

# TN3270 Client Implementation

This chapter discusses the following aspects of TN3270 client implementation:

- How TN3270 Clients Work
- Types of TN3270 Clients
- TN3270 Client of OC://WebConnect Pro
- Cisco WebClient

## How TN3270 Clients Work

As discussed in the previous chapters, the 3270 data stream used by SNA mainframe application is unique and requires special handling at the end user station. Initially, any of the 3270 terminals, such as the IBM 3278 and the IBM 3279, could accommodate the 3270 data stream. When organizations started replacing these 'dumb terminals' with PCs, companies created 3270 emulators (software that made the PC appear to the mainframe as a 3270 terminal). Prior to the integration of IP in SNA networks, 3270 emulators had three primary tasks:

- Negotiate a connection with the mainframe application using an LU name
- Interpret the control characters and data received from the mainframe application and display the information properly in the emulator window
- Format the user responses in a data stream, using control characters to indicate the format of the data, and forward the data to the mainframe application

Once companies started integrating an IP network between the mainframe application and the end user, TN3270 clients were introduced. The job of the TN3270 client is more complex than that of the 3270 emulator.

Because LU names are not relevant outside an SNA network, the session negotiation process involves more steps. Primarily, the allocation of an LU name to a client is handled by the TN3270 server. The client must, however, provide information about its terminal type and whether it is a standard TN3270 client or a TN3270E client.

With TN3270, the 3270 data stream is encapsulated in a Telnet message. Therefore, in addition to interpreting data and formatting responses, the TN3270 client must open the Telnet messages that it receives and extract the 3270 data. The client encapsulates the formatted responses in a Telnet message that is suitable for transport over an IP network.

## Types of TN3270 Clients

When TN3270 was introduced, the new Telnet clients were created. Initially, the TN3270 clients offered for PCs were 16-bit clients based on existing Telnet clients. Later, as Windows 95 and Windows NT were introduced, 32-bit clients were developed. Similarly, UNIX-based Telnet clients were modified to accommodate the 3270 data stream. The result was X3270.

Later, Java-based Web clients were introduced for use with TN3270 connections. Because Java is a portable language, these clients overcome the problem of using a different TN3270 client for each operating system.

First-generation browser-to-host solutions did not provide support for all the options of TN3270. They lacked functionality because Java lacked functionality. Therefore, they were deployed only for point applications and not as general desktop replacements. They were used to provide mainframe access to new users, customers, suppliers, and partners, and were also used to provide remote access for mobile and home users.

With the new version of Java, Java Developer's Kit (JDK) 1.1, these issues have been resolved. Second-generation browser-to-host solutions now include support for local and SNA printing, copy and paste functions, and INDSFILE transfers, making them viable desktop replacements.

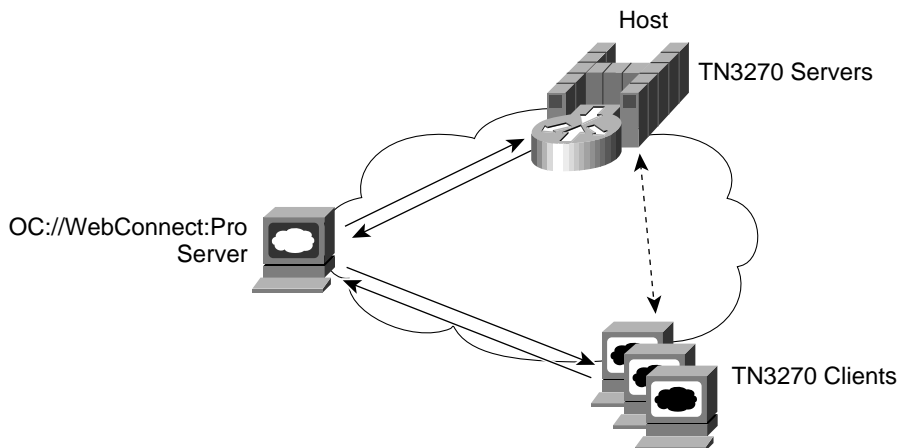
Within the realm of Web-based TN3270 clients, there are two types of solutions: three-tier and two-tier.

With a three-tier solution (Figure 3-1), three network devices are required to access the mainframe. Using a Web browser, the user accesses a specified Web server and selects various options. The Web server replies by sending a Java applet that is stored in cache on the user's end station. The Java applet opens a socket connection to OC://WebConnect Pro. The OC://WebConnect Pro daemon establishes a connection to the TN3270 server, which establishes a connection to the mainframe application. All communication between the user and the mainframe application passes through three devices: the Web browser on the end station, the Web server, and the TN3270 server. Because the Java applet is stored temporarily in cache, if the connection is lost or times out, the entire process must be repeated. The advantage of this design is that only required screen output is sent to the client. The OC://WebConnect Pro server knows the current screen output and will not retransmit existing screen information. This can significantly reduce the amount of data transmitted between the OC://WebConnect Pro server and the client.

The OC://WebConnect Pro server also provides access to other platforms, such as AS/400 via 5250 and UNIX via VT. This provides a central point of administration of all Telnet sessions and allows a single configuration change to be shared automatically between all clients.

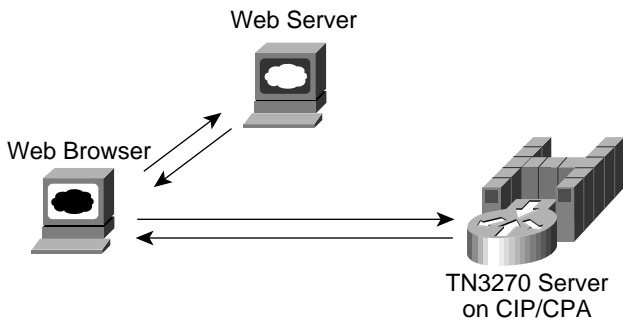


Figure 3-1 Three-tier TN3270 Web Client Solution



With a two-tier solution (Figure 3-2), communication between the user and the mainframe requires only two devices (although three network devices are required initially). With a two-tier solution, the user starts at the Web browser and accesses a specified Web server. The Web server replies by sending a Java applet that is installed on the end station. This Java applet allows the user to establish a connection directly with the TN3270 server (the Web server is no longer required). From then on, the only time that the user would need to access the Web server is to load an upgraded version of the Java applet.

Figure 3-2 Two-tier TN3270 Web Client Solution



## TN3270 Client of OC://WebConnect Pro

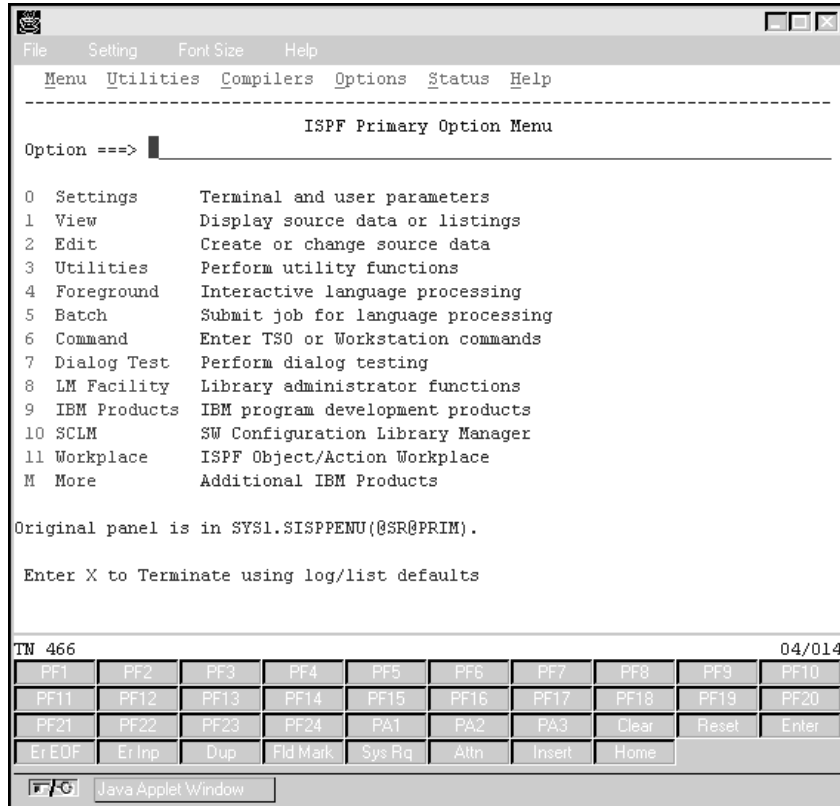
OC://WebConnect Pro is a three-tier TN3270 Web client solution offered by Cisco. It enables mainframe access to Web clients without requiring special software. The client requires only a Java-capable Web browser. In addition, no changes are required at the mainframe.

The OC://WebConnect server runs on HP/UX, Sun Solaris, IBM AIX, or Windows NT servers. Once the server is installed, the end user simply accesses the appropriate URL and, after the client is authorized, a Java applet is downloaded to the client PC. This Java applet provides a 3270-like screen capability and allows the user to log on to mainframe applications using a secure, persistent session. OC://WebConnect Pro uses encryption code, which is downloaded with the Java applet, to protect data flowing between the client and the OC://WebConnect Pro server.

The OC://WebConnect Pro server interoperates with any standard TCP/IP server or gateway including the Cisco Mainframe Channel Connection (CMCC) TN3270 Server. To the mainframe, the OC://WebConnect Pro server appears to be a standard TN3270 or TN3270E client.

To the end user, the Web interface looks like a typical TN3270 client, as shown in Figure 3-3.

Figure 3-3 OC://WebConnect Pro TN3270 Window



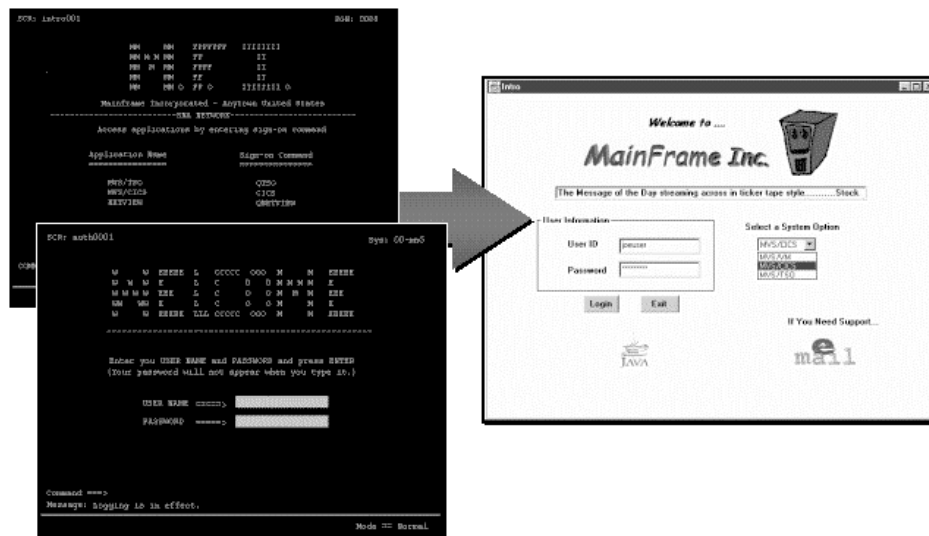
Hot Spots are a configurable option with the Automatic GUI. Host session action keys (such as PF3, PF7, and PF8) become “clickable.” For example, a user can double click on the PF3 function key to execute an exit sequence.

Optionally, you can use the OpenVista component of OC://WebConnect Pro to “update” the appearance of the 3270 screen. The Automatic GUI option enables instant transformation of “green screens” into the familiar “Web like” GUI.

OpenVista (a component of OC://WebConnect Pro) allows an easy rejuvenation of the green-screen interface to the new, standard Web-style interface. It runs on all major UNIX platforms and Windows NT. OpenVista creates the Java code that is downloaded to individual desktops when a rejuvenated application is initiated.

With OpenVista, you can consolidate multiple screens onto a single screen, thus enhancing end-user productivity. Figure 3-4 shows a traditional sign-on screen and a traditional authentication screen combined into a single screen.

Figure 3-4 OpenVista Screen Consolidation



OC://WebConnect Pro offers the following features:

- Printing—Print the 3270 or Java screen to a local or networked printer. OC://WebConnect Pro supports 3287 printing to a local or networked printer.
- File transfers—INDFILE transfers are enabled. (LU 0 or LU 6.2 file transfers are not enabled.)
- Copy and paste—Data can be copied from the Java screen and pasted into a desktop application such as Word, Excel, or PowerPoint.
- Font support—With Automatic Font Sizing, when a session window is resized by the user, all text displayed is resized to fit within the new session window.
- Multiple language support—Double-byte character support enables applications to support Japanese, Korean, and Chinese characters.
- Security—Support is provided for Secure Sockets Layer (SSL) for server and message authentication. SSL provides a means for the server and the client to authenticate each other. Once authentication is complete, they negotiate the type of encryption algorithm and cryptographic key they will use. OC://WebConnect Pro supports either DES or RSA RC2/4 encryption (40 bit or 128 bit) between the NT or UNIX server and the browser so that all data flows are encrypted. In addition, it maintains a secure connection between the server and the mainframe. Unlike HTML conversion approaches, there is a persistent connection between client and server. If the user closes the OC://WebConnect Pro window on the desktop, the upstream TN3270 session is automatically disconnected. The connection between the browser and the server is a proprietary data stream over IP, and is designed so that the amount of data downloaded to the browser and the ensuing flow of session data make optimum use of the bandwidth to the browser.

To enhance scalability, OC://WebConnect Pro can determine whether a TN3270 Server has available LUs. (It is possible for a product such as LocalDirector to indicate that a TN3270 server is available from an IP perspective, when in fact the server may be out of LUs.) OC://WebConnect Pro cycles through available TN3270 Servers until it finds one with available LUs.

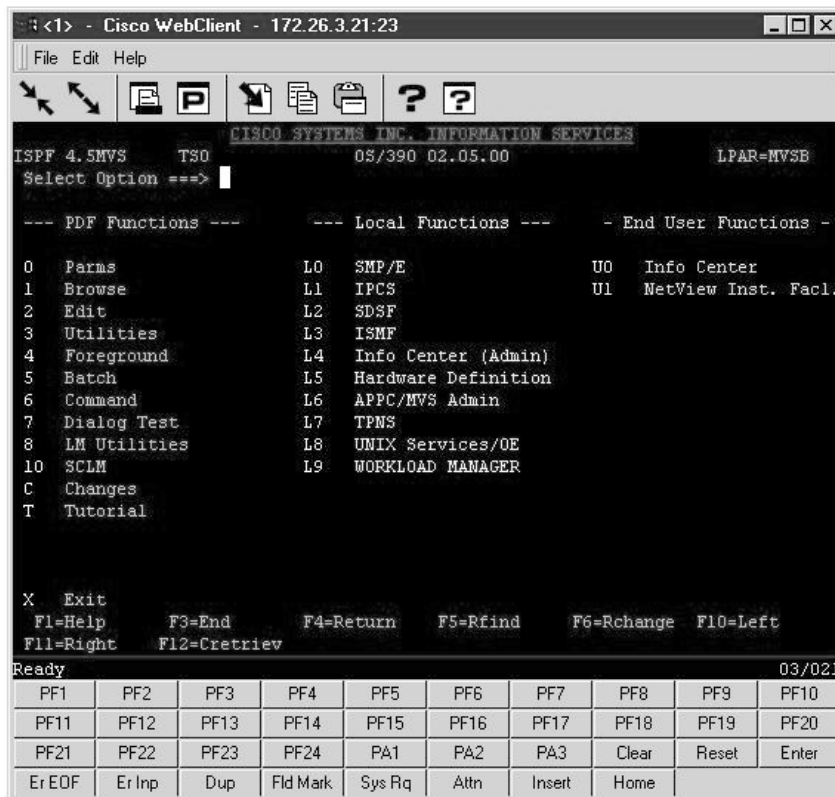
Administrators can choose the functions to which users have access by selecting from three applets; Ultra Lite, Enhanced, and Power user.

- Ultra Lite—Provides standard screen and keyboard support for 3270, 5250, and VT220 applications, but no support for cut and paste or file transfers.
- Enhanced—Adds printing and selectable client session types (3270, 5250, or VT220), which shortens download time.
- Power User—Includes printing, INDSFILE transfer, automatic GUI, and Hot Spots. This option is recommended for full client capabilities.

## Cisco WebClient

Cisco WebClient is a two-tier TN3270 Web client solution offered by Cisco. Like the OC://WebConnect Pro product, it enables mainframe access to Web clients without requiring any special software or changes to the mainframe. Also like the OC://WebConnect Pro product, the client requires a Java-capable Web browser. However, Cisco WebClient requires a higher level of Java (JDK 1.1 with the latest patch). TN3270 WebClient can be used with Netscape Navigator or Internet Explorer.

Figure 3-5 Cisco WebClient Window





The Cisco WebClient offers the following features:

- TN3270 and TN3270E emulation—The Cisco WebClient is compliant with RFC 1647 (TN3270E). It allows users to specify whether or not they want to use TN3270E. If “Allow 3270E” is not selected, the client will attempt to negotiate the following device types (in order):
  - IBM-3279-2-E
  - IBM-3278-2-E
  - IBM-3279-2
  - IBM-3278-2

If “Allow 3270E” is selected, the client can use Models 2 through 5 with the following screen sizes: 24x80, 32x80, 43x80, or 27x132. The Cisco WebClient can dynamically switch between these screen sizes as required by the host emulation session.

Alternately, the user can also specify the Primary and Alternate model types they want to use.

- Printing—The first release of the Cisco WebClient supports local screen printing only. The local screen printing capabilities are provided using JDK 1.1 printing. The user is prompted with the normal operating system print dialog box to choose alternate printers and other print parameters.
- Copy and Paste—Data can be copied from the Java screen and pasted into a desktop application such as Word, Excel, or PowerPoint.
- Persistent Connections—The Cisco WebClient provides a persistent connection between the client browser and a mainframe via a TN3270 server. The user can specify an inactivity timeout value, if desired.
- Configurable Host/Port Address—The Cisco WebClient supports a user-configurable pairing of host to port address. The user can edit the Default Configuration session parameters to connect to a different host and port.
- Firewall Support (Telnet Proxy Support)—The Cisco WebClient provides Telnet Proxy firewall support. Although, the Cisco WebClient does not negotiate through the firewall, it does allow the user to communicate with the firewall.
- Trace Capability—If the Trace facility is selected before a connection to the mainframe is established, the TN3270 WebClient creates a session trace file on the user’s local machine.
- Help Desk Facility—A Help Desk facility is provided that displays information about the current session. This information is useful in solving connection problems. The following information is displayed:

Field	Description	Example
Host Name Requested	Host that was requested	MVS
Connected to Host	Actual host to which connection was made	198.3.241.22
Port Request	Port that was requested	23
Connected to Port	Actual port to which connection was made	23
TN3270E Status	Disabled or allowed	Allowed
Physical Unit	PU connection	MVSPU1
Logical Unit	LU to which you are connected	MVS00029
Device Type	Emulation device type	IBM-3279-2-E
Default Size	Default screen size	2 (80x24)
Alternate Size	Second choice for screen size	2 (80x24)

<b>Field</b>	<b>Description</b>	<b>Example</b>
Current Size	Current screen size	2 (80x24)