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[US/US]; Polycom, Inc., 1565 Barber Lane, Milpitas, CA
95035 (US).

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(74) Agent: **MACKENZIE, Douglas**; Carr & Ferrell, LLP,
2225 East Bayshore Dr., Palo Alto, CA 94303 (US).

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(71) Applicant (for all designated States except US): **POLY-
COM, INC.** [US/US]; 1565 Barber Lane, Milpitas, CA
95035 (US).

(72) Inventor; and

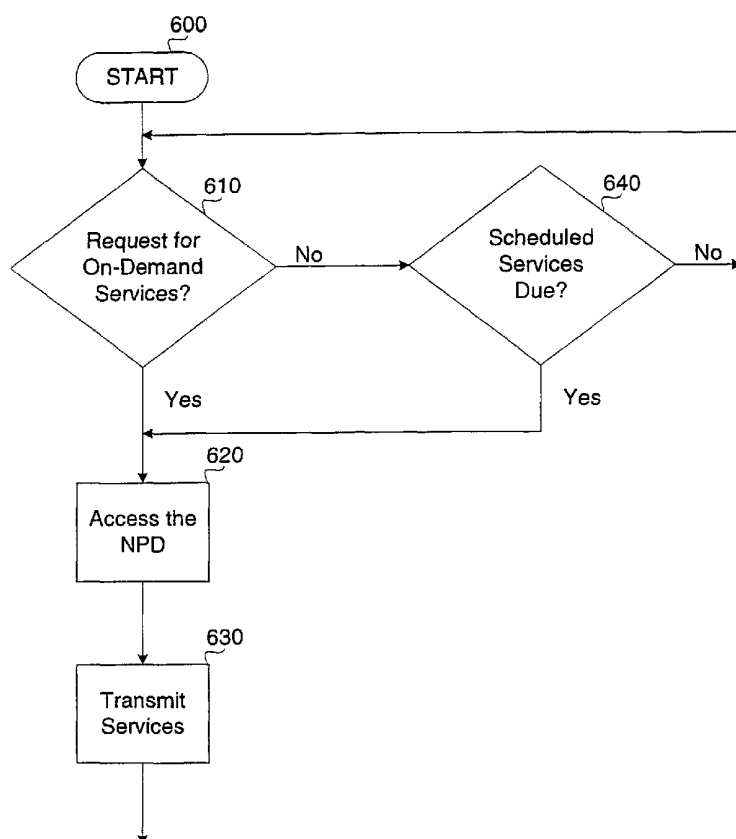
(75) Inventor/Applicant (for US only): **HOGAN, Michael**

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(54) Title: REMOTE MANAGEMENT OF AN INTEGRATED NETWORK ACCESS AND SERVER DEVICE



(57) Abstract: A system and method for providing remote services to an integrated network access and server device. The method includes determining whether a request for services from the integrated network access and server device has been made and accessing the integrated network access and server device. If the request for services has been made then the requested services are provided to the integrated network access and server device. Otherwise services to the integrated network access and server device are provided on a scheduled basis.



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REMOTE MANAGEMENT OF AN INTEGRATED NETWORK ACCESS AND
SERVER DEVICE

5 CROSS-REFERENCE TO RELATED APPLICATION

 This application relates to commonly assigned U.S.
patent application entitled "High-Bandwidth Network
Access Device With Integrated Server Capability" filed on
August 16, 2001 by Ken Goldsholl and Michael Hogan, the
10 disclosure of which is hereby incorporated by reference.

BACKGROUND

Field of the Invention

 The present invention relates generally to
15 communication over a network, and more particularly to a
system and method for remote management and diagnosis of
an integrated network presence device and communication
peripherals connected thereto.

20 Description of the Background Art

 The use of web servers to provide Internet related
dial-up services is well known in the art. Known systems
provide the hardware and necessary application software
to fulfill the needs of Internet Service Providers and
25 their customers. In addition, the use of network access
devices such as modems, conversion devices, routers, and
voice-over-IP (VoIP) access devices is well known in the

art. Such devices provide, when configured in a functional system architecture, the hardware and operating system software necessary to access the full range of services offered over the Internet. A trend in
5 the evolution of networking and communication technology is to provide high-bandwidth access to the Internet through technologies such as digital subscriber line (DSL), and its variations (e.g., ADSL, SDSL).

FIG. 1 illustrates a conventional system in which
10 DSL customers connect their local area network (LAN) 100 to the Internet 130 through an access provider, which is often a competitive local exchange carrier (not shown), and an Internet Service Provider (ISP) 120. The access
provider maintains the network 105. The ISP 120 delivers
15 services that travel over the access provider's network 105.

FIG. 2 illustrates the conventional architecture ISP 120. Original ISP content along with incoming Internet content is routed from a router/firewall 140 through line
20 160 and, ultimately, to the customer premises.

Conversely, customer Internet packets are routed into ISP servers 210 through 250 and if necessary back out through router/firewall 140 and a line 170 and onto the Internet. The servers 210 through 250 provide services such as web,
25 email, caching, domain name, and FTP, respectively.

Thus, an essential aspect of the prior art is that all

Internet-related services provided by ISP 120 flow through the ISP's router/firewall 140 and through the servers 210 through 250. One problem with this approach is that typically, ISP's oversubscribe lines 160 and 170, which often results in diminished data transmission rates for the end customer. Another problem is that the centralized nature of servers 210 through 250 raises privacy and security concerns for the end customer.

With reference to FIG. 1 a number of computers 190 including a Local Area Network (LAN) 100 are shown connected to an integrated access device (IAD) 180. Alternatively a single computer 190 may be connected directly to IAD 180 (not shown). The IAD 180 is further operable to carry VoIP communication and thus analog Plain Old Telephone Service (POTS) devices 195 are coupled directly or through a Private Branch Exchange (PBX) 192 to IAD 180.

The access provider aggregates (i.e., multiplexes), via a Digital Subscriber Line Access Multiplexer (DSLAM) 110, data from several customers for the ISP 120 into a backbone network connection 115, such as a DS3, OC3, or T1. Customer data is then routed out of the backbone 115 and into a regional packet network 125 that is appropriate for the location of the ISP 120. From the regional packet network 125, the data travels over line 160 coupled to the ISP's router/firewall 140. Within the

ISP 120 the data is routed through a bank of servers 150 to line 170 for delivery to the Internet 130. A reverse path is followed for content originating at the Internet 130 and destined for the customer premises.

5 In similar fashion, VoIP communication is routed from the backbone 115 to a regional packet network 135, which is appropriate for the location of a voice gateway 145. The voice gateway 145 converts the packetized VoIP communication back to an analog signal and, through a
10 Class 5 switch 155, sends it through to a PSTN 165.

The prior art suffers from many deficiencies, chief among them the fact that configuring a high-bandwidth access device such as a DSL modem or an IAD 180 to function with a desktop computer 190 is not a simple
15 task. Configuring the system often requires physically connecting the IAD 180 to the computer motherboard, and reconfiguring the desktop operating system, neither of which are typically simple, straight-forward tasks for an end user.

20 What is needed is a low cost, easily installed device that integrates Internet server functionality with high-bandwidth access thus providing the capability to bypass the ISP 120 and route Internet traffic directly to the Internet 130. Such a device would preferably provide
25 enhanced accessibility to the Internet for end customers. Such a device would further advantageously function as a

peripheral to a personal computer allowing access
providers, small to medium-size businesses, and
residential users to eliminate server costs and
complexity, and essentially become their own Internet
5 service provider. Additionally, such a device would
provide voice and integrated dial-up services. Finally
such a device would provide increased privacy and
security and rapid deployment of high-bandwidth Internet
access.

10 In conjunction with the low cost, easily installed
device that integrates Internet server functionality with
high-bandwidth access thus providing the capability to
bypass the ISP 120, what is also needed is a system and
method for remotely managing, diagnosing, and mirroring
15 such devices. Such a system and method preferably
provide value to an end user by performing multiple tasks
that the end user would conventionally be required to
perform. In doing so, the system and method supplement
the "plug and go" capability offered by the low cost,
20 easily installed device of the invention.

SUMMARY OF THE DISCLOSURE

A system and method for providing remote services to
5 an integrated network access and server device. The
method includes determining whether a request for
services from the integrated network access and server
device has been made and accessing the integrated network
access and server device. If the request for services
10 has been made then the requested services are provided to
the integrated network access and server device.
Otherwise services to the integrated network access and
server device are provided on a scheduled basis.

The services include:

- 15 (1) Configuration of the integrated network access
and server device, upon installation, to properly
communicate with a chosen high bandwidth access provider,
for example, registering with the appropriate provider
DSLAM;
- 20 (2) Remote management and performance monitoring and
optimization of integrated network access and server
device and connected communication peripherals such as
audio conference device, streaming device, presentation
device, videoconferencing device, and personal video
25 device, preferably through utilization of Simple Network
Management Protocol (SNMP);

(3) Web-based user interface for users that choose to self-manage the network server applications;

(4) Automatic domain name registration with the registering organization;

5 (5) Automatic IP address allocation and management for the integrated network access and server device, workstations, and connected communication peripherals such as audio conference device, streaming device, presentation device, videoconferencing device, and
10 personal video device;

(6) Automatic software updates, preferably in the background and employing push technology, for the integrated network access and server device operating systems, web server applications, and peripheral
15 communication device operating systems/applications;

(7) Automatic anti-virus software updates, preferably in the background, to devices inside the integrated network access and server device firewall, which may include notifications (e.g., e-mail) to
20 workstations, and/or automatic workstation initiation and update through a LAN;

(8) Automatic redirection of email and web server request packets, so that the data is accessible in the event that the integrated network access and server
25 device is inoperable;

(9) Network Address Translation (NAT) support, for managing translation of IP addresses between inside and outside networks;

(10) File Transfer Protocol (FTP) server support,
5 for managing exchange of files over a network;

(11) Video multi-casting gateway functionality for managing video signal traffic; and

(12) Multi-point audio gateway functionality for managing audio signal traffic.

10 (13) Diagnostic and mirroring services.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 3 illustrates a hardware configuration of the low cost, easily installed device that integrates Internet server functionality with high-bandwidth access thus providing the capability to bypass the ISP 120. This device is referred to as a network presence device (NPD) 300. DSLAM 110 communicates, via backbone 115, directly with the Internet 130 and NPD 300. NPD 300 is coupled to LAN 100 and other POTS devices at the customer premises. NPD 300 includes integrated server functionality. Remote manager 310 provides for remote management of NPD 300 as well as remote diagnostic and mirroring capabilities as further described herein.

FIG. 4 illustrates an architecture in which the remote manager 310 operates to provide services to users of NPD 300. As shown, the remote manager 310 is connected to a network 130, through which it can communicate with the NPD 300. Remote manager 310 may connect to network 130 through DSLAM 110.

The NPD 300 connects to and communicates with other peripheral audio, video, and presentation devices, either directly, through a LAN 412 or 416, or through network 130. For example, such devices include an audio conferencing device 406, such as a SoundStation® Conference Phone, a streaming device 408, such as a

StreamStation™, and a presentation device 410, such as a WebStation® Internet conferencing system, all of which are available from Polycom, Inc. of Milpitas, California.

With continued reference to FIG. 4 peripheral
5 computer workstations 414 connect to the NPD 300 either directly or through LAN 416, through an appropriate NPD 300 interface port (not shown). Additionally, workstations 414 connect to network 130 for communication with NPD 300 to utilize the network services provided by
10 NPD 300.

The architecture also includes a peripheral videoconferencing device 418 and a personal video device 420, for receiving and transmitting signals representative of audio and video via the NPD 300 to a
15 workstation 414. For example, a videoconferencing device 418 includes a ViewStation™, and the personal video device 420 includes a desktop ViaVideo™, both of which are also available from Polycom, Inc. of Milipitas, California. These devices may be connected directly to
20 NPD 300 through an appropriate interface port (not shown), through the LAN 416, or through network 130.

The remote manager 310 provides remote global diagnostic services, for diagnosing NPD 300 as well as connected communication peripherals such as audio
25 conference device 406, streaming device 408, presentation

device 410, videoconferencing device 418, and personal video device 420, within an enterprise network.

FIG. 5 illustrates the steps of a diagnostic method in accordance with the invention. The method starts at step 500. At step 510, it is determined whether diagnostics on the NPD 300 are due. If diagnostics are not due, at step 560, it is determined whether the NPD 300 has reported an error condition on its own accord (i.e., without the initiation of scheduled diagnostics). If no error has been reported, loop back to step 510 occurs. If diagnostics on the NPD 300 are due, at step 520, the remote manager 310 accesses the NPD 300. Accessing NPD 300 entails establishing all initial synchronization between the remote manger 310 and the NPD 300. If necessary, NPD 300 may be remotely powered up for access by the remote manager 310.

At step 530, diagnostic signals and commands are transmitted to NPD 300. At step 540, reply signals from NPD 300 are received. At step 550, it is determined whether errors have been detected. If any errors have been detected, at step 570, the errors are recorded and remedied remotely if possible. Additionally, at step 570, an appropriate notification is sent via e-mail, pager, automated phone message, or by other similar means.

The remote manager 310 provides various services to users of NPD 300. FIG. 6 illustrates a method by which remote manager 310 delivers services to NPD 300. The method starts at step 600 and proceeds to step 610 where
5 it is determined whether a request for on-demand services has been made by NPD 300. If no such request has been made, at step 640 it is determined whether scheduled services are due for NPD 300. If scheduled services are not due, then loop back to step 610 occurs. If services
10 are either due or demanded, then at step 620 the remote manager 310 accesses NPD 300, which entails establishing all initial synchronization, including powering up NPD 300 if necessary. At step 630 transmission of the necessary services to NPD 300 occurs and loop back to
15 step 610 occurs.

The services which remote manager 310 provides to NPD 300 include the following:

- (1) Configuration of the device 300, upon installation, to properly communicate with a chosen high
20 bandwidth access provider, for example, registering with the appropriate provider DSLAM;
- (2) Remote management and performance monitoring and optimization of NPD 300 and connected communication peripherals such as audio conference device 406,
25 streaming device 408, presentation device 410, videoconferencing device 418, and personal video device

420, preferably through utilization of Simple Network Management Protocol (SNMP);

(3) Web-based user interface for users that choose to self-manage the network server applications;

5 (4) Automatic domain name registration with the registering organization;

(5) Automatic IP address allocation and management for NPD 300, workstations 414, and connected communication peripherals such as audio conference device
10 406, streaming device 408, presentation device 410, videoconferencing device 418, and personal video device 420;

(6) Automatic software updates, preferably in the background and employing push technology, for NPD 300
15 operating systems, web server applications, and peripheral communication device operating systems/applications;

(7) Automatic anti-virus software updates, preferably in the background, to devices inside NPD 300
20 firewall, which may include notifications (e.g., e-mail) to workstations 414, and/or automatic workstation initiation and update through LAN 416;

(8) Automatic redirection of email and web server request packets, so that the data is accessible in the
25 event that NPD 300 is inoperable;

(9) Network Address Translation (NAT) support, for managing translation of IP addresses between inside and outside networks;

(10) File Transfer Protocol (FTP) server support,
5 for managing exchange of files over a network;

(11) Video multi-casting gateway functionality for managing video signal traffic; and

(12) Multi-point audio gateway functionality for managing audio signal traffic.

10 Automatic data back-up or mirroring of NPD 300 is accomplished by remote manager 310, preferably in the background. Data files are pushed to connected workstations 414 or to a remote server, such as the remote manager 310, so that the data is accessible in the
15 event that NPD 300 is inoperable. FIG. 7 depicts the method followed in mirroring NPD 300.

Following the initial step 700, at step 710 it is determined whether NPD 300 has demanded/requested mirroring. If no such request has been made, then at
20 step 750 it is determined whether scheduled mirroring of NPD 300 is due. If scheduled mirroring is not due, then loop back to step 710 occurs. If mirroring is demanded or scheduled, then at step 720 NPD 300 is accessed, which includes establishing all initial synchronization between
25 NPD 300 and the remote manager 310. If necessary to the initial synchronization, the remote manager 310 powers-up

NPD 300. At step 730, a disk image of the NPD 300 drives is extracted. At step 740, the disk images are stored in a designated location. Loop back to step 710 then occurs.

- 5 It will be recognized by those skilled in the art that, while the invention has been described above in terms of preferred embodiments, it is not limited thereto. Various features and aspects of the above-described invention may be used individually or jointly.
- 10 Further, although the invention has been described in the context of its implementation in a particular environment and for particular applications, those skilled in the art will recognize that its usefulness is not limited thereto and that the present invention can be utilized in any
- 15 number of environments and implementations.

What is claimed is:

1. A method for providing remote services to an integrated network access and server device, the method comprising the steps of:
 - 5 (a) determining whether a request for services from the integrated network access and server device has been made;
 - (b) accessing the integrated network access and server device; and
 - 10 (c) providing the requested services to the integrated network access and server device if the request for services has been made.
- 15 2. The method of claim 1 further comprising the step of providing services to the integrated network access and server device on a scheduled basis if the request for services has not been made.
- 20 3. The method of claim 1 wherein the requested services further comprise installation configuration of the integrated network access and server device.
4. The method of claim 1 wherein the requested services
25 further comprise management of the integrated network access and server device.

5. The method of claim 1 wherein the requested services further comprise performance monitoring and optimization of the integrated network access and server device.

5

6. The method of claim 1 wherein the requested services further comprise provision of a web-based user interface.

7. The method of claim 1 wherein the requested services
10 further comprise automatic domain name registration.

8. The method of claim 1 wherein the requested services further comprise automatic IP address allocation and management.

15

9. The method of claim 1 wherein the requested services further comprise automatic software updates.

10. The method of claim 1 wherein the requested services
20 further comprise automatic redirection of e-mail.

11. The method of claim 1 wherein the requested services further comprise automatic redirection of web server request packets.

25

12. The method of claim 1 wherein the requested services further comprise network address translation support.

13. The method of claim 1 wherein the requested services
5 further comprise file transfer protocol server support.

14. The method of claim 1 wherein the requested services further comprise video multi-casting gateway functionality.

10

15. The method of claim 1 wherein the requested services further comprise multi-point audio gateway functionality.

16. The method of claim 1 wherein the requested services
15 further comprise mirroring services.

17. The method of claim 1 wherein the requested services further comprise diagnostic services.

20 18. The method of claim 2 wherein the scheduled services further comprise automatic software updates.

19. The method of claim 2 wherein the scheduled services further comprise mirroring services.

25

20. The method of claim 2 wherein the scheduled services further comprise diagnostic services.

21. The method of claim 2 wherein the scheduled services
5 further comprise performance monitoring and optimization of the integrated network access and server device.

22. A system for providing remote services to an integrated network access and server device, the system
10 comprising:

a memory for storing the remote services;
a processor for providing the remote services.

23. A computer readable medium for providing remote
15 services to an integrated network access and server device, the computer readable medium comprising:

- (a) a code segment for determining whether a request for services from the integrated network access and server device has been made;
- 20 (b) a code segment for accessing the integrated network access and server device; and
- (c) a code segment for providing the requested services to the integrated network access and server device if the request for services has
25 been made.

24. The computer readable medium of claim 23 further comprising a code segment for providing services to the integrated network access and server device on a scheduled basis if the request for services has not been
5 made.

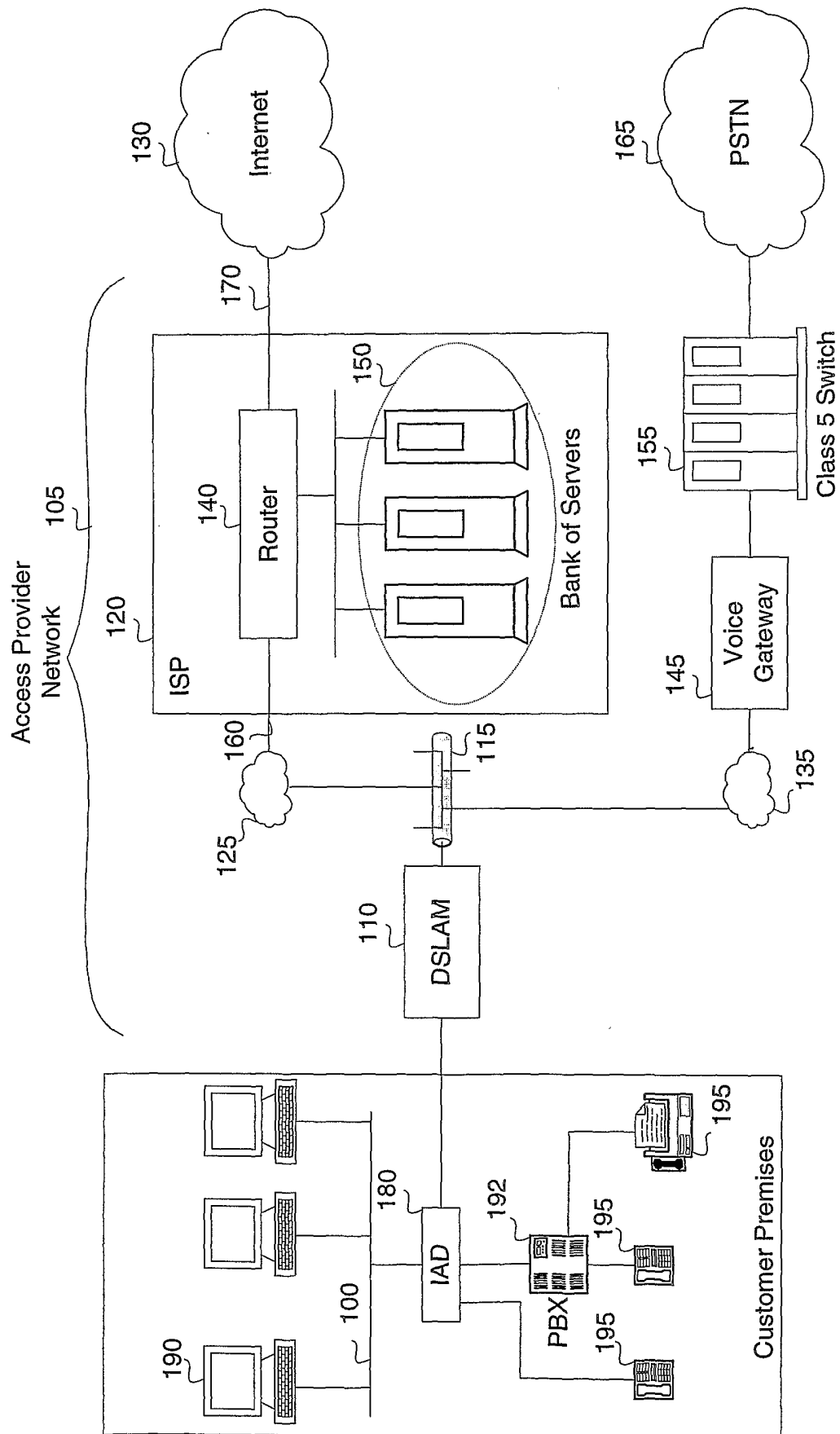


FIG. 1 Prior Art

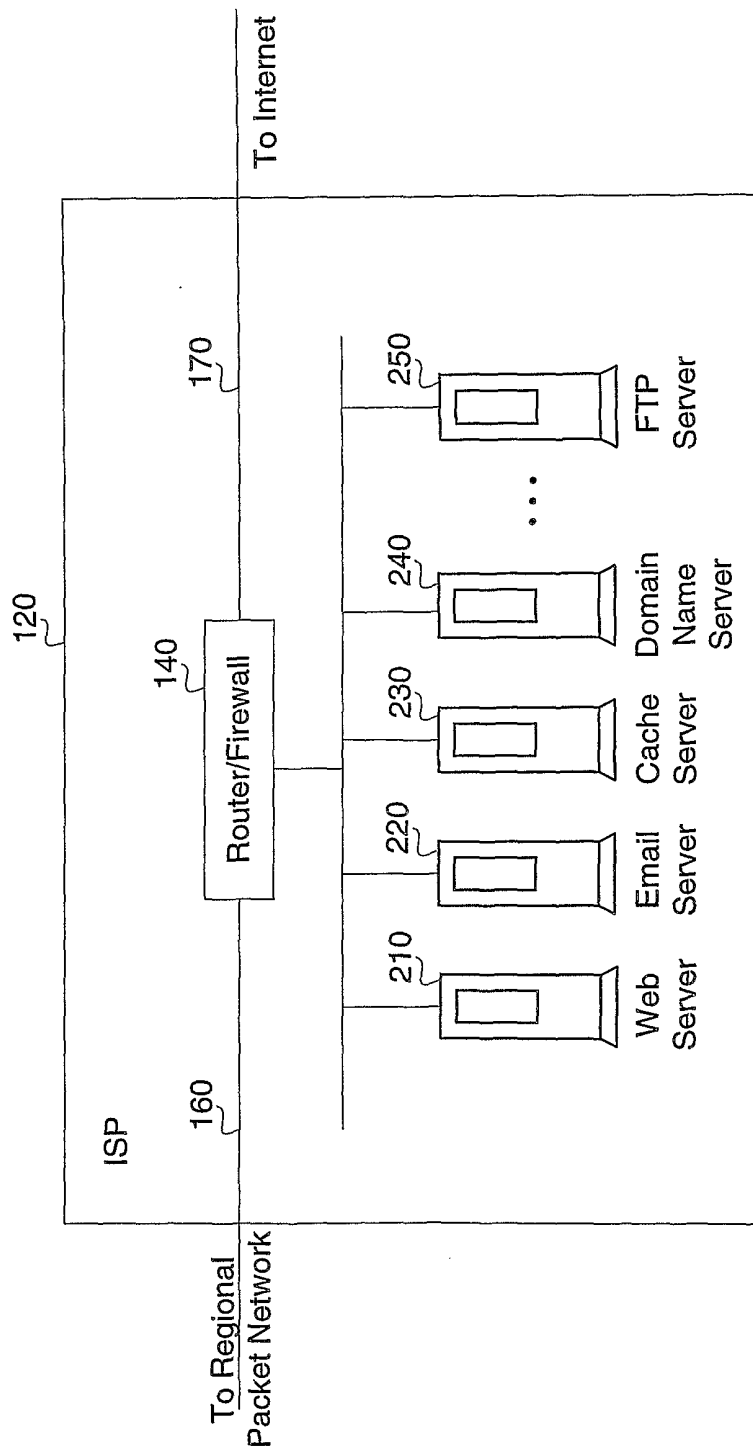


FIG. 2 Prior Art

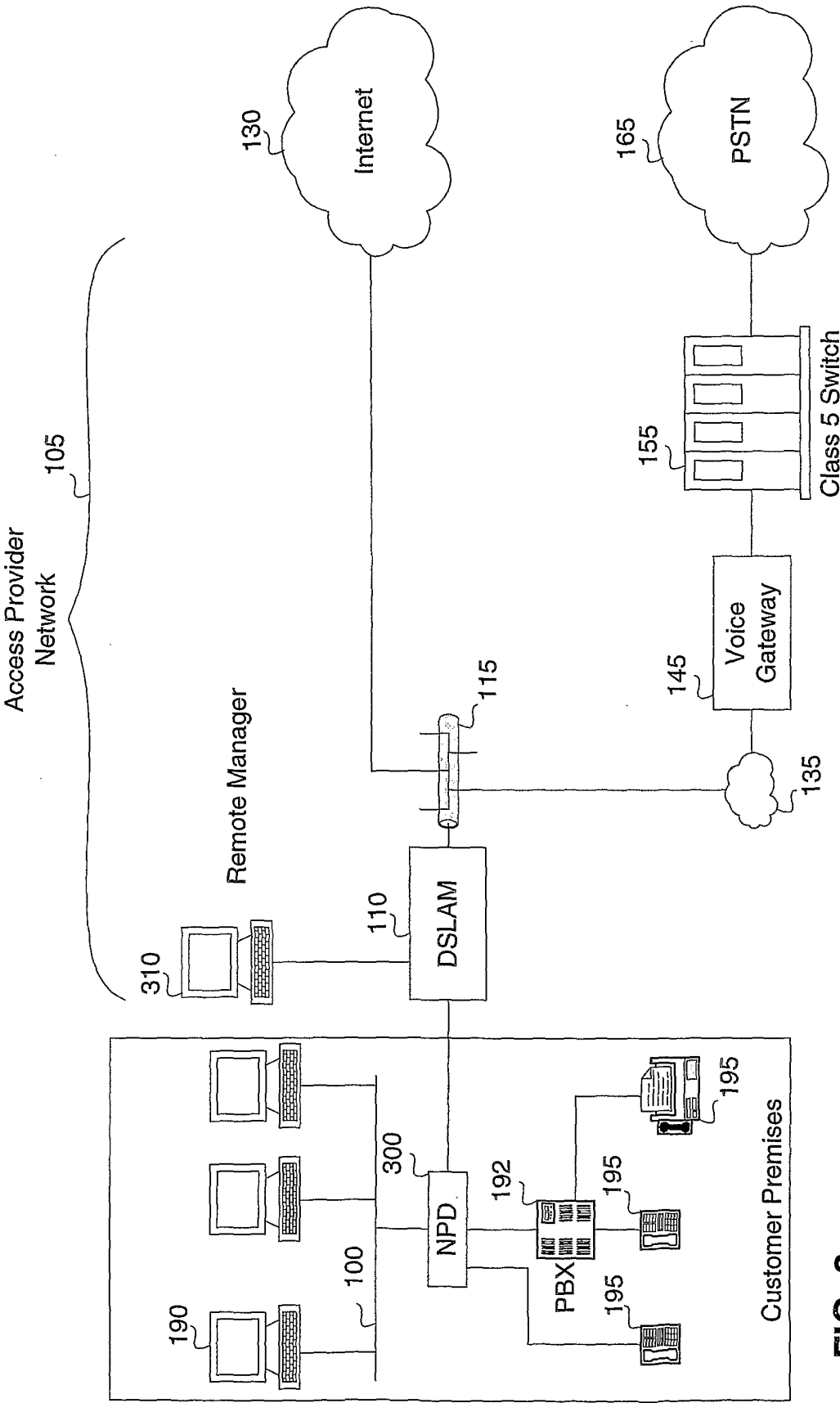


FIG. 3

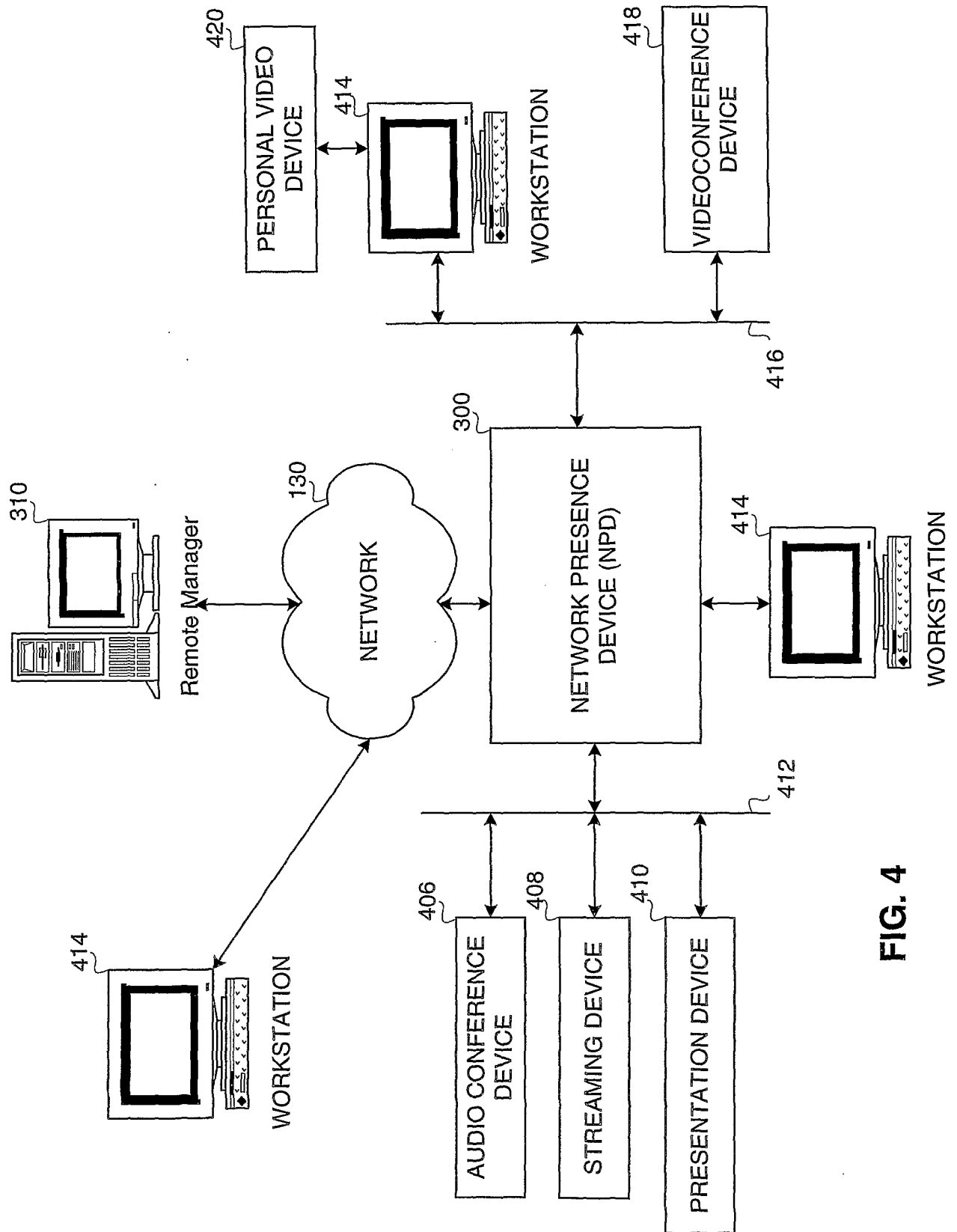
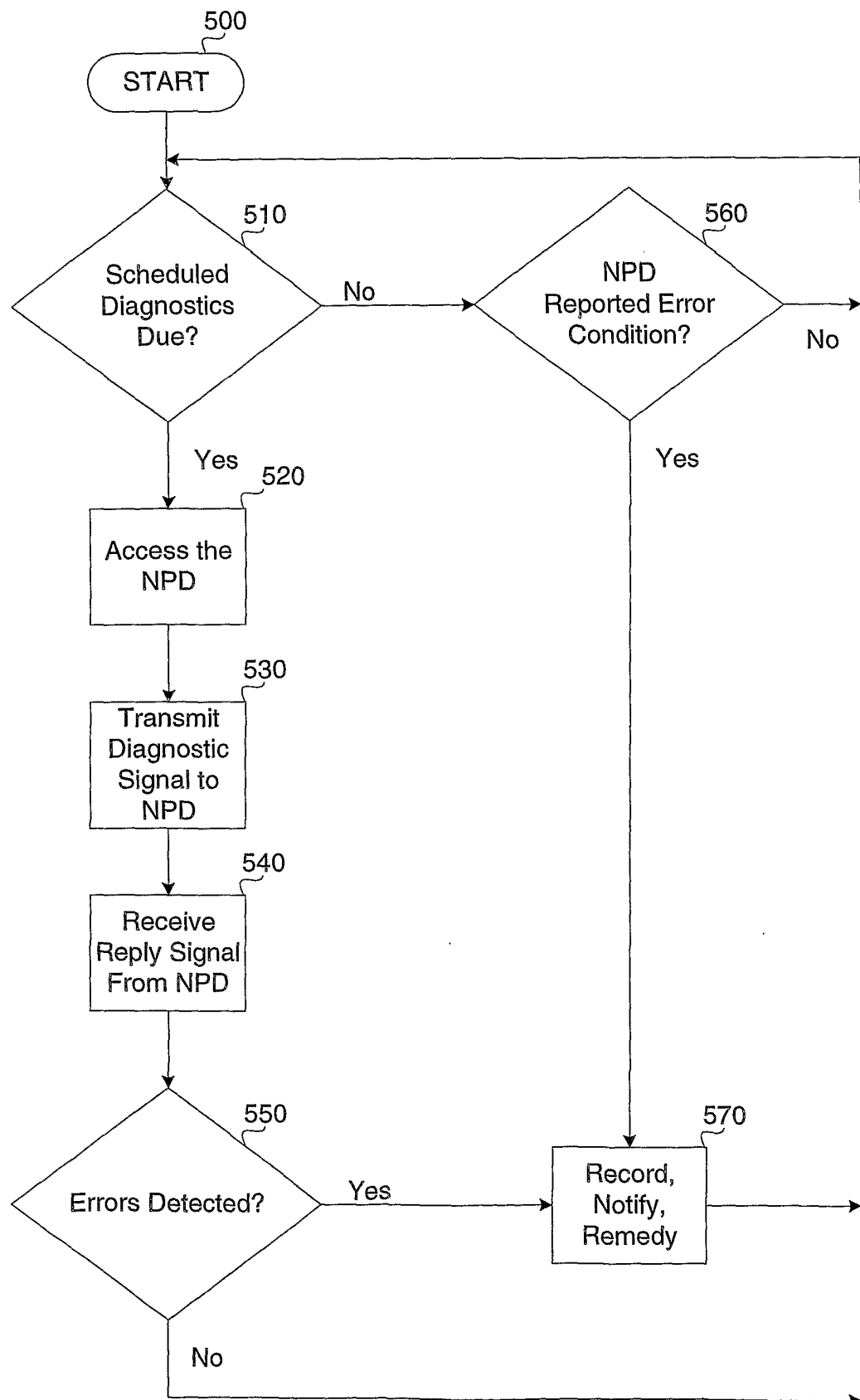


FIG. 4

**FIG. 5**

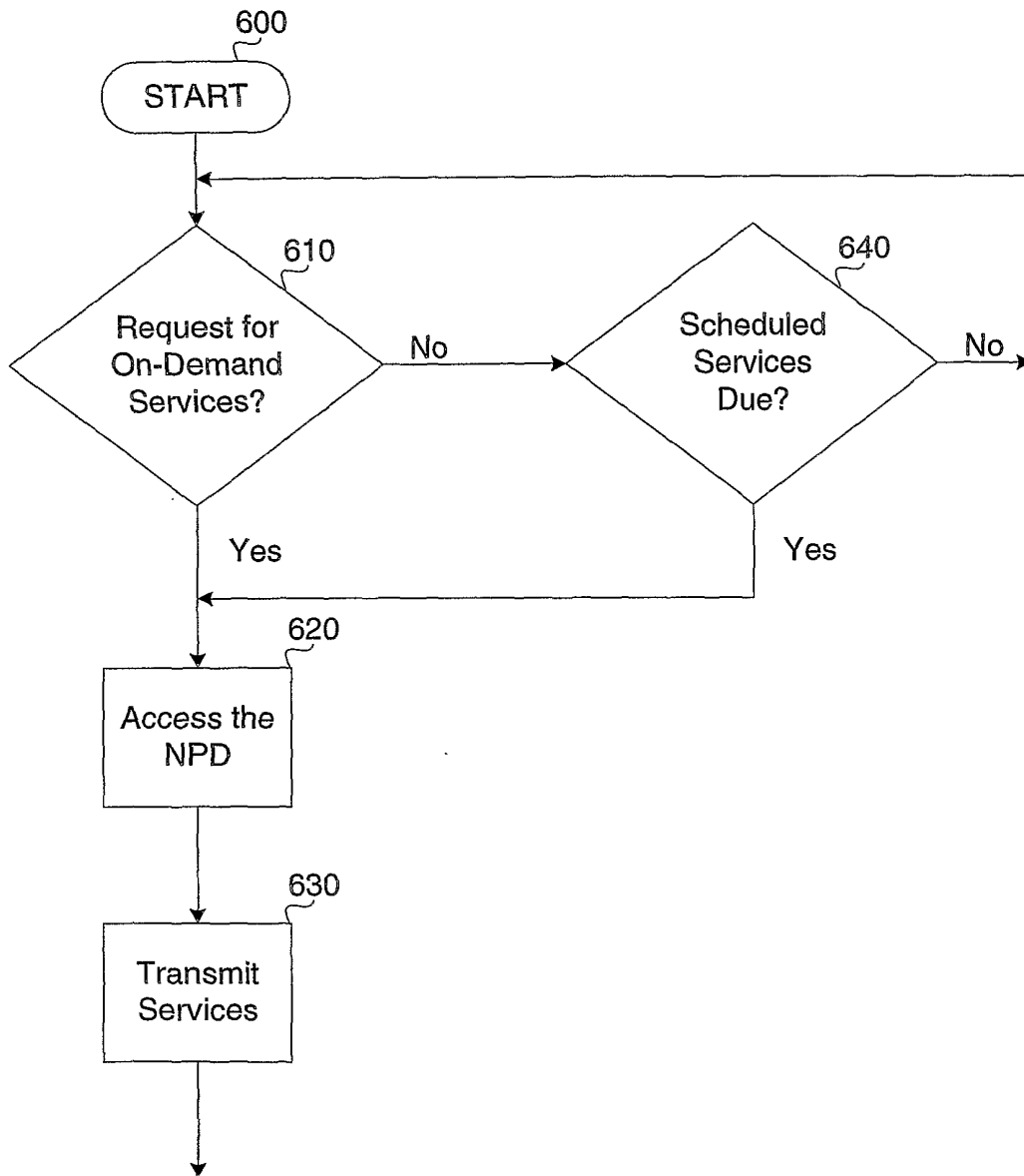


FIG. 6

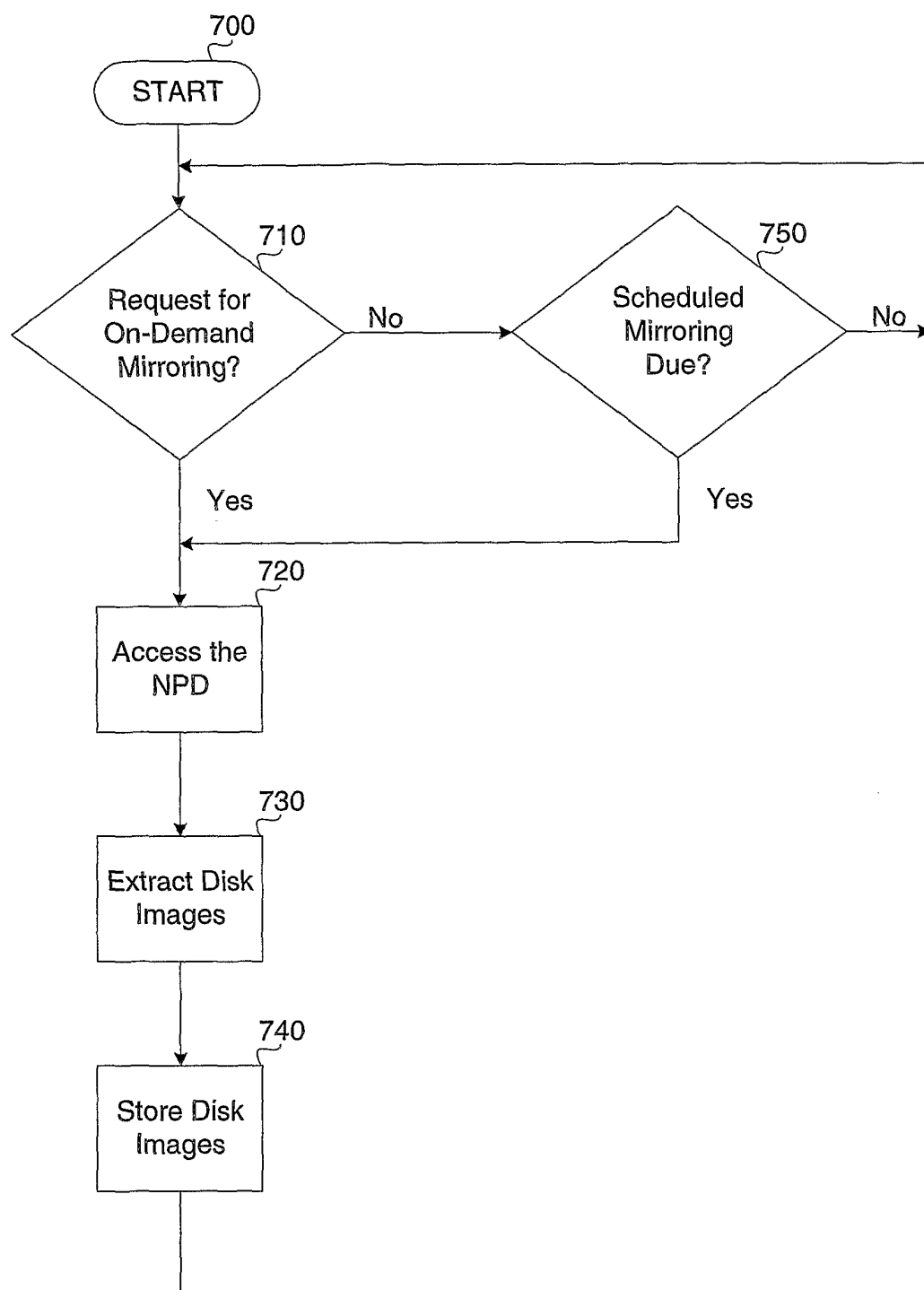


FIG. 7