the customer between the second UE **112** of the third party and the first UE **102** of the customer by transmitting a response to the first UE **102** via the system **108**.

[0071] **FIG. 5** is a flow diagram of a method **500** requesting the call back service, according to one or more embodiments of the present invention. For the purpose of description, the method **500** is described with the embodiments as illustrated in **FIG. 2** and should nowhere be construed as limiting the scope of the present disclosure.

[0072] At step **502**, the method **500** includes the step of receiving a request pertaining to the call back service via a customer application hosted in an at least one of the first (UE) **102**. In one embodiment, receiving unit **208** of the processor **202** is configured to receive the request from the customer. In an alternate embodiment, the API call is received at the receiving unit **208** of the processor to provide the call back service to the customer. For example, when the customer had missed the call from the third party such as the customer care and customer want to connect with the customer care after some time then the customer transmits the call back request using the customer application hosted in the first UE **102** which includes the time slot at which the customer wants to receive call back from the third party at the first UE **102**. Subsequent to receiving the request by the receiving unit **208** of the processor **202**, the checking unit **220** of the processor **202** checks the API related information from which the request is received.

[0073] At step **504**, the method **500** includes the step of generating, a token in response to validation of the customer application. In one embodiment, the generation

unit **210** of the processor **202** is configured to generate the token in response to validation of the customer application. The processor **202** checks whether the request received from the customer application is valid application for providing the call back service. Further, the token is generated to authenticate the customer.

[0074] At step **506**, the method **500** includes the step of validating the token and an Application Programming Interface (API) key extracted from the token. In one embodiment, the validation unit **212** of the processor **202** is configured to validate the token included in the request received and extract the API key from the validated token in order to validate the API key. For example, the request includes the token which is validated by verifying at least one of, but not limited to, the token signature by the validation unit **212**. If the token included in the received request is an invalid token, then a negative response is transmitted to the first UE **102** of the customer.

[0075] Further, the validation unit **212** extracts the API key from the validated token and validates the API key by checking for the match between the API key extracted from validated token with the similar API key which is prestored in storage unit **206**. If the extracted API key is not matching with any of the prestored API key, then the extracted API key is inferred as the invalid API key based on which the then the negative response is transmitted to the first UE **102** of the customer. In an alternate embodiment, the validation unit **212** authenticates customer by validating the token, and the API keys.

[0076] At step **508**, the method **500** includes the step of parsing, based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider. In one embodiment, the parsing unit **214** of the processor **202** is configured to parse whether the customers plan and access policy is valid based on the validated API key. Further, the parsing unit **214** of the processor **202** checks whether the customer application is registered for the call back service with a service provider. In particular, in order to avail the call back service, the customer must have subscribed to the valid subscription plan and

access policy corresponding to the customer application which is registered with the service provider. The service provider is the third party which provides the call back service. If the customers plan and access policy are not valid, then a negative response is transmitted to the first UE **102** of the customer. For example, the customers plan and the access policy includes, at least one of, but not limited to, the subscription plan with a limited number of call back request or the API call are allowed to the customer in a day.

[0077] At step **510**, the method **500** includes the step of enriching the request pertaining to the call back service in response to the customer application being registered for the call back service. In one embodiment, the enrichment unit **216** of the processor **202** is configured to enrich the request pertaining to the call back service in response to the customer application being registered for the call back service. For example, in some scenarios the request are not included with data which is required to provide the call back service to the customer based on which the enrichment unit **216** modifies or add the required data in the request. Let us assume a header value in the request is not appropriate for the call back service, in such scenarios the enrichment unit **216** modifies the header value so that its compatible in order to provide call back service to the customer.

[0078] At step **512**, the method **500** includes the step of transferring, the request received from the at least one of the first UE **102** to at least one instance of a plurality of instances, wherein on receipt of the request at the at least one instance, a call is connected between the at least one of the first UE **102** and a second UE **112** at a time slot indicated as per the request for the callback service. In one embodiment, the transfer unit **218** of the processor **202** is configured to transfer, the request received from first UE **102** to the network element instance **110**.

[0079] In particular, a network element instance **110** is selected by the transfer unit **218** in order to transfer the request to the network element instance **110**. Based on the availability of at least one of, the network element instance **110** among the plurality of

network element instances the selection is done. For example, let us assume the network element instance **110** is BTAS with plurality of instances such as BTAS 1, BTAS 2,...,BTAS N. Whenever the request is received, the transfer unit **218** checks for the availability of each of the BTAS in the round robin manner. If transfer unit **218** determines that the BTAS 1 is not available, then the transfer unit **218** will check for the BTAS 2. Subsequent to determining that the BTAS 2 is available, then the transfer unit **218** transfer the request to BTAS 2 i.e. the network element instance **110**. Advantageously, due to the requests distribution is done in round robin manner among the plurality of BTAS instances, the load pertaining to the requests is equally divided among the plurality of BTAS instances.

[0080] Simultaneously while selecting the network element instance **110**, the generation unit **210** of the processor **202** generates the session identifier based on receiving the request at the transfer unit **218**. For example, once the request is received, the session identifier is generated by the generation unit **210** to connect an A party with a B party. Herein, the A party relates to the customer care and the B party relates to the customer or vice versa.

[0081] Further, the selected network element **110** initiates the call back by utilizing the generated session identifier between the first UE **102** of the customer and the second UE **112** of the third party within the time slot provided by the customer. For example, the customer receives the call back on the first UE **102** from the second UE **112** of the third party within the time slot such as 6pm to 8 pm as per scheduled by the customer in the request pertaining to the call back service.

[0082] In an embodiment, subsequent to initiating the call back between the first UE **102** of the customer and the second UE **112** of the third party, the notification unit **222** notifies regarding the successful call back service and a failed call back service to the first UE **102** of the customer.

[0083] In an embodiment, if the call back is not completed, for example, due to bad network, disconnection mid-way, customer leaving the call midway, etc., the customer will get a notification regarding the same on the first UE **102**.

[0084] The present invention further discloses a non-transitory computer-readable medium having stored thereon computer-readable instructions. The computer-readable instructions are executed by the processor **202**. The processor **202** is configured to receive, a request pertaining to the call back service via a customer application hosted in an at least one of the first User Equipment (UE) **102**. The processor **202** is further configured to generate, a token in response to validation of the customer application. The processor **202** is further configured to validate, the token and an Application Programming Interface (API) key extracted from the token. The processor **202** is further configured to parse, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider based on the API key. The processor **202** is further configured to enrich, the request pertaining to the call back service in response to the customer application being registered for the call back service. The processor **202** is further configured to transfer, the request received from the at least one UE **102** to at least one instance of a plurality of instances **110**, wherein on receipt of the request at the at least one instance **110**, a call is connected between the at least one of the first UE **102** and the second UE **112** at a time slot indicated as per the request for the call back service.

[0085] A person of ordinary skill in the art will readily ascertain that the illustrated embodiments and steps in description and drawings (FIG.1-5) 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.

[0086] The present disclosure provides technical advancement related to the call back service. The call back service is implemented on any application for customer to reach a business. The call back service allows the customers to reach the support team of the business by submitting contact number and the time slot to get a call back within the time slot. The call back service provides flexibility to the customer to schedule the time slot. The call back service provides easy and secure integration of APIs. The call back service provides notification to the notifications related to the call status of the call back. The call back service allows monitoring and logging of the each call request/ API call. The call back service allows flexibility of applying access control policy on every API call.

[0087] 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

- [0088] Environment - 100;
- [0089] First UE - 102;
- [0090] Server - 104;
- [0091] Network- 106;
- [0092] System -108;
- [0093] Network element instance – 110;
- [0094] Second UE – 112;
- [0095] Processor - 202;
- [0096] Memory - 204;
- [0097] Storage unit – 206;
- [0098] Receiving unit – 208;
- [0099] Generation unit – 210
- [00100] Validation unit – 212;
- [00101] Parsing unit– 214;
- [00102] Enrichment unit – 216;
- [00103] Transfer unit – 218;
- [00104] Checking unit – 220;
- [00105] Notification unit -222;
- [00106] Primary processor- 302;
- [00107] Memory- 304;
- [00108] User Interface – 306.

We Claim:

1. A method (500) of requesting a call back service, the method (500) comprising the steps of:
 - receiving, by one or more processors (202), a request pertaining to the call back service via a customer application hosted in an at least one of a first User Equipment (UE) (102);
 - generating, by the one or more processors (202), a token in response to validation of the customer application;
 - validating, by the one or more processors (202), the token and an Application Programming Interface (API) key extracted from the token;
 - parsing, by the one or more processors (202), based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider;
 - enriching, by the one or more processors (202), the request pertaining to the call back service in response to the customer application being registered for the call back service; and
 - transferring, by the one or more processors (202), the request received from the at least one UE (102) to at least one instance of a plurality of instances (110), wherein on receipt of the request at the at least one instance (110), a call is connected between the at least one of the first UE (102) and a second UE (112) at a time slot indicated as per the request for the call back service.
2. The method (500) as claimed in claim 1, wherein each of the at least one of the first UE (102) comprises at least one customer application configured to raise the request for the call back service.
3. The method (500) as claimed in claim 1, wherein the request comprises the time slot at which the call back is requested by the at least one of the first UE (102).

4. The method (500) as claimed in claim 1, wherein upon enrichment, the method (500) comprises the step of, generating, by the one or more processors (202), a session identifier for the request received from each of the first UE (102).
5. The method (500) as claimed in claim 1, wherein upon receiving the request, the method (500) comprises the step of checking, by the one or more processor (202), an Application Programming Interface (API) related information of the request, the API related information comprises at least a user identifier, a password, and a DLS handshake.
6. The method (500) as claimed in claim 1, wherein the method (500) comprises the step of notifying, by the one or more processors (202), the at least one of the first UE (102) on receipt of the request pertaining to the callback service at the at least one instance (110).
7. A system (108) for requesting a call back service, the system (108) comprising:
 - a receiving unit (208) configured to receive, a request pertaining to the call back service via a customer application hosted in at least one of a first User Equipment (UE) (102);
 - a generation unit (210) configured to generate, a token in response to validation of the customer application;
 - a validation unit (212) configured to validate, the token and an Application Programming Interface (API) key extracted from the token;
 - a parsing unit (214) configured to parse, based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider;
 - an enrichment unit (216) configured to enrich, the request pertaining to the call back service in response to the customer application being registered for the call back service; and

a transfer unit (218) configured to transfer, the request received from the at least one UE (102) to at least one instance of a plurality of instances (110), wherein on receipt of the request at the at least one instance (110), a call is connected between the at least one of the first UE (102) and a second UE (112) at a time slot indicated as per the request for the call back service.

8. The system (108) as claimed in claim 7, wherein each of the at least one of the first UE (102) comprises at least one customer application configured to raise the request for the call back service.
9. The system (108) as claimed in claim 7, wherein the request comprises the time slot at which the call back is requested by the at least one of the first UE (102).
10. The system (108) as claimed in claim 7, wherein on enrichment, the generation unit (210) is configured to generate, a session identifier for the request received from each of the first UE (102).
11. The system (108) as claimed in claim 7, wherein the system (108) comprises a checking unit (220) configured to check, an Application Programming Interface (API) related information of the request, the API related information comprises at least a user identifier, a password, and a DLS handshake.
12. The system as claimed in claim 7, wherein the system (108) comprises a notification unit (222) configured to notify, the at least one of the first UE (102) on receipt of the request pertaining to the callback service at the at least one instance (110).
13. A non-transitory computer-readable medium having stored thereon computer-readable instructions that, when executed by a processor (202), cause the processor (202) to:

receive, a request pertaining to the call back service via a customer application hosted in an at least one of a first User Equipment (UE) (102);

generate, a token in response to validation of the customer application;

validate, the token and an Application Programming Interface (API) key extracted from the token;

parse, based on the API key, a customer plan and access control policy to determine if the customer application is registered for the call back service with a service provider;

enrich, the request pertaining to the call back service in response to the customer application being registered for the call back service; and

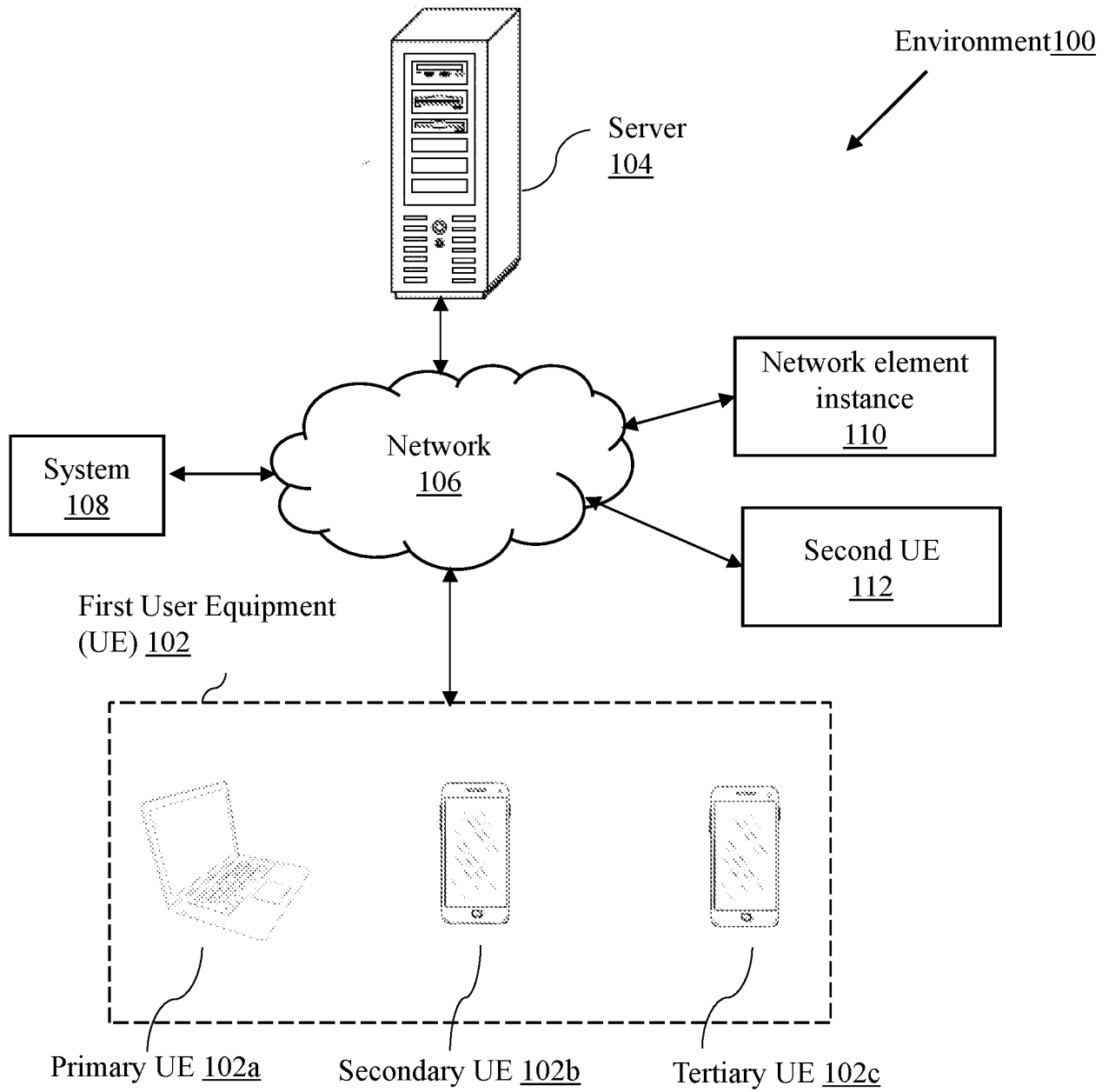
transfer, the request received from the at least one UE (102) to at least one instance of a plurality of instances (110), wherein on receipt of the request at the at least one instance (110), a call is connected between the at least one of the first UE (102) and a second UE (112) at a time slot indicated as per the request for the call back service.

14. A first User Equipment (UE) (102), comprising:

one or more primary processors (302) communicatively coupled to one or more processors (202), the one or more primary processors (302) coupled with a memory (304), wherein said memory (304) stores instructions which when executed by the one or more primary processors (302) causes the first UE (102) to:

transmit, a request pertaining to the call back service to the one or more processors (202);

wherein the one or more processors (202) is configured to perform the steps as claimed in claim 1.

**FIG. 1**

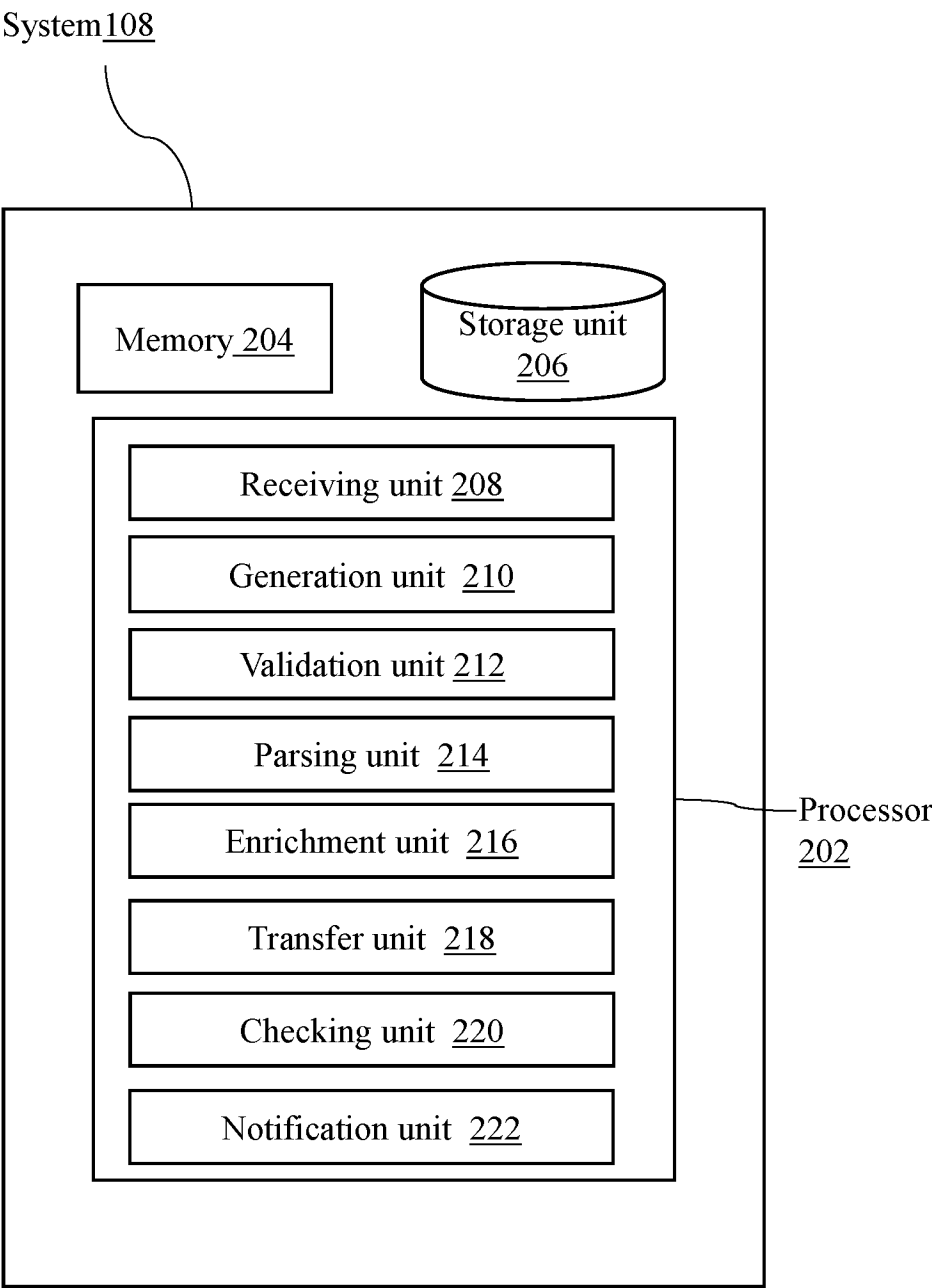


FIG. 2

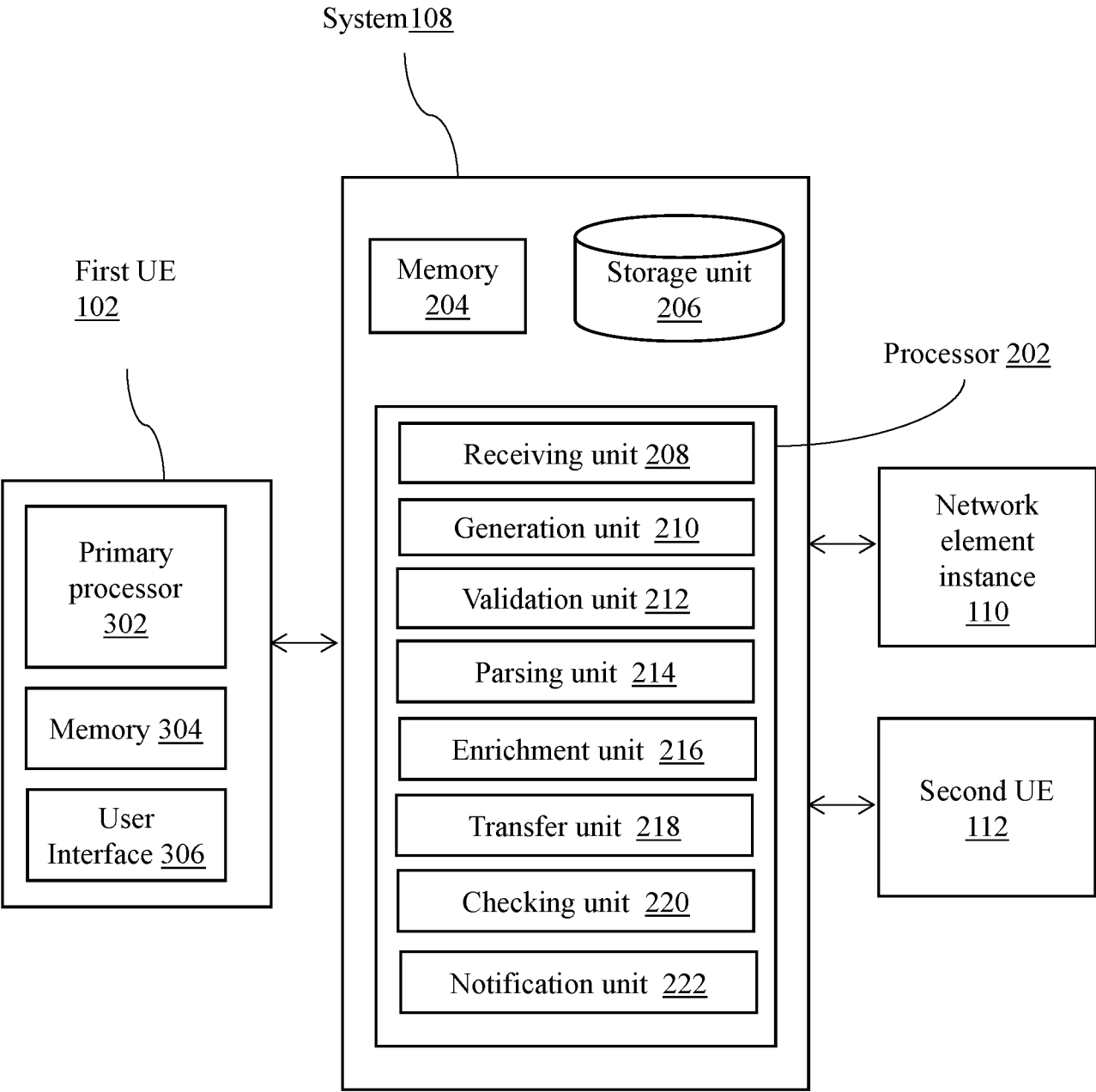


FIG. 3

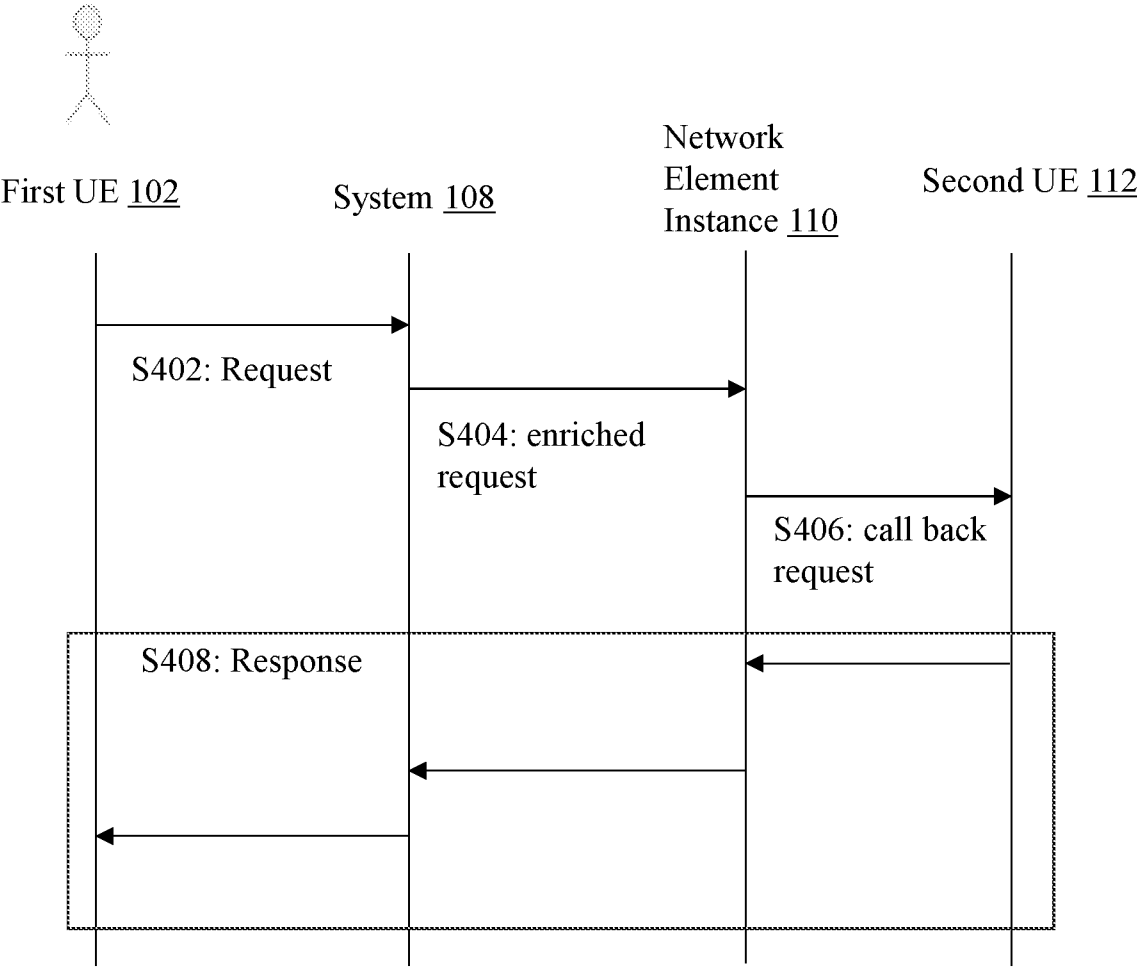


FIG. 4

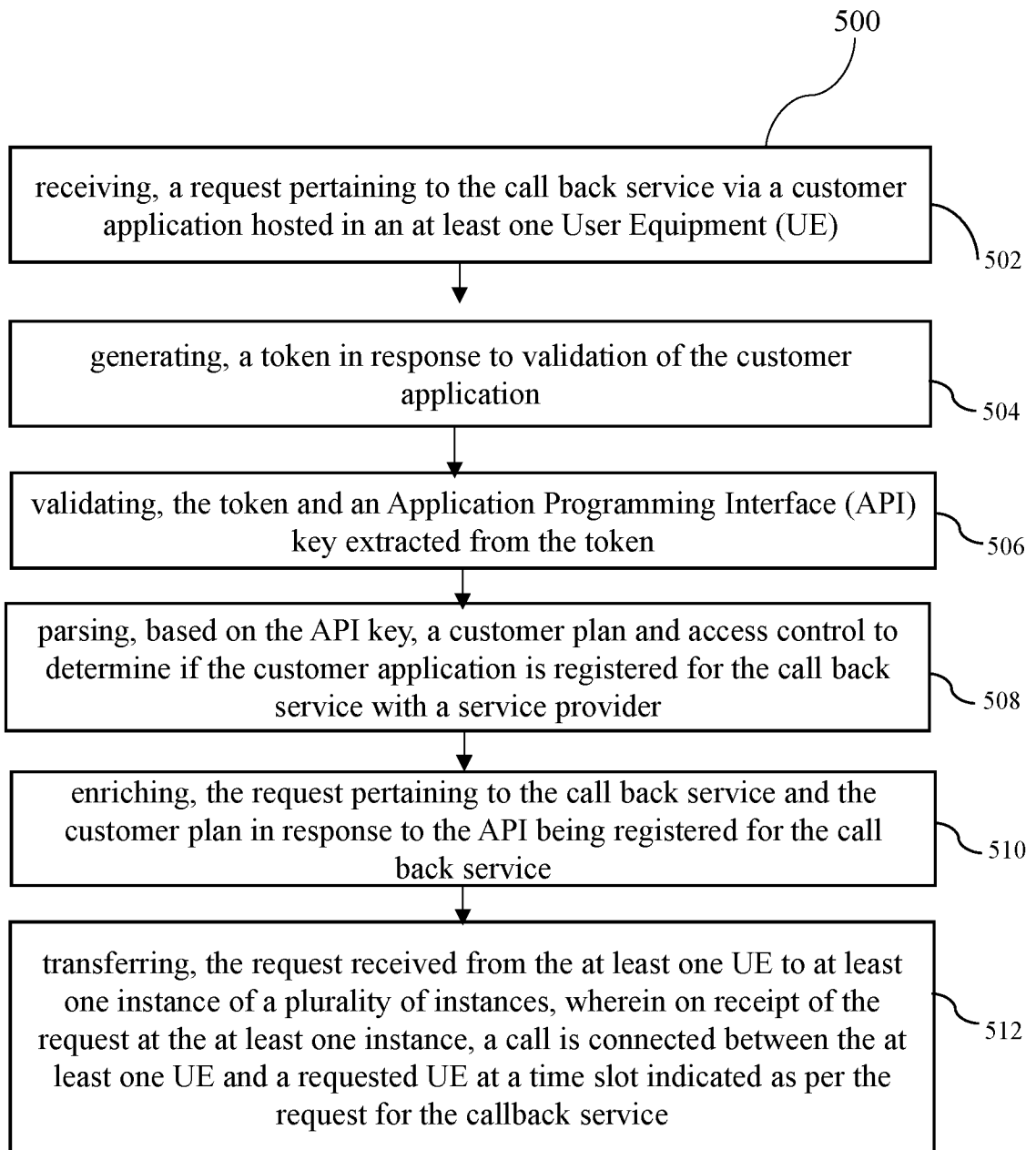


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2024/051201

A. CLASSIFICATION OF SUBJECT MATTER

H04L9/32, H04W12/06, H04L9/40 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, H04W

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	US20170230825A1 (VERIZON PATENT AND LICENSING INC) (10 AUGUST 2017) (2017-08-10) Abstract; Paragraphs-[0012], [0013], [0027], [0038], [0045]; Figures: 1-4; Claims: 1-20.	1-14
Y	US9516126B1 (WELLS FARGO BANK NA) (06 DECEMBER 2016) (2016-12-06) Abstract, Column-4; Figures: 1-6; Claims: 1-12.	1-14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"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

19-11-2024

Date of mailing of the international search report

19-11-2024

Name and mailing address of the ISA/

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Plot No.32, Sector 14, Dwarka, New Delhi-110075
Facsimile No.

Authorized officer

Priy Ranjan Yadav

Telephone No. +91-1125300200

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2024/051201

Citation	Pub.Date	Family	Pub.Date
US 20170230825 A1	10-08-2017	US 10681548 B2	09-06-2020
		US 10341862 B2	02-07-2019
US 9516126 B1	06-12-2016	US 9288324 B2	15-03-2016
		US 9854099 B1	26-12-2017