

Overview of the Cisco IPeXchange Internet Gateways

NetWare, Novell's network operating system, provides shared file servers, printers, and other resources to personal computers in the workplace, using applications that run over Novell's Internetwork Packet Exchange (IPX) protocol. Popular Internet applications, such as FTP, Gopher, Mosaic, and Netscape, however, run over the Transmission Control Protocol/Internet Protocol (TCP/IP) network protocol, not IPX.

Cisco IPeXchange Internet Gateway software brings TCP/IP-based Internet applications to NetWare clients that use Microsoft Windows, without the overhead of running TCP/IP on every PC. A Novell network is not even a prerequisite, provided you can install and run IPX drivers at PC clients.

Note This publication describes IPeXchange NLM and NT software versions, not IPeXchange 1000 Series software and router hardware, which is described in another Cisco IPeXchange Internet Gateway publication.

One Network, Two Protocols

To enable users to access the Internet, you can either run a TCP/IP stack on every PC, or you can implement a TCP/IP gateway at a central location.

Running TCP/IP at every PC provides access to Internet applications, but has several disadvantages. These disadvantages include the cost of configuring and administering dual protocol stacks, the dwindling supply of IP addresses, and lack of security.

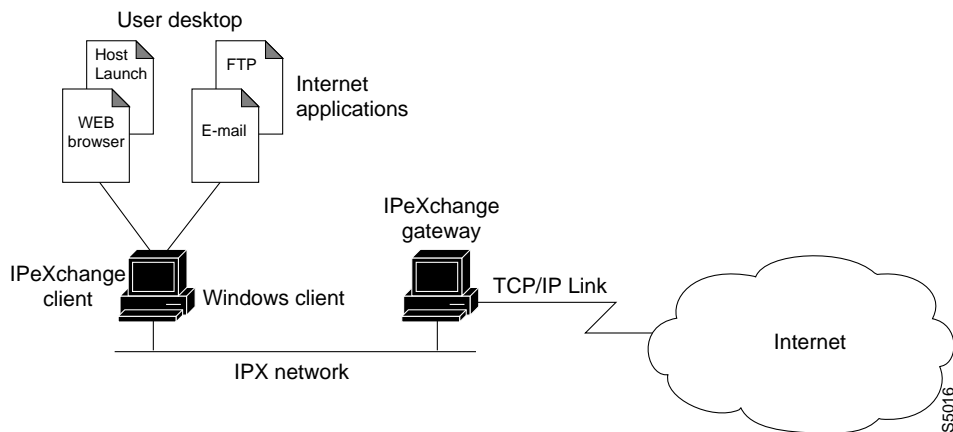
In contrast, IPeXchange IPX-to-IP gateway needs only one IP address for all PC clients in the network.

Software Components

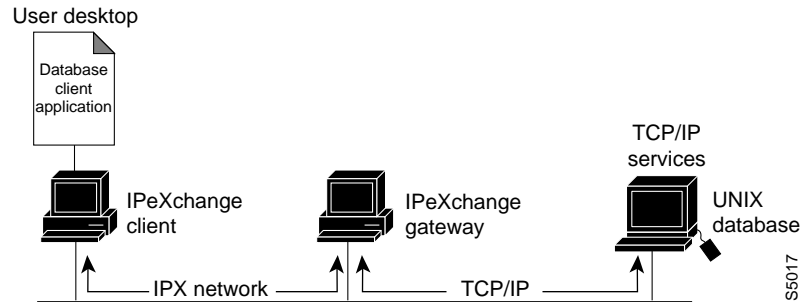
Cisco IPeXchange Internet Gateway is a client/server product. The client software runs on a Windows-based PC over IPX. The server (IPeXchange gateway) software is on a PC running NetWare server or Windows NT (workstation or server). The IPeXchange gateway runs over both IPX and TCP/IP.

The IPeXchange client interacts with the Internet through the IPeXchange gateway, as shown in Figure 1-1.

Figure 1-1 Connecting to the Internet



If your site has TCP/IP-based resources, such as UNIX databases, the IPeXchange gateway acts as a protocol bridge that enables you to run client-side applications (such as Oracle SQL*Net or the SAP R3 client). Figure 1-2 shows the IPeXchange gateway used as an internal protocol bridge.

Figure 1-2 Connecting to Internal TCP/IP Resources

Use of the Internet may involve transferring text, sound, graphical images, and animation. The IPeXchange gateway uses a streaming protocol to take advantage of all the available bandwidth to perform these tasks. Packet size is negotiated between the client and gateway and can range from 512 to 1,500 bytes. This variable packet length provides for better throughput and higher performance than a fixed-packet-length protocol such as the Novell Sequenced Packet Exchange (SPX), which is used by most other IPX-to-IP gateways.

IPeXchange Client

For Windows 3.1, the IPeXchange client has these files:

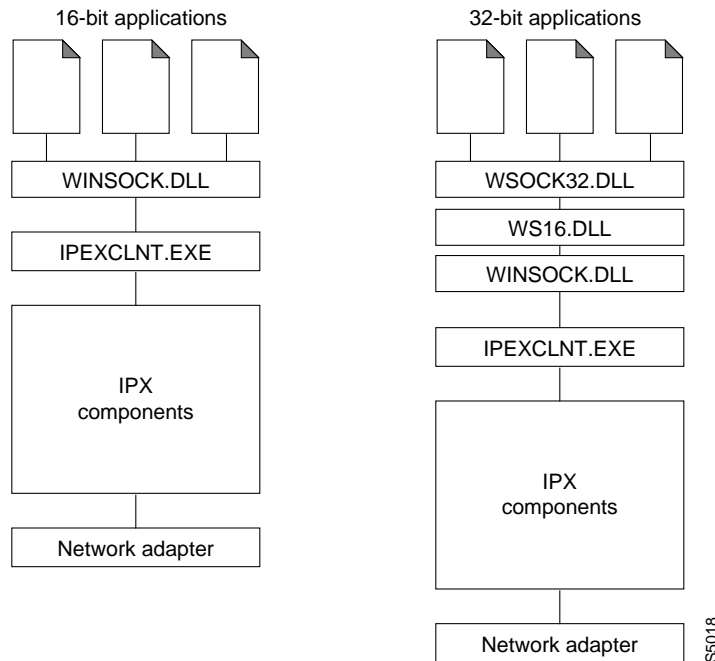
- WINSOCK.DLL (16 bit)
- IPEXCLNT.EXE

For Windows 95, the IPeXchange client has these files:

- WINSOCK.DLL (16 bit)
- WSOCK32.DLL (32 bit)
- WS16.DLL
- IPEXCLNT.EXE

The IPeXchange client components are shown in Figure 1-3.

Figure 1-3 Components of the IPeXchange Client PC



Windows Sockets (WinSock) is the application programming interface (API) generally used for writing Microsoft Windows applications over TCP/IP. WinSock is implemented as a dynamic link library (DLL), which is a set of executable functions that links with an application at runtime. The WINSOCK.DLL and WSOCK32.DLL provided with the IPeXchange client is an implementation of the WinSock 1.1 specifications that has been customized to run over IPX.

The IPEXCLNT.EXE executable file encapsulates WinSock application requests into outgoing IPX packets and decapsulates incoming IPX packets to pass WinSock responses to applications. The client is resource-efficient: when Internet applications are not in use, the client releases memory by disconnecting from the gateway.

IPEXCLNT.EXE uses approximately 180 kilobytes and WINSOCK.DLL approximately 90 kilobytes of high memory only. WSOCK32.DLL and WS16.DLL together use about 10 kilobytes of high memory.

IPeXchange client software supports the following Windows versions:

- Windows 3.1, running in Enhanced mode
- Windows for Workgroups 3.11
- Windows 95

Cisco IPeXchange Internet Gateway

There are two types of IPeXchange gateways that are described in this publication: the NLM version and the NT version.

For best performance and security, the IPeXchange gateway should be on a dedicated PC. If you cannot set aside a PC for this purpose, you can run the gateway software concurrently on a PC or your NetWare or NT server. You should make certain that the PC is always available.

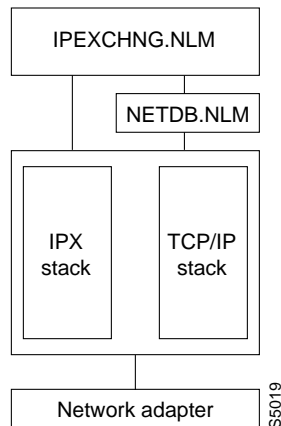
IPeXchange NLM Version

The IPeXchange NLM version includes the following files:

- IPEXCHNG.NLM — IPeXchange gateway that handles IPX-to-TCP/IP bridging
- IPEXSTAT.NLM — module that puts the IPeXchange gateway status in the IPEXSTAT.TXT file
- IPEXSTAT.TXT — IPeXchange gateway status snapshot
- IPEXREAD.TXT — README file
- IPEXREAD.WRI — README file launched by the setup program
- IPEXCHNG.CFG — configuration file created during installation
- IPEXSMPL.CFG — sample configuration file

Figure 1-4 shows the IPeXchange NLM version components.

Figure 1-4 Components of the IPeXchange NLM Version



IPeXchange NT Version

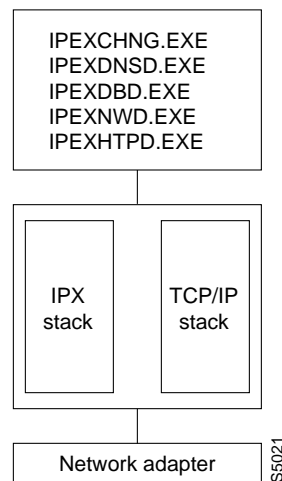
The IPeXchange NT version is made of several executable files:

- IPEXCHNG.EXE — This IPeXchange gateway and monitor agent handles IPX-to-TCP/IP bridging and Cisco IPeXchange Monitor functions.
- IPEXDNSD.EXE — This IPeXchange DNS daemon handles Domain Name Server (DNS) name resolution at the gateway. It looks up symbolic addresses, such as www.cisco.com.
- IPEXDBD.EXE — This IPeXchange monitor database daemon stores user and group information in the database file (IPEXDBD.DB) and retrieves this information when the IPeXchange gateway is restarted.
- IPEXNWD.EXE — This IPeXchange NetWare daemon is a 16-bit application that uses NWCALLS.DLL and the NetWare client to retrieve user and group names when a download is requested by the Cisco IPeXchange Monitor.
- IPEXHTPD.EXE — This IPeXchange HTTP web daemon generates the web pages for the Cisco IPeXchange Monitor.

In addition, there are GIF graphics files that are used by the web daemon, mostly for page titles.

Figure 1-5 shows the network components of the IPeXchange NT version.

Figure 1-5 Components of the IPeXchange NT Version



Network Security

Internet access provides valuable information and opportunities, but it also involves some risks. To eliminate the risk of intrusion on the Internet, every Internet site should exercise care in running Internet services and should have a security firewall.

Internet Services

Internet services, or daemons, are designed to permit users on the Internet specific types of access to the PCs on which the daemons run. These services include file transfer daemon (ftpd), remote login daemon (telnetd), and World Wide Web publishing daemon (httpd).

Network Security

We strongly suggest that you run all Internet services at the IPeXchange gateway. Because only one instance of each service can be run for the single IP address, running the services at the IPeXchange gateway prevents IPeXchange clients from running them at their PCs, intentionally or unintentionally.

Services running on the gateway are available to IPeXchange clients and to legitimate external users. The services do not threaten network security, because external users cannot penetrate beyond the IPeXchange gateway to the NetWare network.

Firewalls

In a homogeneous IPX/SPX network, IPeXchange gateway software acts as a firewall, preventing Internet intruders from accessing the NetWare network.

In a heterogeneous network, the IPeXchange gateway protects only IPX-based PCs. Consult with your Internet service provider about setting up an external firewall to protect other PCs running TCP/IP services.

To protect a NetWare file server, do one of the following:

- Run the IPeXchange NT version on another PC and do not run TCP/IP services on the NetWare file server.
- Run the IPeXchange NLM version on another PC and do not run TCP/IP services on any NetWare file server except the PC running IPeXchange NLM version software.

Security Checklist

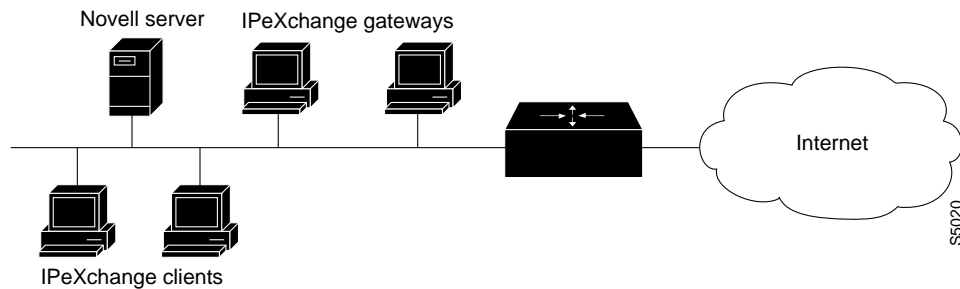
In summary, we recommend the following policies to secure your network:

- Allocate a dedicated PC as the IPeXchange gateway.
- Do not run TCP/IP on NetWare servers for the IPeXchange NT version.
- Do not run TCP/IP at any client PCs.
- Run Internet services only on the IPeXchange gateway PC.
- Keep the IPeXchange gateway PC free of sensitive material.
- If the IPeXchange gateway connects to a corporate TCP/IP network, consult with your Internet service provider about installing a firewall.

Scaling Up with Multiple Gateways

Although only one IPeXchange gateway is required, some sites may benefit from additional gateways. Multiple gateways provide load sharing, better performance, and fault tolerance. IPeXchange licenses of 100 or more users may be distributed on multiple PCs. Figure 1-6 shows a network containing multiple IPeXchange gateways.

Figure 1-6 Multiple Gateways on an IPX Network to Provide Load Sharing



Performance Issues

A bottleneck at the IPeXchange gateway connection to the Internet, or excessive load on the gateway PC, can affect performance at the PC. To determine whether the gateway is overloaded, monitor its CPU with a tool such as the Windows NT Performance Monitor or MONITOR.NLM for NetWare. Heavy CPU usage may indicate a need for additional IPeXchange gateways.

If you want to explicitly assign users to a certain gateway, you can specify a preferred gateway for each IPeXchange client, as described in the chapter “Installing the IPeXchange Client Software.” If no preferred gateway is specified or the preferred gateway is not available, the IPeXchange client chooses between gateways at random.

Upgrades

Availability Issues

Service can be interrupted by failure at the IPeXchange gateway PC or at the Internet connection. To provide uninterrupted service, consider adding redundancy. A fault-tolerant environment includes multiple IPeXchange gateways, multiple Internet connections, or both.

If an IPeXchange gateway PC fails, applications at IPeXchange clients connected to that gateway also fail. If you have additional IPeXchange gateways, IPeXchange client software automatically connects to the IPeXchange gateways that are running when PC users restart their applications.

To ensure against failure of the network link to the Internet service provider, consider adding a backup link.

Upgrades

You can upgrade your user license or your software version. See the appendix “Getting Upgrades” for more information.