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(54) **SYSTEM AND METHODS FOR FACILITATING OBJECT ASSIGNMENTS**

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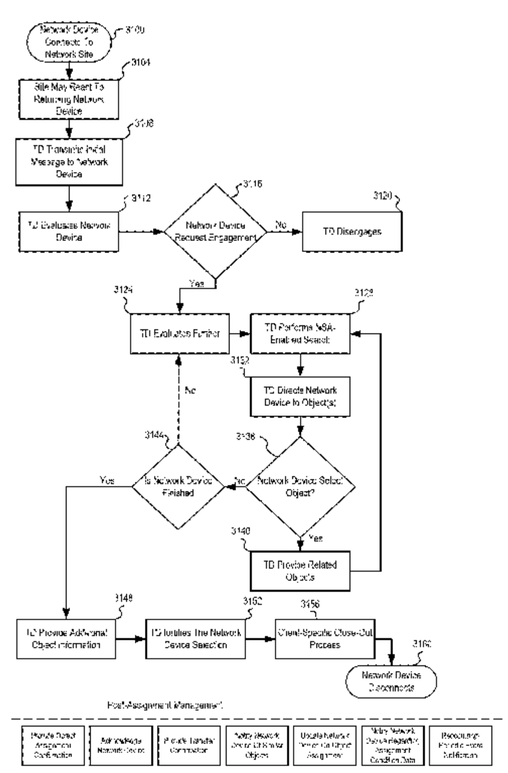
(57) **ABSTRACT**

The present invention determines which network devices are likely to have a positive result in engagements with terminal devices. A server can obtain data about network devices with respect to the communication session with a network site. Then the server can use rules to define a set of network devices that are eligible to interact or communicate with a terminal device. The server can connect to the network devices as randomly as possible. Terminal devices can initiate engagements with network devices. The server can detect characteristics in the interaction of engagements that have positive results. The server generates an evaluation protocol based on the characteristics, to assign new network devices a parameter representing how close the new network device conforms to the evaluation protocol. The parameter is used by the system in real-time to inform terminal devices as to which network devices to connect to and in what order.

18 Claims, 34 Drawing Sheets



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which is a continuation of application No. 09/922,753, filed on Aug. 6, 2001, now Pat. No. 8,868,448, and a continuation-in-part of application No. 10/980,613, filed on Nov. 3, 2004, now abandoned, which is a continuation of application No. 09/922,753, filed on Aug. 6, 2001, now Pat. No. 8,868,448.

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* cited by examiner

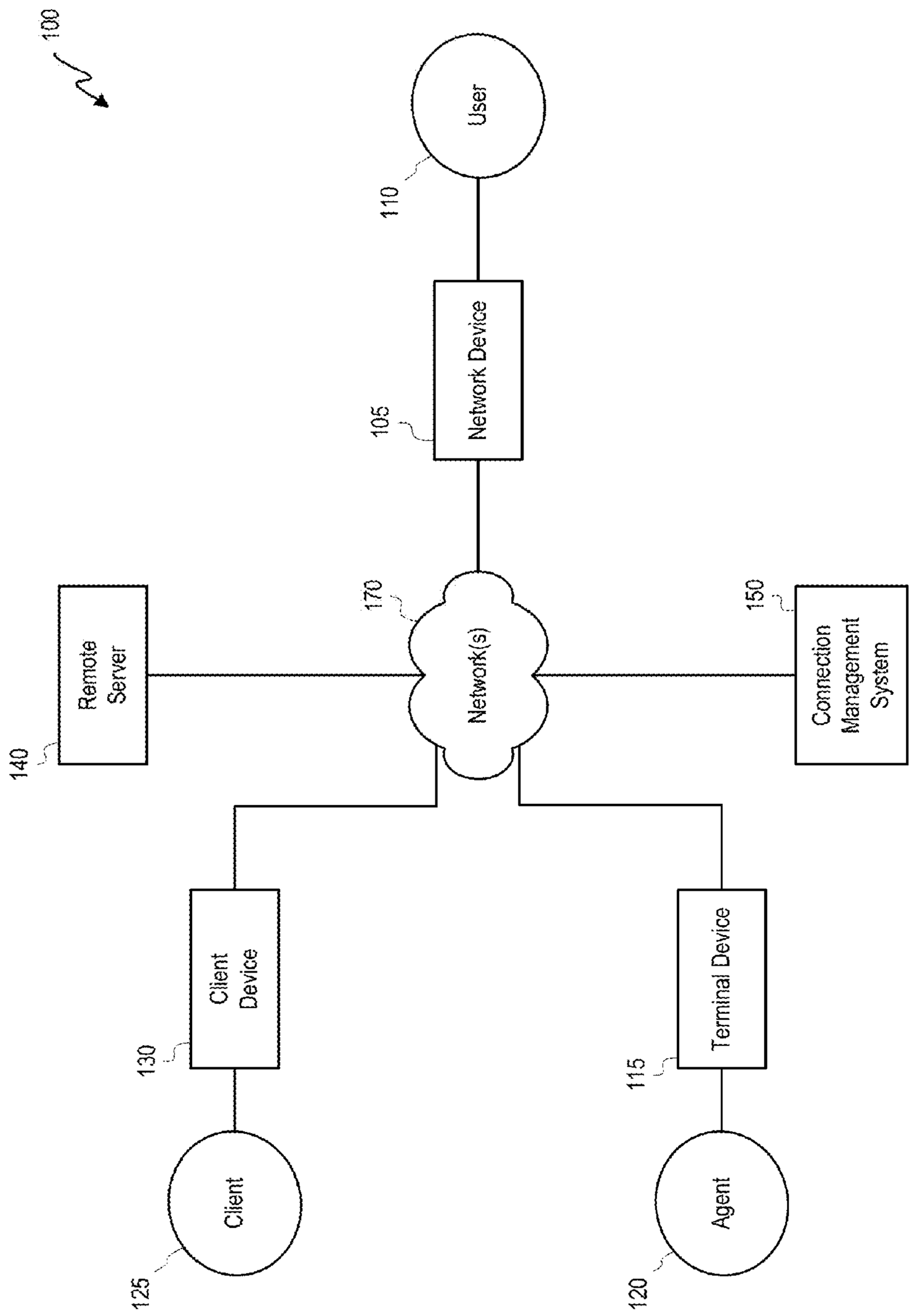
100
User
110
Network Device
105
Remote Server
140
Network(s)
170
Connection Management System
150
Client Device
130
Client
125
Terminal Device
115
Agent
120

FIG. 1

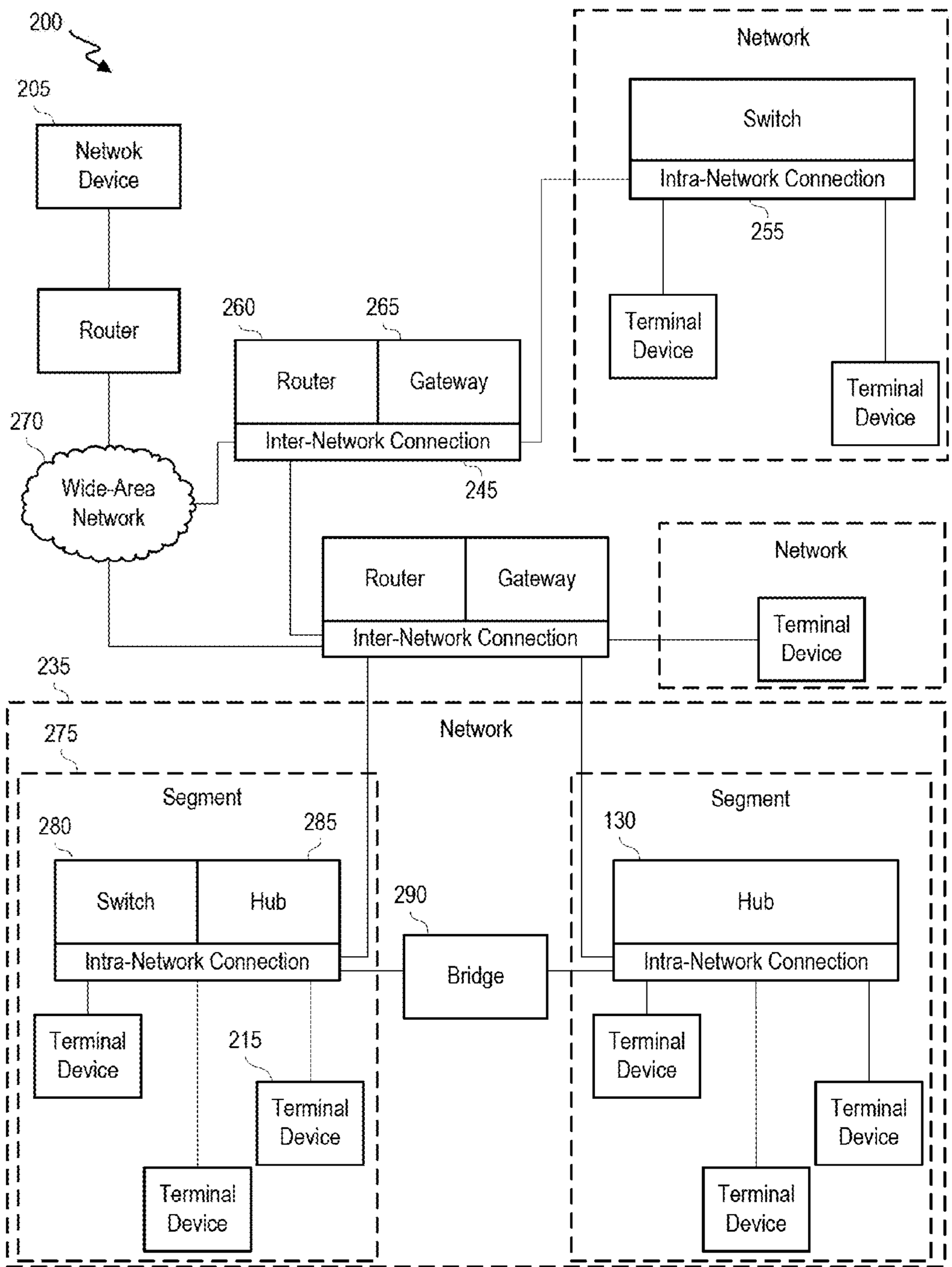
200
205
Netwok Device
Router
260
265
Router
Gateway
Inter-Network Connection
245
270
Wide-Area Network
Network
Switch
Intra-Network Connection
255
Terminal Device
Terminal Device
Router
Gateway
Inter-Network Connection
Network
Terminal Device
235
Network
275
Segment
280
285
Switch
Hub
Intra-Network Connection
Terminal Device
215
Terminal Device
Terminal Device
290
Bridge
Segment
130
Hub
Intra-Network Connection
Terminal Device
Terminal Device
Terminal Device

FIG. 2

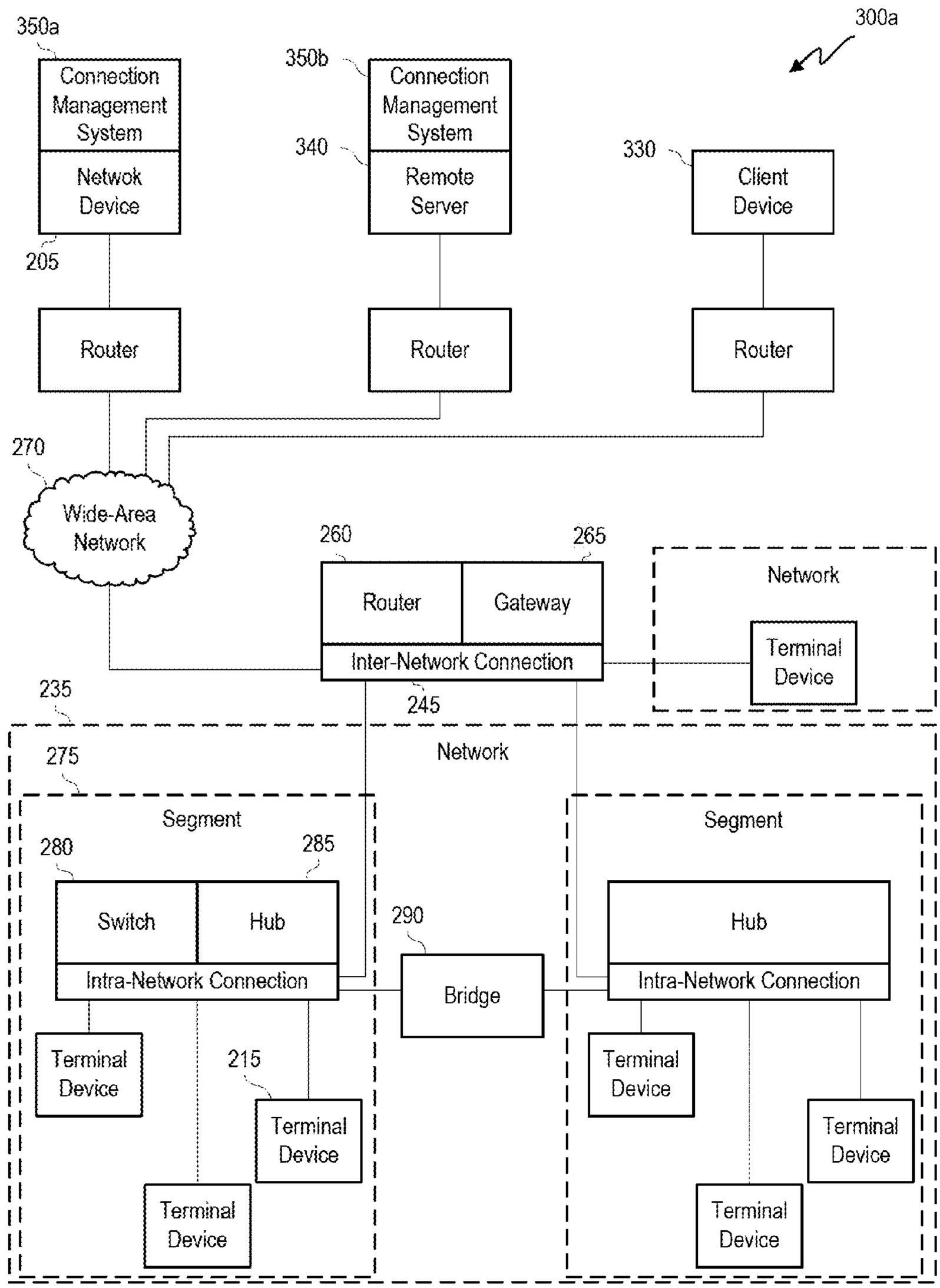
300a
350a
Connection Management System
Network Device
205
350b
Connection Management System
340
Remote Server
330
Client Device
Router
Router
Router
270
Wide-Area Network
260
265
Router
Gateway
Inter-Network Connection
245
Network
Terminal Device
235
Network
275
Segment
280
285
Switch
Hub
Intra-Network Connection
290
Bridge
Segment
Hub
Intra-Network Connection
Terminal Device
215
Terminal Device
Terminal Device
Terminal Device
Terminal Device
Terminal Device

FIG. 3A

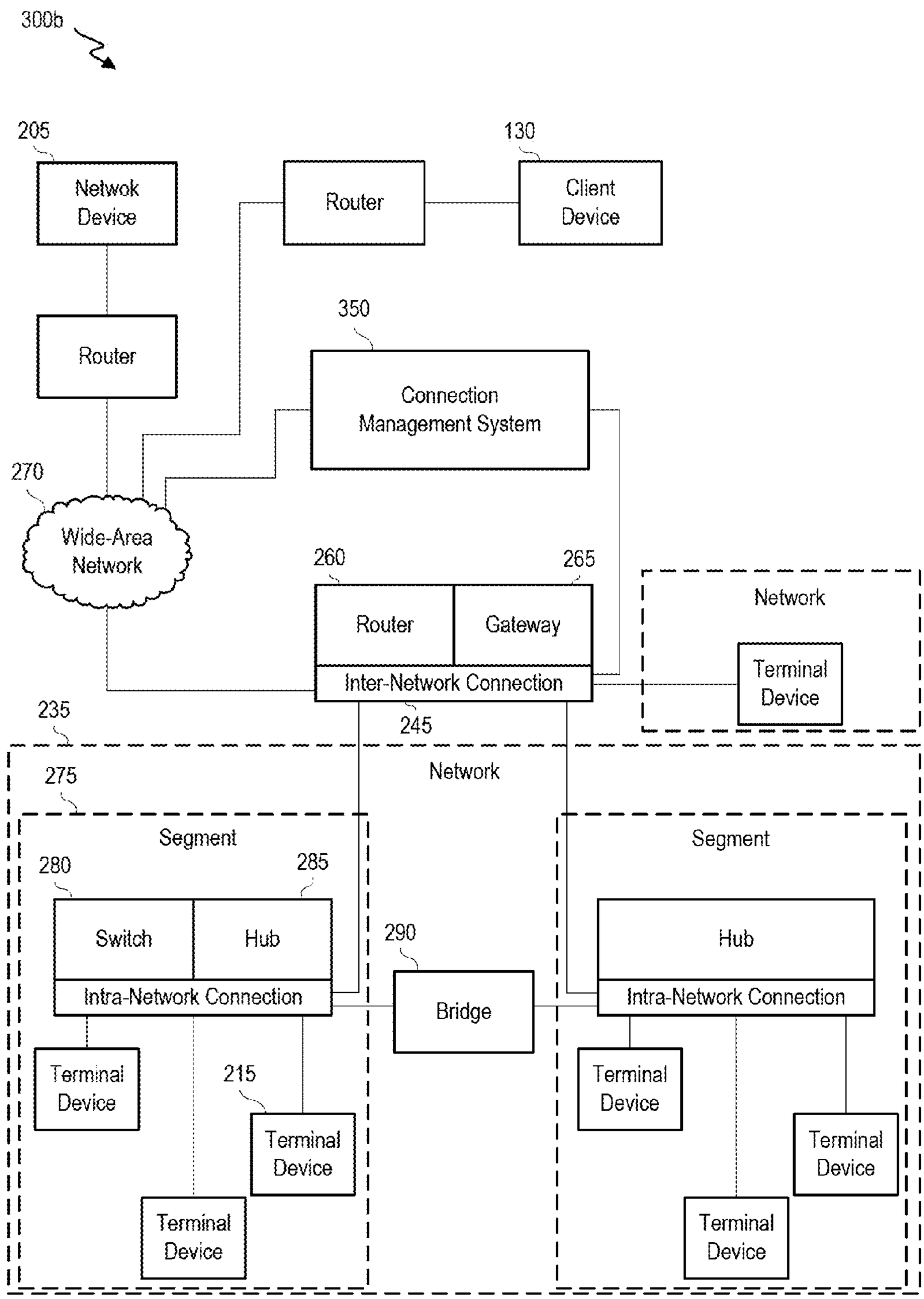
300b
205
Netwok Device
Router
130
Client Device
Router
350
Connection Management System
270
Wide-Area Network
260
265
Router
Gateway
Inter-Network Connection
Network
Terminal Device
235
245
Network
275
Segment
280
285
Switch
Hub
Intra-Network Connection
290
Bridge
Segment
Hub
Intra-Network Connection
Terminal Device
215
Terminal Device
Terminal Device
Terminal Device
Terminal Device
Terminal Device

FIG. 3B

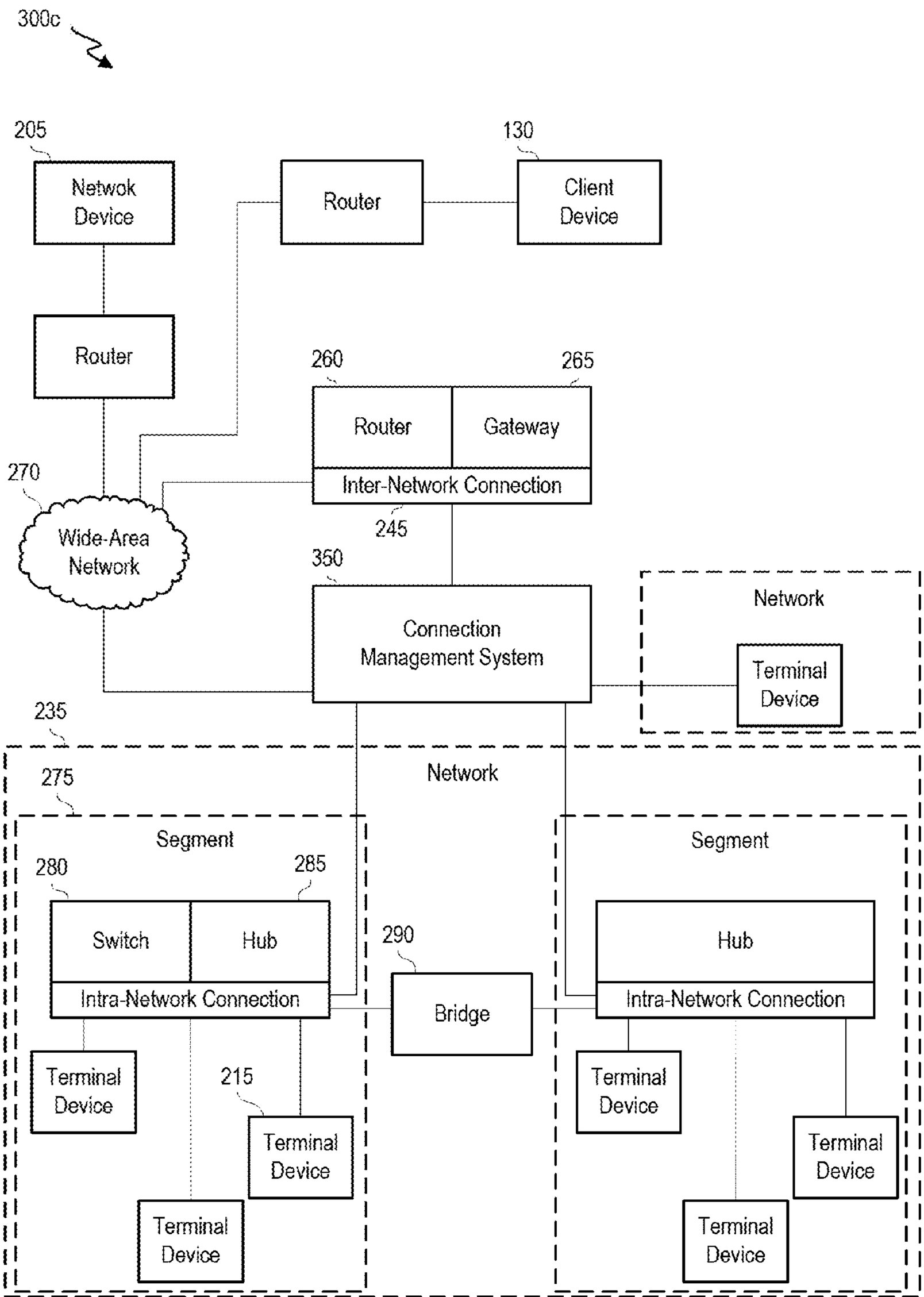
300c
205
Network Device
Router
130
Client Device
Router
260
265
Router
Gateway
Inter-Network Connection
245
270
Wide-Area Network
350
Connection Management System
Network
Terminal Device
235
Network
275
Segment
280
285
Switch
Hub
Intra-Network Connection
290
Bridge
Segment
Hub
Intra-Network Connection
Terminal Device
215
Terminal Device
Terminal Device
Terminal Device
Terminal Device
Terminal Device

FIG. 3C

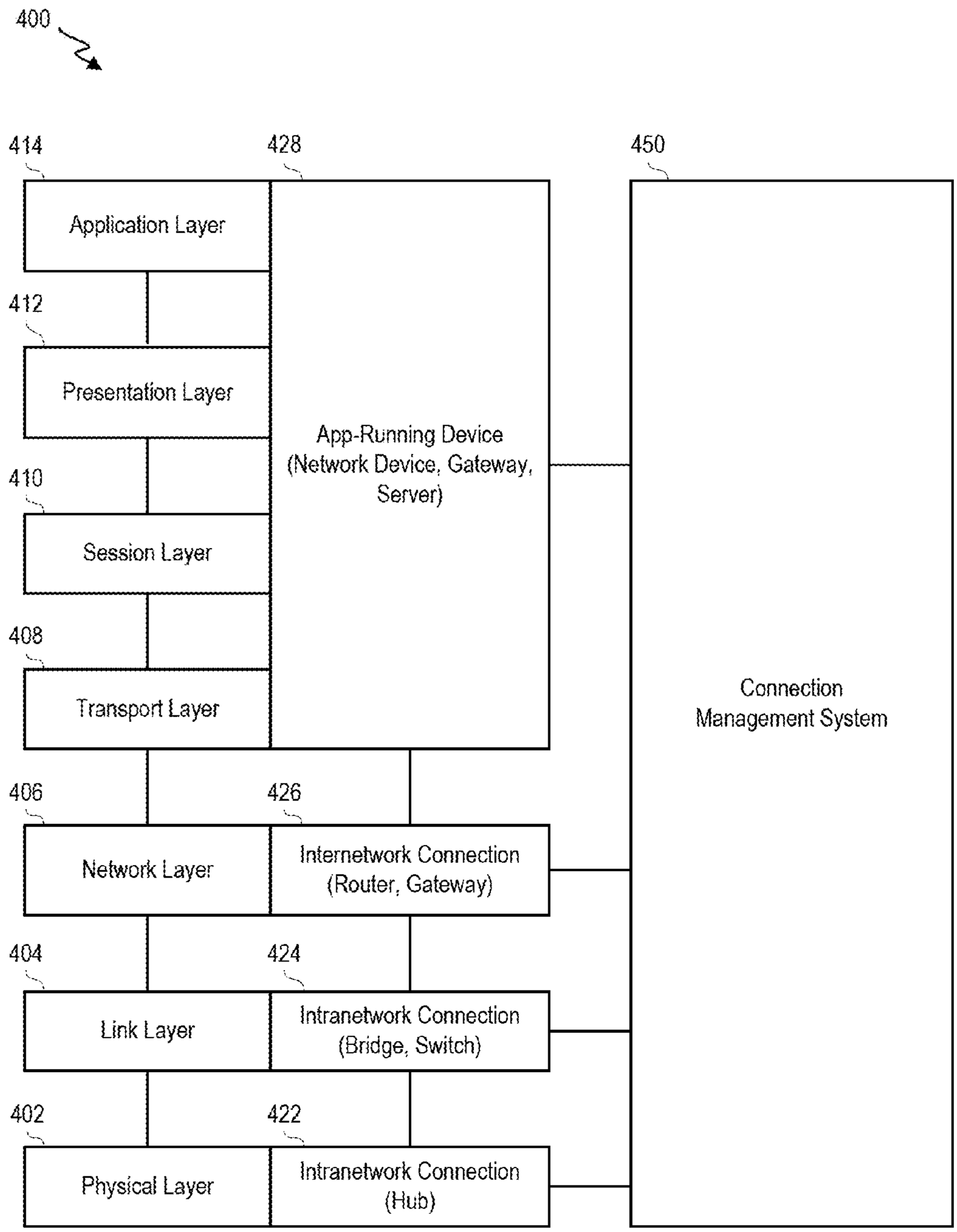
400
414
428
450
Application Layer
412
Presentation Layer
App-Running Device
(Network Device, Gateway,
Server)
410
Session Layer
408
Transport Layer
Connection
Management System
406
426
Network Layer
Internetwork Connection
(Router, Gateway)
404
424
Link Layer
Intranetwork Connection
(Bridge, Switch)
402
422
Physical Layer
Intranetwork Connection
(Hub)

FIG. 4

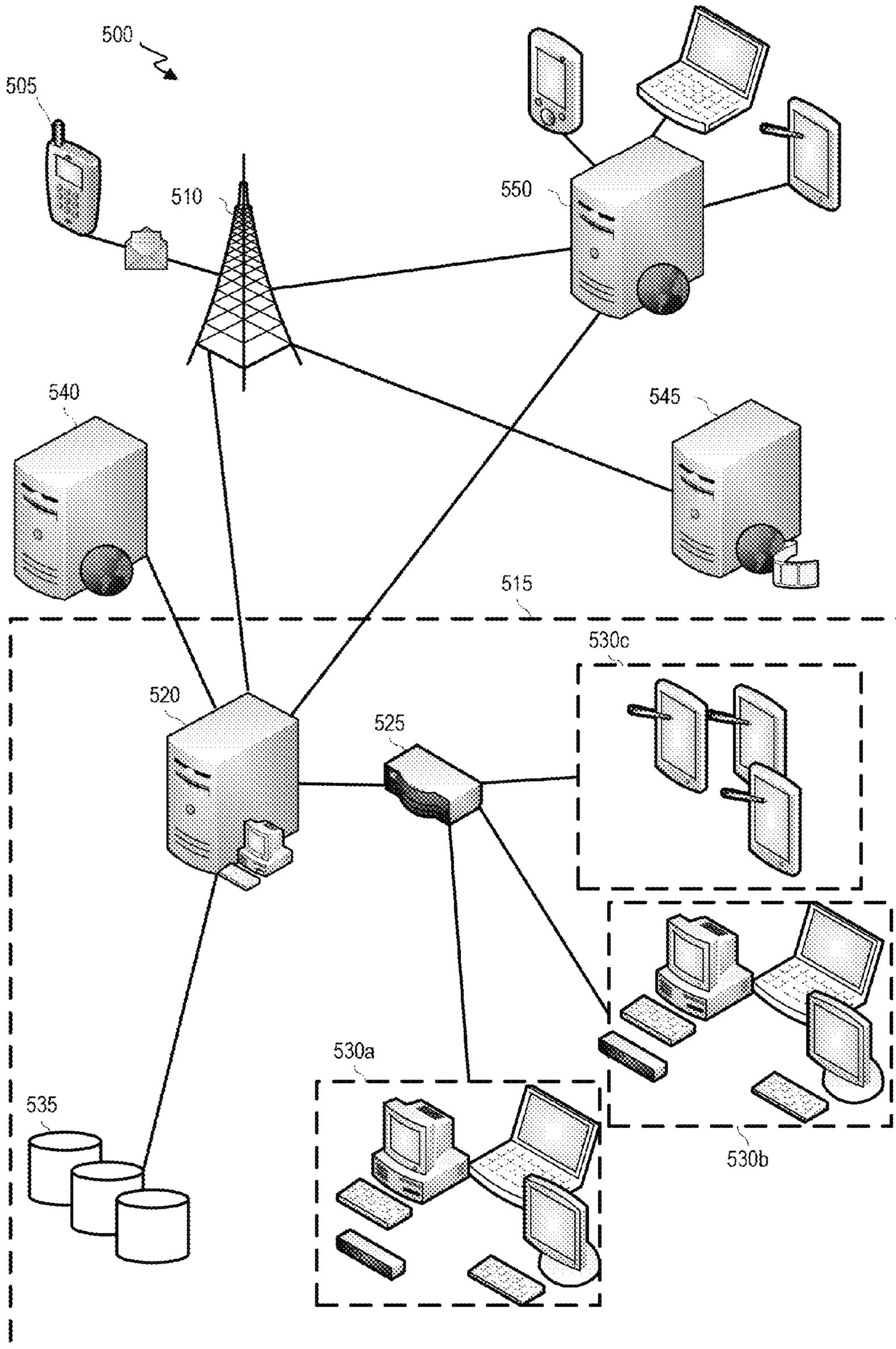

FIG. 5

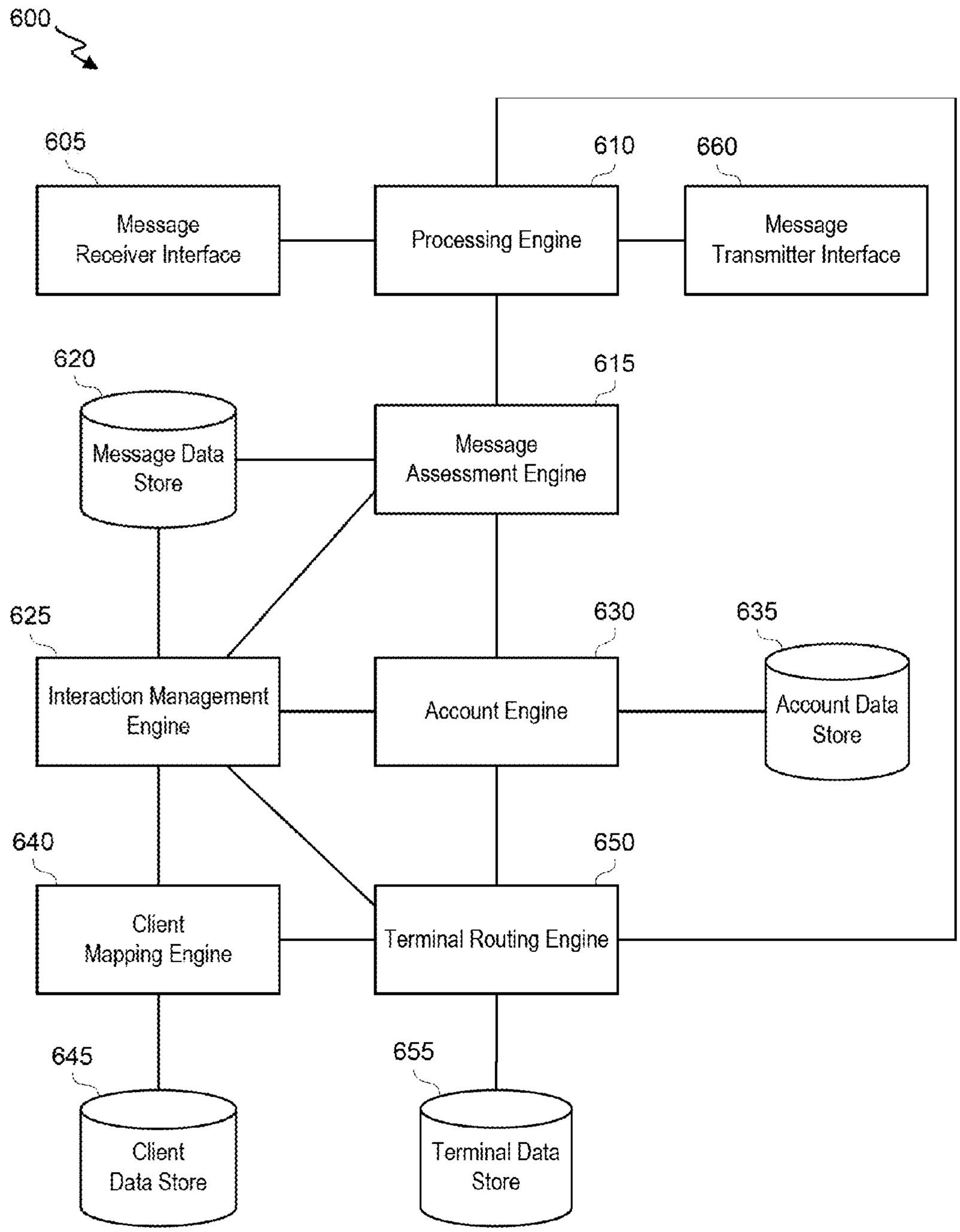
600
605
Message Receiver Interface
610
Processing Engine
660
Message Transmitter Interface
620
Message Data Store
615
Message Assessment Engine
625
Interaction Management Engine
630
Account Engine
635
Account Data Store
640
Client Mapping Engine
650
Terminal Routing Engine
645
Client Data Store
655
Terminal Data Store

FIG. 6

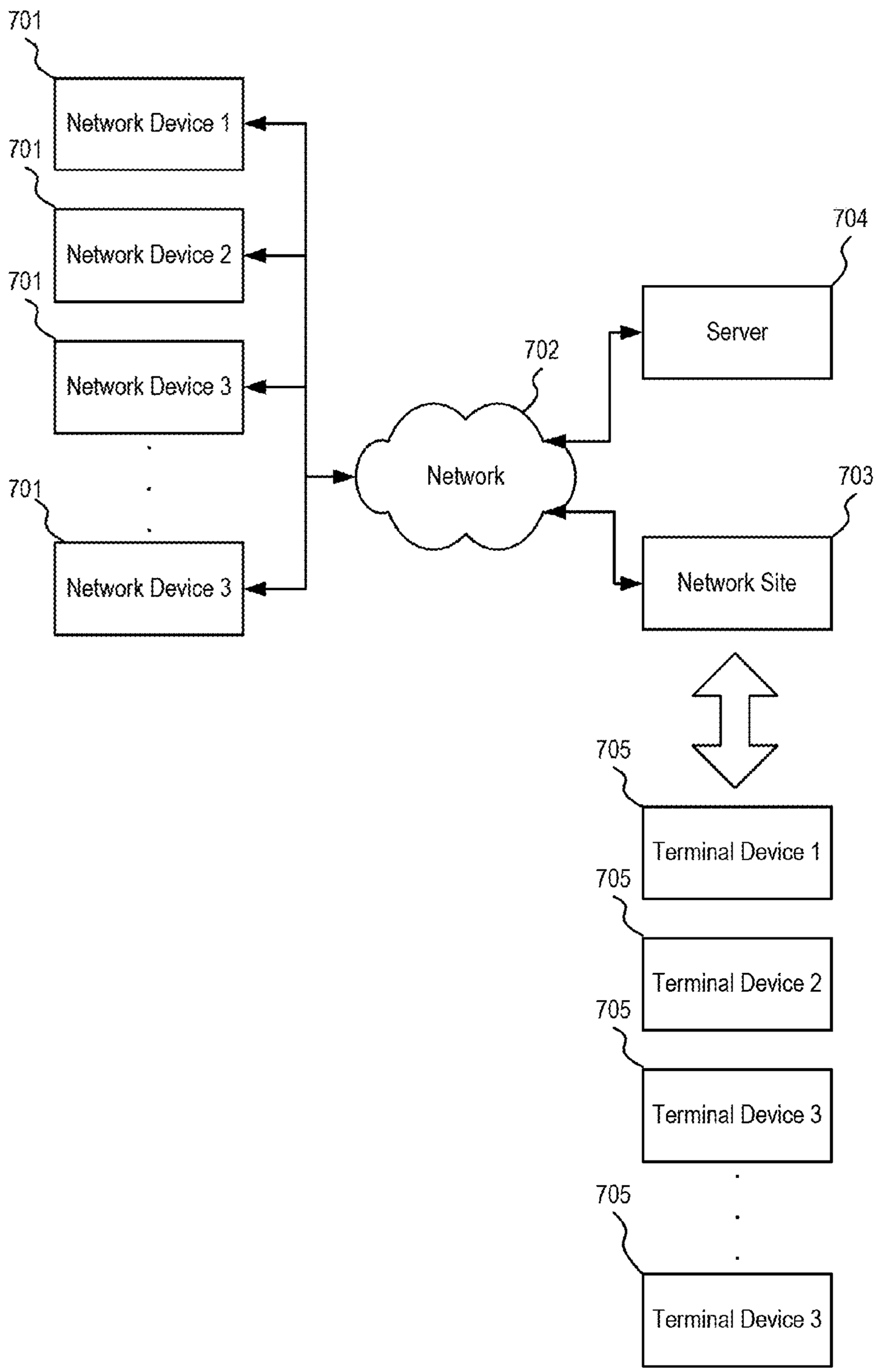
701
Network Device 1
701
Network Device 2
701
Network Device 3
701
Network Device 3
702
Network
704
Server
703
Network Site
705
Terminal Device 1
705
Terminal Device 2
705
Terminal Device 3
705
Terminal Device 3

FIG. 7A

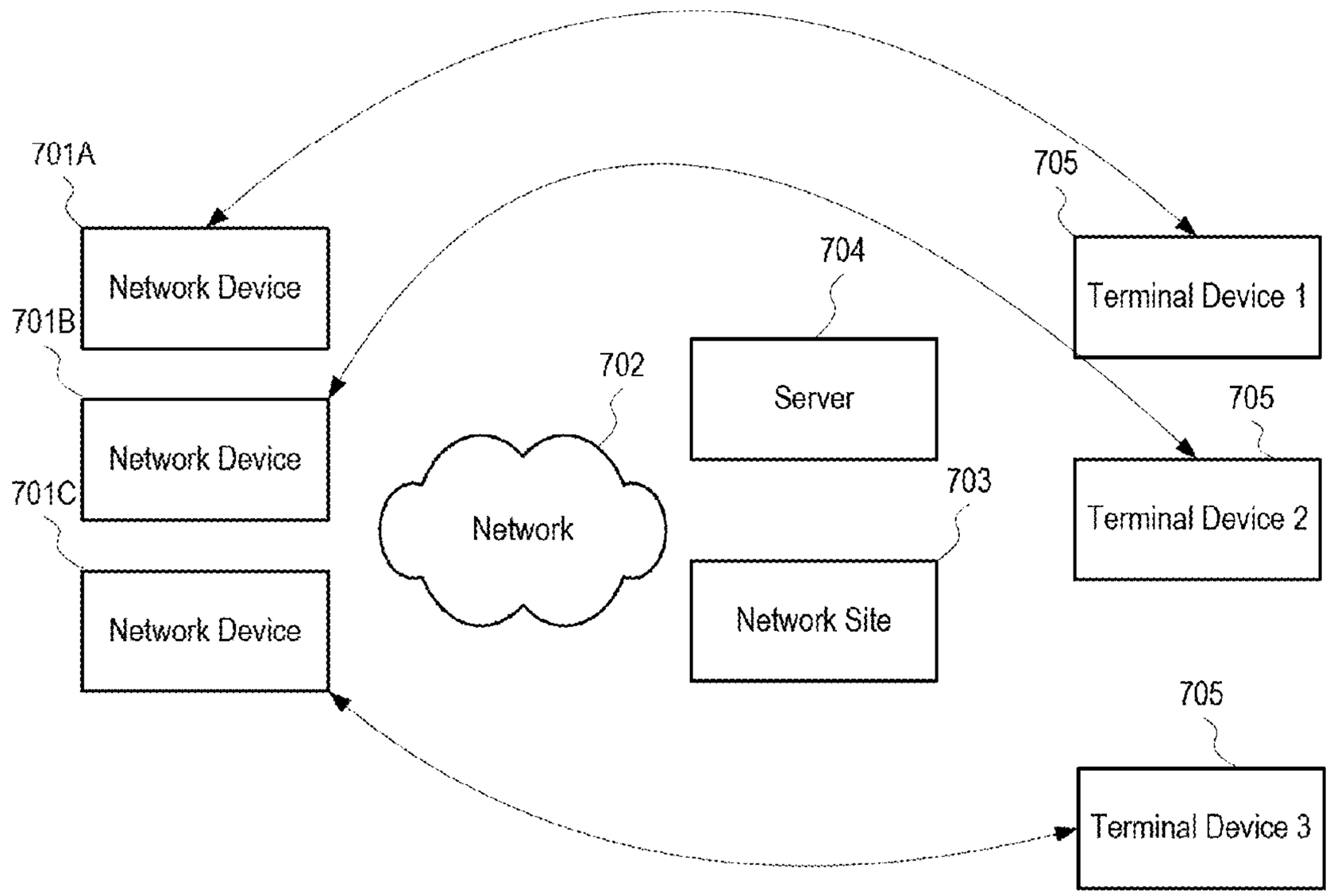
701A
Network Device
701B
Network Device
701C
Network Device
702
Network
704
Server
703
Network Site
705
Terminal Device 1
705
Terminal Device 2
705
Terminal Device 3

FIG. 7B

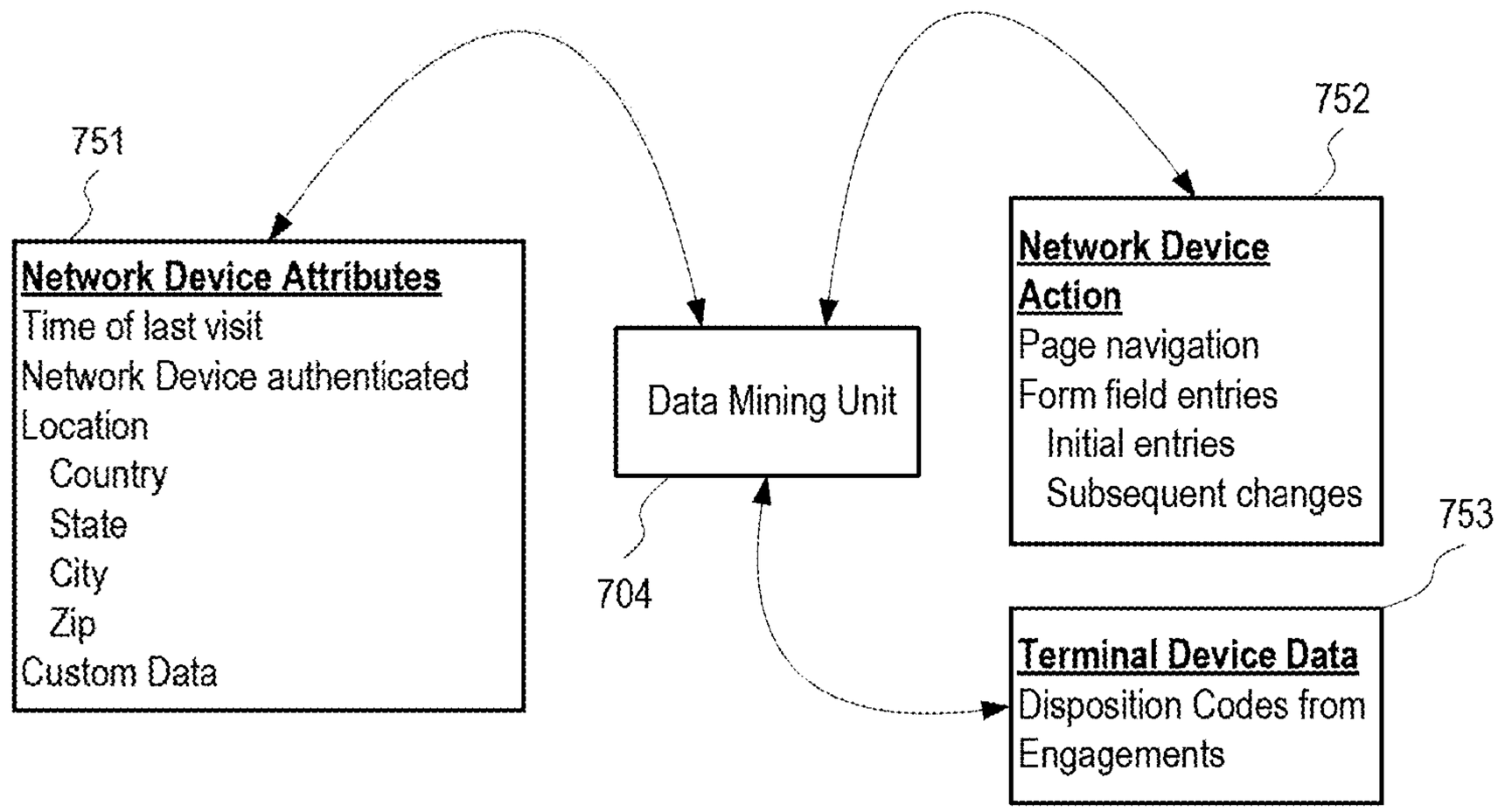
751
Network Device Attributes
Time of last visit
Network Device authenticated
Location
Country
State
City
Zip
Custom Data
Data Mining Unit
704
752
Network Device Action
Page navigation
Form field entries
Initial entries
Subsequent changes
753
Terminal Device Data
Disposition Codes from Engagements

FIG. 7C

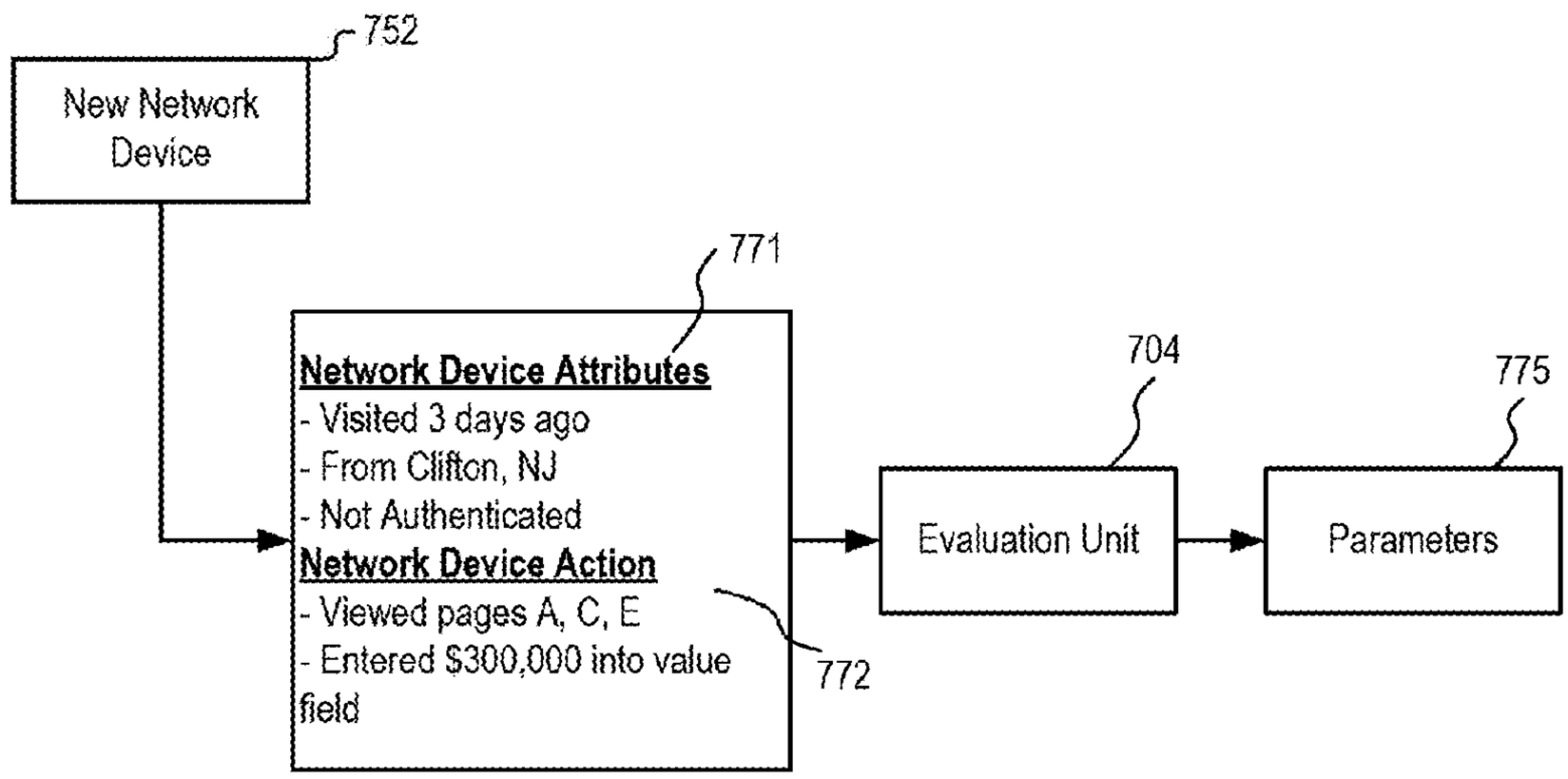
752
New Network Device
771
Network Device Attributes
- Visited 3 days ago
- From Clifton, NJ
- Not Authenticated
Network Device Action
- Viewed pages A, C, E
- Entered $300,000 into value field
772
704
Evaluation Unit
775
Parameters

FIG. 7D

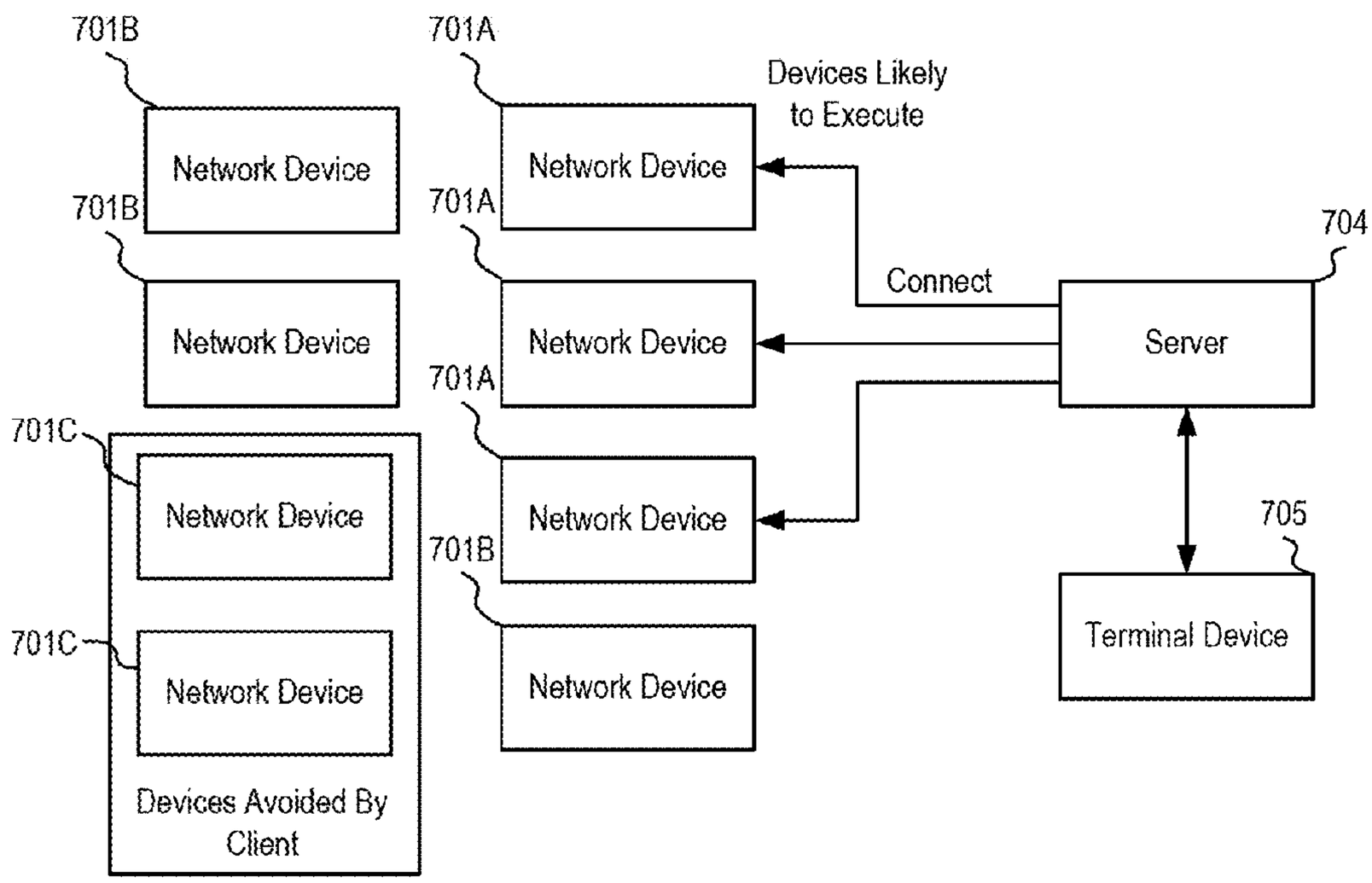
701B
Network Device
701B
Network Device
701C
Network Device
701C
Network Device
Devices Avoided By Client
701A
Network Device
701A
Network Device
701A
Network Device
701B
Network Device
Devices Likely to Execute
Connect
704
Server
705
Terminal Device

FIG. 7E

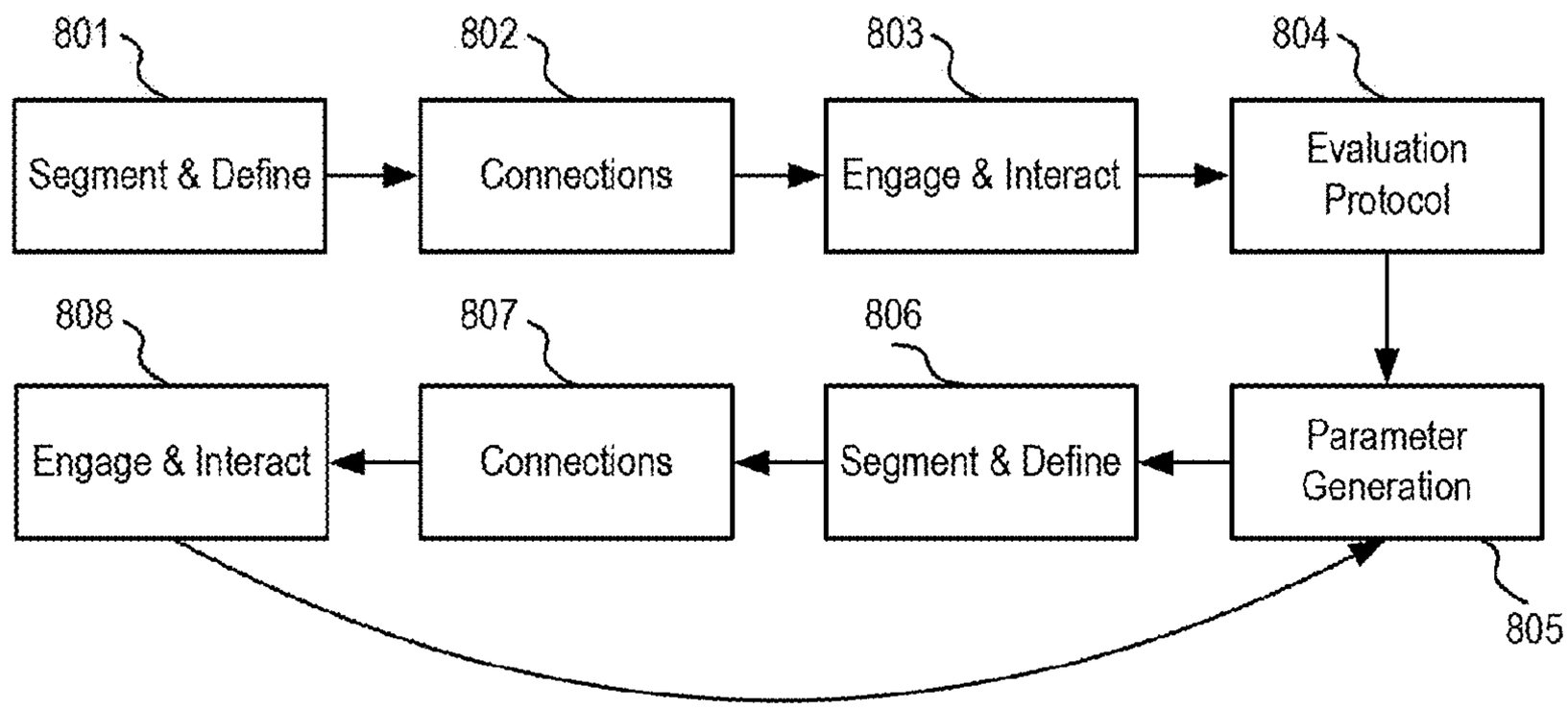
801
Segment & Define
802
Connections
803
Engage & Interact
804
Evaluation Protocol
805
Parameter Generation
806
Segment & Define
807
Connections
808
Engage & Interact

FIG. 8

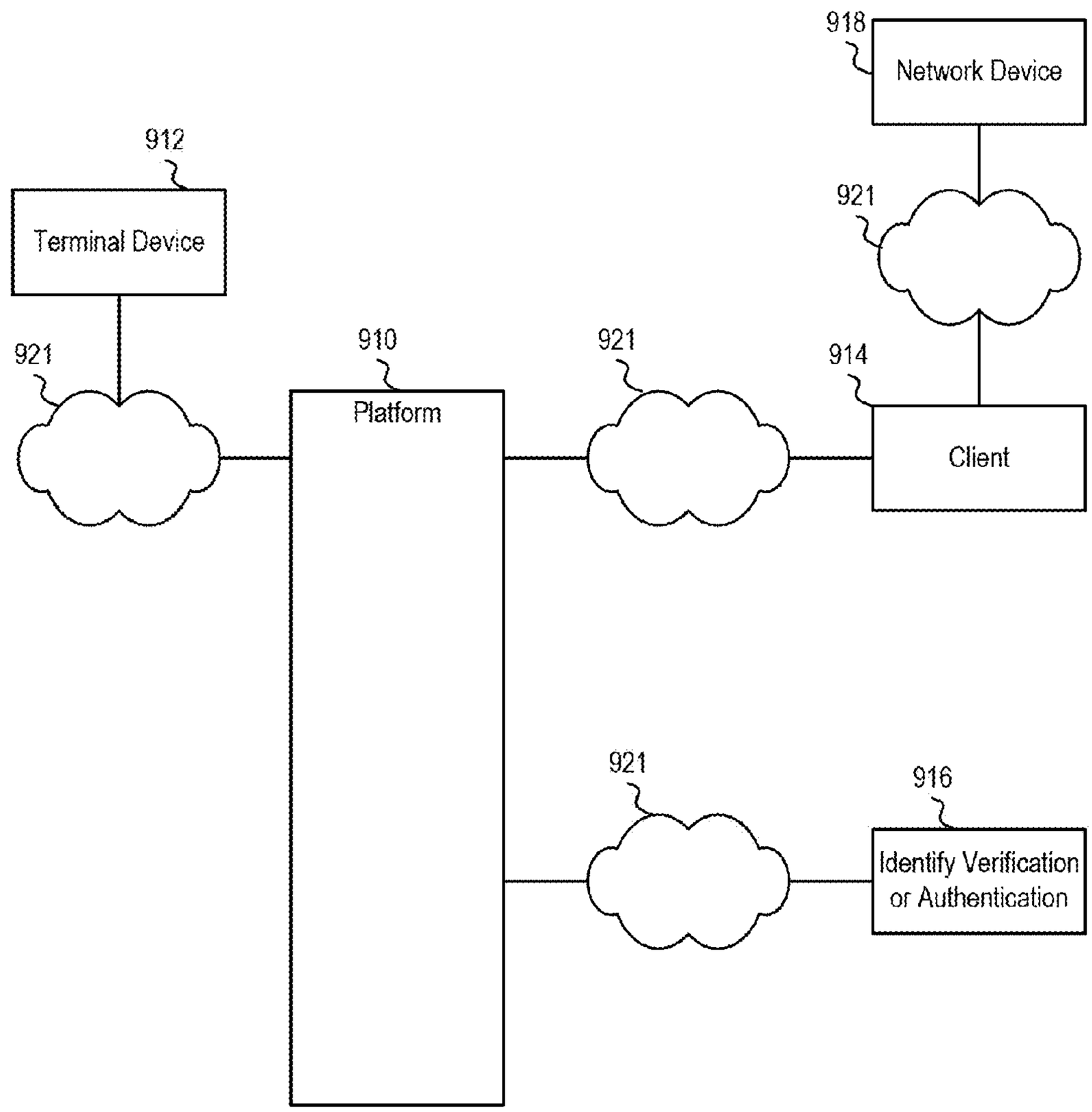
918
Network Device
912
Terminal Device
921
921
910
Platform
921
914
Client
921
916
Identify Verification
or Authentication

FIG. 9

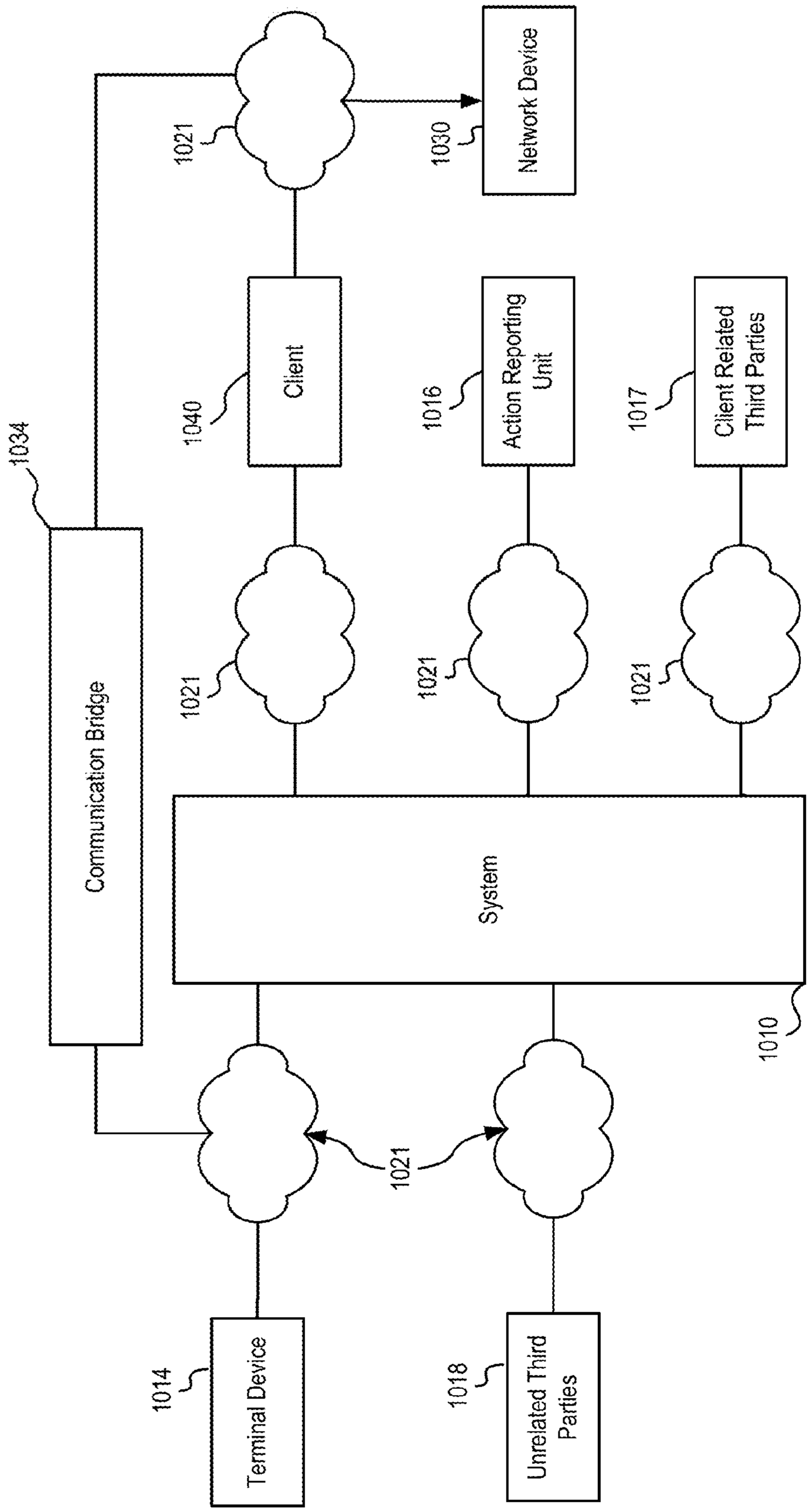
1034
Communication Bridge
1021
1040
Client
1021
1016
Action Reporting Unit
1021
1017
Client Related Third Parties
1021
1030
Network Device
System
1010
1021
1014
Terminal Device
1018
Unrelated Third Parties

FIG. 10

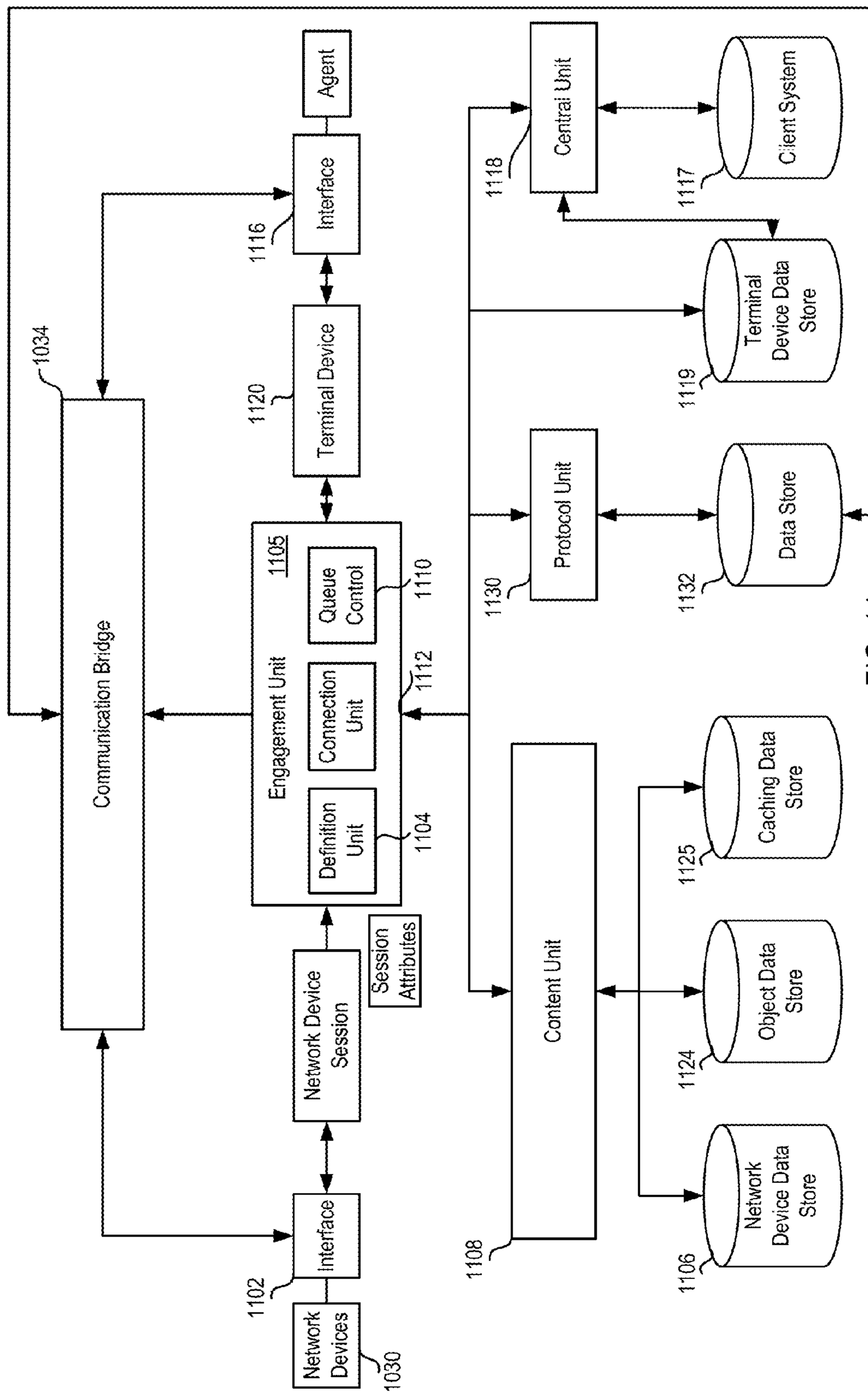
Agent
Interface
1116
Central Unit
1118
Client System
1117
1034
Terminal Device
1120
Terminal Device Data Store
1119
Communication Bridge
Engagement Unit
1105
Queue Control
1110
Connection Unit
1112
Definition Unit
1104
Protocol Unit
1130
Data Store
1132
Session Attributes
Network Device Session
Caching Data Store
1125
Content Unit
1108
Object Data Store
1124
Interface
1102
Network Devices
1030
Network Device Data Store
1106

FIG. 11

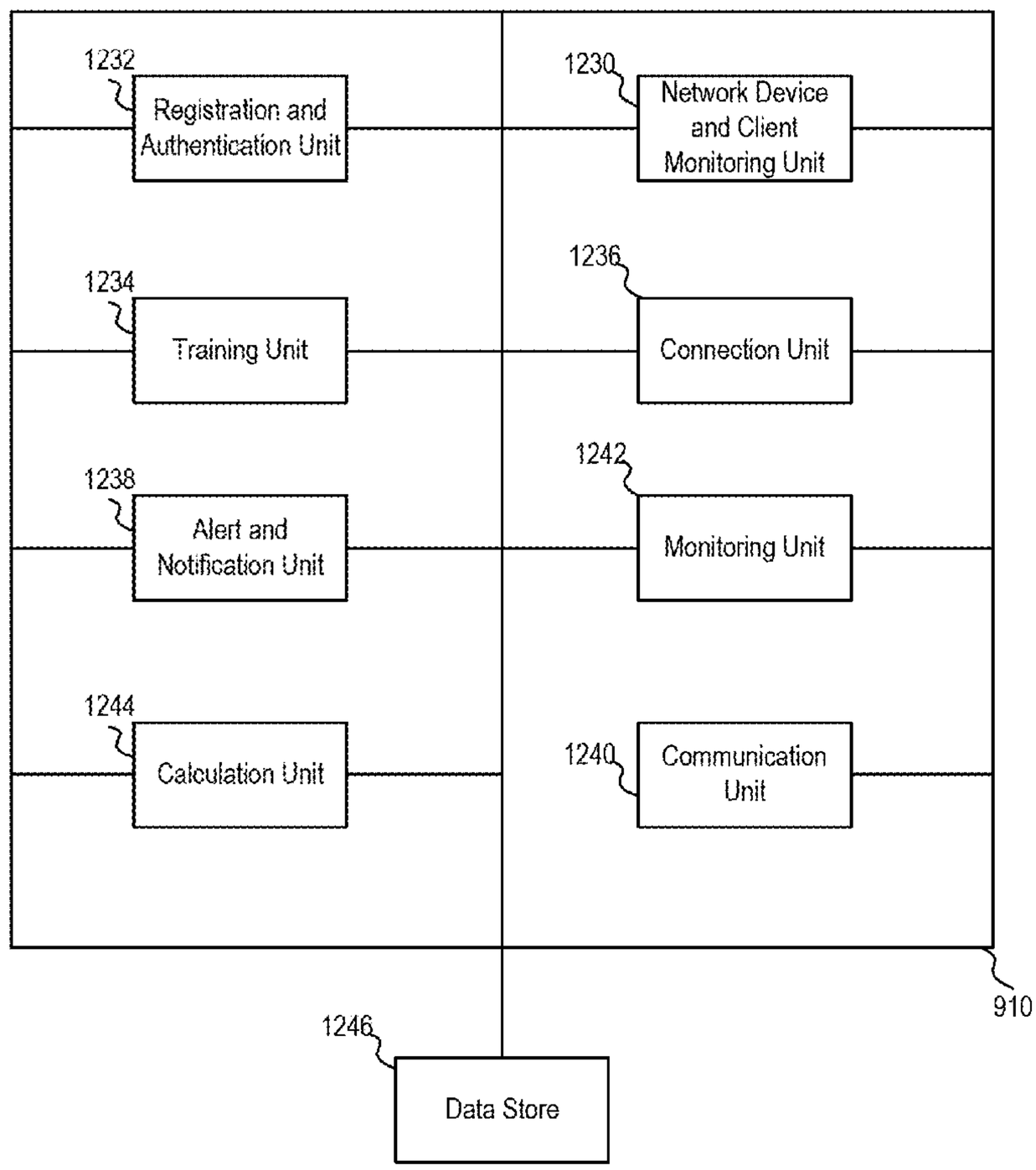
1232
Registration and Authentication Unit
1230
Network Device and Client Monitoring Unit
1234
Training Unit
1236
Connection Unit
1238
Alert and Notification Unit
1242
Monitoring Unit
1244
Calculation Unit
1240
Communication Unit
910
1246
Data Store

FIG. 12

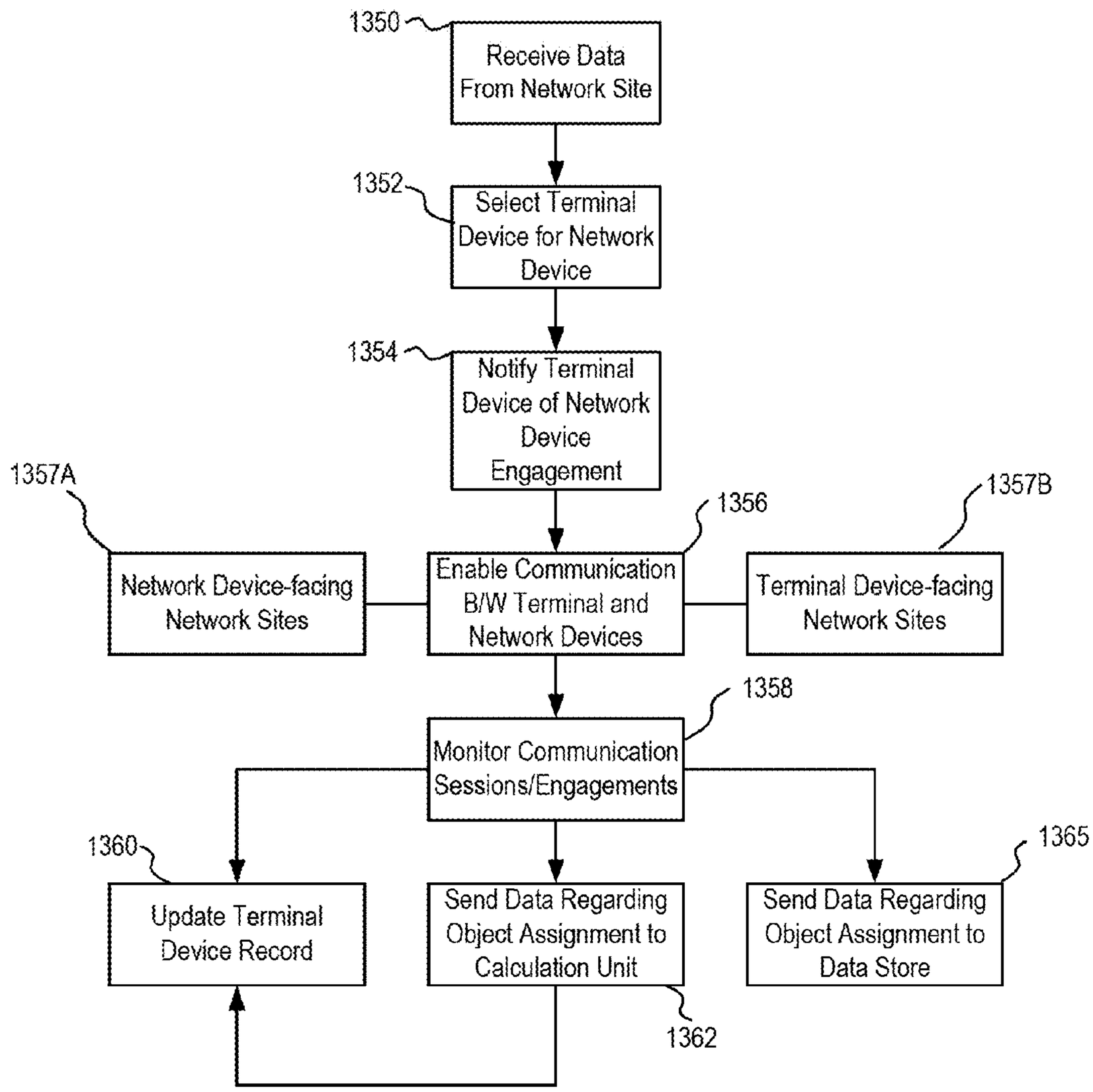
1350
Receive Data From Network Site
1352
Select Terminal Device for Network Device
1354
Notify Terminal Device of Network Device Engagement
1357A
1356
1357B
Network Device-facing Network Sites
Enable Communication B/W Terminal and Network Devices
Terminal Device-facing Network Sites
1358
Monitor Communication Sessions/Engagements
1360
1365
Update Terminal Device Record
Send Data Regarding Object Assignment to Calculation Unit
Send Data Regarding Object Assignment to Data Store
1362

FIG. 13

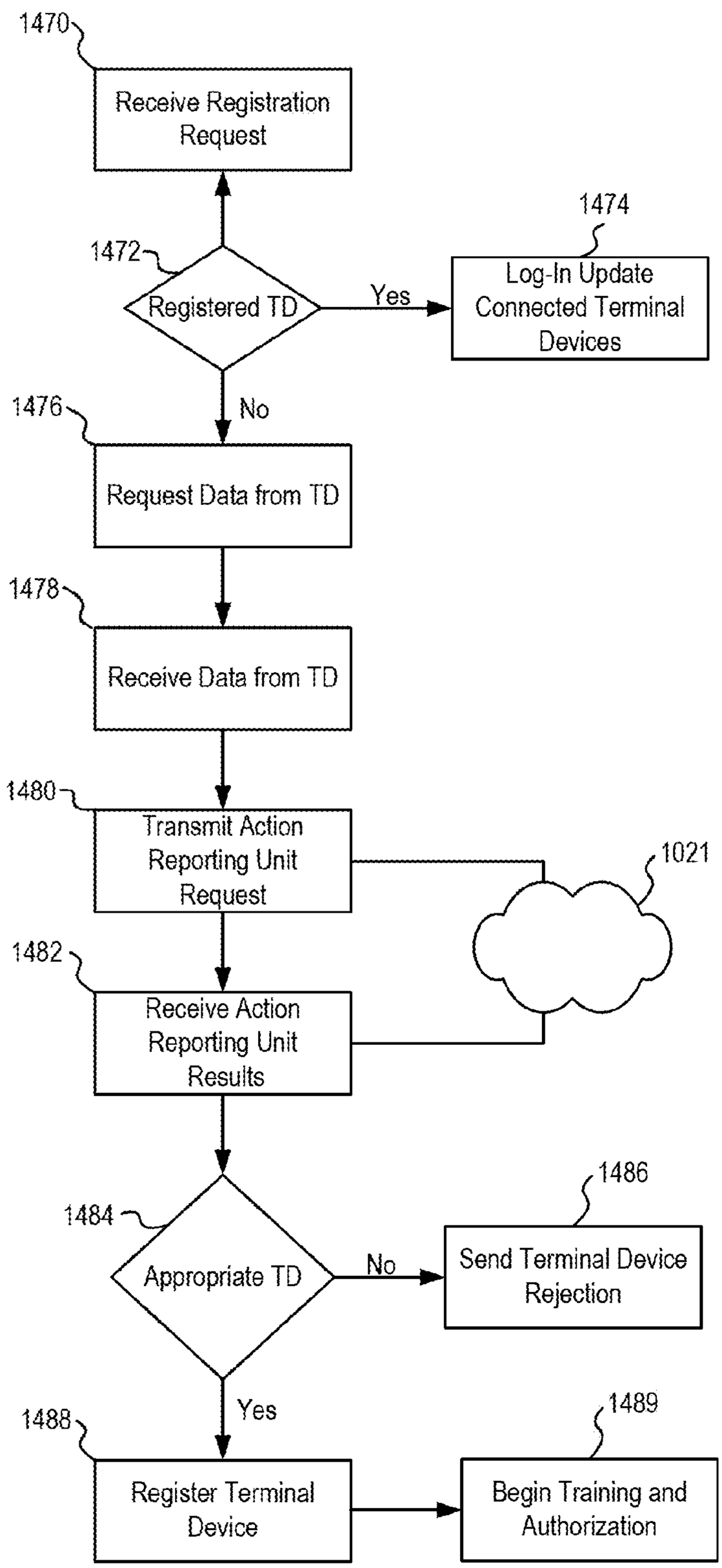
1470
Receive Registration Request
1472
Registered TD
Yes
1474
Log-In Update Connected Terminal Devices
No
1476
Request Data from TD
1478
Receive Data from TD
1480
Transmit Action Reporting Unit Request
1021
1482
Receive Action Reporting Unit Results
1484
Appropriate TD
No
1486
Send Terminal Device Rejection
Yes
1488
Register Terminal Device
1489
Begin Training and Authorization

FIG. 14

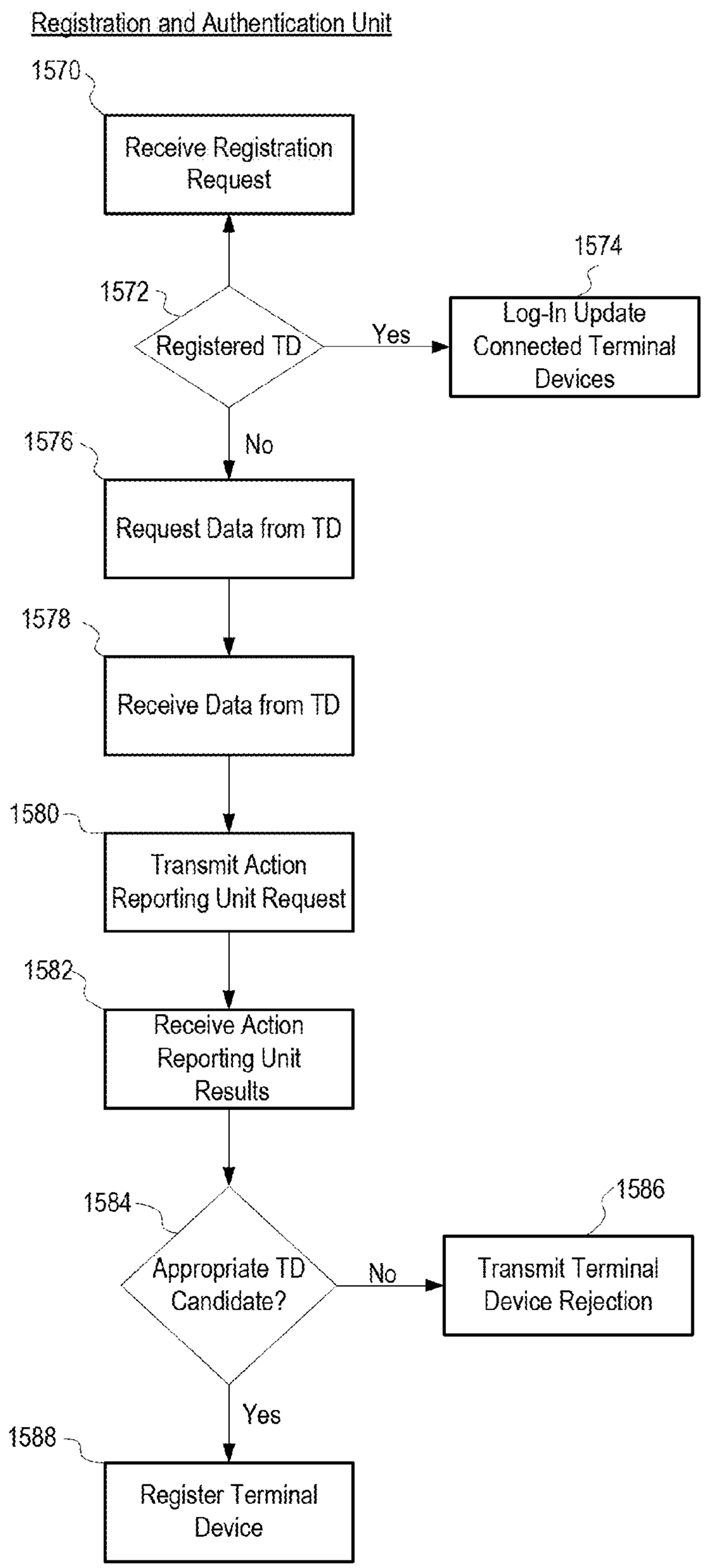
Registration and Authentication Unit
1570
Receive Registration Request
1572
Registered TD
Yes
1574
Log-In Update Connected Terminal Devices
No
1576
Request Data from TD
1578
Receive Data from TD
1580
Transmit Action Reporting Unit Request
1582
Receive Action Reporting Unit Results
1584
Appropriate TD Candidate?
No
1586
Transmit Terminal Device Rejection
Yes
1588
Register Terminal Device

FIG. 15

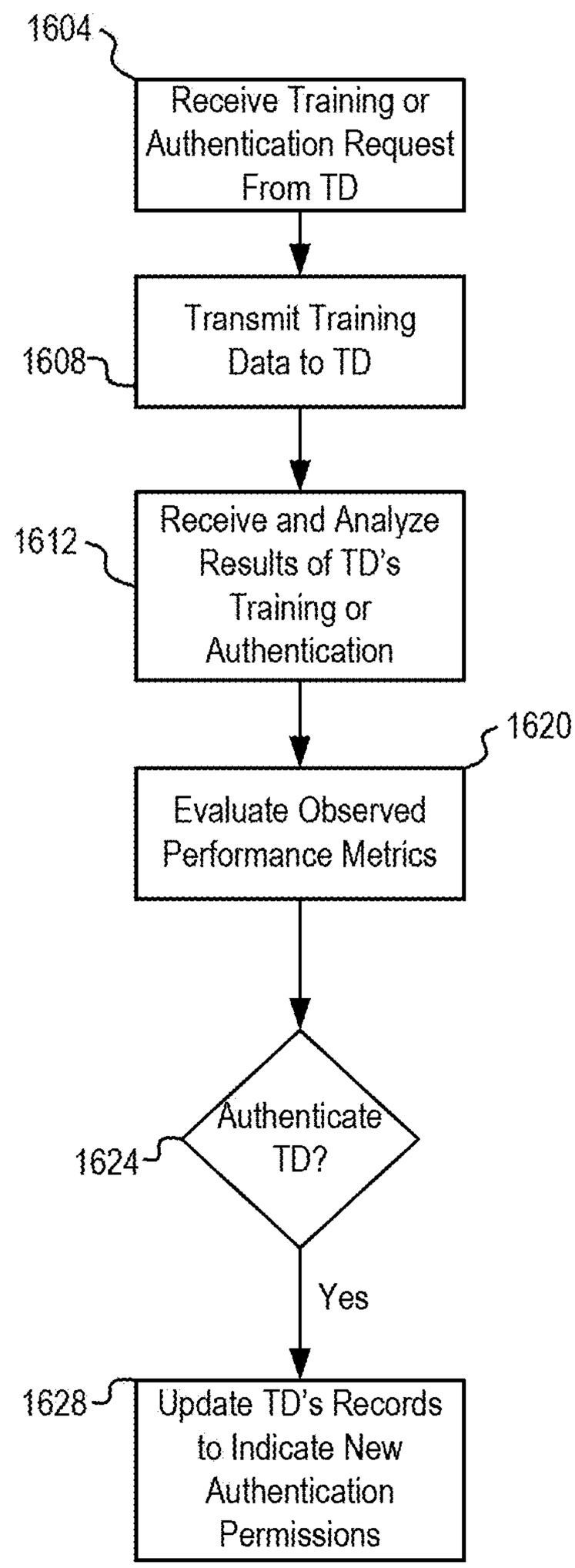
1604
Receive Training or Authentication Request From TD
Transmit Training Data to TD
1608
1612
Receive and Analyze Results of TD's Training or Authentication
1620
Evaluate Observed Performance Metrics
Authenticate TD?
1624
Yes
1628
Update TD's Records to Indicate New Authentication Permissions

FIG. 16

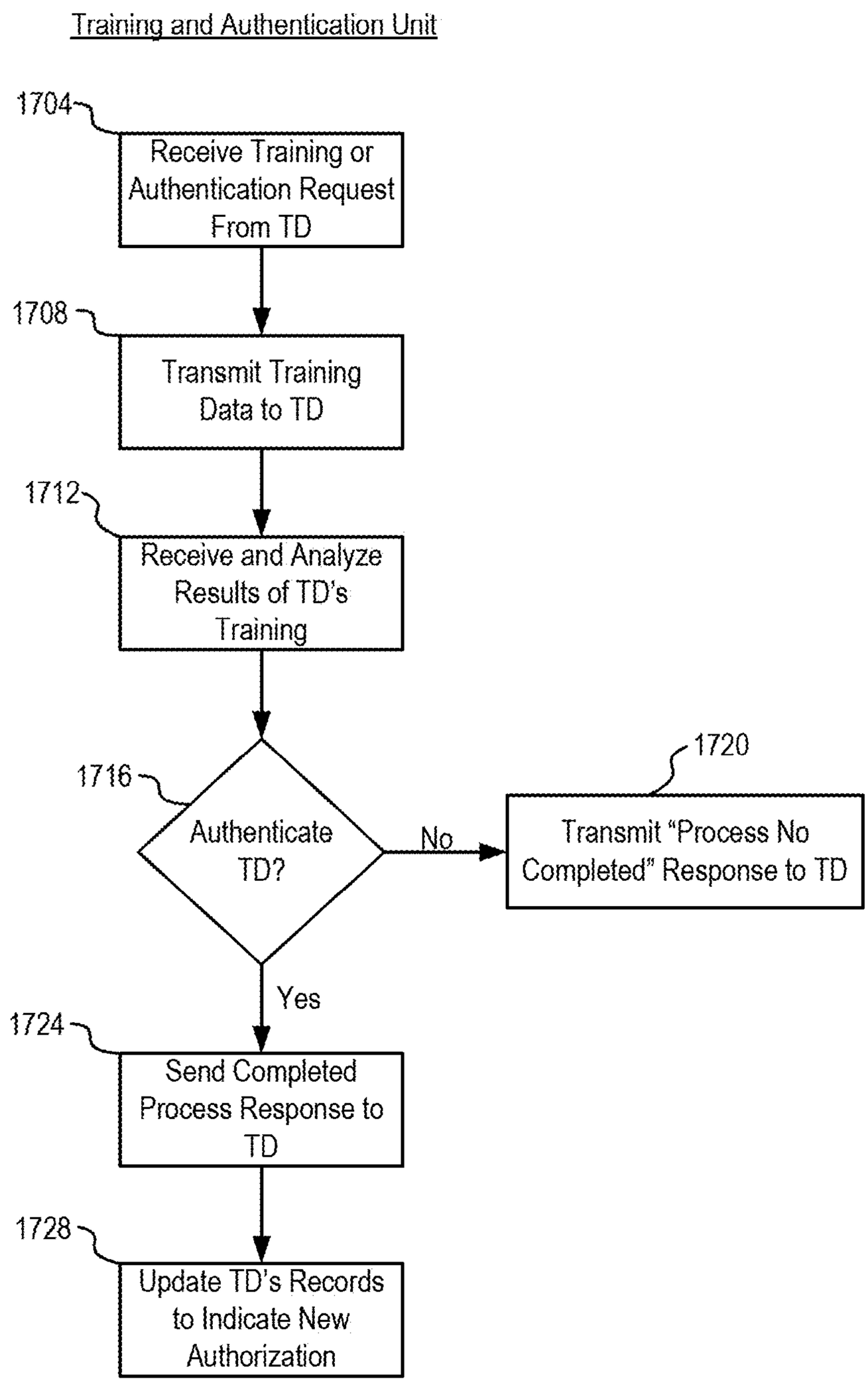
Training and Authentication Unit
1704
Receive Training or Authentication Request From TD
1708
Transmit Training Data to TD
1712
Receive and Analyze Results of TD's Training
1716
Authenticate TD?
No
1720
Transmit "Process No Completed" Response to TD
Yes
1724
Send Completed Process Response to TD
1728
Update TD's Records to Indicate New Authorization

FIG. 17

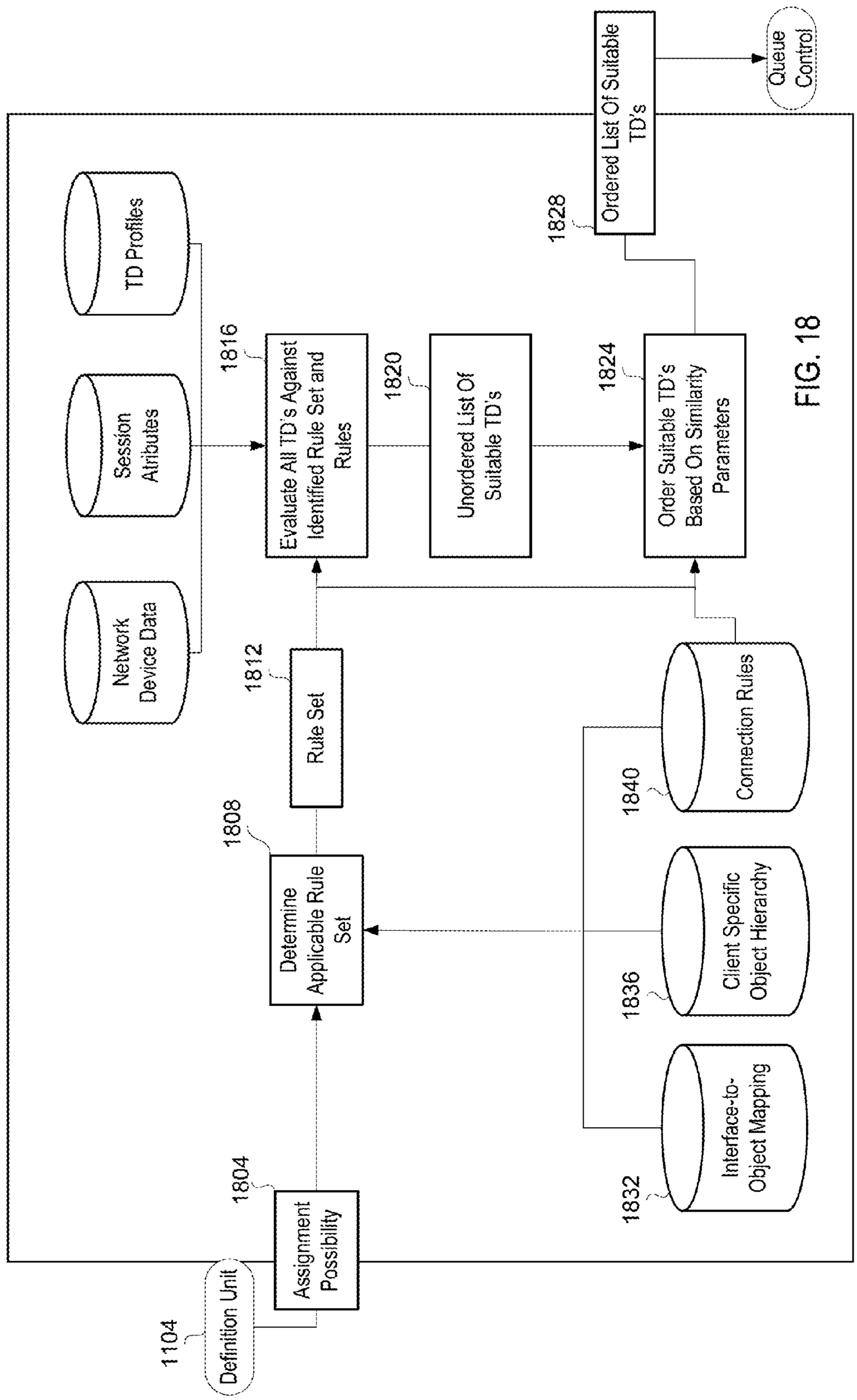
Ordered List Of Suitable TD's
1828
Queue Control
TD Profiles
Session Atributes
Network Device Data
1816
Evaluate All TD's Against Identified Rule Set and Rules
1820
Unordered List Of Suitable TD's
1824
Order Suitable TD's Based On Similarity Parameters
1812
Rule Set
1808
Determine Applicable Rule Set
1840
Connection Rules
1836
Client Specific Object Hierarchy
1832
Interface-to-Object Mapping
1804
Assignment Possibility
1104
Definition Unit

FIG. 18

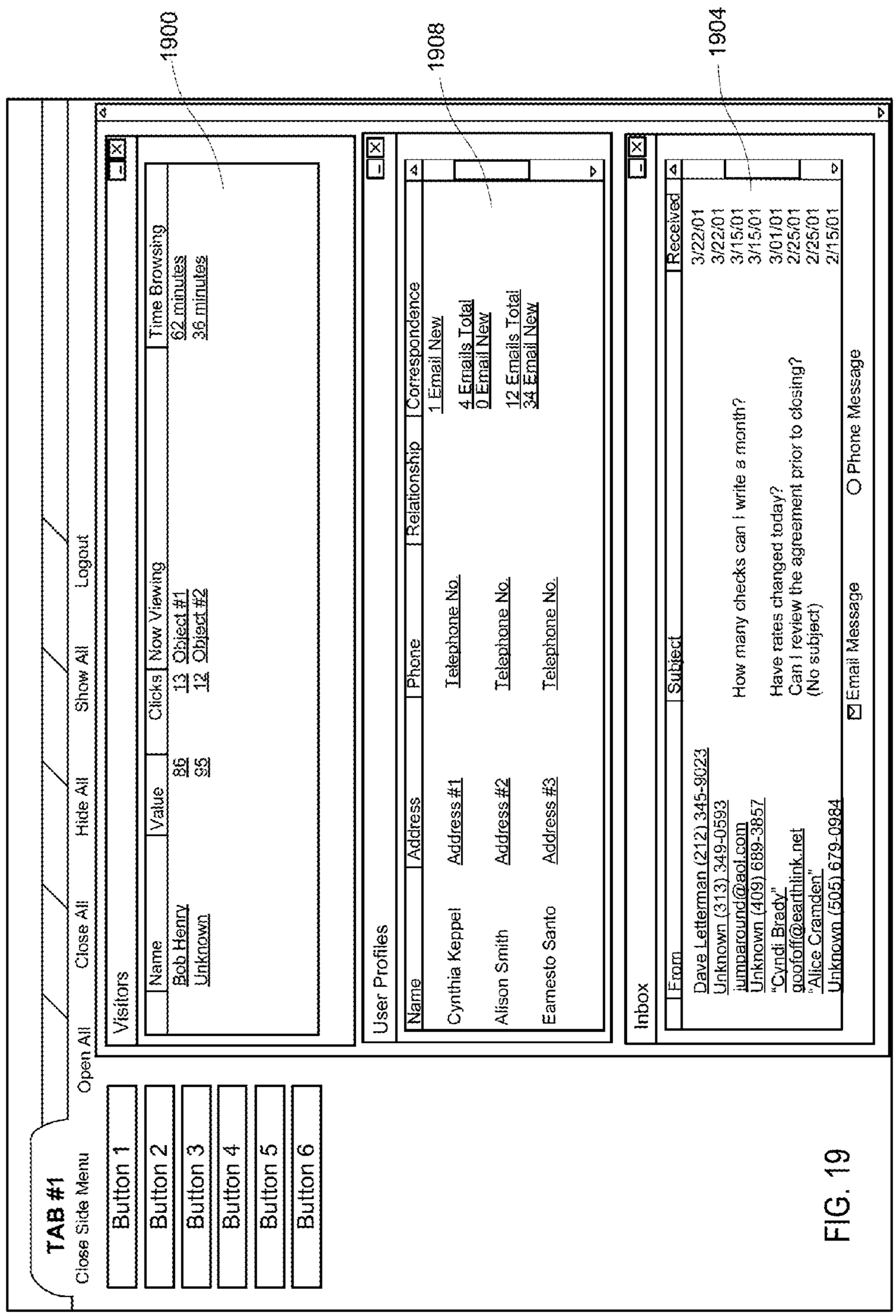
1900
1908
1904
TAB #1
Close Side Menu
Open All
Close All
Hide All
Show All
Logout
Button 1
Button 2
Button 3
Button 4
Button 5
Button 6
Visitors
Name
Value
Clicks
Now Viewing
Time Browsing
Bob Henry
86
13
Object #1
62 minutes
Unknown
95
12
Object #2
36 minutes
User Profiles
Name
Address
Phone
Relationship
Correspondence
Cynthia Keppel
Address #1
Telephone No.
1 Email New
Alison Smith
Address #2
Telephone No.
4 Emails Total
0 Email New
Earnesto Santo
Address #3
Telephone No.
12 Emails Total
34 Email New
Inbox
From
Subject
Received
Dave Letterman (212) 345-9023
Unknown (313) 349-0593
jumparound@aol.com
Unknown (409) 689-3857
"Cyndi Brady"
goofoff@earthlink.net
"Alice Cramden"
Unknown (505) 679-0984
How many checks can I write a month?
Have rates changed today?
Can I review the agreement prior to closing?
(No subject)
3/22/01
3/22/01
3/15/01
3/15/01
3/01/01
2/25/01
2/25/01
2/15/01
Email Message
Phone Message

FIG. 19

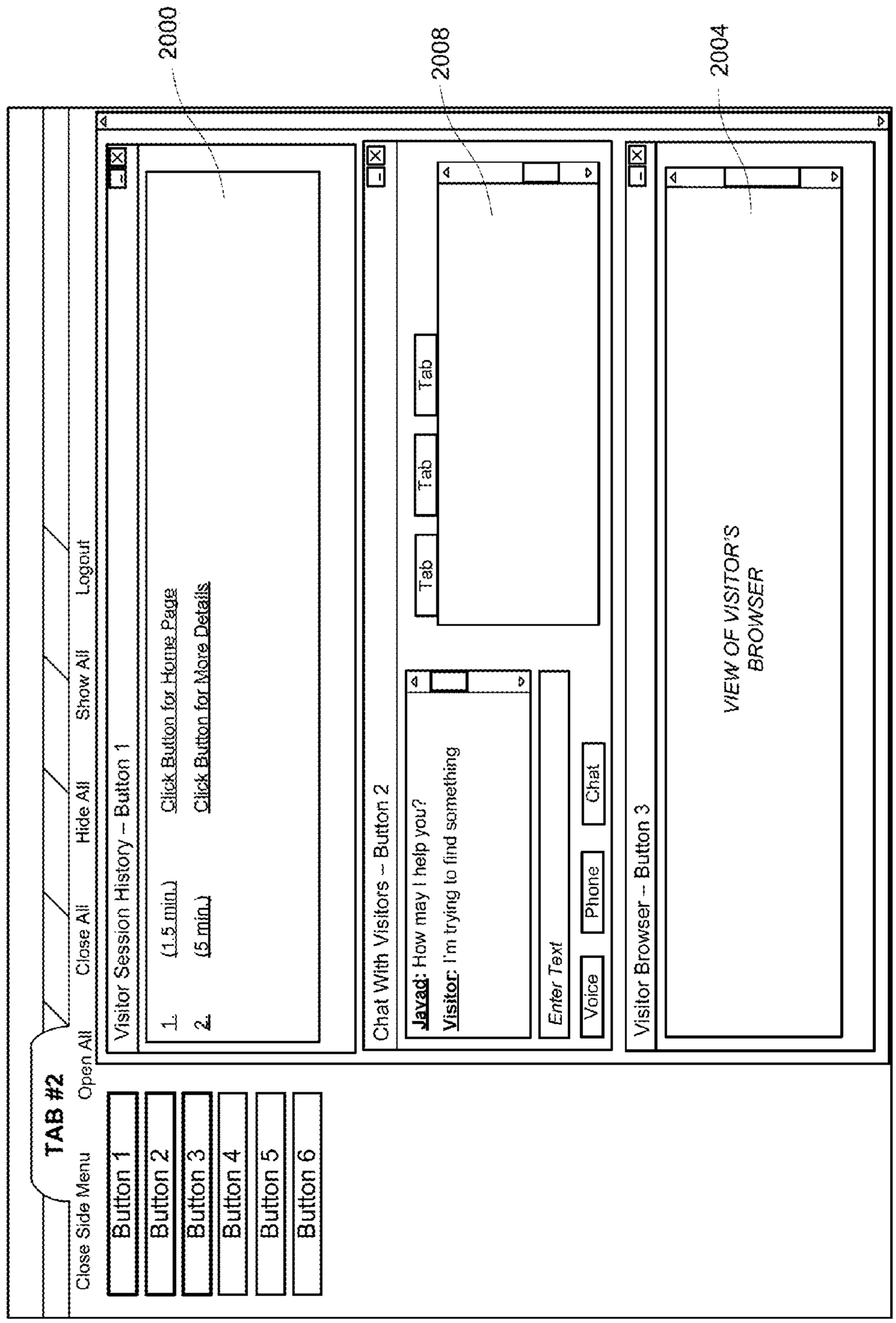
2000
2008
2004
TAB #2
Close Side Menu
Open All
Close All
Hide All
Show All
Logout
Button 1
Button 2
Button 3
Button 4
Button 5
Button 6
Visitor Session History – Button 1
1. (1.5 min.) Click Button for Home Page
2. (5 min.) Click Button for More Details
Chat With Visitors – Button 2
Tab
Tab
Tab
Javad: How may I help you?
Visitor: I'm trying to find something
Enter Text
Voice
Phone
Chat
Visitor Browser – Button 3
VIEW OF VISITOR'S BROWSER

FIG. 20

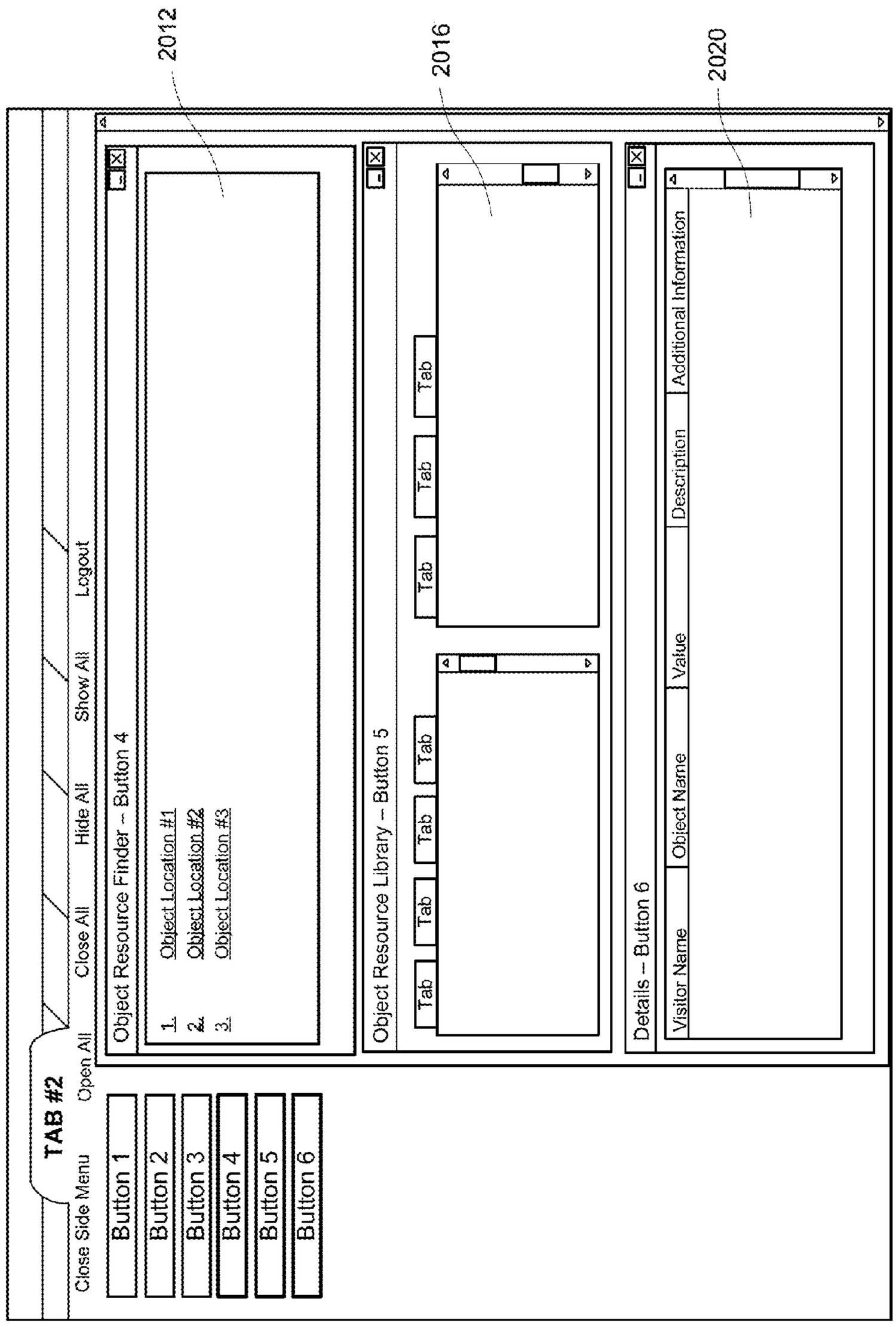
2012
2016
2020
TAB #2
Close Side Menu
Open All
Close All
Hide All
Show All
Logout
Button 1
Button 2
Button 3
Button 4
Button 5
Button 6
Object Resource Finder – Button 4
1. Object Location #1
2. Object Location #2
3. Object Location #3
Object Resource Library – Button 5
Tab
Tab
Tab
Tab
Tab
Tab
Tab
Details – Button 6
Visitor Name
Object Name
Value
Description
Additional Information

FIG. 21

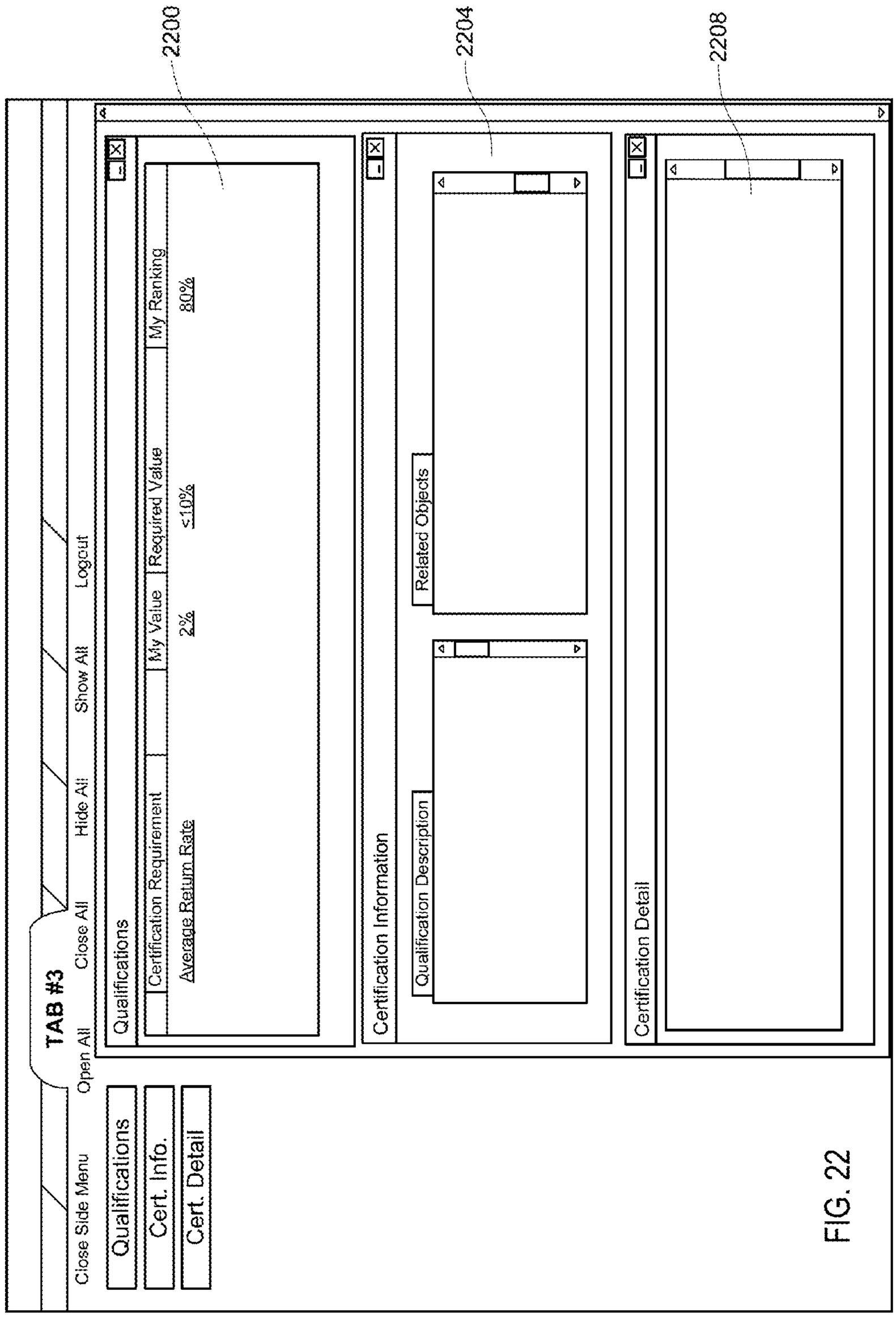
2200
2204
2208
TAB #3
Close All
Hide All
Show All
Logout
Close Side Menu
Open All
Qualifications
Cert. Info.
Cert. Detail
Qualifications
Certification Requirement
My Value
Required Value
Average Return Rate
2%
≤10%
My Ranking
80%
Certification Information
Qualification Description
Related Objects
Certification Detail

FIG. 22

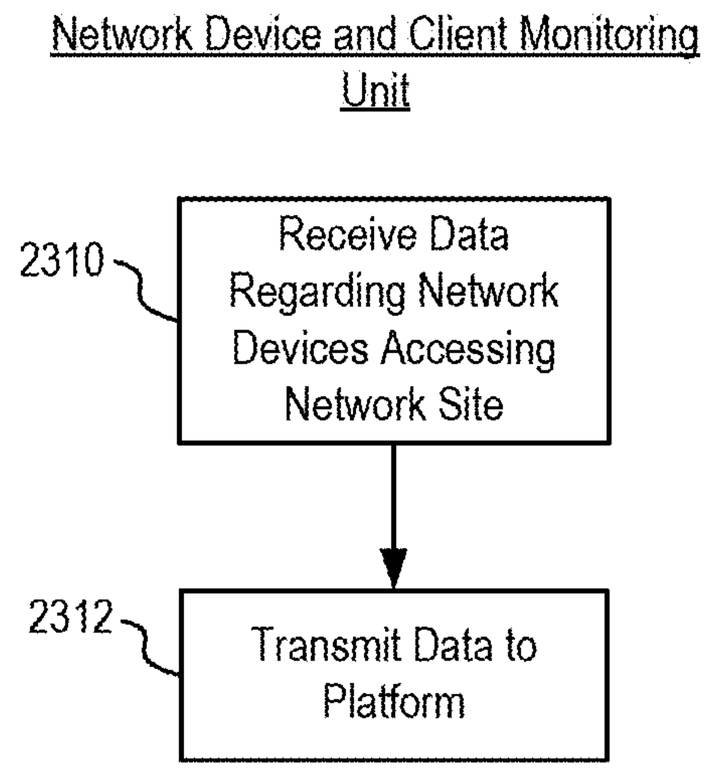
Network Device and Client Monitoring Unit
2310
Receive Data Regarding Network Devices Accessing Network Site
2312
Transmit Data to Platform

FIG. 23

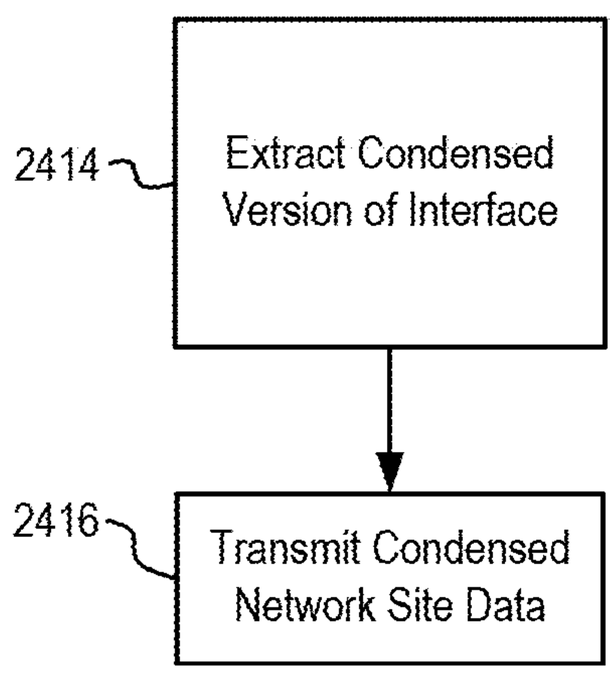
2414
Extract Condensed Version of Interface
2416
Transmit Condensed Network Site Data

FIG. 24

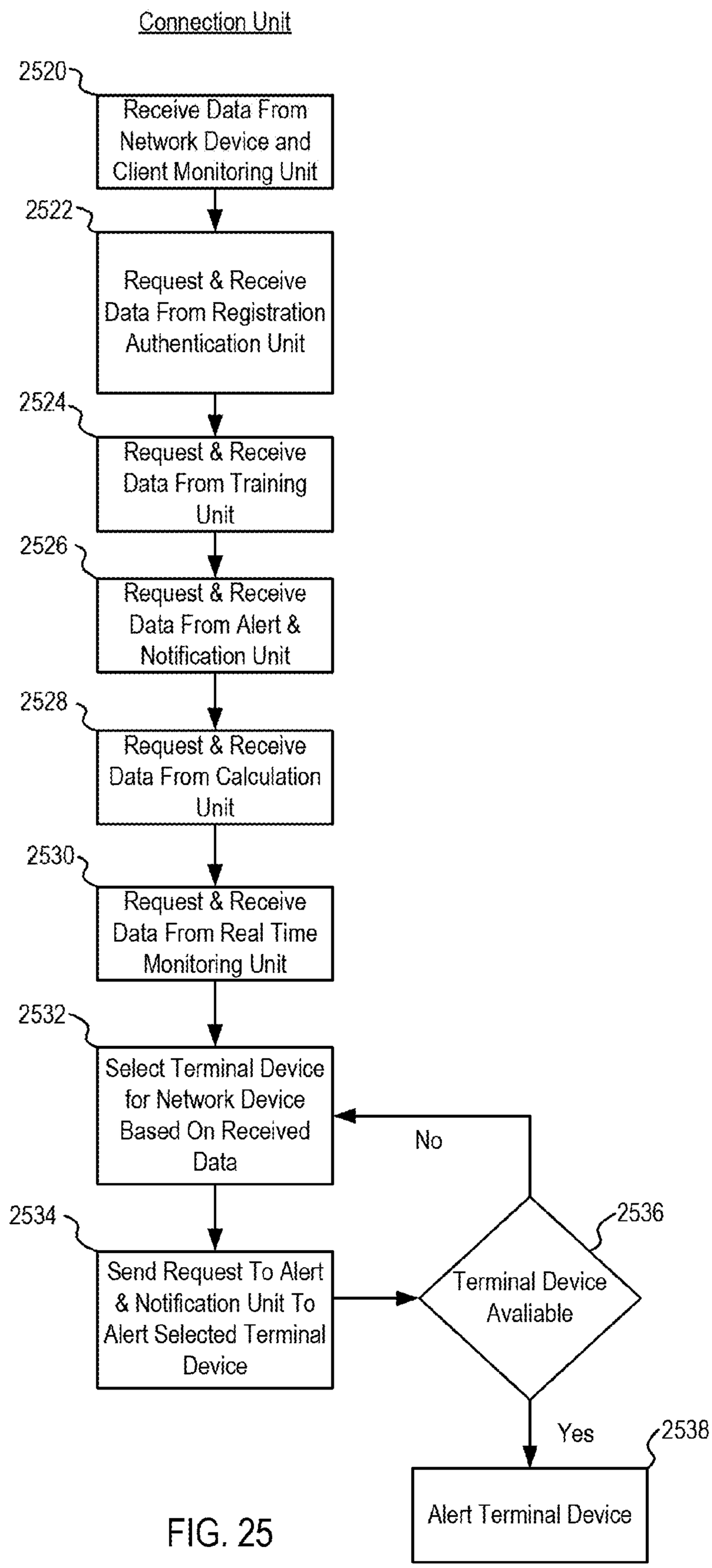
Connection Unit
2520
Receive Data From Network Device and Client Monitoring Unit
2522
Request & Receive Data From Registration Authentication Unit
2524
Request & Receive Data From Training Unit
2526
Request & Receive Data From Alert & Notification Unit
2528
Request & Receive Data From Calculation Unit
2530
Request & Receive Data From Real Time Monitoring Unit
2532
Select Terminal Device for Network Device Based On Received Data
No
2534
Send Request To Alert & Notification Unit To Alert Selected Terminal Device
2536
Terminal Device Avaliable
Yes
2538
Alert Terminal Device

FIG. 25

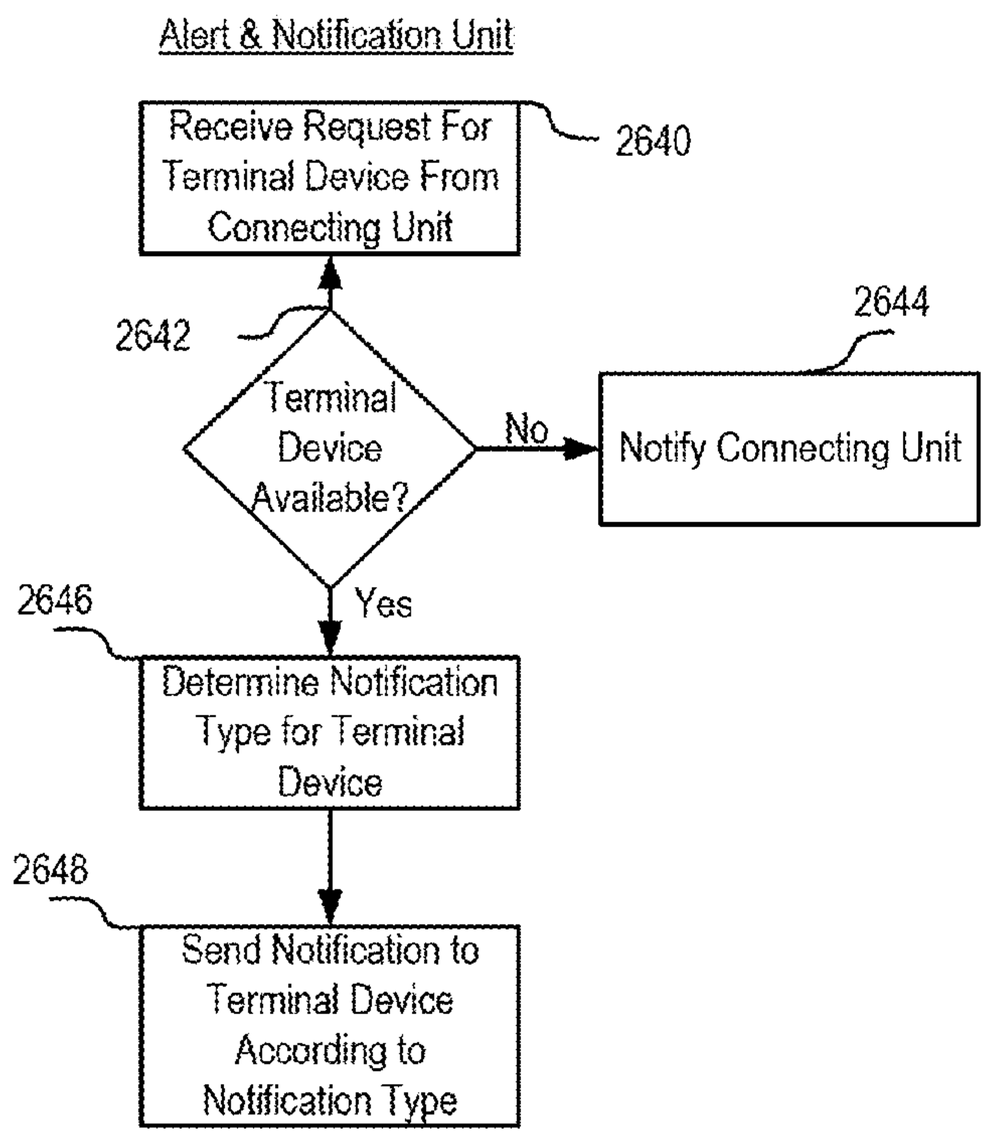
Alert & Notification Unit
Receive Request For Terminal Device From Connecting Unit
2640
2642
Terminal Device Available?
No
2644
Notify Connecting Unit
Yes
2646
Determine Notification Type for Terminal Device
2648
Send Notification to Terminal Device According to Notification Type

FIG. 26

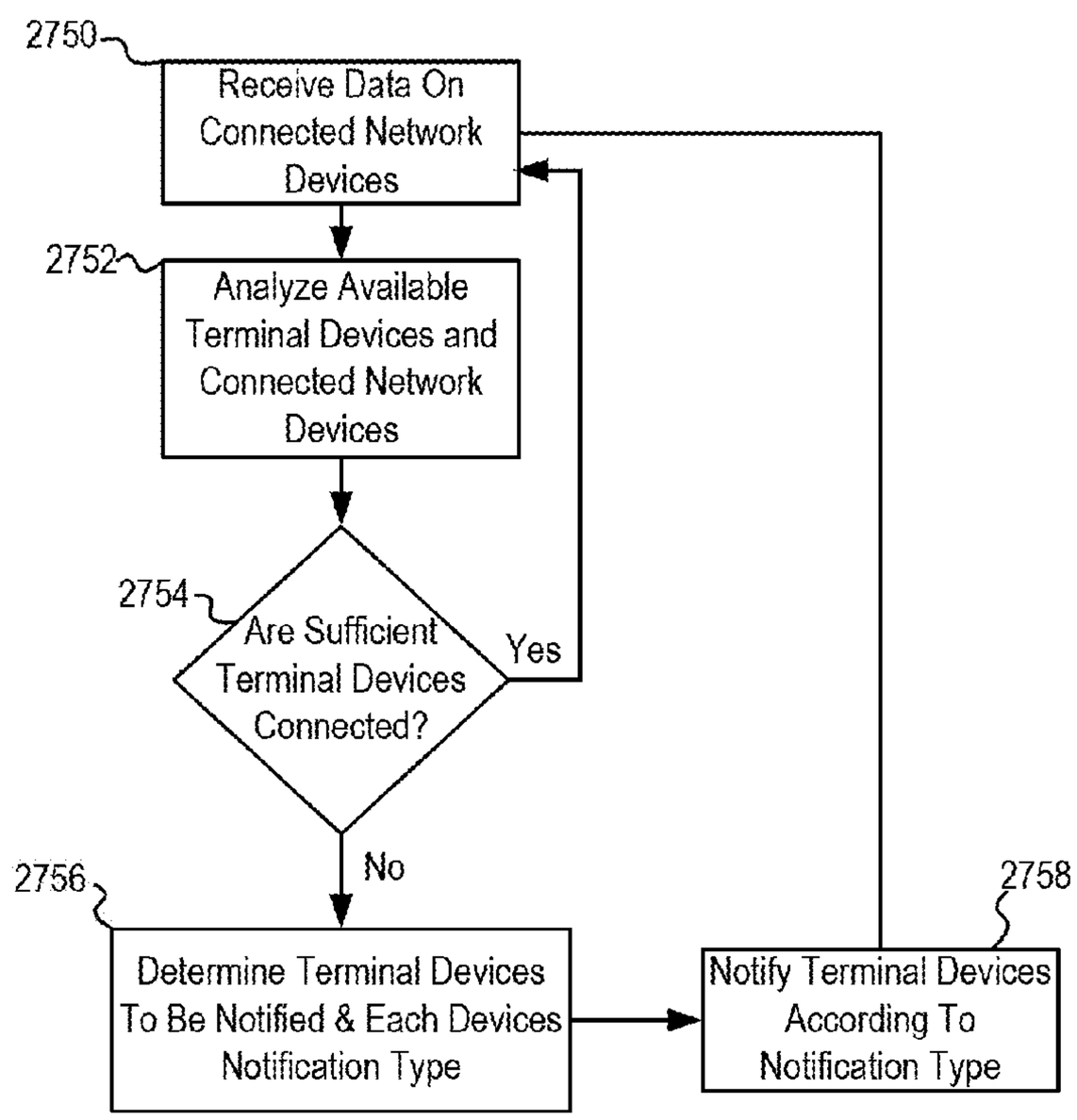
2750
Receive Data On Connected Network Devices
2752
Analyze Available Terminal Devices and Connected Network Devices
2754
Are Sufficient Terminal Devices Connected?
Yes
No
2756
Determine Terminal Devices To Be Notified & Each Devices Notification Type
2758
Notify Terminal Devices According To Notification Type

FIG. 27

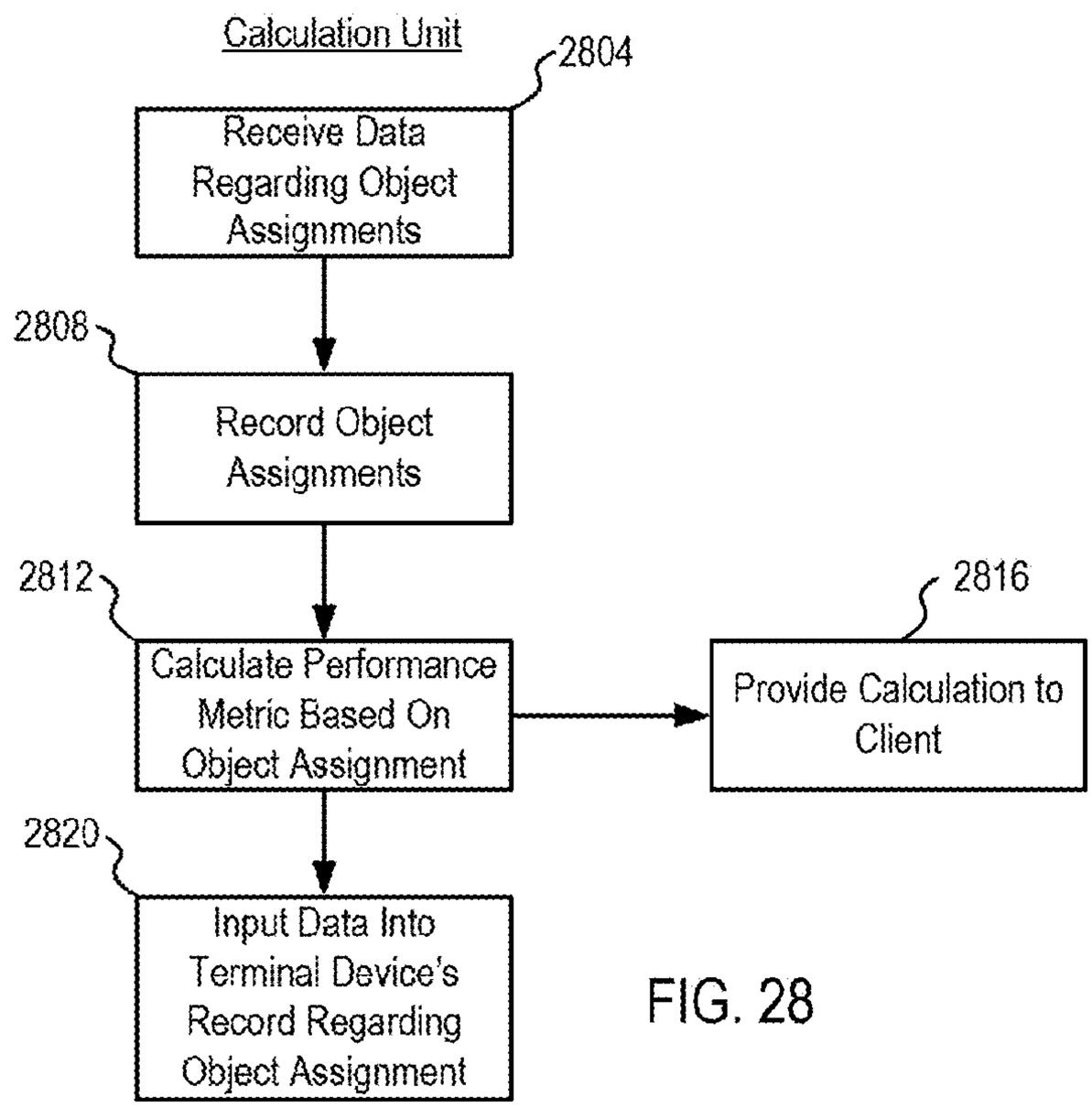
Calculation Unit
2804
Receive Data Regarding Object Assignments
2808
Record Object Assignments
2812
Calculate Performance Metric Based On Object Assignment
2816
Provide Calculation to Client
2820
Input Data Into Terminal Device's Record Regarding Object Assignment

FIG. 28

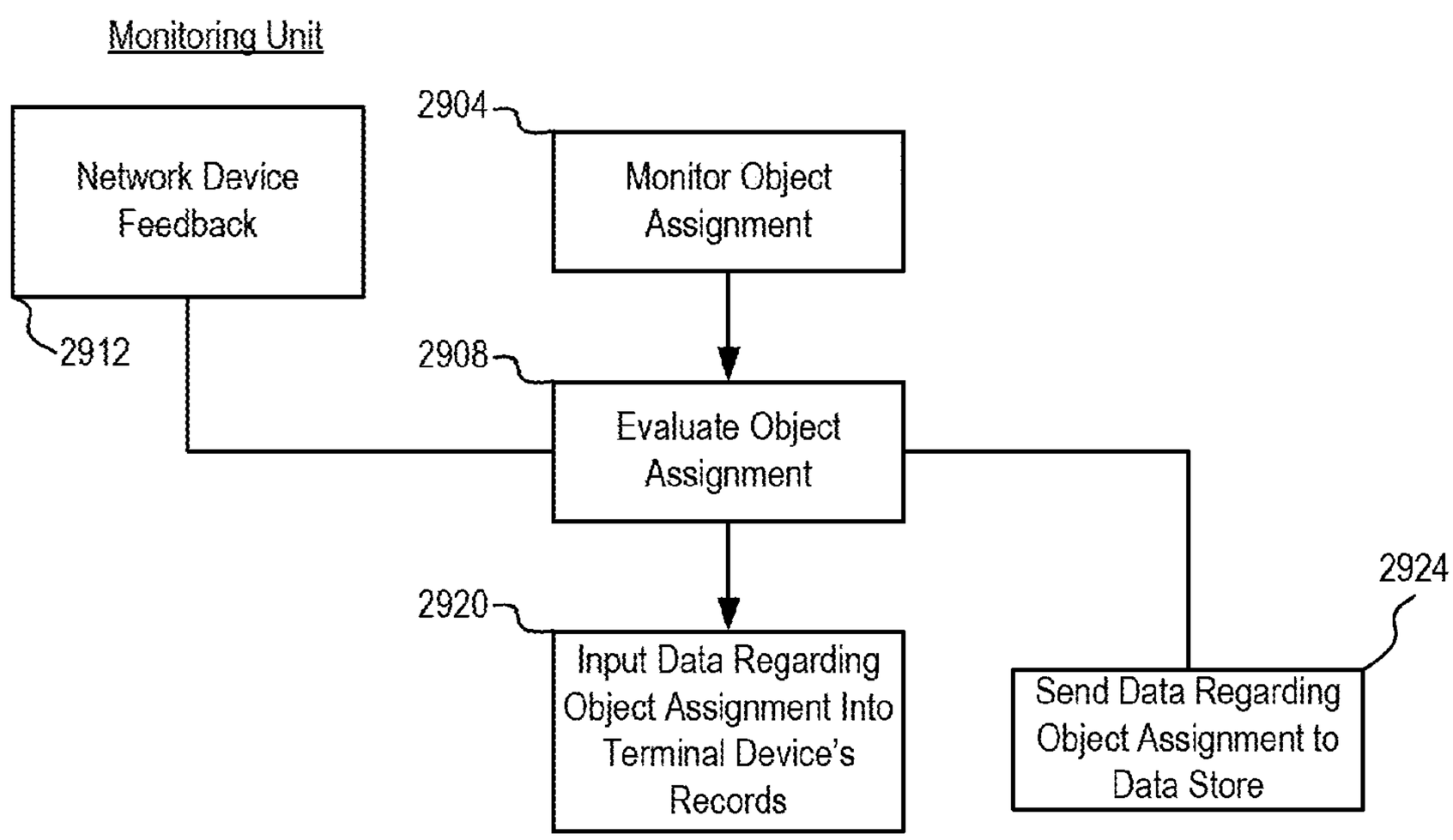
Monitoring Unit
Network Device Feedback
2912
2904
Monitor Object Assignment
2908
Evaluate Object Assignment
2920
Input Data Regarding Object Assignment Into Terminal Device's Records
2924
Send Data Regarding Object Assignment to Data Store

FIG. 29

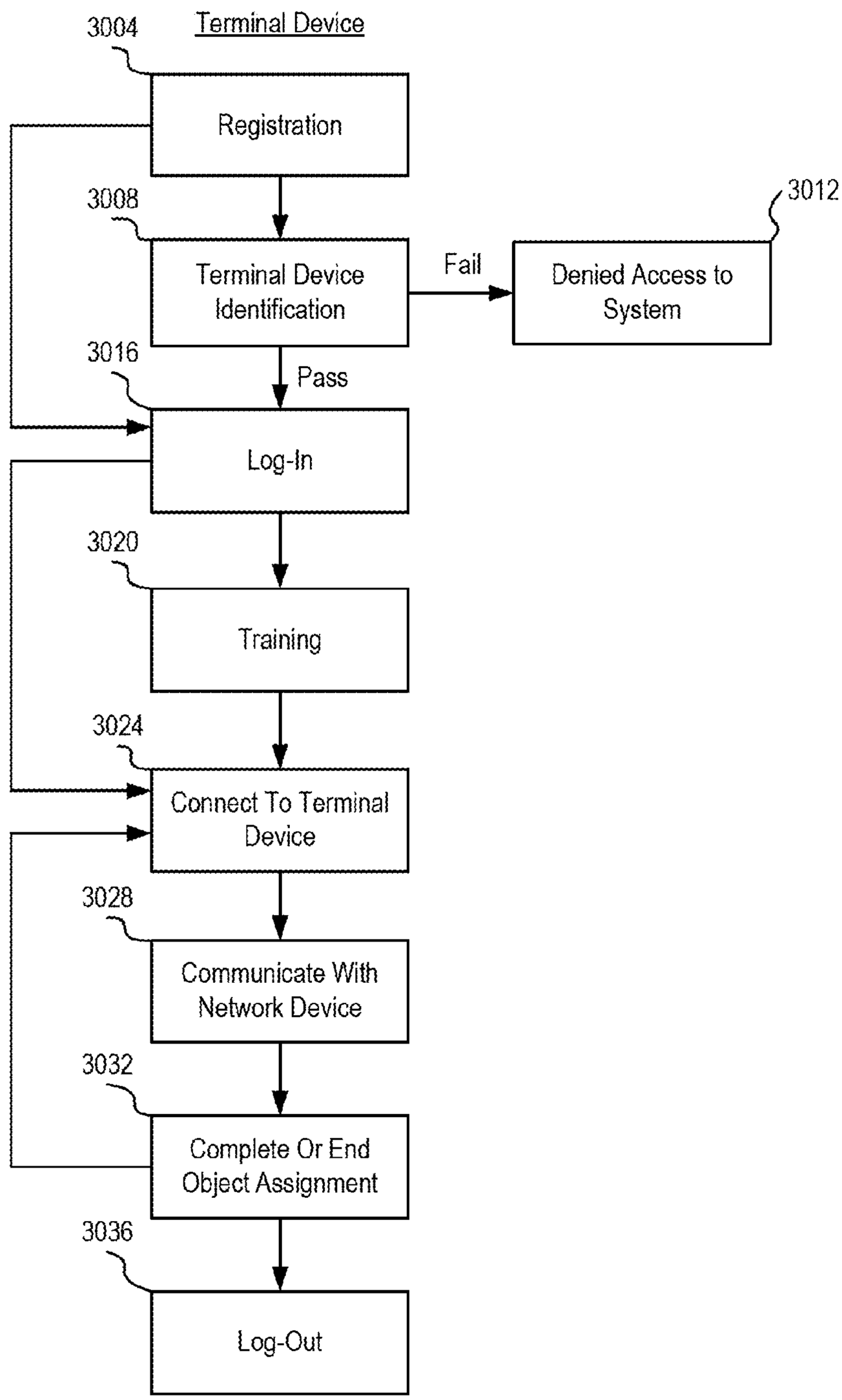
3004
Terminal Device
Registration
3008
Terminal Device Identification
Fail
3012
Denied Access to System
3016
Pass
Log-In
3020
Training
3024
Connect To Terminal Device
3028
Communicate With Network Device
3032
Complete Or End Object Assignment
3036
Log-Out

FIG. 30

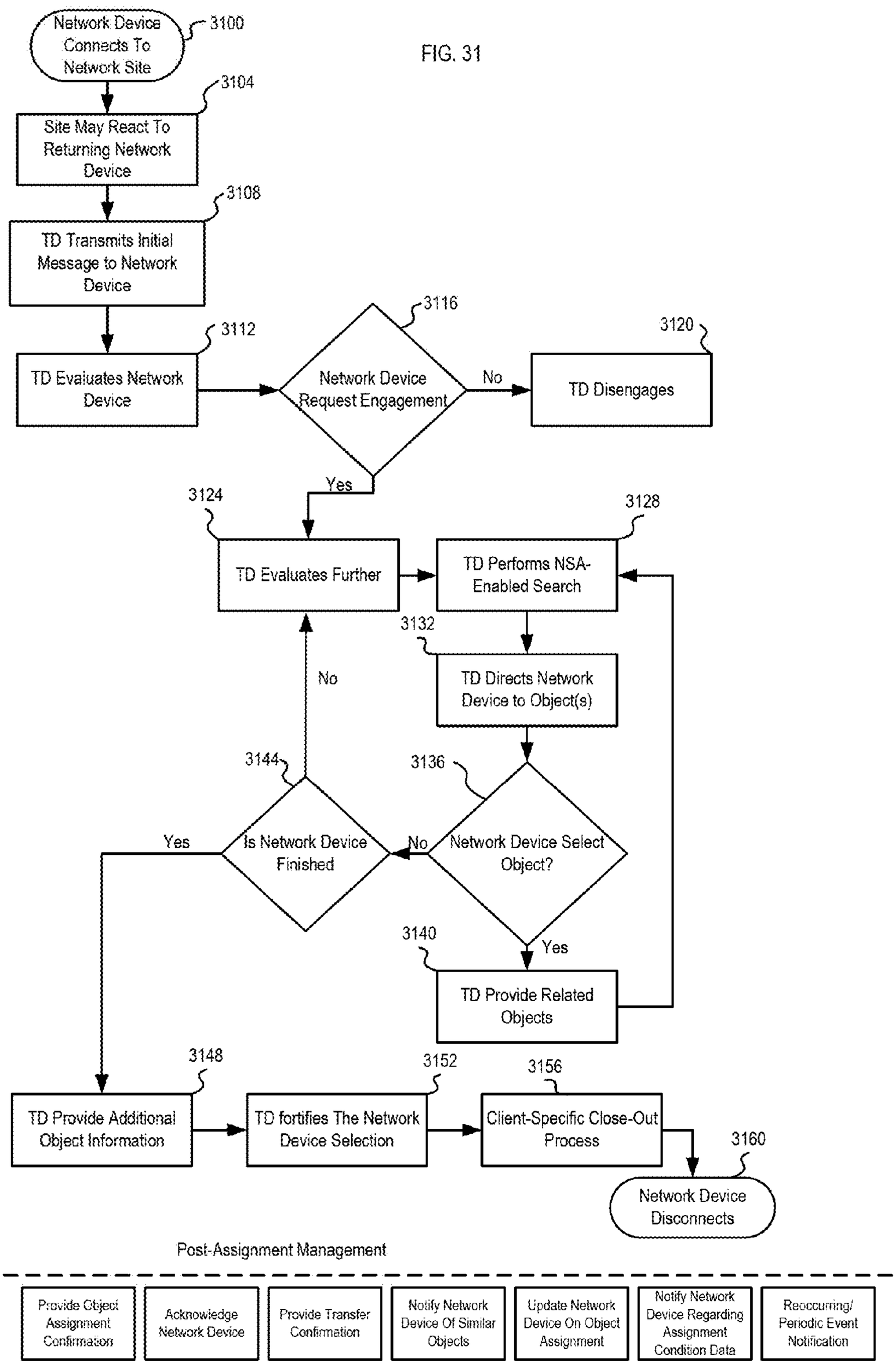
Network Device Connects To Network Site
3100
Site May React To Returning Network Device
3104
TD Transmits Initial Message to Network Device
3108
TD Evaluates Network Device
3112
Network Device Request Engagement
3116
No
TD Disengages
3120
Yes
TD Evaluates Further
3124
TD Performs NSA-Enabled Search
3128
TD Directs Network Device to Object(s)
3132
No
Network Device Select Object?
3136
No
Is Network Device Finished
3144
Yes
Yes
TD Provide Related Objects
3140
TD Provide Additional Object Information
3148
TD fortifies The Network Device Selection
3152
Client-Specific Close-Out Process
3156
Network Device Disconnects
3160
Post-Assignment Management
Provide Object Assignment Confirmation
Acknowledge Network Device
Provide Transfer Confirmation
Notify Network Device Of Similar Objects
Update Network Device On Object Assignment
Notify Network Device Regarding Assignment Condition Data
Reoccurring/ Periodic Event Notification

FIG. 31

SYSTEM AND METHODS FOR FACILITATING OBJECT ASSIGNMENTS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. patent application Ser. No. 14/288,258 filed on May 27, 2014, which is a continuation of U.S. patent application Ser. No. 09/922,753 filed on Aug. 6, 2001, now issued as U.S. Pat. No. 8,868,448, which claims priority under 35 U.S.C. §119(e) to U.S. Provisional Application No. 60/244,039 filed on Oct. 26, 2000. This application is also a continuation-in-part of U.S. application Ser. No. 10/980,613 filed on Nov. 3, 2004, which is a continuation of U.S. patent application Ser. No. 09/922,753 filed on Aug. 6, 2001, now issued as U.S. Pat. No. 8,868,448, which claims priority under 35 U.S.C. §119(e) to U.S. Provisional Application No. 60/244,039 filed on Oct. 26, 2000. The disclosures of each of the foregoing patent applications is incorporated herein by reference in their entirety for all purposes.

FIELD OF THE INVENTION

The present disclosure relates to generally to facilitating routing of communications. More specifically, techniques are provided to facilitate communication sessions between network devices and terminal devices.

BACKGROUND

In order to enhance the efficiency of agents, clients define rules that attempt to improve the agents' time usage. Clients try to create rules which they feel are indicators of a user's likelihood of ending up with a positive result. Invariably, these rules are almost always wrong. In fact, using such a technique, rule upon rule may be created, and after a while one can logically determine the efficacy of these rules that are created due to their complexity.

A system does not exist that (i) connects users with agents, (ii) provides relevant information to terminal devices and then (iii) facilitates the type of communication between the network device and the terminal device that is familiar in real-world situations.

SUMMARY OF THE INVENTION

The present invention is directed to a system and functionality that removes the guess work out of trying to determine which network devices (e.g., computing devices associated with users interacting with a network site) are more inclined to end up with a positive result. The present invention captures as much information about network devices at a server with respect to their interactions with the server. Then the server enables the client to use rules to define the plurality of network devices that are suitable for chat invitations. Out of this plurality, the server, on behalf of each terminal device (e.g., computing devices associated with agents), can engage in communication with network devices in a random manner. As terminal devices are communicating with network devices and determining their result codes (e.g., a code representing a particular event or result), the server determines if it can identify any characteristics in those communications or communication sessions (e.g., engagements) that end up with a target result code. For example, the server may detect that network devices who were invited to communicate (e.g. chat) in the

8th minute of their session and those who had seen two particular pages end up in positive engagements four times more often than a normal network device. When a defined set of engagements is performed to allow the server to develop an evaluation protocol (e.g., a model or profile) of network devices that end up with positive engagements, the server compares all new network devices against this evaluation protocol and generates a parameter (e.g., a score or value) indicating the similarity between the new network device and the evaluation protocol. This parameter is then used by the system to order the network devices in real time and used as the rule defining who should be engaged and in which order.

The invention can also analyze information that extends beyond the network device's action or interaction (e.g., behavior) on the network site (e.g., web page, network interface, network location, URL, etc., used interchangeably herein) by interfacing with other data sources, such as network device records in the client, to provide the process additional data to analyze.

Furthermore, the invention can also use specific network device interactions on the network interface to determine if network devices have ended up with positive results, such as completion of an object assignment during or after the communication. This can be determined by analyzing the clickstream data obtained or provided by the client.

In addition, the present invention creates a system that allows agents to assign objects (e.g. products and/or services, referred to herein as "objects") to users over, through, or in conjunction with a server connected to a network. The terms "over, through or in conjunction with," used singly or in combination, contemplate object assignments that occur through the present invention that (i) are performed solely through interactions with the server, as well as object assignments that occur through the present invention that merely originate through interactions with the server, or (ii) are captured by interactions using the server, such as through the present invention, but are completed either through a telephone connection (as contemplated herein) or in face-to-face settings. With regard to the scenarios contemplated in item (ii) above, the present invention represents a bridge that connects server-based and face-to-face object assignments.

The present invention fundamentally changes object assignments using interactions with the server to one similar to object assignments in face-to-face situations with real time access to people who have resource sets relating to the objects being assigned. Moreover, the present invention provides the terminal devices with object data from the client and third parties. The present invention further monitors each object assignment and accumulates a record of techniques and data. The present invention further provides real-time communication functionality, via chat functions, voice over IP, data streaming and the public switched telephone network ("PSTN"), that facilitates live communication between the terminal devices and network devices. The present invention may be implemented by a client either as a stand-alone application or on integrated with other applications that operate in reference to a client's network site, or a client's existing customer relationship management ("CRM"), or client resource planning ("ERP") systems.

The present invention allows clients to bring their existing terminal devices into communication with network devices—generating more requests for object assignments, irrespective of where a the communication originates. The present invention further allows a new paradigm to emerge by permitting terminal devices to provide data on an object-

centric, rather than an client-centric manner. Independent terminal devices (independents with respect to the client that provide a particular object) may be available for any number of network-based object assignment options.

The present invention is for use in connection with the network environment, whether wired or wireless, or can be used with other environments. The present invention has application in face-to-face environments as well. For example, the data store of subject-matter specific terminal devices could be accessed by other subject-matter specific terminal devices within the client (or by the client's administrators) to obtain data as to which agent would be fit to be the engage with a user on a face-to-face engagement. Similarly, terminal devices could use the data store of engagement data (e.g., collateral material) to address a network device's objection expressed in a face-to-face engagement. Thus, there are both offline and network-accessible (e.g., online) applications of the present invention. Within this application, the word network site refers to any electronic interface to the client and includes, but is not limited to, a network site accessed by a computer or wireless device with a browser functionality and also includes any other electronic interface where a client's objects can be assigned to users, including a network connected telephone or voice response system.

The system of the present invention performs several major tasks. First, the system provides a registration system for all terminal devices that enables the system to monitor all terminal devices and allows for a verification of the terminal device. The system also provides training procedures that enable terminal devices to establish their resource set to assign specific types (e.g., classes) of objects and to assign objects over a network in general. The system determines whether a network device interacting with a network interface has characteristics indicating a need for engagement from a terminal device based upon available clickstream and/or login data (the login data, for example, might identify the network device as a high value device who either already is or is eligible to become a private client). The system also allows the network device either to transmit a request for an engagement or to be engaged by a terminal device to assign that object and who has been made aware of the option using the similarity parameters of the system.

As noted above, the system includes an engagement unit. The engagement unit dynamically connects terminal devices with network devices based on a range of client and/or system-driven rules to determine the most appropriate terminal device to connect to each network device (based on data about the network device's session (the nature of the engagement), the network device and the terminal device and performance orders (e.g., rankings), defined permissions). Examples of the relevant connection rules (e.g., matching rules) can include clickstream data, spatial characteristics of the network device or the terminal device. The system enables the client to establish and weigh these similarity parameters to facilitate the most appropriate connections based on previous engagements with the systems. The engagement unit additionally dynamically changes the connection rule based on various factors, such as positive results. The engagement unit orders the terminal devices based on the connection rules used and generates a list of terminal devices in an order. The rules underlying the engagement unit can be dynamically modified by the client's administrators to set different 'triggers' for terminal device/network device communication in accordance with changes in the client's engagement workflows. A client server can parse the processing load (e.g., traffic) at the server to the most suitable terminal devices depending upon an range of variables: the type of object, the location characteristics of both the network device and the terminal device, the abilities of the terminal device in that object type and the terminal device's ability to complete a networked object assignment.

The mismatches of terminal device to engagement options, either in terms of the object resource set of the terminal device, or of the location characteristics of the network device and the terminal device, are addressed by the present invention. The present invention addresses this by connecting object-specific terminal devices with network devices based on (i) available clickstream data that passes data to the system about the nature of the object assignment option itself, (ii) spatial data about the network device, (iii) data about the proficiencies of the terminal devices in the client's terminal device force (e.g., which terminal devices perform well into these types of engagements to these types of network devices) and (iv) the nature of the 'triggers,' or connection rules established by the client.

After the engagement unit performs the connection function, the terminal device can be linked to the network device in a range of ways. First, the system can identify the most appropriate terminal device for a particular engagement; if that terminal device is not available, the engagement unit will identify the next most appropriate terminal device and so on until the network device is engaged by a terminal device. The engagement unit can notify the terminal device of an engagement even when the device is not connected, such as through a page or a call to the terminal device's telephone. Second, the engagement unit can transmit a notification message to a group of terminal devices and allow the terminal devices that initiates an engagement first to connect with the network device for a communication session.

Alternatively, the engagement unit can provide the terminal devices with their similarity parameter (or notify them, without necessarily providing their similarity, that they are available for a particular engagement), and let the terminal devices determine whether to engage the network device (or let the terminal devices 'race' to the network device). This data is provided to the terminal device on a series of terminal device-facing pages (e.g., a terminal device desktop) that the terminal device can view to see, in a dynamic, real-time manner, the number and kind of network devices that the terminal device is authorized under the system to engage. So, the terminal device can identify candidate engagements by being connected to the system or the terminal device, with the client's permission, can be contacted by the system when an appropriate candidate engagement for that terminal device is identified by the system.

In some instances, the connection unit allows for "permissive" and "required" engagements, as established through the system by the client (e.g., the object distributor (e.g. vender) of a particular object) that controls its operation. A "permissive" situation is defined by the system as one in which a terminal device may (permissively) engage a network device based on elements of the connection unit. A "required" situation is defined as one that the client has defined as requiring a terminal device to engage (mandatory). The system allows both "permissive" and "required" scenarios to be executed, and for the parameters that define these scenarios to be established, weighted, ordered and then re-ordered based on actual performance.

The system can operate independently to the client's networked channel or be connected to the client's servers to obtain data about known network devices (the system of course allows terminal devices to engage both network

devices known to the client (such as through login data or a cookie) and network devices, as far as the client is aware at the time of engagement, simply anonymous connected network devices). The system can also be connected to the other client servers to retrieve object and catalog data, such as alternative object data, and any related objects. This data is provided to the terminal device on the terminal device-facing interface.

An external data obtaining unit allows the terminal devices to obtain, at the point of an engagement option (e.g., opportunity), engagement data (either from the client or from third-party servers accessible through a network or from other servers) that may facilitate an object assignment process. A range of data, both internal and external to the client, could be obtained that might be helpful completing an object assignment process with the network device, including existing client-provided information. The data obtaining unit obtains this data (as established in a baseline (i.e., initial) configuration), and as it has subsequently been used throughout the client's terminal device force), and then can prescribe specific engagement data for use in conjunction with any particular engagement option to the terminal device via the terminal device-facing network sites.

Additionally, the system includes a protocol unit that monitors the object assignment process to create a data store of functions (e.g. techniques) and engagement data that were and were not conducive to any particular object assignment process. The unit continually evaluates and re-orders terminal devices (e.g. engagement options available to terminal devices) and engagement data based on all activity captured by the system contemporaneously. During an object assignment process, the system enables terminal devices to access one or more data stores using the terminal device's interface so that the terminal device can facilitate completion of an object assignment process with a network device.

The system does not have to result in the completion of object assignments processes through networked interactions. For example, in a complex situation, it may be sufficient for the engagement to originate via a networked or connected (e.g. online) process at a device interface, for the terminal device to achieve an introduction through a proactive chat session, for the session to bridge from chat to a PSTN connection, for the terminal device to make an appointment with the network device at a defined location. Accordingly, the utility of the application is not limited to the network channel. Hence, the present invention also relates to functionality that will enable a terminal device to first communicate with a network device in chat, but also to bridge from the chat session to a telephonic connection through the PSTN or via VOIP technology.

The system also continuously monitors the object assignment process and provides this data as well as reports on network devices, terminal devices, and object assignments to the client server. This data can also be transmitted to data stores associated with the client for management purposes. Further, the system obtains a data store of network device object assignment characteristics that provide network device action data (e.g., data representing an interaction between a network device/terminal device and a network site) to terminal devices and clients. This data drives connections between terminal devices and network devices (both in terms of agents and object assignment data that are determined in any engagement option). Therefore, the present invention will substantially enhance network device's networked object assignment processes and increase the volume of object assignments, over, through, or in conjunction with networked environments.

The present invention enhances the effectiveness of the networked object assignment process particularly with respect to more complex objects, such as electronic equipment, automobiles, and other objects that typically require a high-level of interaction with a terminal device. Thus, the present invention allows clients to expand the types of objects that can be assigned using a networked channel. Moreover, by enabling terminal devices to engage connected network devices, the present invention enables clients to use the communication functionality provided through the present invention to address network device requirements in real time, either for the purpose of completing an object assignment. Thus, the present invention bridges the networked and face-to-face object assignment processes.

The present invention addresses networked object assignment problems by connecting current object assignment availabilities with terminal devices—in effect placing a terminal device into the networked channel.

A major difference between current eCRM and the present invention is that the present invention goes beyond existing CRM tactics by connecting the network device with the most appropriate terminal devices for the network devices requirements, bringing the most appropriate terminal device to the engagement, and then providing that terminal device with the necessary tools to execute the object assignment process (both data and communication functionalities). This should be compared to current eCRM that merely provide access to a call center representative who is inadequately trained to answer questions about objects or suggest reasonable alternatives to network devices. By establishing interaction between network and terminal devices as part of the object assignment process rather than waiting for a network device to request an engagement, the present invention improves the networked object assignment interaction (e.g. experience). Additionally, the present invention allows for a terminal device to have a relationship with the network devices (rather than the "data store" building a relationship with the network device). Further, the present invention provides a dynamic solution—not a mechanized solution. Finally, the present invention contemplates a series of real-time communication functionalities—chat, VOIP, streaming media and, importantly, the PSTN—that bridge the networked and offline channels and make the networked interaction far more potent from an object assignment perspective.

BRIEF DESCRIPTION OF THE DRAWINGS

The present disclosure is described in conjunction with the appended figures:

FIG. **1** shows a block diagram of an embodiment of a network interaction system;

FIG. **2** shows a block diagram of another embodiment of a network interaction system;

FIGS. **3**A-**3**C show block diagrams of other embodiments of a network interaction system that includes a connection management system;

FIG. **4** shows a representation of a protocol-stack mapping of connection components' operation;

FIG. **5** represents a multi-device communication interaction system according to an embodiment;

FIG. **6** shows a block diagram of an embodiment of a connection management system;

FIGS. **7**A and **7**B are block diagrams illustrating the overall architecture of the present invention.

FIG. **7**C is a diagram illustrating examples of the various types of attributes, actions, and terminal device feedback that may be evaluated by the real time data mining unit.

FIG. **7**D illustrates the process of generating a parameter for a new network device accessing a server.

FIG. **7**E illustrates sorting network devices by similarity parameter, and how terminal device may thereafter engage the network device.

FIG. **8** is a process diagram illustrating the overall operation of the present invention.

FIG. **9** is a functional diagram illustrating the external connectivity of an embodiment of a system for linking terminal devices to network devices according to the present invention.

FIG. **10** is a functional diagram illustrating the external connectivity of an embodiment of a system for linking terminal devices with network devices according to the present invention.

FIG. **11** is a functional diagram schematically illustrating the architecture of the system and the external connectivity of the system with an client.

FIG. **12** is a functional diagram schematically illustrating the architecture of the system and the external connectivity of the system with an client.

FIG. **13** is a flow diagram illustrating the operation of some of the functionality of the present invention.

FIG. **14** is a flow diagram illustrating the registration and authentication process according to an embodiment of the present invention.

FIG. **15** is a flow diagram illustrating the registration and authentication process according to an embodiment of the present invention.

FIG. **16** is a flow diagram illustrating the training process according to an embodiment of the present invention.

FIG. **17** is a flow diagram illustrating the training process according to an embodiment of the present invention.

FIG. **18** is a functional diagram illustrating the connection unit according to an embodiment of the present invention.

FIG. **19** is a screen shot of the object assignment function of a terminal device user interface.

FIG. **20** is a screen shot of an example interface of the terminal device user interface.

FIG. **21** is a further screen shot of the example interface of the terminal device user interface.

FIG. **22** is a screen shot of another example interface of the terminal device user interface.

FIGS. **23** and **24** are flow diagrams illustrating the operation of functionalities of the network device monitoring unit according to an embodiment of the present invention.

FIG. **25** is a flow diagram illustrating the connection process according to one embodiment of the present invention.

FIGS. **26** and **27** are flow diagrams of the alert and notification unit according to an embodiment of the present invention.

FIG. **28** is a flow diagram illustrating the operation of functionalities of the Calculation (e.g., accounting) Unit according to an embodiment of the present invention.

FIG. **29** is a flow diagram illustrating the operation of functionalities of the Real Time Monitoring Unit according to an embodiment of the present invention.

FIG. **30** is a flow diagram illustrating the interaction of a terminal device with one embodiment of the present invention.

FIG. **31** is a flow diagram illustrating object assignment process according to an embodiment of the present invention.

In the appended figures, similar components and/or features can have the same reference label. Further, various components of the same type can be distinguished by following the reference label by a dash and a second label that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label.

DETAILED DESCRIPTION

The ensuing description provides examples of embodiment(s) only and is not intended to limit the scope, applicability or configuration of the disclosure. Rather, the ensuing description of the examples of embodiment(s) will provide those skilled in the art with an enabling description for implementing examples of embodiment. It is understood that various changes can be made in the function and arrangement of elements without departing from the spirit and scope as set forth in the appended claims.

FIG. **1** shows a block diagram of an embodiment of a network interaction system **100** which implements and supports certain embodiments and features described herein. Certain embodiments relate to establishing a connection channel between a network device **105** (which can be operated by a user **110**) and a terminal device **115** (which can be operated by an agent **120**). In certain embodiments, the network interaction system **100** can include a client device **130** associated with a client **125**.

In certain embodiments, a user **110** can access remote server **140** to interact with an interface. A client **125** can be an entity that provides, operates, or runs the network site, or agents employed by or assigned by such an entity to perform the tasks available to a client **125** as described herein. The agent **120** can be a person, such as a support agent tasked with providing support or data to the user **110** regarding the network site (e.g., data about objects available for assignment over a network). Out of a large number of agents, a subset of agents may be appropriate for providing support or data for a particular client **125**. The agent **120** may be affiliated or not affiliated with the client **125**. Each agent can be associated with one or more clients **125**. In some non-limiting examples, a user **110** can access a network site using a user device (e.g., a smartphone, an electronic computing device, an electronic computing device, and other suitable computing devices), a client **125** can be a company that provides objects to be assigned to users that meet certain conditions (e.g., pays a specific price), and an agent **120** can be an agent that is associated with the company. In various embodiments, the user **110**, client **125**, and agent **120** can be other users or entities.

While FIG. **1** shows only a single network device **105**, terminal device **115** and client device **130**, an interaction system **100** can include multiple or many (e.g., tens, hundreds or thousands) of each of one or more of these types of devices. Similarly, while FIG. **1** shows only a single user **110**, agent **120** and client **125**, an interaction system **100** can include multiple or many of each of one or more of such entities. Thus, it may be necessary to determine which terminal device is to be selected to communicate with a particular network device. Further complicating matters, a remote server **140** may also be configured to receive and respond to select network-device communications.

A connection management system **150** can facilitate strategic routing of communications. A communication can include a message with content (e.g., defined based on input

from an entity, such as typed or spoken input). The communication can also include additional data, such as data about a transmitting device (e.g., an IP address, user identifier, device type and/or operating system); a destination address; an identifier of a client; an identifier of an interface or interface element (e.g., a network site or network site element being visited when the communication was generated or otherwise associated with the communication); a time (e.g., time of day); and/or destination address. Other data can be included in the communication. In some instances, connection management system **150** routes the entire communication to another device. In some instances, connection management system **150** modifies the communication or generates a new communication (e.g., based on the initial communication). The new or modified communication can include the message (or processed version thereof), at least some (or all) of the additional data (e.g., about the transmitting device, network interface and/or time) and/or other data identified by connection management system **150** (e.g., user data associated with a particular user identifier or device). The new or modified communication can include other data as well.

Part of strategic-routing facilitation can include establishing, updating and using one or more connection channels between network device **105** and one or more terminal devices **115**. For example, upon receiving a communication from network device **105**, connection management system **150** can first estimate to which client (if any) the communication corresponds. Upon identifying a client, connection management system **150** can identify a terminal device **115** associated with the client for communication with network device **105**. In some instances, the identification can include evaluating a protocol (e.g., profile) of each of a plurality of agents, each agent (e.g., agent **120**) in the plurality of agents being associated with a terminal device (e.g., terminal device **115**). The evaluation can relate to a content in a network-device message. The identification of the terminal device **115** can include a technique described, for example, in U.S. application Ser. No. 12/725,799, filed on Mar. 17, 2010, which is hereby incorporated by reference in its entirety for all purposes.

In some instances, connection management system **150** can determine whether any connection channels are established between network device **105** and a terminal device associated with the client (or remote server **140**) and, if so, whether such channel is to be used to transmit and receive a series of communications including the communication or message. This determination may depend, at least in part, on a topic associated with the communication, a polarity parameter (e.g., a sentiment score or value) associated with the communication or a past related communication, an estimated response latency for terminal device **115** and/or a type of communication channel associated with the communication (e.g., instant message, message, email, phone). Selecting an established communication channel may reduce the need to relay data from network device **105** multiple times. Meanwhile, determining that a new communication channel is to be established can facilitate quicker responses from more specialized agents.

A decision as to whether to select (or continue to use) an established communication channel and/or a selection of a new terminal device can include determining an extent to which each of one or more terminal devices (e.g., associated with a client) corresponds to a communication and/or an associated the user. Such correspondence can relate to, for example, an extent to which an agent's resource set (e.g., knowledge base) corresponds to a communication topic, an availability of an agent at a particular time and/or over a channel type, a language similarity between a user and agent.

Connection management system **150** may use communication analyses to influence routing determinations (e.g., determining whether to route a communication to a terminal device having previously received a communication from a network device having transmitted the communication or selecting a terminal device to receive or transmit a communication). One communication analysis can include determining one or more types or tags of a current or past communication or communication series. For example, a communication can be assigned a type for each of (for example) a topic, channel type (e.g., email, SMS message, real-time chat, phone call or asynchronous message), complexity level, message polarity, and/or whether/which file type is attached, and a terminal-device selection can be biased towards terminal devices associated with similar or related types.

Upon selecting a terminal device **115** to communicate with network device **105**, connection management system **150** can establish a connection channel between the network device **105** and terminal device **115**. In some instances, connection management system **150** can transmit a message to the selected terminal device **115**. The message may request that the terminal device approve a proposed assignment to communicate with a network device **105** or identify that such an assignment has been generated. The message can include data about network device **105** (e.g., IP address, device type, and/or operating system), data about an associated user **110** (e.g., language spoken, duration of having interacted with client, skill level, and/or topic preferences), a received communication, code (e.g., a clickable hyperlink) for generating and transmitting a communication to the network device **105**, and/or an instruction to generate and transmit a communication to network device **105**.

In one instance, communications between network device **105** and terminal device **115** can be routed through connection management system **150**. Such a configuration can allow connection management system **150** to monitor the transmitting and/or receiving of communications or messages and to detect issues (e.g., as defined based on rules) such as non-responsiveness of either device or extended latency. Further, such a configuration can facilitate selective or complete storage of communications, which may later be used, for example, to determine a quality of a communications between network devices and terminal devices and/or to support learning to update or generate routing rules so as to determine particular post-communication targets. Such storage can also facilitate generation of a series of previous messages (e.g., a message history) between a network device and first terminal device, which may be transmitted (for example) to a second terminal device when it is determined that the second terminal device is to join an existing or participate in a new communication series with the network device.

In some embodiments, connection management system **150** can monitor the transmitting and receiving of communications in real-time and perform automated actions (e.g., rule-based actions) based on the live communications. For example, when connection management system **150** determines that a communication relates to a particular object, connection management system **150** can automatically transmit an additional message to terminal device **115** containing additional data about the object (e.g., quantity of objects available, other data about the similar objects, etc.).

In one instance, a designated terminal device **115** can communicate with network device **105** without relaying communications through connection management system **150**. One or both devices **105**, **115** may (or may not) report particular communication metrics or content to connection management system **150** to facilitate communication monitoring and/or data storage.

As mentioned, connection management system **150** may route select communications to a remote server **140**. Remote server **140** can be configured to provide data in a predetermined manner. For example, remote server **140** may access defined one or more text passages, voice recording and/or files to transmit in response to a communication. Remote server **140** may select a particular text passage, recording or file based on, for example, an analysis of a received communication (e.g., a semantic or mapping analysis).

Routing and/or other determinations or processing performed at connection management system **150** can be performed based on rules and/or data at least partly defined by or provided by one or more client devices **130**. For example, client device **130** may transmit a communication that identifies a prioritization of agents, terminal-device types, and/or topic similarity. As another example, client device **130** may identify one or more weights to apply to various variables that may impact routing determinations (e.g., estimated response time, device type and capabilities, and/or terminal-device load balancing). It will be appreciated that which terminal devices and/or agents are to be associated with a client may be dynamic. Communications from client device **130** and/or terminal devices **115** may provide data indicating that a particular terminal device and/or agent is to be added or removed as one associated with a client. For example, client device **130** can transmit a communication with IP address and an indication as to whether a terminal device with the address is to be added or removed from a list identifying client-associated terminal devices.

In one instance, connection management system **150** facilitates an initial connection and routing between network device **105** and a first terminal device **115**. For example, a message received in a communication from network device **105** can be routed to the first terminal device. As another example, communication management system **150** can transmit a communication to the first terminal device that includes or is indicative of a request or instruction to transmit a communication (e.g., initiating a communication series) to network device **105**.

Connection management system **150** can monitor and/or analyze a corresponding communication series between network device **105** and the first terminal device to determine a characteristic. For example, connection management system **150** can analyze message content in one or more communications (e.g., to determine whether and/or how many of particular words, symbols or character types, such as "frustrat*", "very", "thank", or "irritat*", "!" or capital letters, were used). As another example, connection management system **150** can determine one or more statistics relating to each of one or more messages and/or the series. Examples of statistics can include, for example, message length (e.g., in words or characters), latency between a receipt of a communication and transmission of a responsive communication, latency between subsequent message transmissions, or typing speed while typing a message. As yet another example, connection management system **150** can receive and process one or more inputs, detected initially at network device **105** or the first terminal device and then identified to connection management system **150**. Such inputs can identify, for example, a reroute request, or a resolution stage.

Connection management system **150** can evaluate the characteristic (e.g., characterizing message content, including a statistic or characterizing an input) to determine whether to define subsequent routing rules in a particular manner. For example, a continuous-channel rule can include a condition relating to a characteristic that specifies when routing of network-device messages is to be inclined towards the first terminal device (which previously communicated with the network device). The rule can be configured such that satisfaction of the condition results in establishment of a continuous channel between the network device and the first terminal device. The continuous channel can allow subsequent messages from the network device to be automatically routed to the first terminal device and/or preferentially routed to the first terminal device. The continuous channel can be configured to persist through multiple communication series. For example, even if a first series of messages are communicated between the network device and first terminal device on a first day, the channel can inclination routing of another message from the network device transmitted on a second day to be routed to the same first terminal device. A magnitude of such inclination may depend on, for example, a time since a previous interaction between the network device and first terminal device (e.g., increasing the level of inclination when a past interaction was recent), a total duration of and/or number of communications in a previous conversation (e.g., series of messages communicated between the network device and first terminal device) and/or a number of previous messages communicated between the network device and first terminal device (and/or a cumulative interaction time or count of messages).

Upon establishing a continuous channel, connection management system **150** can further facilitate presenting a presentation (e.g., notification) at network device **105** so as to alert user **110** that a continuous channel has been established, to identify the first terminal device or associated user and/or to indicate that subsequent messages (e.g., transmitted in association with an identifier of the channel, associated with a particular client, etc.) are to be routed to or to have routing inclined towards the first terminal device.

Conversely, connection management system **150** may determine that the characteristic indicates that subsequent messages from network device **105** (e.g., relating to a client) are not to be routed to the same first terminal device and/or are to be rerouted. For example, it can be determined that the condition in the continuous-channel rule is not satisfied. Upon such a determination, connection management system **150** can identify a new terminal device to route communications (e.g., relating to a client) to from the network device.

In one instance, a continuous-channel rule is configured such that a continuous channel is to be established between a network device and a terminal device following an initial routing of a communication between the two devices. Thus, the continuous channel may serve to facilitate consistent message routing within a single conversation (e.g., series of communicated messages). In an alternative or same instance, a continuous-channel rule may (also or alternatively) be configured such that a continuous channel is established, maintained or used so as to execute consistent message routing across different message series (e.g., the series being separated in time). Depending on the embodiment, a continuous-channel rule may limit a number of continuous channels that can be provided with respect to a network device and/or client. For example, a rule may

indicate that, for a network device and client, the network device can only be connected to one (or three or another specified number) terminal devices via continuous channel.

In some instances, connection management system **150** can determine that a re-routing process is to be initiated (e.g., based on satisfaction of a condition in a re-routing rule). The determination can be based on a characteristic (e.g., characterizing message content, including a statistic or characterizing an input). For example, a re-routing rule can be configured such that re-routing is to be initiated upon detecting a characteristic indicative of user frustration or dissatisfaction; detecting a characteristic indicative of a lack of progress towards a resolution of an issue; detecting impermissible terminal-device communication statistics (e.g., long response latencies); or detecting that messages are beginning to focus on a new topic.

A re-routing process can include identifying a different terminal device to participate in a communication session with network device **105**. Such an identification can be based on, for example, a topic associated with the communication, a polarity parameter associated with the communication or a past related communication, an estimated response latency for terminal device **115**, a type of communication channel associated with the communication (e.g., instant message, message, email, phone), a type of each of one or more other terminal devices, a capability of one or more other terminal devices, and the like. A selection of the different terminal device may be performed in a same, similar or different manner as compared to a selection of a first terminal device. For example, determining that a re-routing rule's condition has been satisfied may incline a subsequent terminal-device selection towards higher-ranked devices.

A re-routing process may include transmitting a notification identifying a proposed re-routing to one or more devices, such as network device **105**, the first terminal device or the different terminal device. The notification may include an option to authorize and/or an option reject the proposed re-routing. The notification may include data about network device **105**, the first terminal device and/or the different terminal device and/or an associated party.

To reduce an abrupt transition between terminal devices, connection management system **150** can coordinate an overlap time period. During this time period, each of the first terminal device and the different terminal device can receive one or more communications (or processed versions thereof) from network device **105**. For example, a new communication from network device **105** can be duplicated and then routed to each of the first and different terminal device.

In some instances, connection management system **150** can generate a dynamic message chronicle that includes multiple messages from network device **105** and/or from the first terminal device. The chronicle can include, for example, all messages in a communication session, all messages routed within a defined time period (e.g., previous 3 minutes), or all messages associated with one or more defined tags or types. For example, messages relating to a particular topic, message polarity (e.g., corresponding to dissatisfaction), or content type (e.g., including a question) can be selected. Connection management system **150** can transmit the dynamic message chronicle to the different terminal device. New messages from network device **105** and/or the first terminal device can further be transmitted to the different terminal device, such that the dynamic message chronicle can be appended with such new messages. Message selection for a dynamic message chronicle and/or whether a dynamic message chronicle is to be provided may also depend on whether re-routing is to occur during a temporally clustered series of messages or between message series.

In some instances, connection management system **150** can determine whether and/or when to stop routing communications to the first terminal device. For example, such routing termination may be performed upon detecting a response communication from the different terminal device, after a defined time period has elapsed following transmission of the message chronicle, after detecting an input received at the first terminal device indicating an intent to terminate a communication session, after detecting an input received at the different terminal device indicating an intent to handle a communication session, after detecting an input received at network device **105** requesting the proposed re-routing to the different terminal device be executed, and so on.

Depending on a rule or a reason for initiating a re-routing transfer, the re-routing may include closing a connection channel between network device **105** and the first terminal device (e.g., if a re-routing process was initiated in response to a low user polarity) and/or establishing a new connection channel between network device **105** and the different terminal device.

Each communication (e.g., between devices, between a device and connection management system **150**, between remote server **140** and connection management system **150** or between remote server **140** and a device) can occur over one or more networks **170**. Any combination of open or closed networks can be included in the one or more networks **170**. Examples of suitable networks include the Internet, a personal area network, a local area network (LAN), a wide area network (WAN), or a wireless local area network (WLAN). Other networks may be suitable as well. The one or more networks **170** can be incorporated entirely within or can include an intranet, an extranet, or a combination thereof. In some instances, a network in the one or more networks **170** includes a short-range communication channel, such as a Bluetooth or a Bluetooth Low Energy channel. In one embodiment, communications between two or more systems and/or devices can be achieved by a secure communications protocol, such as secure sockets layer (SSL) or transport layer security (TLS). In addition, data may be encrypted based on any convenient, known, or to be developed manner, such as, but not limited to, Data Encryption Standard (DES), Triple DES, Rivest-Shamir-Adleman encryption (RSA), Blowfish encryption, Advanced Encryption Standard (AES), CAST-128, CAST-256, Decorrelated Fast Cipher (DFC), Tiny Encryption Algorithm (TEA), eXtended TEA (XTEA), Corrected Block TEA (XXTEA), and/or RC5, etc.

A network device **105**, terminal device **115** and/or client device **130** can include, for example, a portable electronic device (e.g., a smart phone, tablet, laptop computer, or smart wearable device) or a non-portable electronic device (e.g., one or more desktop computers, smart appliances, servers, and/or processors). Connection management system **150** can be separately housed from network, terminal and client devices or may be part of one or more such devices (e.g., via installation of an application on a device). Remote server **140** may be separately housed from each device and connection management system **150** and/or may be part of another device or system. While each device, server and system in FIG. **1** is shown as a single device, it will be appreciated that multiple devices may instead be used. For example, a set of network devices can be used to transmit

various communications from a single user, or remote server **140** may include a server stack.

A software agent or application may be installed on and/or executable on a depicted device, system or server. In one instance, the software agent or application is configured such that various depicted elements can act in related manners. For example, a software agent on a device can be configured to obtain and transmit data about device usage to a separate connection management system, and a software application on the separate connection management system can be configured to receive and process the data.

FIG. **2** shows a block diagram of another embodiment of a network interaction system **200**. Generally, FIG. **2** illustrates a range of components configured and arranged to enable a network device **205** to communicate with one or more terminal devices **215**. The depicted instance includes nine terminal devices **215** included in three local-area networks **235**.

In some instances, a communication from network device **205** includes destination data (e.g., a destination IP address) that at least partly or entirely indicates which terminal device is to receive the communication. Network interaction system **200** can include one or more inter-network connection components **240** and/or one or more intra-network connection components **255** that can process the destination data and facilitate appropriate routing.

Each inter-network connection components **245** can be connected to a plurality of networks **235** and can have multiple network cards installed (e.g., each card connected to a different network). For example, an inter-network connection component **245** can be connected to a wide-area network **270** and one or more local-area networks **235**. In the depicted instance, in order for a communication to be transmitted from network device **205** to any of the terminal devices, in the depicted system, the communication must be handled by multiple inter-network connection components **245**.

When an inter-network connection component **245** receives a communication (or a set of packets corresponding to the communication), inter-network connection component **245** can determine at least part of a route to pass the communication to a network associated with a destination. The route can be determined using, for example, a routing table (e.g., stored at the router), which can include one or more routes that are pre-defined, generated based on an incoming message (e.g., from another router or from another device) or learned.

Examples of inter-network connection components **245** include a router **260** and a gateway **265**. An inter-network connection component **245** (e.g., gateway **265**) may be configured to convert between network systems or protocols. For example, gateway **265** may facilitate communication between Transmission Control Protocol/Internet Protocol (TCP/IP) and Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) devices.

Upon receiving a communication at a local-area network **235**, further routing may still need to be performed. Such intra-network routing can be performed via an intra-network connection component **255**, such as a switch **280** or hub **285**. Each intra-network connection component **255** can be connected to (e.g., wirelessly or wired, such as via an Ethernet cable) multiple terminal devices **215**. Hub **285** can be configured to repeat all received communications to each device to which it is connected. Each terminal device can then evaluate each communication to determine whether the terminal device is the destination device or whether the communication is to be ignored. Switch **280** can be configured to selectively direct communications to only the destination terminal device.

In some instances, a local-area network **235** can be divided into multiple segments, each of which can be associated with independent firewalls, security rules and network protocols. An intra-network connection component **255** can be provided in each of one, more or all segments to facilitate intra-segment routing. A bridge **280** can be configured to route communications across segments **275**.

To appropriately route communications across or within networks, various components analyze destination data in the communications. For example, such data can indicate which network a communication is to be routed to, which device within a network a communication is to be routed to or which communications a terminal device is to process (as opposed to ignore). However, in some instances, it is not immediately apparent which terminal device (or even which network) is to participate in a communication from a network device.

To illustrate, a set of terminal devices may be configured so as to provide similar types of responsive communications. Thus, it may be expected that a query in a communication from a network device may be responded to in similar manners regardless to which network device the communication is routed. While this assumption may be true at a high level, various details relating to terminal devices can give rise to particular routings being advantageous as compared to others. For example, terminal devices in the set may differ from each other with respect to (for example) which communication channels are supported, location and/or network proximity to a network device and/or characteristics of associated agents (e.g., availability, etc.). Accordingly, select routings may facilitate faster responses that more accurately and/or completely respond to a network-device communication. A complication is that static routings mapping network devices to terminal devices may fail to consider variations in communication topics, channel types, agent availability, and so on.

FIGS. **3**A-**3**C show block diagrams of other embodiments of a network interaction system **300***a-c* that includes a connection management system. Each of the depicted systems **300***a-c* show only 2 local-area networks **235** for simplicity, though it can be appreciated that embodiments can be extended to expand the number of local-area networks. Each of systems **300***a-c* include a connection management system **350**, which can identify which terminal device is to communicate with network device **205**, can establish and manage (e.g., maintain or close) connection channels, can determine whether and when to re-route communications in an communication session, and so on. Thus, connection management system **350** can be configured to dynamically, and in real-time, evaluate communications, agent availability, capabilities of terminal devices or agents, and so on, to influence routing determinations.

In FIG. **3**A, connection management system **350** is associated with each of network device **205** and a remote server **340** (e.g., connection management system **350***a* is associated with network device **205** and connection management system **350***b* is associated with remote server **340**). For example, connection management system **350***a* and/or connection management system **350***b* can be installed or stored as an application on each of network device **205** and remote server **340**, respectively. Execution of the application(s) can facilitate, for example, a communication between network device **205** and remote server **340** to identify a terminal device **215** selected to participate in a communication ses-

sion with network device **205**. The identification can be made based on one or more factors disclosed herein (e.g., availability, connections between a communication's topic/level of detail with agents' or terminal devices' resource sets, estimated latency, channel-type availability, and so on).

A client device **330** can provide client data indicating how routing determinations are to be made. For example, such data can include: indications as to how particular characteristics are to be weighted or constraints or inclinations (e.g., relating to load balancing or estimated response latency). Client data can also include specifications related to when communication channels are to be established (or closed) or when communications are to be re-routed to a different network device. Client data can be used to define various client-specific rules, such as rules for communication routing; channel establishment, management or closing; communication re-routing; communication type-identification, and so on.

Connection management system **350***b* executing on remote server **340** can monitor various metrics relating to terminal devices (e.g., relating to a client), such as which communication channels are supported, location and/or network proximity to a network device, communication latency and/or stability with the terminal device, a type of the terminal device, a capability of the terminal device, whether the terminal device (or agent) has communicated with a network device (or user) before and/or characteristics of associated agents (e.g., languages spoken, availability, etc.). Accordingly, communication management system **350***b* may be enabled to select routings to facilitate faster responses that more accurately and/or completely respond to a network-device communication based on the metrics.

In the example depicted in FIG. **3**A, a communication session between network device **205** and remote server **340** can facilitate early identification of a destination address. Network device **205** may then use the destination address to direct subsequent communications. For example, network device **205** may send an initial communication to remote server **340** (e.g., via one or more inter-network connections and a wide-area network), and remote server **340** may identify one or more corresponding clients. Remote server **340** may then identify a set of terminal devices associated with the one or more corresponding clients and obtain metrics for those terminal devices. The metrics can be evaluated (e.g., by remote server **340**) so as to select a terminal device to involve in a communication session, and data relating to the terminal device (e.g., an IP address) can be sent to network device **205**. In some embodiments, remote server **340** may continuously or periodically obtain and evaluate metrics for various terminal devices and store evaluation results in a data store. In such embodiments, upon identifying a set of terminal devices associated with the one or more corresponding clients, remote server **340** can access the stored evaluation results from the data store and select a terminal device to involve in the communication session based on the stored evaluation results.

In FIG. **3**B, connection management system **350** can be configured to serve as a relay and/or destination address. Thus, for example, a set of network devices **205** may transmit communications, each identifying connection management system **350** as a destination. Connection management system **350** can receive each communication and can concurrently monitor a set of terminal devices (e.g., so as to generate metrics for each terminal device). Based on the monitoring and a rule, connection management system **350** can identify a terminal device **215** to which it may relay each communication. Depending on the embodiment, terminal device communications may similarly be directed to a consistent destination (e.g., of connection management system **350**) for further relaying, or terminal devices may begin communicating directly with corresponding network devices. These embodiments can facilitate efficient routing and thorough communication monitoring.

The embodiment depicted in FIG. **3**C is similar to that in FIG. **3**B. However, in some embodiments, connection management system **350** is directly connected to intra-network components (e.g., terminal devices, intra-network connections, or other).

It will be appreciated that many variations of FIGS. **3**A-**3**C are contemplated. For example, connection management system **350** may be associated with a connection component (e.g., inter-network connection component **245** or intra-network connection component **255**) such that an application corresponding to connection management system **350** (or part thereof) is installed on the component. The application may, for example, perform independently or by communicating with one or more similar or related applications (e.g., executing on one or more other components, network devices or remotes servers).

FIG. **4** shows a representation of a protocol-stack mapping **400** of connection components' operation. More specifically, FIG. **4** identifies a layer of operation in an Open Systems Interaction (OSI) model that corresponds to various connection components.

The OSI model can include multiple logical layers **402**-**414**. The layers are arranged in an ordered stack, such that layers **402**-**412** each serve a higher level and layers **404**-**414** is each served by a lower layer. The OSI model includes a physical layer **402**. Physical layer **402** can define parameters physical communication (e.g., electrical, optical, or electromagnetic). Physical layer **402** also defines connection management protocols, such as protocols to establish and close connections. Physical layer **402** can further define a flow-control protocol and a transmission mode.

A link layer **404** can manage node-to-node communications. Link layer **404** can detect and correct errors (e.g., transmission errors in the physical layer **402**) and manage access permissions. Link layer **404** can include a media access control (MAC) layer and logical link control (LLC) layer.

A network layer **406** can coordinate transferring data (e.g., of variable length) across nodes in a same network (e.g., as datagrams). Network layer **406** can transform a logical network address to a physical machine address.

A transport layer **408** can manage transmission and receipt quality. Transport layer **408** can provide a protocol for transferring data, such as a Transmission Control Protocol (TCP). Transport layer **408** can perform segmentation/desegmentation of data packets for transmission and can detect transmission errors occurring in layers **402**-**406**. A session layer **410** can initiate, maintain and terminate connections between local and remote applications. Sessions may be used as part of remote-procedure interactions. A presentation layer **412** can encrypt, decrypt and format data based on data types known to be accepted by an application or network layer.

An application layer **414** can interact with software applications that control or manage communications. Via such applications, application layer **414** can (for example) identify destinations, local resource states or availability and/or communication content or formatting. Various layers **402**-**414** can perform other functions as available and applicable.

Intra-network connection components **422**, **424** are shown to operate in physical layer **402** and link layer **404**. More

specifically, a hub can operate in the physical layer, such that operations can be controlled with respect to receipts and transmissions of communications. Because hubs lack the ability to address communications or filter data, they possess little to no capability to operate in higher levels. Switches, meanwhile, can operate in link layer **404**, as they are capable of filtering communication frames based on addresses (e.g., MAC addresses).

Meanwhile, inter-network connection components **426**, **428** are shown to operate on higher levels (e.g., layers **406-414**). For example, routers can filter communication data packets based on addresses (e.g., IP addresses). Routers can forward packets to particular ports based on the address, so as to direct the packets to an appropriate network. Gateways can operate at the network layer and above, perform similar filtering and directing and further translation of data (e.g., across protocols or architectures).

A connection management system **450** can interact with and/or operate on, in various embodiments, one, more, all or any of the various layers. For example, connection management system **450** can interact with a hub so as to dynamically adjust which terminal devices the hub communicates. As another example, connection management system **450** can communicate with a bridge, switch, router or gateway so as to influence which terminal device the component selects as a destination (e.g., MAC, logical or physical) address. By way of further examples, a connection management system **450** can monitor, control, or direct segmentation of data packets on transport layer **408**, session duration on session layer **410**, and/or encryption and/or compression on presentation layer **412**. In some embodiments, connection management system **450** can interact with various layers by exchanging communications with (e.g., sending commands to) equipment operating on a particular layer (e.g., a switch operating on link layer **404**), by routing or modifying existing communications (e.g., between a network device and a terminal device) in a particular manner, and/or by generating new communications containing particular data (e.g., new destination addresses) based on the existing communication. Thus, connection management system **450** can influence communication routing and channel establishment (or maintenance or termination) via interaction with a wide range of devices and/or via influencing operating at a wide range of protocol-stack layers.

FIG. **5** represents a multi-device communication interaction system **500** according to an embodiment. System **500** includes a network device **505** configured to communicate with a various terminal devices over various types of communication channels.

In the depicted instance, network device **505** can transmit a communication over a cellular network (e.g., via a base station **510**). The communication can be routed to an operative network **515**. Operative network **515** can include a connection management system **520** that receives the communication and identifies which terminal device is to respond to the communication. Such determination can depend on identifying a client to which that communication pertains (e.g., based on a content analysis or user input indicative of the client) and determining one or more metrics for each of one or more terminal devices associated with the client. For example, in FIG. **5**, each cluster of terminal devices **530***a-c* can correspond to a different client. The terminal devices may be locationally co-located or disperse. The metrics may be determined based on stored or learned data and/or real-time monitoring (e.g., based on availability).

Connection management system **520** can communicate with various terminal devices via one or more routers **525** or other inter-network or intra-network connection components. Connection management system **520** may obtain, analyze and/or store data from or relating to communications, terminal-device operations, client rules, and/or user-associated actions (e.g., interaction activity on a network site, etc.) at one or more data stores. Such data may influence communication routing.

Notably, various other devices can further be used to influence communication routing and/or processing. For example, in the depicted instance, connection management system **520** also is connected to a network server **540**. Thus, connection management system **540** can retrieve data of interest, such as technical object details and additional data, and so on.

Network device **505** may also be connected to a network server (e.g., including a streaming network server **545**). In some instances, communication with such a server provided an initial option to initiate a communication session with connection management system **520**. For example, network device **505** may detect that, while visiting a particular network site, a communication engagement option is available and such an option can be presented.

One or more elements of communication system **500** can also be connected to a social-networking server **550**. Social networking server **550** can aggregate data received from various user devices. Thus, for example, connection management system **520** may be able to estimate a general (or user-specific) polarity towards a particular topic or estimate a general action of a user or type of users.

FIG. **6** shows a block diagram of an embodiment of a connection management system **600**. A message receiver interface **605** can receive a message. In some instances, the message can be received, for example, as part of a communication transmitted by a source device (e.g., housed separately from connection management system **600** or within a same housing), such as a network device or terminal device. In some instances, the communication can be part of a series of communications or a communicate session, which can include a series of messages or message being routed between two devices (e.g., a network device and terminal device). This message or communication session may be part of and/or may define an interaction between the devices. A communication channel or operative channel can include one or more protocols (e.g., routing protocols, task-assigning protocols and/or addressing protocols) used to facilitate routing and a communication session between the devices.

In some instances, the message can include a message generated based on inputs received at a local or remote user interface. For example, the message can include a message that was generated based on button or key presses or recorded speech signals. In one instance, the message includes an automatically generated message, such as one generated upon detecting that a network device is presenting a particular app page or network interface or has provided a particular input command (e.g., key sequence). The message can include an instruction or request, such as one to initiate a communication session.

In some instances, the message can include or be associated with an identifier of a client. For example, the message can explicitly identify the client (or a device associated with the client); the message can include or be associated with a network interface or app page associated with the client; the message can include or be associated with a destination address associated with a client; or the message can include or be associated with an identification of an object associ-

ated with the client. To illustrate, a network device may be presenting an app page of a particular client, which may provide an option to transmit a communication to an agent. Upon receiving user input corresponding to a message, a communication may be generated to include the message and an identifier of the particular client.

A processing unit **610** may process a received communication and/or message. Processing can include, for example, extracting one or more particular data elements (e.g., a message, a client identifier, a network-device identifier, a user or user protocol identifier, and so on). Processing can include transforming a formatting or communication type (e.g., to be compatible with a particular device type, operating system, communication-channel type, protocol and/or network).

A message determination unit **615** may determine the message. The determination can include identifying, for example, one or more types or tags for the message. Examples of type or tag types can include (for example) topic, message polarity, complexity, and urgency. A difference between determining a type of message and tagging a message can be that types can be limited (e.g., according to a predefined set of type options), while tags can be open. A topic can include, for example, an object, a technical issue, a use question, a complaint, or other suitable topic. A type or tag can be determined, for example, based on a semantic analysis of a message (e.g., by identifying keywords, sentence structures, repeated words, punctuation characters and/or non-article words); user input (e.g., having selected one or more types); and/or message-associated statistics (e.g., typing speed and/or response latency).

In some instances, message determination unit **615** can determine a metric for a message. A metric can include, for example, a number of characters, words, capital letters, all-capital words or instances of particular characters or punctuation marks (e.g., exclamation points, question marks and/or periods). A metric can include a ratio, such as a fraction of sentences that end with an exclamation point (or question mark), a fraction of words that are all capitalized, and so on.

Message determination unit **615** can store a message, message metric and/or message statistic in a message data store **620**. Each message can also be stored in association with other data (e.g., metadata), such as data identifying a corresponding source device, destination device, network device, terminal device, client, one or more types, one or more stages and/or message-associated statistics). Various components of connection management system **600** (e.g., message determination unit **615** and/or an interaction management unit **625**) can query message data store **620** to retrieve query-responsive messages, message metrics and/or message statistics.

An interaction management unit **625** can determine to which device a communication is to be routed and how the receiving and transmitting devices are to communicate. Each of these determinations can depend, for example, on whether a particular network device (or any network device associated with a particular user) has previously communicated with a terminal device in a set of terminal devices (e.g., any terminal device associated with connection management system **600** or any terminal device associated with one or more particular clients).

In some instances, when a network device (or other network device associated with a sane user or user protocol (e.g., profile)) has previously communicated with a terminal device (e.g., about matters relating to a client), communication routing can be generally inclined towards the same terminal device. Other factors that may influence routing can include, for example, an inferred or identified user or agent polarity relating to the previous communication; a topic of a present communication (e.g., and an extent to which that relates to a topic of a previous communication and/or a resource set associated with one or more terminal devices or agents); whether the terminal device (or corresponding agent) is available; and/or an estimated response latency of the terminal device. Such factors may be considered absolutely or relative to similar metrics corresponding to other terminal devices. A re-routing rule (e.g., a client-specific or general rule) can indicate how such factors are to be evaluated and weighted to determine whether to forego agent consistency.

When a network device (or other network device associated with a same user or user protocol) has not previously communicated with a terminal device (e.g., about matters relating to a client), a terminal-device selection can be performed based on factors such as, for example, an extent to which various agents' resource set corresponds to a communication topic, availability of various agents at a time and/or over a channel type, types and/or capabilities of terminal devices (e.g., associated with the client), a language similarity between a user and agents. In one instance, a rule can identify how to determine a sub-parameter to one or more factors such as these and a weight to assign to each parameter. By combining (e.g., summing) weighted sub-parameters, a parameter for each agent can be determined. A terminal device selection can then be made by comparing terminal devices' parameters (e.g., to select a high or highest value).

With regard to determining how devices are to communicate, interaction management unit **625** can (for example) determine whether a terminal device is to respond to a communication via (for example) email, chat, SMS message, voice call, video chat, etc. A communication type can be selected based on, for example, a communication-type priority list (e.g., at least partly defined by a client or user); a type of a communication previously received from the network device, a complexity of a received message, capabilities of the network device, and/or an availability of one or more terminal devices. Appreciably, some communication types will result in real-time communication (e.g., where fast message response is expected), while others can result in asynchronous communication (e.g., where delays (e.g., of several minutes or hours) between messages are acceptable).

Further, interaction management unit **625** can determine whether a continuous channel between two devices should be established, used or terminated. A continuous channel can be structured so as to facilitate routing of communications from a network device to a specified terminal device. This inclination can persist even across message series (e.g., days, weeks or months). In some instances, a representation of a continuous channel (e.g., identifying an agent) can be included in a presentation to be presented on a network device. In this manner, a user can understand that communications are to be consistently routed.

In one instance, a parameter (e.g., a score or value, etc.) can be generated using one or more factors described herein and a rule (e.g., that includes a weight for each of the one or more factors) to determine a connection parameter corresponding to a network device and terminal device. The parameter may relate to an overall similarity or one specific to a communication or communication series. Thus, for example, the parameter may reflect a degree to which a terminal device is estimated to be suited to respond to a

network-device communication. In some instances, analysis of the parameter can identify a terminal device to route a communication to and whether to establish, use or terminate a connection channel. When an analysis is used to both address a routing decision and a channel decision, a parameter relevant to each decision may be determined in a same, similar or different manner.

Thus, for example, it will be appreciated that different factors may be considered depending on whether the parameter is to estimate a strength of a long-term similarity compared to one to respond to a particular message query. For example, in the former instance, considerations of overall schedules and time zones may be important, while in the latter instance, immediate availability may be more highly weighted. A parameter can be determined for a single network-device/terminal-device combination, or multiple parameters can be determined, each characterizing a similarity between a network device and a different terminal device.

To illustrate, a set of three terminal devices associated with a client may be evaluated for determining candidate terminal devices for communication routing. A parameter may be generated for each that relates to a similarity for the particular communication. Each of the first two terminal devices may have previously communicated with a network device having transmitted the communication. An input from the network device may have indicated satisfaction with an interaction with the communication(s) with the first device. Thus, a past-interact sub-parameter (as calculated according to a rule) for the first, second and third devices may be 10, 5, and 0, respectively. (Negative satisfaction inputs may result in negative sub-parameters.) It may be determined that only the third terminal device is immediately available. It may be estimated that the second terminal device will be available for responding within 15 minutes, but that the first terminal device will not be available for responding until the next day. Thus, a fast-response sub-parameter for the first, second and third devices may be 1, 3 and 10. Finally, it may be estimated a degree to which an agent (associated with the terminal device) can communicate regarding a topic. It may be determined that an agent associated with the third terminal device can communicate with a network device at a higher level than those associated with the other two devices, resulting in sub-parameters of 3, 4 and 9. In this example, the rule does not include weighting or normalization parameters (though, in other instances, a rule may), resulting in parameters of 14, 11 and 19. Thus, the rule may indicate that the message is to be routed to a device with the highest parameter, that being the third terminal device. If routing to a particular terminal device is unsuccessful, the message can be routed to a device with the next-highest parameter, and so on.

A parameter may be compared to one or more absolute or relative thresholds. For example, parameters for a set of terminal devices can be compared to each other to identify a high parameter to select a terminal device to which a communication can be routed. As another example, a parameter (e.g., a high parameter) can be compared to one or more absolute thresholds to determine whether to establish a continuous channel with a terminal device. An overall threshold for establishing a continuous channel may (but need not) be higher than a threshold for consistently routing communications in a series of messages. This difference between the overall threshold and threshold for determining whether to consistently route communication may be because a strong similarity is important in the continuous-channel context considering the extended utility of the channel. In some embodiments, an overall threshold for using a continuous channel may (but need not) be lower than a threshold for establishing a continuous channel and/or for consistently routing communications in a series of messages.

Interaction management unit **625** can interact with an user data unit **630** in various contexts. For example, user data unit **630** may look up an identifier of a network device or terminal device in a protocol data store **635** to identify a protocol corresponding to the device. Further, user data unit **630** can maintain data about previous communication sessions (e.g., times, involved other device(s), channel type, resolution stage, topic(s) and/or associated client identifier), connection channels (e.g., indicating—for each of one or more clients—whether any channels exist, a terminal device associated with each channel, an establishment time, a usage frequency, a time of last use, any channel constraints and/or supported types of communication), user or agent preferences or constraints (e.g., related to terminal-device selection, response latency, terminal-device consistency, agent resource set, and/or communication-type preference or constraint), and/or user or agent characteristics (e.g., age, language(s) spoken, location, interests, and so on).

Further, interaction management unit **625** can alert user data unit **630** of various connection-channel actions, such that protocol data store **635** can be updated to reflect the current channel data. For example, upon establishing a channel, interaction management unit **625** can notify user data unit **630** of the establishment and identify one or more of: a network device, a terminal device, a user protocol and a client. protocol unit **635** can (in some instances) subsequently notify a user of the channel's existence such that the user can be aware of the agent consistency being availed.

Interaction management unit **625** can further interact with a client mapping unit **640**, which can map a communication to one or more clients (and/or associated brands). In some instances, a communication received from a network device itself includes an identifier corresponding to a client (e.g., an identifier of a client, object provided by a client, network site, or app page). The identifier can be included as part of a message (e.g., which client mapping unit **640** may detect) or included as other data in a message-inclusive communication. Client mapping unit **640** may then look up the identifier in a client data store **645** to retrieve additional data about the client and/or an identifier of the client.

In some instances, a message may not particularly correspond to any client. For example, a message may include a general query. Client mapping unit **640** may, for example, perform a semantic analysis on the message, identify one or more keywords and identify one or more clients associated with the keyword(s). In some instances, a single client is identified. In some instances, multiple clients are identified. An identification of each client may then be presented via a network device such that a user can select a client to communicate with (e.g., via an associated terminal device).

Client data store **645** can include identifications of one or more terminal devices (and/or agents) associated with the client. A terminal routing unit **650** can retrieve data relating to each of one, more or all such terminal devices (and/or agents) so as to influence routing determinations. For example, terminal routing unit **650** may maintain a terminal data store **655**, which can store data such as terminal devices' device types, operating system, communication-type capabilities, installed applications accessories, location and/or identifiers (e.g., IP addresses). Data can also include agent data, such as position, resource sets (e.g., topics that the agent is knowledgeable about), identifier metrics, work-

ing hours, language(s) spoken and/or location data. Some data can be dynamically updated. For example, data indicating whether a terminal device is available may be dynamically updated based on (for example) a communication from a terminal device (e.g., identifying whether the device is asleep, being turned off/on, idle/active, or identifying whether input has been received within a time period); a communication routing (e.g., indicative of whether a terminal device is involved in or being assigned to be part of a communication session); or a communication from a network device or terminal device indicating that a communication session has ended or begun.

It will be appreciated that, in various contexts, being engaged in one or more communication sessions do not necessarily indicate that a terminal device is not available to engage in another communication session. Various factors, such as communication types (e.g., message, email, chat, phone), client-identified or user-identified target response times, and/or system loads (e.g., generally or with respect to a user) may influence how many communication sessions a terminal device may be involved in.

When interaction management unit **625** has identified a terminal device to involve in a communication session or connection channel, it can notify terminal routing unit **650**, which may retrieve any pertinent data about the terminal device from terminal data store **655**, such as a destination (e.g., IP) address, device type, protocol, etc. Processing unit **610** can then (in some instances) modify the message-inclusive communication or generate a new communication (including the message) so as to have a particular format, comply with a particular protocol, and so on. In some instances, a new or modified message may include additional data, such as user data corresponding to a network device, a message chronicle, and/or client data.

A message transmitter interface **660** can then transmit the communication to the terminal device. The transmission may include, for example, a wired or wireless transmission to a device housed in a separate housing. The terminal device can include a terminal device in a same or different network (e.g., local-area network) as connection management system **600**. Accordingly, transmitting the communication to the terminal device can include transmitting the communication to an inter- or intra-network connection component.

Systems and Methods for Facilitating Object Assignments

FIGS. **7**A and **7**B are block diagrams depicting the overall structure of the present invention in one embodiment. Network devices **701** (corresponding to **701**A, **701**B, **701**C in FIG. **7**B) can access an interface **703** (e.g., a website) through, for example, the network **702**, and can access data regarding objects using the interface **703**. Interface **703** may operate as a server, using one of the various types of execution units, including but not limited to a static or dynamic network platform that provides user-specific content to network devices, and network platforms for object assignments. For example, an object assignment and/or object assignment process can refer to the sale of an object while accessing or through the server **704**.

A server **704** may store data representing the interface **703**, and one or more terminal devices **705** may operate computing devices (e.g., a mobile device) and connect to the server **704** to access the interface, such that the interface is displayed on a screen of the terminal device **705**.

The server **704** can operate on any operating system and any hardware platform, such as those that supports JAVA, C, and C++ environments. This includes, but is not limited to, Windows, Linux, Solaris, AIX, etc. In one embodiment, the server **704** may utilize the platform, operating system and development platform as described in detail with respect to system **10** in co-pending U.S. Ser. No. 09/922,753, filed Aug. 6, 2001, which is incorporated by reference herein in its entirety for all purposes.

The interface **703** may facilitate any type of activity, including the assignment of objects, retrieving and/or communication of data, etc. The present invention is not limited thereto—it may be used in conjunction with any type of interface **703** or server that may be accessed by network device **701**, or equivalents thereof.

Specifically, the data mining unit (implemented by server **704**) of the present invention enables a server to identify specific network devices **701**A (see FIG. **7**B, described further below) accessing the interface **703**. Additionally, this unit may be used to target network devices **701**A across multiple interfaces **703**, within or outside one or more clients.

FIG. **7**B depicts a graphical representation of the type of activity that the present invention can facilitate. Network devices **701**A, **701**B and **701**C can be included in the pool of network devices that can access interface **703** by connecting to server **704** through the network **702**. Network devices **701**A represent those network devices that are likely to transmit requests for the assignment of an object using the interface **703**. In contrast, network devices **701**C represent those network devices that the server **704** do not wish to engage. Finally, network devices **701**B represent those network devices that may or may not be likely to transmit a request for an object to be assigned to them using the interface based on previous interactions with server **704**.

FIG. **8** depicts the process performed by the server **104**, in one embodiment (with reference to step numbers of FIG. **8**):

Step Explanation

801 SEGMENT and DEFINE—The server **704** can segment the network device **701** pool based on a set of predefined rules identified by the client operating the interface **703**.

802 CONNECTIONS—The set of segmented and candidate engagements with network devices from step **801** are connected to specific terminal devices **705** or terminal device pools.

803 ENGAGE/INTERACT RANDOMLY—The terminal device **705** then has the option of selecting network devices **701** to engage based on a list of candidate network devices **701** available for engagements, OR, the terminal device **705** can set the system into automatic engage mode where the server **704** can engage network devices **701**. The terminal device **705** can tag the end of the engagement with a code that represents the result code of the engagement. Result codes are a set of codes that indicate a type of end result of an engagement.

804 EVALUATION PROTOCOL—The server **704** uses statistical sampling of appropriate connections (e.g., engagements) for modeling the communication session between the network device and the terminal device. Appropriate connections are defined as those connections with network devices **701** terminating in specific result codes, or connections in which network devices **701** successfully completed an object assignment process, or connections in which the client has determined that the network device successfully completed an object assignment process at a later time. The server **704** identifies attributes of network devices **701** while the network devices **701** are accessing a server (e.g., a client server) to determine attributes that can estimate

an intent of a user associated with the network device to request assignment of an object during one or more new connections (such as, e.g., using a regression analysis as described herein). The server generates an evaluation protocol from the data for subsequent analysis.

805 PARAMETER GENERATION—When an evaluation protocol is generated, subsequent network devices **701** are continuously analyzed using the generated evaluation protocol and one or more parameters are generated. For example, the subsequent network devices **701** can be analyzed using the evaluation protocols every 6-10 seconds. A parameter can be generated as a result of analyzing the subsequent network devices **701** using the evaluation protocol. This parameter is used to order all of the network devices **701** connected to the interface **703**.

At this point, the process goes to the SEGMENT and DEFINE step **806** (similar to step **801**), the CONNECTIONS step **807** (similar to step **802**), and the ENGAGE AND INTERACT STEP **808** (similar to step **803**), and then the process is repeated at step **805**. Subsequent connection determinations are executed using the order generated by the PARAMETER GENERATION step **805** and connect to those with the largest parameters first.

As described above in steps **803** and **808**, in one embodiment, the evaluation protocol is generated by having terminal devices **705** that are connected to the server **704** randomly initiate communications with network devices **701** until a statistically relevant number of interactions are obtained for network devices that complete an object assignment.

The interactions may be initiated through windows or buttons displayed on the network devices, along with accompanying chat, telephone communications or co-browsing as needed.

For example, for a client operating the interface **703**, a desired result code may be defined as a case when a network device **101** initiates an assignment request for an object provided by the client.

Co-pending U.S. patent application Ser. No. 09/922,753, filed Aug. 6, 2001, as well as co-pending U.S. patent application Ser. No. 09/742,091, filed Dec. 22, 2000, disclose various techniques for allowing terminal devices to engage network devices, along with accompanying chat, phone and co-browsing communications, and are both incorporated herein in their entirety by reference thereto. These patent applications are commonly assigned to the assignee of the present application.

FIG. **7**C graphically depicts the type of data that is used to generate the evaluation protocol in step **804**. Network device attributes **751**, network device action **752** and terminal device data **753** are all attributes and characteristics that are obtained by the data mining unit (server) **104** as the evaluation protocol. In the example of FIG. **7**C, the network device attributes include data such as: time of last visit, authentication of network device **701**, location of network device **701**, and/or other suitable data. For example, network device action may include page navigation detected at the network device **701** and data received from inputs into form fields displayed on the network device. Terminal device data may include result codes that terminal devices **705** may use when initially engaging a random sampling of network device **701**, and determining what type of object assignment (if any) the network device completed while accessing the interface **703**. The result codes may include "completed object assignment", "started but not completed object assignment", and are a set of codes into which the client wants to determine a type of the end results of an engagement. They may vary from implementation to implementation.

According to an aspect of the present disclosure, the network device attributes used to generate the evaluation protocol of step **804** should be random. Rules that distort the selection of one type of network device **701** over another should be bypassed and terminal devices should be prevented from distorting the sample set by initiating connections with network devices in a random manner. The client operating the interface **703** can exclude certain types of network devices (for example those with bad confidence), but any exclusion that exists in the sampling data should persist in the current environment. Specifically, for example, excluding network devices with bad confidence in the sample set, should continue to be excluded network devices with negative attributes when evaluating network devices **701**. Moreover, in one embodiment, terminal devices may continue to randomly connect to a certain number of network devices **701** in order to maintain the integrity of the evaluation protocol. The sample size of the random set of network devices will depend on the "lift" provided by the evaluation protocol and how fast evaluation protocols deteriorate or become inaccurate. "Lift" is computed as the increase in predetermined result code rates while using an evaluation unit when compared to a completely random selection process. If 100% of the connected network devices are engaged, then the lift will be zero.

The server **704** requires a predefined amount of data before an algorithm analysis (e.g., regression analysis) may be performed in step **804** (described further below). In one embodiment, terminal devices **705** may randomly connect to network devices **701** until a set number of connections (e.g., 500-1000 connections) occur and corresponding result codes are generated. In another embodiment, terminal devices **705** may conduct a sufficient number of engagements with network devices **701** until they reach a set number (e.g. 500-1000) of "appropriate" engagements.

In step **804**, an algorithm analysis is executed which determines the most occurring attributes of network devices **701**. In one embodiment, the attributes on which the algorithm analysis is executed are undistorted by any manual process, and the attribute data is obtained. Moreover, the attributes common among those network devices **701** having executed or initiated the object assignment process may vary. For example, suppose the following attributes are obtained for network device **701** while accessing server **704**:

IP address
Time of day
Time on site
Values input into a digital form
Page navigation details
Version of software interface

These attributes obtained when connected to one server may be different than attributes obtained when connected to a different server. Nevertheless, if over time, certain attributes are common for network device **701**, then the algorithm analysis performed in step **804** will identify such common attributes.

In addition to attributes or characteristics identified by the server **704**, the present invention may also perform the algorithm analysis on attributes obtained from third-party sources, such as third-party data stores, and the like. Any data associated with a network device **701** may be obtained and analyzed in an neutral manner. The present invention

can include performing the algorithm analysis (in step **804**) on any and all such data, and will determine common characteristics of this set of data, thereby solving for the similarities of all network devices **701** who end up interacting with a server (e.g., server **704**) in a manner than results in an object assignment.

An algorithm analysis tool may be used to execute a regression analysis in step **804**. Logistical Regression with Sequence Analysis may be used to perform the algorithm and generate an evaluation unit.

The present invention may be configured to characterize different types of actions, including a network device's **701** proclivity to approve an engagement by terminal devices **705**, or to complete an object assignment while accessing the server **704** (e.g., an object assignment associated with a high value). For example, the type of action characterized may be based on the activity by terminal devices **705**.

In step **804**, when the algorithm analysis generates, as output, a list of common attributes, the list may be sorted as needed. For example, the list of attributes may be sorted in order of importance, starting with the most common attribute first.

Also in step **804**, the server **704** creates an evaluation protocol of the most common attributes, and stores it in memory. The server **704** may perform this evaluation periodically, and when there is a critical mass of data, in step **805**, it will then automatically begin to generate parameters for new network devices **701** against the evaluation protocol.

In step **805**, the server **704** compares every new network device **701** on the network interface **703** (or plurality of network interface **703**) with the stored evaluation protocol in real time (every few seconds or so). Based upon how similar the new network devices **701** are in comparison with the stored evaluation protocol, each new network device **701** is evaluated (e.g., a parameter is generated for each new network device). As the network devices **701** continue to interact with the interface **703**, the evaluation may be continuously updated.

The parameter generation process of step **805** is shown graphically in FIG. **7**D, whereby the new network device **701** has certain attributes **771** and action **772**. In this example, the new network device **701** accessed the interface **703** three days ago, and is located in Clifton, N.J. In this case, the new network device **701** is not authenticated—for example, the new network device **701** may not have registered and logged into the server **704** before. Also, in this case, the new network device **701** has viewed pages A, C and E of the interface during this session, and has entered the value $300,000 into a "value" field of a form. The evaluation unit thereafter generate a parameter for (step **805**) the new network device **701** against the evaluation protocol stored in step **804**, and an evaluation **875** is created.

After the parameters **775** for the new network devices **701** are generated, the parameters are used to determine who to engage (by a terminal device **705**) and when. With reference to FIG. **7**E, when the new network devices **701**A, **701**B and **701**C have parameters generated for them in step **805**, the server **704** may sort these network devices by the value of the parameter. In the example of FIG. **7**E, the network devices **701**A most likely to execute a process are evaluated **1**, **2** and **3**, the middle group **701**B is evaluated **4**, **5** and **6**, and the network devices **701**C that the client does not want to engage are evaluated **7** and **8**.

The sorted list of new network device **701** may then be transmitted to or retrieved by a server (either the server **704**, or a separate server). This server will then automatically engage the highest-evaluated network devices **701**, on behalf of terminal devices **705**.

Because parameters may change for network devices during their session (based upon changes in attributes and actions over time), the server **704** may periodically re-evaluate and re-sort new network devices **701**, and thus re-prioritize which network devices **701** to engage first.

Through a combination of rules and a real time data mining unit, the server **704** operates to connect the most appropriate network devices **701**A to the most appropriate terminal devices **705**. Rules may be used to implement constraints—for example, identifying network device **701**C that the client has defined as network devices not to be engaged (e.g., those with negative attributes, etc.). Rules may also be used to implement routing requirements (e.g., network devices **701**A can be routed to terminal device **705**A to communicate regarding a particular subject matter, and not terminal device **705**C, etc.). For example, see U.S. Ser. No. 10/980,613, filed Nov. 3, 2004, the disclosure of which is incorporated by reference herein in its entirety for all purposes. Over time, the server **704** of the present invention will learn to identify the action of network devices **701**A who are most likely to successfully completed particular processes when accessing the server hosting the interface **703** (out of the pool of network devices **701**B who may not be the most appropriate, and network devices **701**C who the operator of the interface **703** does not want to engage).

Identification of Terminal Devices Suitable for Engagement with Network Devices

FIG. **9** shows the connectivity of an embodiment of the platform **910** of the terminal device connection processes and systems according to the present invention to other entities. For example, platform **910** can interface with terminal devices **912**, clients **914**, and action reporting unit (e.g. identity verification or authentication) **916**. Platform **910** is indirectly connected to network devices **918** through clients **914**. Platform **910** provides a complete solution to connecting terminal devices **912** with network devices **918**, so that the terminal devices **912** can set up communication sessions with the network devices **918**.

In some instances, clients and client devices can be associated with any organization. For example, a client can be an entity that provides objects for assignment to users over networks, and that provides terminal devices to communicate with network devices through the network (e.g., a network site). Action reporting unit **916** includes any protocol that provides data on a user (e.g., background data and other suitable identifying data).

Platform **910** may include a network of platforms, computers, or other functionality, located in one or more locations, running any operating systems and applications. In the embodiment, platform **910** is implemented on a Sun Microsystems, JAVA-based architecture. Platform **910** may be connected to the terminal devices **912**, client **914**, and action reporting unit **916** and any other entity via public or private packet switched or other data networks including circuit switched networks, such as the public switched telephone network, wireless network, or any other communications infrastructure **921**.

FIG. **10** shows the connectivity of an embodiment of the system **1010** of the present invention to other entities. System **1010** can interface with other external entities, terminal devices (e.g. computing devices operated by or associated with agents) **1014**, clients **1040**, action reporting

unit **1016**, client related third parties **1017**, and unrelated third parties **1018**. System **1010** is indirectly connected to network devices **1030** through the client **1040**. System **1010** connects a network device with the most appropriate terminal device or terminal devices based on predetermined criteria and provides the terminal devices with tools and data to enable terminal devices via terminal device-facing interfaces to communicate with the network during communication sessions. Further communication between the terminal devices and network devices is facilitated by the communication bridge **1034**. System **1010** further provides network sites or interfaces to enable the client to monitor the process.

Terminal devices can work for the client, captive terminal devices (CTD), or can be independent terminal devices (ITD), who represent the same object or set of objects for a number of different clients.

Examples of some client related third parties **1017** are the client's CRM or eCRM system, the client's ERP system, the client's data mining/analytics platforms, the client's human resources system, and the client's object quantity, and other backend systems. Unrelated third parties **1018** are parties that have relevant data to assist in the process, such as publications and a third-party's network site. Action reporting protocols **1016** are any protocols that provide identifying data relating to a user. These protocols can be accessed to verify the identity of a terminal device.

System **1010** may take the form of a network of a particular systems, computers, or other functionality, located in one or more locations, miming any operating systems and applications. In one embodiment, system **1010** is J2EE compliant and is implemented on a Sun

Microsystems, JAVA-based architecture and in another embodiment system **1010** is implemented in a Linux-based system. System **1010** may be connected to the terminal devices **1012**, clients **1014**, action reporting protocols **1016**, and client related third parties **1017** and any other entity via public or private packet switched or other data networks circuit switched networks, such as the PSTN, wireless network, or any other communications infrastructure **1021**. Server is used herein to refer to an application on a server or a portion of a server shared with other applications.

FIG. **11** illustrates the connectivity and architecture of the system **1010** when connected to a particular client server **1014**. A network device **1030** accesses a client server **1014** using an interface **1116**. As the network device navigates the network site, the client can monitor the activities or session data of the network device **1030**. For example, a session data message or messages can be transmitted in XML format, and are sent from the client server **1014** to a definition unit **1104** in an engagement unit **1105**. For example, session data includes any clickstream-related data, such as, whether the network device has requested a communication session with a terminal device, whether the network device has indicated that it does not want to connect or communication with a terminal device, the page on an interface that the network device has accessed, and/or the objects the network device is displaying on that page, location or other data characterizing the network device extracted from the interface the network device is displaying, the contents of the network device's object assignment request queue (e.g., cart of objects on a network site), the time that the network device has displayed a particular object on an interface, the network device's analysis characteristics, the identity of the network device, and the network device's previous object assignments with this client. The definition unit **1104** may also receive network device data about the network device **1030** from an client's network device data store **1106** via a content unit **1108**. The content unit **1108** accesses the network device data store the client's system. The network device data may include some or all of the following data: a name associated with the network device, address, previous object assignment data, past terminal devices accessed or engaged, objects of interest, past network activity, and recommended object assignment based on previous object assignments, if such data is available about the network device. Based on the session data and/or the network device data received, the definition unit **1104** defines and determines whether the network device is required to be engaged by a terminal device or is a target for permissive engagement from a terminal device. If the definition unit **1104** determines the network device requests or requires engagement from a terminal device, the definition unit **1104** sends an XML message to a connection unit **1112**. The definition unit data input to the connection unit **1112** from the definition unit **1104** includes session data and network device data.

A terminal device connects to the system **1010** either through the client's internal network ("intranet") and/or through an interface **1116**. A terminal device must be authorized to provide information relating to objects to be assigned to users, before initiating an engagement with a network device and communicating regarding specific objects. A central unit **1118** (e.g., intelligence unit) may also receive performance data regarding terminal devices from the client's systems **1117**. For example, performance data can include data indicating a terminal device's evaluation parameter within the client (based on a range of criteria, including a number of times the terminal device has facilitated a completion of an object assignment, etc.), and any authorizations to provide certain objects. This data on terminal devices is stored in the terminal device data store **1119**. The central unit **1118** also continuously obtains data regarding processes (e.g. interactions with network devices) and the performance of the terminal devices within specific process contexts, and generates reports on the processes as well as performance reports on the terminal devices. Such process data includes, for example, whether the process resulted in the object assignment and identifiers of the objects assigned or attempted to be assigned. The central unit **1118** can include applications to monitor the assignments completed over the system and manage the engagements initiated by terminal devices. The system also includes applications that monitor and generate reports on the clients and network devices and can be provided to the client via client-facing network sites. If the system is used with independent terminal devices, the system connects with action an recording unit so that action reports of the terminal device can be obtained.

When an agent is connected to a server associated with the system, the agent can access an interface displayed on terminal device **1120**. The terminal device's protocol data is sent to the connection unit **1112**. A terminal device's protocol data includes, for example, the terminal device's name, objects for which the terminal device can facilitate an assignment to a user, and performance data with respect to the terminal device's performance using the system. The terminal device's protocol data is continuously updated by the system. Based on the protocol data of the currently available terminal devices, network device data, and session data, the connection unit can identify available terminal devices most fit to communicate with the network device. The connection is performed in a wide range of client- and system-specified ways, as explained in more detail below. A list of identifiers of terminal devices can be sent from the connection unit to the queue control **1110** and the queue

control ensures that a terminal device is paired up with the network device and that the terminal device responds or initiates an engagement with the network device.

The terminal device **1120** can display a communication user interface to the agent through which the interactions of network devices can be monitored. The terminal device **1120** can facilitate a communication session with a selected network device and provide information regarding one or more objects associated with a client. For example, during a communication session, the terminal device can remotely control the network device's navigation of one or more network sites.

The terminal device **1120** can connect to object data store **1124** using the content unit **1108** and can request object data and object quantity data. The content unit **1108** can connect to the object data store **1124** using, for example, the client's system. Object data includes, for example, object specifications, ancillary objects (e.g., similar objects or object alternatives and/or alternative quantities of objects), object type data, object data from other network sites providing similar objects. Object quantity data includes, for example, a quantity of objects available for assignment, assignment condition data (e.g., a price), and the like.

The terminal device **1120** receives external data from a caching data store **1125** via the content unit **1108** and from a data store of protocols via a protocol unit **1130**. The protocol unit **1130** retrieves and organizes in the caching data store **1125** and the data store **1132** the external data, such as object-related data, and any data related to the object, whether provided from client servers, from third party servers and made available digitally or from terminal devices in past engagements.

Assignment data (referred to herein as object, object quantity, and/or external data) is obtained electronically, passed from the object data store **1124** in the case of internal data, or, in the case of external data, generated from external servers and captured through monitoring of the system over time. This data is then displayed on the terminal device **1120** through an interface.

The terminal device **1120** receives protocol data (e.g., data relating to best practices) from the data store **1132** via the protocol unit **1130**. The protocol unit **1130** monitors all communication, data, external data, and resources used by a terminal device during an engagement and for a particular object. All of this data is then stored by client servers and analyzed based on a result of each engagement to generate a set of protocols (e.g., protocol data). The protocol data is then stored in the data store **1132**. The protocol unit **1130** indexes the object assignment interactions (e.g., transcripts of communication sessions, audio transcripts of voice over IP sessions and/or telephone sessions, interactions with interfaces, etc.) in a manner that allows the protocol unit to generate dynamic protocol data against the specific parameters of each engagement resulting in an object assignment. Further, during an assignment, a terminal device has access to the stored protocol data and external data to assist in completing the assignment, as discussed below with reference to FIGS. **15** and **16**. The protocol unit **1130** can calculate a correlation between the communication data, external data, and resources used, the use of the communication data, external data, and resources in an engagement, and how many times the communication data, external data, and resources were used in engagements that resulted in completion of an object assignment to a user associated with a network device. This data can also be transmitted to client servers.

Further communication between terminal devices and network devices is facilitated by communication bridge **1034**. Communication bridge **1034** facilitates communication channels, such as telephone, instant messaging, collaboration, conferencing, e-mail, and voice over IP. The communication bridge **1034** can be internal or external to the system **1010**. Through this communication bridge, an object assignment to a user associated with a network device that was initiated in a communication session (e.g., a chat) with a terminal device can be bridged through a third-party to a PSTN-based phone call. This bridge is established either by the terminal device during the communication session with the network device using a telephone number to call or by the network device providing the terminal device with the a telephone number associated with the user operating the network device. The terminal device can establish a telephone call with the network device via the communications bridge **1034**. In that call, if the terminal device has access to both a phone line and a connected network, the terminal device and network device can communicate via voice, while still maintaining a co-browsing session, i.e., the terminal device can talk to the network device while navigating the network device through a network site.

FIG. **12** shows various units that facilitate the data flow and system activity and processes of platform **910**. Platforms **910** can include some or all of the units shown in FIG. **12**; they need not include all such units. The Network Device and Client Monitoring Unit **1230** monitors network device interaction with the client's server when accessing a network site. The Registration and Authentication Unit **1232** facilitates registering new terminal devices (including verification of the candidate terminal device's identity) and authenticating existing terminal devices. The Training Unit **1234** facilitates the training and authorization procedures that enable terminal devices to establish a resource set relating to objects provided by the client for assignment to users. The Connection Unit **1236** connects terminal devices with network devices (or allows network devices to connect to specified terminal devices with which the network device had prior positive communications) based on various client or network device conditions.

The Alert and Notification Unit **1238** transmits alerts via instant messaging, email, pager, telephone, or any similar method to terminal devices that they have been selected to engage with a network device accessing a client's server (e.g., to display a network site), monitors the number of terminal devices connected to a server, and transmits alerts to terminal devices when certain conditions are satisfied (e.g., a rule is satisfied based on interactions between the client server and the network device) to connect to the server and initiate communication sessions with network devices. The terminal device/network device Communication Unit **1240** can facilitate communication between the terminal device and the network device via instant messaging, voice over IP, or other methods. The Monitoring Unit **1242** monitors all communications in real-time between the terminal device and the network device and analyses each process (e.g., for terminal device performance data). The Monitoring Unit **1242** also receives network device feedback on terminal devices. The Calculation Unit **1244** obtains all object-assignment data, analysis of terminal device performance data, and other similar data. The Data store **1246** contains data on the interactions and could be separate from all of the aforementioned units or a portion of the data store could be found in each of the aforementioned units.

FIG. **13** illustrates an overview of part of the functionality of platform **910**. At **1350**, data is received from a client

server regarding a network device's interaction on a network site, such as what objects are displayed on a screen of the network device and whether or not a request is received from the network device for an engagement (e.g., a communication session, a chat session, etc.) with a terminal device. At **1352**, based on the network device data and various terminal device data, the platform selects a terminal device to initiate an engagement (e.g., initiate a communication session) with the network device. The network device may also request a specific terminal device. Then at **1354**, the platform notifies the selected terminal device of the network device requiring an engagement. In another embodiment, the terminal device identifies candidate network devices by using the platform to identify active sessions across the network relating to a particular resource set. In all embodiments, the platform provides object-assignment data. In any embodiment, the platform manages the engagement or communication session so that only a specified number of terminal devices is communicating with a single network device at any one time.

The platform then, at **1356**, facilitates a communication session between the network device and the terminal device via instant messaging, voice over IP, or other communication technologies. For example, the same images and text being displayed on a screen of the network device are also displayed on the terminal device when the terminal device has initiated a communication session or engagement with the network device. Moreover, the platform enables the terminal device, with the network device's authorization, to control the network device's access of one or more servers (e.g., a client server) to access a network site.

At **1358**, the platform monitors all communication sessions and/or engagements, including all of the communication between the terminal device and the network device. This monitoring allows the platform to provide such data for random analysis of the terminal devices. In addition, through open APIs between the platform and the client infrastructure, the platform can be integrated with other systems, whether administered by the client or not.

At **1360**, some of this data is used to update the records of the terminal devices. At **1362**, some of this data is sent to the Calculation Unit where it is used to generate performance data relating to terminal devices. At **1364**, the data regarding object assignment processes is sent to the data store. Such data is important in determining protocols for assigning objects to users and network device actions (e.g., behavior) and can be used to generate and transmit reports to the client systems.

FIG. **14** shows a flow diagram of the registration and authentication process according to one embodiment of the present invention. At **1470**, the central unit **1118** receives a registration request. At **1472**, the central unit **1118** unit determines if the requester is a registered terminal device by transmitting a prompt to the terminal device for receiving a preselected username and password from the terminal device. If the terminal device is registered with the system, the central unit **1118** logs the terminal device in and updates its records of connected terminal devices, as shown at **1474**. If the terminal device is not registered, the central unit **1118** requests terminal device data from the terminal device, as shown at **1476**. The requested terminal device data may include user identification (including a picture), and other data, such as, the name, address, and phone number of the agent associated with the terminal device, etc. The intelligence unit may also request and receive some client terminal device data on the terminal device. This client terminal device data includes, for example, performance data on the terminal device, and the objects the terminal device is authorized to assign to users. Terminal device data and client terminal device data is combined with any other terminal device performance data to generate a terminal device protocol on each terminal device. If this is a CTD, the terminal device may be required to provide security data to establish that the device may initiate engagements on behalf of the particular client. Alternatively, a CTD for a particular client can register via an client-specific URL.

At **1478**, terminal device data is received from the terminal device. For identity verification, the central unit **1118** may cause a request to be transmitted to an action reporting unit as shown at **1480**. This request may be transmitted directly from the system network. As a result, the system can identify authorized terminal devices and prevent unauthorized access to client systems. At **1482**, the central unit **1118** receives the action reporting data from the unit. The intelligence unit can also receive client terminal device data, such as, for example, object authorization data, schedule data, other relevant data, and performance data on the terminal device from the client. The central unit **1118** analyzes any action reporting data, any client terminal device data, and terminal device data at **1484** to determine if the terminal device is appropriate for an engagement. If not, at **1486**, the terminal device is sent a rejection message. If the terminal device is appropriate, the terminal device receives a notification message indicating such, and provided further instructions about registering and about the system. The notification messages can be transmitted and received either over a network or not. The terminal device then may provide the system with the schedule and contact data, for example, (i) only when "available," (ii) as notification preferences, and (iii) as notification preferences based on a terminal device-established schedule. At **1489**, the terminal device may be routed to initiate the training and authorization process prior to completing the registration process.

FIG. **15** provides a flow diagram of the registration and authentication process according to one embodiment of the present invention. At **1570**, the Registration and Authentication Unit receives a communication that includes data representing a registration request from a requester device (e.g., a candidate terminal device). At **1572**, the Registration and Authentication unit determines if the requester is a registered terminal device by transmitting a prompt to the terminal device for a username and password. If the terminal device is registered with the platform, the Registration and Authentication Unit logs the terminal device in and updates the record of connected terminal device, as shown at **1574**. If the terminal device is not registered, the Registration and Authentication Unit requests additional data from the terminal device, as shown at **1576**. The requested data can includes user identification and other identification data. At **1578**, the data is received from the terminal device. The Registration and Authentication Unit causes a request to be transmitted to an action reporting as shown at **1580**. This request may be transmitted directly from the connected platform. As a result, the platform can identify terminal devices and prevent unauthorized access to client or third-party servers. At **1582**, the Registration and Authentication Unit receives the action reporting data. The Registration and Authentication Unit analyzes this data at **1584** to determine if the terminal device is an appropriate candidate. If not, at **1586**, a communication including data representing a rejection is transmitted to the terminal device. If the terminal device is an appropriate candidate for an engagement, a notification message is transmitted to the terminal device

indicating such determination. Further instructions about registering and about the platform can also be transmitted to the terminal device after the authorization and verification processes are complete. The notification message can be transmitted either over a network or not.

FIG. **16** illustrates a flow diagram of the training process according to one embodiment of the invention. At **1604**, the central unit **1118** receives a training or authentication request from a terminal device. Terminal devices may be request to be authorized to communicate with network devices regarding a particular object type or a specific object. At **1608**, the central unit **1118** causes training data (e.g., testing material) to be transmitted to the terminal device. The training data can include the protocol data captured by the protocol unit **1130**. At **1612**, the central unit **1118** receives and analyzes the results of the training or authentication process and then at **1620** the central unit **1118** evaluates the performance metrics related to the training or authentication process. At **1624**, the central unit **1118** determines whether to authorize the terminal device based on the performance metrics. Then at **1628**, the intelligence unit updates the terminal device records to indicate any new authentication permissions. Upon authentication, the terminal device receives an authorization indication (e.g., a license) from the system or the client to assign a specific object or type of objects to a user associated with a network device. Authorization indications could also be granted based on other parameters as well, such as by location of the network device (determined from network device login data or location code data) or by any combination of the foregoing (e.g., by object and by spatial characteristics).

The testing and authentication process can be performed by a server. The testing and authentication process enables the system to train and authorize agents associated with terminal devices in order to generate authorization indications to assign specific types of objects. Each client can impose a particular training or authentication level before a terminal device is permitted to process requests to assign objects during engagements with network devices accessing the client server.

FIG. **17** illustrates a flow diagram of the training and authorization process according to one embodiment of the invention. At **1704**, the Training and Authorization Unit receives a communication including data indicating a request to train or obtain authorization from a terminal device. The request can be for an object type or a specific object. Training data to facilitate the training and authorization process can be generated by the client or a third-party entity. At **1708**, the Training and Authorization Unit causes the training data to be transmitted to the terminal device. The training data can be transmitted to the terminal device while the terminal device is connected to and accessing the client server. At **1712**, the Training and Authorization Unit receives and analyzes the results of the training or authorization process, and then at **1716**, the Training and Authorization Unit determines whether to authorize the terminal device based on performance metrics of the process. If the terminal device does not complete the process, a communication including data indicating that the process has not been completed is transmitted to the terminal device as shown at **1720**. If the terminal device has completed the process, a communication including data indicating such completion is transmitted to the terminal device, as shown at **1724**. Further, at **1728**, the terminal device records are updated to indicate the new authorization.

Turning now to FIG. **18**, the connection functionality of the connection unit **1112** facilitates routing of communications (e.g., messages) between the most appropriate terminal device or terminal devices to the most appropriate network devices. The following description of the connection functionality is provided in terms of a CTD and client or client specific connections, but can also be applied to an ITD communicating with network devices on behalf of different clients.

At **1804**, the definition unit **1104** identifies a communication session that has characteristics that indicate that a network device may request assignment of an object (based on session data and, if available, network device data). The engagement context server **204** transmits to the connection unit a communication including a request for terminal device engagement based on one or more parameters (e.g., similarity parameters). At **1808**, the connection unit determines a rule set to apply to the connection. The rule set is determined by the object for which the network device has requested or may request an assignment. The rule set is determined from interface-to-object mapping **1832**, client specific object hierarchy **1836**, and connection rules **1840**. Interface-to-object mapping **1832** decodes the URL data from the session attributes to determine what object is currently or has been displayed on a screen of the network device. The Interface-to-object mapping **1832** could be part of the definition unit **1104** or could be separate. The client-specific object hierarchy is then used to determine if the currently or previously displayed object has a corresponding rule set. If the specific object does not have a rule set, then a predefined rule set is determined from the hierarchy. The appropriate rule set is then selected from the connection rules **1840**.

When the appropriate rule set **1812** is determined, at **1816** the connection unit analyzes all terminal devices against the rules of the chosen rule set. First, at **1820**, an unordered list of candidate terminal devices is generated. The connections are dynamically performed by weighing network device data, session data, and terminal device protocol data according to the rule set, and each terminal device is associated with a similarity parameter (e.g., a matching parameter). The terminal device protocols are continuously updated by the system to provide current data for the connection unit. A connection parameter is generated based on the order of each terminal device within the bounds of a particular rule times the importance of that rule among all the rules for a particular rule set. At **1824**, the connection unit orders the terminal devices based on the resulting similarity parameters. A list is generated of available terminal devices in order at **1828**. The list is then sent to the queue control at **1110** and the queue control **1110** ensures that a terminal device from the list is paired up with the network device.

Depending on embodiments, the similarity unit connects a network device with an available terminal device with the highest similarity parameter and alerts the terminal device that the terminal device must initiate an engagement with the network device, alerts terminal devices at the top of the generated list that a network device requires an engagement, or transmits to the terminal devices their similarity parameter and enables the terminal devices to permissively engage the network device. The terminal devices receive notification messages through the desktop communication user interface, instant messaging, e-mail, telephone, wireless device, and/or any other applicable means and may receive a communication including their similarity parameter. If the pool of available terminal devices is small, the connecting application can cause terminal devices to be contacted via instant messaging, e-mail, telephone, wireless device, and/or

any other applicable means to get connected. The terminal devices can be contacted through different means than described above.

In one embodiment, the desktop **1120** provides a user interface, for example, to or through a client server, to the connection unit **1112** for the client to modify the connection rules, to introduce new connection rules, or to re-weigh existing connection rules for the connection unit. The connection unit also dynamically modifies the connection rules based on various factors, such as object assignment data. Through this dynamic feature, the connection unit can determine connection options based on the client and the data related to the terminal device.

FIG. **19** illustrates an example screen shot of the terminal device user interface. The network device window **1900** displays network devices that are currently accessing a client server. For example, the network device window can display all network devices that are currently connected to the server. Terminal devices authorized to facilitate the assignment of specific objects would see different views of the aggregate interaction activity with the server. The network device window **1900** specifically displays, inter alia, an identifier of the network device, if the identifier is available, the similarity parameter associated with the terminal device and/or the network device, the number of clicks received from the network device, content data that is currently displayed on the interface of the network device, and the amount of time the network device has been connected to the client server.

The Inbox window **1904** displays messages from network devices along with the network device's identification, type of message, and time received. The terminal device can create new messages or can reply to the network device's messages via the Inbox.

If available on the network device, the network device protocol window **1908** displays a list of these network devices obtained from the network device data server. Basic data about the network devices (such as location and telephone number) is displayed and a menu of additional data, such as, relationship, correspondence, etc. is also displayed. By selecting one of the menu items, additional data is displayed in a More Detail window (not shown).

The top left hand side of the screen displays the various functions as "buttons."

When a terminal device is currently in an engagement or communication session with a network device, a screen is displayed on the terminal devices user interface as shown in FIGS. **20** and **21**. For example, the screen has a Session window **2000** that displays a series of previous messages between the terminal device and the network device and a current map of the network device accessing the client server. A connected network device window **2004** is displays the content data that is currently being displayed on the network device. If authorized by the client and/or the network device, a terminal device may control the network device interface. For example, see U.S. Ser. No. 09/922,753, filed Aug. 6, 2001, the disclosure of which is incorporated by reference herein in its entirety for all purposes.

The connect to network device window **2008** displays message of a communication session with one or more network device. For example, instant messenger can be the method of communication shown in the connect to network device window **2008**. The terminal device and network device can communicate via voice over IP, telephone, e-mail, or on other applicable means. If the network device has the capability to receive a telephone call while connected to the network, the terminal device can connect to the network device via voice over IP or a telephone call over the PSTN through a bridge provided by the system. The network device can continue to access the server and navigate other interfaces while communicating with the terminal device.

The Object Resource Finder **2012** window enables an agent operating the terminal device to select a particular object. The terminal device can, after receiving the selection from the agent identifying a particular object, obtain additional object and object quantity data regarding the object. In some instances, the terminal device can query one or data stores for other objects. Data is provided to the Object Resource Finder window from the object data store **1124** via the content unit **1108**.

The Object Resource Library window **2016** can be used to access or query for additional data about a particular object. The window **2016** can also display the protocol data from the protocol unit **1130**. As explained above, the protocol data can include, for example, external data and object and object quantity data, and the like.

The Interaction Detail window **2020** displays the network devices object assignment request queue. The terminal device, subject to the client's and/or the network device's permission, can manipulate the network device's object assignment request queue.

FIG. **22** illustrates an example screen shot of the terminal device user interface. The frame **2200** shows the terminal device the objects that the terminal device is authorized to assign to users. The frame **2204** provides the terminal device with data regarding the particular training available. The detail frame **2208** provides the terminal device with an network connected evaluation for authorization.

FIGS. **23** and **24** show functionalities of the network device and client Monitoring Unit. The network device and Monitoring Unit is at the client's server (e.g., server **704**) in some embodiments, but can be located separate from the client's server in other embodiments. In FIG. **23**, at **2310** the network device and Monitoring Unit monitors and analyzes interactions between the connected network devices and the client server, and at **2312**, this data is transmitted to or retrieved by other units in the platform.

FIG. **24**, at **2414** the network device and client Monitoring Unit extracts a condensed version of the interface (e.g., a WAP version) for use by the terminal device to facilitate the object assignment process. At **2416**, this data is transmitted to or retrieved by other units in the platform.

Additionally, the network device and client Monitoring Unit can obtain current details regarding object assignments. The network device and client Monitoring Unit enables the client to define constraints (e.g., preferences) regarding how and when any terminal device can interact with network devices. For example, the client may define the constraint, such that when the network device connects to the client server, the network device may be contacted by a terminal device that has a resource set regarding a specific topic or object.

In some instances, data causing a window or a button to be displayed on the network device can be transmitted to the network device. When the data is received at the network device, the window or button can be displayed. For example, the window can include text or a prompt indicating that the user associated with the network device can request that a communication session be initiated by a terminal device. As another example, or a button can be displayed, such that when the button is selected a communication session can be initiated with a terminal device. In some instances, a communication session or engagement with a terminal device can be triggered based on an interaction received from a

network device (e.g., a click). These "connecting" or "connection" parameters can be defined by the client, as are the types of communication channels between the network device and the terminal device (e.g., chat or telephone). In some instances, network devices can be anonymous to terminal devices.

If the network device indicates an interest in requesting assignment of an object (by, for example, adding an object to the network device object assignment request queue), the terminal device may rejoin or initiate a communication session with the network device.

FIG. **25** illustrates a flow diagram of the connecting process according to an embodiment. At **2520**, the Connecting Unit receives data from the network device and client Monitoring Unit, such as an identifier of an object that is currently being or has been displayed on the network devices, an indication that the network device requests an engagement from a terminal device, and other suitable data. The Connecting Unit then queries data from the Registration and Authentication Unit (e.g., location of a terminal device, etc.) at **2522**, the Training Unit (e.g., objects the terminal device is authorized to assign to users) **2524**, the Alert and Notification Unit (e.g., identifiers of terminal devices connected to the client server or network) at **2526**, the Calculation Unit (the most appropriate terminal device to connect with the network device based on various factors) **2528**, and the Monitoring Unit **2530**. In another embodiment, all of the terminal device data is contained in a single data store and the Connecting Unit queries for the data from the single data store. Moreover, the Connecting Unit does not have to queries for all of the terminal device data. The received data is then used by the Connecting Unit to select the most appropriate terminal device for the network device at **2532**. At **2534**, the Connecting Unit transmits a communication requesting the Alert and Notification Unit to alert the selected terminal device. As is shown at **136**, if the Alert and Notification determines that the terminal device is available, it alerts the terminal device **2538**, but if the Alert and Notification Unit determines that the terminal device is unavailable (e.g., communicating with another network device, etc.), it causes the Connecting Unit to select another terminal device at **2532**. The Connecting Unit automatically selects the next most appropriate connected terminal device and enables only that terminal device to interact with the connected network device.

FIGS. **26** and **27** illustrate flow diagrams of a process of one embodiment of the Alert and Notification Unit. In FIG. **26**, at **2640**, the Alert and Notification Unit receives a request to transmit a notification message to a particular terminal device from the Connecting Unit. At **2642**, the Alert and Notification Unit determines if that particular terminal device is available to initiate a communication session and/or engagement with the network device. If the terminal device is not available, at **2644** the Alert and Notification Unit transmits a notification message to the Connecting Unit. If the terminal device is available, at **2646** the Alert and Notification unit determines the communication channel for transmitting the notification message to the terminal device. Then at **2648**, the Alert and Notification Unit transmits a notification message to the terminal device using the determined communication channel.

FIG. **27** illustrates a flow diagram of one embodiment of the Alert and Notification Unit detecting whether there are a sufficient number of terminal devices to communication with network device requests for engagement. At **2750**, the Alert and Notification Unit receives data on the network devices that are connected and/or accessing a particular server. The Alert and Notification Unit may periodically query for this data or may be periodically transmitted this data. At **2752**, the Alert and Notification Unit analyzes the available terminal devices and network device requirements. At **2754**, the Alert and Notification Unit determines whether there are a sufficient number of terminal devices connected to the server (e.g., to a central server managing the terminal device connections) to meet the network device's requirements. If there are enough terminal devices, the Alert and Notification Unit begins the process over again the next time network device data is received. If there are not enough terminal devices available, the Alert and Notification Unit determines identifiers of terminal devices to be notified and each terminal device's communication channel for the notification, as shown in **2756**. Then, at **2758**, the Alert and Notification Unit notifies the terminal devices using the determined communication channel.

FIG. **28** is a flow diagram illustrating a processes executed at an object assignment management unit. As depicted at **2804**, data is received regarding object assignments during engagements or communication sessions between terminal devices and network devices. At **2808**, completed object assignments are recorded. At **2812**, terminal device's performance metrics are calculated based on the object assignments. At **2820**, the data is input into terminal device's record. At **2816**, a client is provided with the calculations at **2812**.

FIG. **29** is a flow diagram illustrating a process executed at a monitoring unit. Object assignment activity is monitored at **2904**. Network device feedback is obtained, as shown at **2912**. Object assignment activity is evaluated at **2908**. At **2920**, data regarding object assignment activity is inputted into terminal device's records. At **2924**, data regarding object assignment activity is transmitted to a data store.

FIG. **30** indicates example processes executed at a terminal device in accordance with the present disclosure. At **3004**, registration occurs. At **3008**, an identification or authorization of the agent associated with the terminal device is performed. If the terminal device fails the identification or authorization, the terminal device can be denied access to the system, as shown at **3012**. If the terminal device completes the identification or authorization, at **3004** a log-in is performed at **3016**. At **3020**, training can be provided to the agent. A communication link between the terminal device and a network device is formed at **3024**. At **3028**, communication with a network device occurs during a communication session. At **3032**, an object assignment process is either completed or terminated during the communication session. At **3036**, the terminal device performs a log-out.

FIG. **31** illustrates a flow diagram of an object assignment process using the system of the invention. At **3100**, a network device accesses a client server, which is part of the system. If the network device is a returning network device, the client server can facilitate an engagement with the network device at **3104**. The connection unit **1112** then establishes a communication link between the network device and a particular terminal device or several terminal devices. In step **3108**, the terminal device can transmit an initial message to the network device over the communication link during the communication session. The terminal device determines whether the network device requests an engagement at **3116**. If the network device does not request an engagement, the terminal device disengages at **3120**.

If the network device does request an engagement, the terminal device then evaluates the network device's requirements further through communication with the network

device and accessing data on the network device at **3124**. At this point, the terminal device determines the objects, features, volume range, user, and the network device's understanding of the object based on communication messages received, for example. The terminal device directs the network device to specific objects at **3132** and provides additional data as necessary to complete the object assignment. The terminal device can access external resources or third-party servers as part of the process, for example, the terminal device can route or navigate the network device to another server associated with a different object provider.

The terminal device evaluates whether the network device selected an object at **3136** and if so provides related objects at **3140**. The terminal device can then perform research at step **3128** on the related objects and then the process continues as before. If the network device did not make a selection, the terminal device further determines if the network device has completed accessing the client server to evaluate whether or not to request an assignment of objects at **3144**. If the network device is not completed accessing the client server, the terminal device evaluates the requirements of the network device further at **3124** and the process continues as before. If the network device is completed accessing the client server, the terminal device provides additional object data at **3148** and facilitates a completion of the engagement or communication session at **3152**. At **3160**, a satisfied network device disconnects from the client server. The terminal device can follow up with the network device through the methods shown at the bottom of FIG. **31**. For example, see U.S. Ser. No. 14/288,258, filed May 27, 2014, the disclosure of which is incorporated by reference herein in its entirety for all purposes.

Specific details are provided in the above description to provide a thorough understanding of the embodiments. However, it is understood that the embodiments can be practiced without these specific details. For example, circuits can be shown as block diagrams in order not to obscure the embodiments in unnecessary detail. In other instances, well-known circuits, processes, algorithms, structures, and techniques can be shown without unnecessary detail in order to avoid obscuring the embodiments.

Implementation of the techniques, blocks, steps and means described above can be done in various ways. For example, these techniques, blocks, steps and means can be implemented in hardware, software, or a combination thereof. For a hardware implementation, the processing units can be implemented within one or more application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, micro-controllers, microprocessors, other electronic units designed to perform the functions described above, and/or a combination thereof.

Also, it is noted that portions of the embodiments can be described as a process which is depicted as a flowchart, a flow diagram, a data flow diagram, a structure diagram, or a block diagram. Although a flowchart can describe the operations as a sequential process, many of the operations can be performed in parallel or concurrently. In addition, the order of the operations can be re-arranged. A process is terminated when its operations are completed, but could have additional steps not included in the figure. A process can correspond to a method, a function, a procedure, a subroutine, a subprogram, etc. When a process corresponds to a function, its termination corresponds to a return of the function to the calling function or the main function.

Furthermore, embodiments can be implemented by hardware, software, scripting languages, firmware, middleware, microcode, hardware description languages, and/or any combination thereof. When implemented in software, firmware, middleware, scripting language, and/or microcode, the program code or code segments to perform the necessary tasks can be stored in a machine readable medium such as a storage medium. A code segment or machine-executable instruction can represent a procedure, a function, a subprogram, a program, a routine, a subroutine, a module, a software package, a script, a type, or any combination of instructions, data structures, and/or program statements. A code segment can be coupled to another code segment or a hardware circuit by passing and/or receiving data, data, arguments, parameters, and/or memory contents. Data, arguments, parameters, etc. can be passed, forwarded, or transmitted via any suitable means including memory sharing, message passing, ticket passing, network transmission, etc.

For a firmware and/or software implementation, the methodologies can be implemented with modules (e.g., procedures, functions, and so on) that perform the functions described herein. Any machine-readable medium tangibly embodying instructions can be used in implementing the methodologies described herein. For example, software codes can be stored in a memory. Memory can be implemented within the processor or external to the processor. As used herein the term "memory" refers to any type of long term, short term, volatile, nonvolatile, or other storage medium and is not to be limited to any particular type of memory or number of memories, or type of media upon which memory is stored.

Moreover, as disclosed herein, the term "storage medium", "storage" or "memory" can represent one or more memories for storing data, including read only memory (ROM), random access memory (RAM), magnetic RAM, core memory, magnetic disk storage mediums, optical storage mediums, flash memory devices and/or other machine readable mediums for storing data. The term "machine-readable medium" includes, but is not limited to portable or fixed storage devices, optical storage devices, wireless channels, and/or various other storage mediums capable of storing that contain or carry instruction(s) and/or data.

While the principles of the disclosure have been described above in connection with specific apparatuses and methods, it is to be clearly understood that this description is made only by way of example and not as limitation on the scope of the disclosure.

What is claimed is:

1. A computer-implemented method, comprising:

receiving, on a computing device, input corresponding to terminal device data from a plurality of terminal devices, wherein data from a terminal device includes a result code indicating a result of an engagement executed on a server;

identifying a plurality of network devices that have been used to obtain an object from the server during a plurality of engagements;

storing a set of attributes associated with each of the identified plurality of network devices;

identifying, from the set of attributes, a result code corresponding to the plurality of engagements, wherein the result code indicates that each of the identified plurality of network devices were used to obtain the object from the server;

performing a regression analysis on the stored set of attributes, wherein performing the regression analysis includes generating a subset of common attributes from

the set of attributes for the plurality of engagements that include the result code, wherein the generated subset of common attributes includes one or more attributes that are predictive of an object assignment during one or more engagements;

comparing attributes of a new network device on the server to the generated subset of common attributes;

generating a similarity parameter for the new network device based on the comparison; and

determining whether to facilitate a terminal device communication based on the similarity parameter.

2. The computer-implemented method of claim **1**, wherein the set of attributes includes one more network device attributes, one or more network device actions, and terminal device data.

3. The computer-implemented method of claim **2**, wherein the one more network device attributes includes a time of a last visit of each of the identified plurality of network devices, a network device type of each of the identified plurality of network devices, an authentication status of each of the identified plurality of network devices, a location of each of the identified plurality of network devices, or an Internet Protocol (IP) address of each of the identified plurality of network devices.

4. The computer-implemented method of claim **2**, wherein the one or more network device actions includes an amount of time spent on the by each of the identified plurality of network devices, page navigation of each of the identified plurality of network devices, or one or more form field entries of each of the identified plurality of network devices.

5. The computer-implemented method of claim **2**, wherein the terminal device data includes one or more result codes.

6. The computer-implemented method of claim **1**, wherein identifying the plurality of network devices includes:

randomly facilitating terminal device communication with each of the plurality of terminal devices.

7. A system, comprising:

a processor; and

a non-transitory computer-readable storage medium containing instructions configured to cause the processor to perform operations including:

receiving input corresponding to terminal device data from a plurality of terminal devices, wherein data from a terminal device includes a result code indicating a result of an engagement executed on a server;

identifying a plurality of network devices that have been used to obtain an object from the server during a plurality of engagements;

storing a set of attributes associated with each of the identified plurality of network devices;

identifying, from the set of attributes, a result code corresponding to the plurality of engagements, wherein the result code indicates that each of the identified plurality of network devices were used to obtain the object from the server;

performing a regression analysis on the stored set of attributes, wherein

performing the regression analysis includes generating a subset of common attributes from the set of attributes for the plurality of engagements that include the result code, wherein the generated subset of common attributes includes one or more attributes that are predictive of an object assignment during one or more engagements;

comparing attributes of a new network device on the server to the generated subset of common attributes;

generating a similarity parameter for the new network device based on the comparison; and

determining whether to facilitate a terminal device communication based on the similarity parameter.

8. The system of claim **7**, wherein the set of attributes includes one more network device attributes, one or more network device actions, and terminal device data.

9. The system of claim **8**, wherein the one more network device attributes includes a time of a last visit of each of the identified plurality of network devices, a network device type of each of the identified plurality of network devices, an authentication status of each of the identified plurality of network devices, a location of each of the identified plurality of network devices, or an IP address of each of the identified plurality of network devices.

10. The system of claim **8**, wherein the one or more network device actions includes an amount of time spent on the server by each of the identified plurality of network devices, page navigation of each of the identified plurality of network devices, or one or more form field entries of each of the identified plurality of network devices.

11. The system of claim **8**, wherein the terminal device data includes one or more result codes.

12. The system of claim **7**, wherein identifying the plurality of network devices includes:

randomly facilitating terminal device communication with each of the plurality of network devices.

13. A computer-program product, tangibly embodied in a non-transitory machine readable medium, including instructions configured to cause a data processing apparatus to:

receive input corresponding to terminal device data from a plurality of terminal devices, wherein data from a terminal device includes a result code indicating a result of an engagement executed on a server;

identify a plurality of network devices that have been used to obtain an object from the server during a plurality of engagements;

store a set of attributes associated with each of the identified plurality of network devices;

identify, from the set of attributes, a result code corresponding to the plurality of engagements, wherein the result code indicates that each of the identified plurality of network devices were used to obtain the object from the server;

perform a regression analysis on the stored set of attributes, wherein performing the regression analysis includes generating a subset of common attributes from the set of attributes for the plurality of engagements that include the result code, wherein the generated subset of common attributes includes one or more attributes that are predictive of an object assignment during one or more engagement;

compare attributes of a new network device on the server to the generated subset of common attributes;

generate a similarity parameter for the new network device based on the comparison; and

determine whether to facilitate a terminal device communication based on the similarity parameter.

14. The computer-program product of claim **13**, wherein the set of attributes includes one more network device attributes, one or more network device actions, and terminal device data.

15. The computer-program product of claim **14**, wherein the one more network device attributes includes a time of a last visit of each of the identified plurality of network devices, a network device type of each of the identified plurality of network devices, an authentication status of each of the identified plurality of network devices, a location of each of the identified plurality of network devices, or an IP address of each of the identified plurality of network devices.

16. The computer-program product of claim **14**, wherein the one or more network device actions includes an amount of time spent on the server by each of the identified plurality of network devices, page navigation of each of the identified plurality of network devices, or one or more form field entries of each of the identified plurality of network devices.

17. The computer-program product of claim **14**, wherein the terminal device data includes one or more result codes.

18. The computer-program product of claim **13**, wherein identifying the plurality of network device includes:

randomly facilitate terminal device communication with each of the plurality of network devices.

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