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# **Across the Boards<sup>®</sup>**

## **APPX TPN Service Implementation Guide and Reference**

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Across the Boards® APPX TPN Service, Release 1.30

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## Section 1 - Introduction

APPX provides a base set of API functions which facilitate developing peer-to-peer applications between PCs and IBM enterprise systems. APPX is used in a wide variety of cooperative applications, including cfSOFTWARE's own pcMAINFRAME product.

Traditionally, APPX applications have been hosted on the mainframe by CICS, or, less frequently, by TSO or CMS. In all these environments, the mainframe application is started on behalf of the PC peer. In this sense, the PC is the originating (connecting) side of the session, and the mainframe is the answering (accepting) side.

For scheduling purposes and other reasons, it is sometimes better for the mainframe APPX application to be a batch program (invoked via MVS or VSE job control). For these cases, it is more natural for the mainframe to originate the APPX session.

The APPX TPN Service (TPNS) provides this capability. The mainframe APPX component uses either TCP/IP or LU6.2 internally, but the application layer uses only the APPX API. The application is then shielded from transport-specific programming considerations.

We expect that the TPN Service will be used to support both inter- and intra-net access. Client connections are authenticated on the basis of the originating TCP/IP address: connection requests from unknown addresses are rejected and logged. Program access can be controlled on this basis too, providing a simple yet effective security mechanism.

<p><i><b>NOTE:</b> For more introductory information about the TPN Service, review Appendix B, "Frequently Asked Questions."</i></p>
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## **Section 2 - System Requirements**

### **Hardware Requirements**

In general, the APPX TPN Service can run on any machine running the Win32 platform (Windows 95, 98, NT). The machine must be hardware-equipped for communication with the desired enterprise host system (for example, via a token-ring or Ethernet adapter), and the TCP/IP network.

The TPNS machine must have at least 10 megabytes free disk space. If diagnostic traces are needed, up to 100 megabytes may be required.

The mainframe system can be any system capable of supporting the required networking software listed below, and it must be equipped with networking hardware necessary to support connectivity to TPNS machine (a token-ring LAN adapter is a common choice).

For more details about hardware requirements, consult the appropriate IBM or Microsoft documentation for your gateway of choice.

### **Software Requirements**

#### PC Systems Software

##### Operating System

- Windows 95
- Windows 98
- Windows NT (3.51 or above)

#### PC APPX XAPI Versions

APPX Version 4.02 or greater required (as of 01/10/2000)

XAPI release date 01/05/2000 or above

CF Memory Pipe driver (driver number 149)

#### Mainframe Systems Software

IBM S/390 enterprise system or the equivalent, running the VSE or MVS operating system. Further requirements depend on whether LU6.2 or TCP/IP will be used:

#### TCP/IP

MVS TCP/IP for MVS, IBM program number 5655-HAL or  
TCP/IP for VSE/ESA, IBM program number 5685-A04

LU6.2

VTAM Release 3.4 or later

IBM program number 5695-117 (VTAM MVS/ESA)

IBM program number 5645-001 (OS/390)

IBM program number 5686-065 (VSE/ESA)

**NOTE:** It may be possible to run the APPX TPNS with other mainframe software versions or configurations. Contact cfSOFTWARE if you need clarification.

Mainframe APPX Version

Core Module, version 3.33 or later

CFXVTM1 version 1.20 or later

Service module for CFXVTM1, version 3.33 or later

**pcMAINFRAME**

Client PCs

- pcMAINFRAME Version 5.40 or greater

Mainframe

- pcMAINFRAME Version 5.40 or greater

**APPX Router**

Version 1.30 or above (the APPX Router is required only when LU6.2 connectivity is used by the host peer)

## **Section 3 - Getting Started**

This manual is intended for those who will be evaluating, installing, or maintaining an APPX TPNS configuration. For all who will review this manual, a basic knowledge of data communications is assumed. Those who install TPNS at the PC level will need to be familiar with Microsoft Windows and its networking components.

While there is no mainframe component of TPNS, a test program is provided, which, if installed, will require the assistance of mainframe systems programming personnel. Even if the test program is not installed, mainframe networking personnel may be required to ensure that the necessary VTAM and TCP/IP configuration issues are addressed.

The remaining sections of this manual provide details about the installation and operation of TPNS. Since the manual is relatively brief, we suggest you review it in its entirety before attempting the installation. Then, follow the checklist below as a guide. Should you encounter any difficulties or have any questions, feel free to contact cfSOFTWARE for help.

- 1. Review mainframe and PC system requirements (*Section 2, "System Requirements"*). Install any required hardware and software that is not already in place.
- 2. Install the APPX Router (required only when LU6.2 is to be used at the mainframe). See APPX Router Implementation Guide and Reference.
- 3. Install TPNS (*Section 5, "Installing TPNS"*).
- 4. Configure TPNS (*Section 6, "APPX TPNS Configuration"*). Be sure to configure the TPN Definitions for the PC programs you need to support.
- 5. Set the configuration file active using the APPX TPNS Configuration application (*Section 6, "APPX TPNS Configuration"*).

**NOTE:** If you are installing TPNS for use with pcMAINFRAME, you may want to use pcMAINFRAME to test TPNS. In that case, you can skip the next two items.

- 6. Install the APPX TPNS Test Program (APPXVTM1) on your mainframe system (*Section 11, "The APPX TPNS Test Programs"*).
- 7. Run the TPNS Test Program to verify proper operation of TPNS (*Section 11, "The APPX TPNS Test Programs"*). If you encounter any problems, see *Section 12 and also Appendix A, "Messages"*, for help.
- 8. Configure the client applications you want TPNS to support (*Section 7, "PC Application Considerations"*).
- 9. If desired, set TPNS to start up automatically (*Section 6, "APPX TPNS Configuration"*).



## **Section 4 - Mainframe Configuration**

### **TCP/IP**

The issues for configuring the mainframe TCP/IP environment to support TPNS are the same as for any other mainframe TCP/IP application link: the mainframe must have a valid access route through to the destination TPNS machine.

The requirements for accomplishing this vary, and are beyond the scope of this document. Here are some items to consider:

1. If your mainframe application will use a domain name as a symbolic reference to the target TPNS machine, the domain must be defined in the TCP/IP system or resolvable through a domain name server.
2. If you are employing a firewall on the mainframe (or elsewhere), it must be configured to allow access to the destination TCP/IP address and port.

Using TCP/IP as the mainframe protocol is often preferable because it is easier to configure than LU6.2. It is possible, however, that TCP/IP is not an option:

1. It may not be installed on your mainframe. TCP/IP is not a component of the base VSE operating system distribution, and must be purchased separately.
2. For security reasons, your installation may prohibit TCP/IP traffic involving your mainframe.
3. There may be no physical route available to the destination TPNS machine.

For these reasons, using TPNS may require use of the LU6.2 protocol.

### **LU6.2**

LU6.2 support in TPNS is provided through the use of the APPX Router facility, which is also licensed through cfSOFTWARE. For configuration information, consult the [APPX Router Implementation Guide and Reference](#).

### **Additional References**

More specific details about mainframe programming and configuration may be found in the following manuals:

- [pcMAINFRAME Installation Guide](#)
- [Across-the-Boards APPX Programmer's Guide](#)
- [pcMAINFRAME and Across the Boards Communications Device Drivers](#)



## **Section 5 - Installing the APPX TPN Service**

*Warning! For NT platforms, installation of the APPX TPNS should be done under using an Administrative logon.*

The PC APPX application and TPNS operate as cooperating Win32 processes on the same machine. Because of this, TPNS must be installed on each workstation that will host a TPNS PC peer application.

### **Installation Steps**

Insert the TPNS installation CDROM, and wait a few moments. If an installation menu appears, click “Install APPX TPNS.” If no installation menu is presented, do the following:

1. Start a command prompt.
2. Change to the CD-ROM, for example:

D:

3. Change to the TPNS directory:

CD \APPXTPNS

4. Start the installation program

SETUP

Installation will then begin and consists of the following steps:

1. Password verification. You may be prompted for an installation password, which you must obtain from cfSOFTWARE.
2. Program and configuration files will be copied to directory:  

```
\Program Files\cfSOFTWARE\APPX TPN Service (for Across-the-Boards) or  
\PCM_WIN (for pcMAINFRAME)
```

These are the default target directories; you may use another target if you so choose.
3. Various registry entries will be created.
4. APPX TPN Service will be added to the Start/Programs menu. From this path, the APPX TPN Service Configuration program, the APPX TPN Service Manager, and the APPX TPN Service Test Program can be accessed.



## Section 6 - APPX TPNS Configuration

The APPX TPNS configuration section is divided into two parts: Listeners and TPN Definitions. Listeners define the TCP/IP ports on which TPNS will accept connections from originators, and TPN Definitions define the PC programs that will be run for those clients. Several security options are provided to restrict which PC programs can be accessed by various originators.

Once the configuration is complete, you must save the configuration file. It may be saved as the active file (in which case it will be used the next time TPNS is started), or it may be saved as an ordinary file and activated later.

### Quick Start: Configuration

To configure your first APPX TPNS, we suggest reading this section and then following the directions in the five Quick Start sections. Further, we provide a sample configuration file which may be usable in your environment with only minor adjustments. For information on the sample configuration, see the last topic in this section.

### First Time Users

If you are here to configure TPNS for use with the test program, you may proceed to directly to “Sample Configuration” near the end of this section.

## Security Overview

This section provides a brief overview of APPX TPNS security. *See Sections 9 and 10 for a detailed look at APPX TPNS security.* Reading the security sections is highly recommended before using TPNS.

Security in the APPX TPNS is controlled by security classes. Twenty-six security classes, A-Z, exist. Each incoming connection accepted by a listener is assigned one or more security classes, and only TPN definitions assigned to one or more of those security classes may be accessed by that originator.

For purposes of validation, the originator’s TCP/IP address will be that of the connecting mainframe (when the mainframe uses TCP/IP), or that of the APPX Router that accepted the mainframe’s LU62 connection.

### Quick Start: Security

The Quick Start procedure will define a single listener which will accept connections from any originator. Further, all listeners and TPN definitions will initially be assigned to security class A. Additional listeners, TPN definitions and security can be defined later.

## Listeners

One or more listeners may be defined. Different listeners will listen on different ports and may provide different levels of access. For example, if multiple mainframes can initiate connections, you might use a unique security class for each one.

A definition of a listener consists of two basic parts: The General portion which includes the TCP/IP port number on which the listener will connect, as well as the basic security permissions for requests arriving on that listener, and an Addresses portion which defines the permitted originator(s) for the listener.

A third panel, the Advanced portion, is used for debugging and other special information.

### Listeners: General Configuration

A listener will wait for incoming connections from originators on an assigned TCP/IP port. The port assignments are arbitrary, but should in general follow the recommendations in RFC1700. In general, we suggest assignments in the range 1025-65534.

The basic security classes assigned to any connection accepted by this listener are also defined on this panel.

**NOTE:** Additional security classes can be added to a connection if it originates from specific address range(s) specified on the Addresses panel.

Each defined address range must have at least one security class associated with it, either via the Addresses panel or the General panel.

A descriptive name for the listener should also be assigned.

### Listeners: Addresses Configuration

The Addresses panel defines the IP addresses from which the listener will accept connections. At least one address range must be specified, or the listener will not accept any connections.

**NOTE:** Overlapping address ranges are not allowed.

To accept connections from all addresses, the address range of **0.0.0.0** to **255.255.255.255** can be used. If your internal network consists of a block of eight class C addresses (for example, 193.1.1 to 193.1.7), all connections from your internal network can be accepted by specifying an address range of **193.1.1.0** to **193.1.7.255**.

For each address range, additional security classes can be specified. These security classes are **added** to the basic security classes.

When incoming connections arrive, the security classes are used to determine which PC programs are available to the originating mainframe. This is done by matching the security classes in the target TPN Definition against those in the Listener; if one or more classes match, the connection is accepted; if not, it is refused. In simple configurations, a single security class is commonly for all definitions.

For this reason, the following defaults are used for the Address Range panel:

- Address range **0.0.0.0 – 255.255.255.255** (all incoming connections accepted)
- Security Class **A** (all TPNs defined for Class A allowed)

The defaults are used in the Quick Start: Listeners section that follows.

Listeners: Advanced

The Advanced panel allows you to configure the listener to produce a diagnostic trace; this should be done only at the request of cfSOFTWARE technical support.

Quick Start: Listeners

Define one listener to get started with:

1. Select Edit/Insert/Listener from the menu bar.
2. On the General tab:
  - a) Fill in a description.
  - b) Fill in the port number to use (use 2500 to start with -- this can be changed later).
3. Click OK on the Listener dialog box, the listener just defined should be added in the tree on the left side of the main window.

This will add the listener using security class **A**. The listener will accept connections from any originator (TCP/IP address range **0.0.0.0 – 255.255.255.255**).

## TPN Definitions

One or more TPN definitions may be defined. Each TPN definition represents a single PC program that an originator can access. Each TPN definition consists of two required parts, the General and Security panels, and an optional Advanced panel. The General panel defines the access path to the PC program (along with other details such as program parameters), and the Security panel defines which originators can access the defined PC program. The Advanced panel is used to specify additional security options and for diagnostic purposes.

### TPN Definitions: General Configuration

The following table describes the fields which may be specified on the TPN Definition panel:

Field	Description	Example	Notes
Client TPN	Transaction program name	<b>SLS1</b>	1
Variant	---	---	2
Program	The file specification of the PC program to be started	<b>C:\salesprogs\sls1.exe</b>	
Parameters	Command-line parameters associated with the startup	<b>/jan-feb</b>	3
Startup Directory	The “working directory” to be used for the program	<b>C:\salesprogs</b>	
Startup Size	The initial size of the program Window	<b>NORMAL</b>	
Timeout	The amount of time TPNS will wait for the started program to complete its connection (minutes)	<b>5</b>	4

### Notes

1. “Client TPN” must match the TPN specified in the mainframe APPX Connect.
2. “Variant” is used only in complex configurations, where a single TPN definition is inadequate. An example would be when a program is started by two different mainframe originators, but with differing “Parameters”. Here, two variants of the TPN could be defined to separate the usage. “Variant” should ordinarily be left blank.
3. The combination of “Program” and “Parameters” defines the complete command-line used when starting the program. In this case:  
**C:\salesprogr\sls1.exe /jan-feb**
4. The timeout period begins at the time the program is started and ends when the program has issued its APPX Connect. Normally, the default specification of five minutes is adequate.

#### TPN Definitions: Security

The security panel allows the entry of one or more security classes. Each originator is assigned one or more security classes when it connects to TPNS (see “Listeners” above), and it may only access a particular TPN only if the security class in the TPN Definition matches one of the classes in the associated listener.

At least one security class must be associated with each TPN definition. If you do not provide a security class when defining the TPN, a default (class **A**) will be used.

#### TPN Definitions: Advanced

The security definitions (Conversation Security) are reserved for a future release of TPNS.

This panel also permits a trace buffer to be specified (Trace Size). Do not enter this field unless instructed to do so by cfSOFTWARE’s technical support group.

#### Quick Start: TPN Definitions

Define one or more TPN definitions to get started with (typically only one will be required initially):

1. Select Edit/Insert/TPN Definition from the menu bar.
2. On the General tab:
  - a) Fill in the Client TPN to use. This should match the TPN configured for the mainframe APPX application. For pcMAINFRAME, use MAINW.
  - b) Leave the Variant field blank.
  - c) Fill in the Program field. For the TPNS test program use:  
**CFTTAPPX**  
For pcMAINFRAME, use:  
**c:\pcm\_win\mainw.exe**
  - d) Fill in Parameters. For the TPNS test program use:  
**/X**  
For pcMAINFRAME, use:  
**c:\pcm\_win\inittcp.pcm**
  - e) Fill in Startup Directory. For the TPNS test program, no entry is required. For pcMAINFRAME, use:  
**c:\pcm\_win**
3. Click OK on the TPN Definition dialog box; the TPN definition just defined should be added in the tree on the left side of the main window.

This Quick Start sample uses the default security class (class **A**).

## **Finish APPX TPNS Configuration**

Once the listeners, TPN definitions and security are set up, the TPNS global properties must be set and the configuration file must be saved and made active.

### APPX TPNS Global Configuration

The Global configuration panel may be accessed by selecting the Global entry in the tree on the left side of the main window, and then clicking Edit/Properties on the menu bar. The configuration panel contains one tab:

#### Global: General

“Enable Taskbar Icon” should normally be checked, to provide a simple means of access the TPNS Management utility. The “Start TPN Service Automatically” checkbox can be used to automate TPNS startup when Windows is started.

The maximum number of concurrent sessions that TPNS will support must be entered.

If desired, you may change the Connect and Session Inactivity timeouts; the defaults are 60 and 30 minutes respectively.

#### Quick Start: Finish APPX TPNS Configuration

To complete the TPNS configuration:

1. Set the TPNS global configuration.
  - a) Select the Global entry in the tree on the left side of the main window, and then select Edit/Properties from the menu bar.
  - b) Leave “Enable Taskbar Icon” checked;
  - c) If desired adjust the “Limits/Timeouts” specifications.
2. Save the configuration file as the active file by selecting “File/Save As Active” from the menu bar.
3. At this point TPNS may be started with the APPX TPNS Manager application.

## **Sample Configuration**

When you install the APPX TPNS, a sample TPNS configuration file is created in the installation directory (Sample.TCF). The sample configuration can, without modification, be used directly for your initial TPNS testing (as described in *Section 11, The APPX TPNS Test Programs*)

The sample configuration contains the following:

1. Two TPN definitions, one for pcMAINFRAME (MAINW), and one for the APPX TPNS Test program (CFTTAPPX).
2. One listener, established for port 2500, accepting connections from any TCP/IP address.

The following procedure should be used to make use of the sample configuration file. Review the preceding quick start topics for details on how to do the configuration tasks described. **Important!** The following procedure will replace the active configuration file. It should be used only for new installations.

1. Open the sample configuration file (Sample.TCF), using File/Open.
2. If necessary, change the Listener port address from its default of 2500.
3. Save the configuration file as active (File/Save As Active).
4. The next time TPNS is started, the configuration file you have just activated will be used. *For information on starting TPNS, see Section 8, "The APPX TPNS Manager."*

## **Automatically Starting TPNS**

If desired, you may start the TPN Service automatically each time the workstation is started. To do this, check the "Start TPN Service Automatically" checkbox on the TPNS Configuration "Global/Properties" panel.

## **When using the APPX Router...**

If you are running cfSOFTWARE's APPX Router on the same machine as TPNS, you must avoid port conflicts. The ports defined in the Router's TCP/IP Listeners must not be defined in any of TPNS's Listeners.

Both facilities default to port 2500; reconfigure TPNS to use an alternate port if necessary.

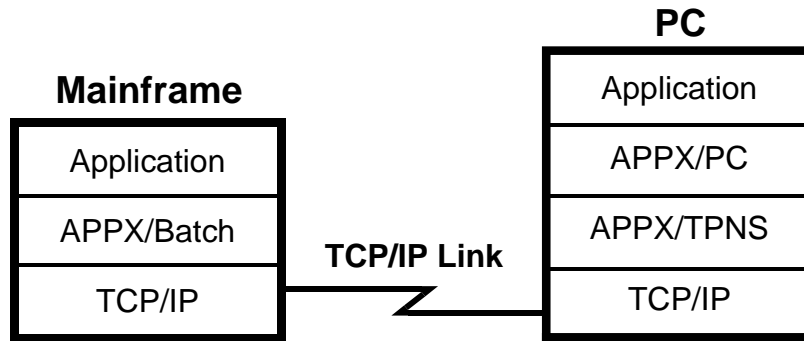


## Section 7 – PC Application Considerations

Applications which communicate via TPNS sessions are standard Across the Boards APPX applications. The mainframe initiates the conversation via an APPX *connect* call.

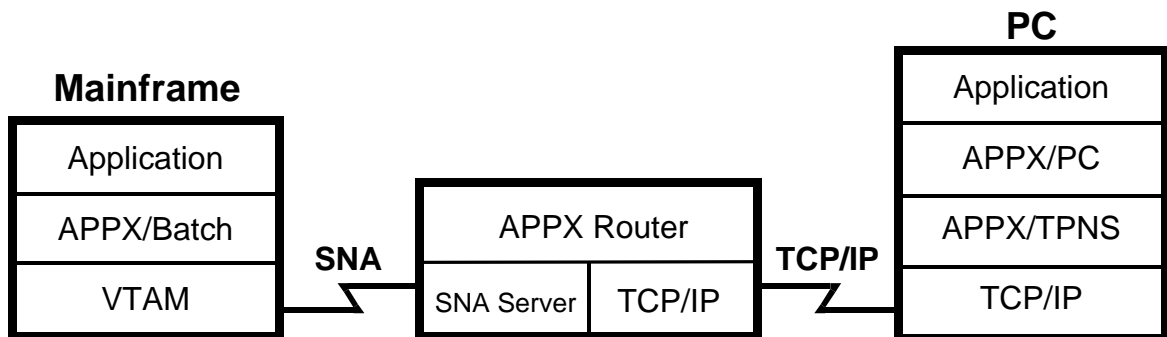
The host application may (through APPX) use either TCP/IP or LU6.2 as its communications engine.

When TCP/IP is used, the connection is straightforward, as depicted in Figure 7.1. The TCP/IP protocol is provided on the PC as a component of Microsoft Windows 95/98, or Windows NT.



*Figure 7.1 TPNS Using TCP/IP*

When LU6.2 is employed, the connection involves several additional software components: Microsoft's SNA Server, and cfSOFTWARE's APPX Router. This option is illustrated in Figure 7.2



*Figure 7.2 TPNS Using LU 6.2*

The PC application is not impacted by the connectivity choice. The communications session is conducted using standard APPX calls. When issuing the APPX connect, the PC application must:

1. Use device driver number 149 (CFMPIPE) ;
2. Set the “reverse-connect” option flag (PPX-REVERSE-CONNECT-SW). This option indicates that PC APPX session is completing a connection that was started by the mainframe, rather than initiating an entirely new connection.

While designing PC programs for TPNS, remember that the program is started by the mainframe, not by the PC user. It might be started at an unexpected time, so it’s best to minimize or eliminate operation intervention.

If possible, to avoid all operator interaction except for serious errors that require the user to make a decision. This is a particularly good idea if numerous TPNS sessions will occur at varying times throughout the day.

### **16-bit Applications and Windows 95/98**

16-bit large-model Windows programs are “single-instance” programs under Windows 95/98.

If TPNS attempts to create a new instance of one of these programs, the attempt will fail. In this case, TPNS will log an error message (see Event ID 1022, described in *Appendix A, “Messages”*).

If you need to invoke multiple copies of a single-instance program, there may be a workaround solution available that fits your needs. Contact cfSOFTWARE technical support for more information.

### **16-bit Applications and Windows NT**

Under Windows NT, TPNS starts each 16-bit application in a separate virtual machine (VDM). Repeatedly reusing VDMs under NT can cause resource leaks, which are avoided through this technique.

The “single-instance” problem described in the prior heading does not occur under Windows NT.

### **Where to go for more information**

For details about programming the APPX API, consult the [Across the Boards APPX Programming Guide](#).

For details about configuring pcMAINFRAME for use with TPNS, consult the [pcMAINFRAME Installation Guide](#).

Finally, for Across the Boards device configuration details, see [pcMAINFRAME](#) and [Across the Boards Communications Device Drivers](#).

## **Section 8 - The APPX TPNS Manager**

The APPX TPNS is controlled via the APPX TPNS Manager application, which allows you to:

1. Start and stop the TPN Service and individual Listeners.
2. View the status of the TPN Service.
3. Stop TPNS sessions.
4. Launch the Event Viewer utility.
5. Launch the configuration program.

The TPNS Manager program is started via the Start/Programs/APPX TPNS menu path (or, for pcMAINFRAME, via the Start/Programs/pcMAINFRAME path).

Each of the capabilities the Manager provides is discussed in more depth in the topics that follow. Further details are available via the program's online help facility.

### **Starting and Stopping TPNS**

Obviously, TPNS will not be able to manage APPX sessions if it is stopped, so you need to schedule any outage with end-users and other interested parties.

Usually, there is no need to stop TPNS unless you have changed your TPNS configuration. If you have, you'll need to activate the file (*see Section 6, "APPX TPNS Configuration"*), then stop and restart TPNS.


If you stop TPNS, you may want to quiesce all session activity first. When shut down, TPNS will wait 60 seconds for active sessions to finish, but will then shut down even if sessions are still running.

If you want to quiesce TPNS:

1. Stop each of your Listeners; if end-users initiate sessions, they will be rejected.
2. Wait for running sessions to complete.

Then, you may stop TPNS and proceed with offline activities.

### **The APPX TPNS Icon**

While the APPX TPN Service is running, there is normally a taskbar icon () visible in the task tray (the icon may be disabled in the configuration program, but we discourage this).

Double-clicking the icon will activate the Manager program.

## Viewing the Status of TPNS

When the TPNS Manager is started, a panel with two tabs, Listeners and Sessions, will be shown. At the bottom of the screen is a status display.

If TPNS is stopped, the status display will indicate this and no other data will be visible on either tab of the panel.

If TPNS is running, a status display, such as the one shown in Figure 8.1, will be presented.

The top half of the Listeners panel is a list of configured listeners, while the bottom part shows detailed statistics for the listener. You can see the statistics for the other listeners by simply clicking on the desired listener in the listener list.

The Sessions tab will present a list of running sessions (sessions which have finished are not represented in the list) in the upper part of the panel, and detailed information for the selected session in the bottom part of the display. Here too, you may move between sessions by clicking on the desired session.

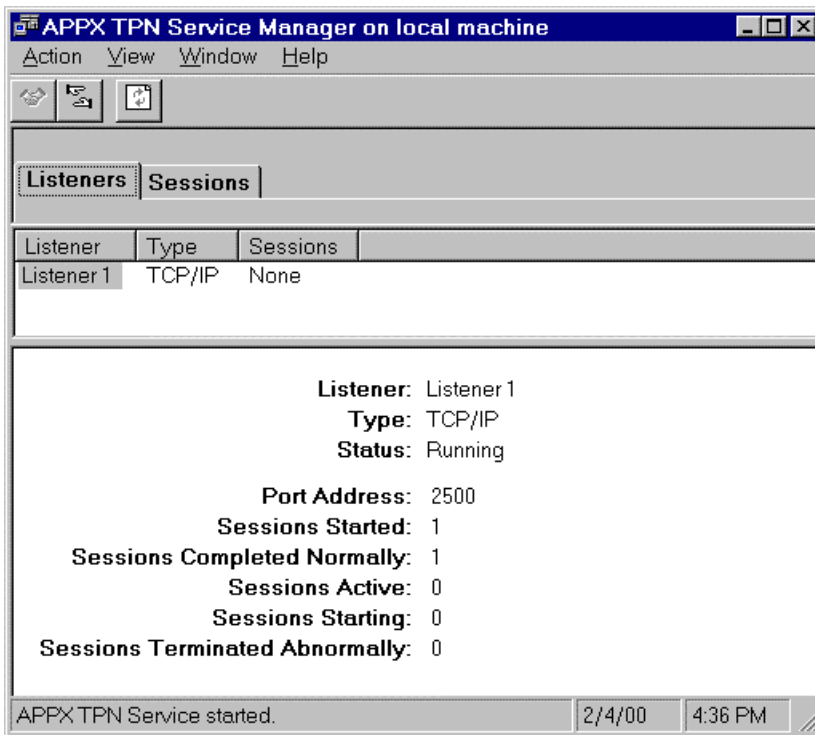


Figure 8.1

## **Stopping TPNS Sessions**

In an emergency, or while testing, it may become necessary to stop a running TPNS session. This is accomplished via the Action menu.

Keep in mind that, in a production environment, stopping a session could have important consequences, such as lost or duplicated data. As a rule, end-user APPX applications ought to be designed to deal with unsuccessful data transfers. The technical issues involved in such designs are beyond the scope of this manual.

Consult the appropriate system designers and managers to decide whether stopping sessions is a safe practice in your environment.

## **Launching the Event Viewer**

During the course of operation, TPNS will log successful program executions, along with any difficulties it may encounter.

As a convenience, the event viewer may be launched from the Manager's Window menu.

1. When running Windows NT: the Windows NT Event Log viewer will be started.
2. When running Windows 95/98: the APPX TPNS Event Viewer will be started.

*For detailed information about event log entries, see Appendix A, "Messages."*



## Section 9 - TPNS Security Overview

TPNS provides a means by which mainframe computers can originate data communications sessions with cooperating PC applications. Even though PC workstations may not originate data transfer, TPNS still provides new avenues for data to enter your mainframe because data can flow in either direction.

Because of this, it is useful to consider the security implications of the access TPNS provides.

In the past, networked access in the IBM mainframe environment had a considerable degree of built-in security due to the following factors:

1. Networking software and protocols typically consisted of IBM-proprietary designs such as VTAM and SNA.
2. Networking infrastructure was often a somewhat closed system, consisting of locally attached IBM hardware (again, consisting of proprietary designs), and remote links through leased telephone circuits or, less frequently, switched (dialup) lines.

While these two factors alone were not sufficient to meet the most demanding privacy needs, they nonetheless provided data center managers with a fair degree of comfort that their company's networked data was secure.

Many companies today, however, are deploying a wide variety of hardware/software solutions which allow the mainframe to be connected via the Internet. The APPX TPN Service is one such solution.

It is possible to employ the APPX TPN Service in a closed network. There is no rule that you cannot have a closed TCP/IP network, and in fact many such networks exist. In the IBM mainframe connectivity arena, however, TCP/IP is a relative latecomer and is often added on the basis that open connectivity via the Internet is very appealing. TPNS provides a straightforward and cost-effective means of enabling outbound Internet access in mainframe batch applications.

A firewall may be used to construct a "partially closed" TCP/IP network. In that case, the firewall can be configured to permit isolated external systems access the internal network. The firewall can be set up to permit external TPN originators to access selected ports on the TPNS machine. The TPN Service can then be configured to assign specific security classes to those users, either by using the address range restrictions on a listener, or by defining an additional listener (with appropriate security class assignments) for a specific, externally accessible, port.

**NOTE:** The TCP/IP stack in Windows NT can be configured to do a limited amount of filtering.

**NOTE:** The current version of TPNS does not support proxying the external connection. This support is planned for a future version.

It may first appear that using a firewall to filter incoming connection attempts from a mainframe originator to be overkill. The risk, albeit very small, is that a malevolent external program could "impersonate" a mainframe originator, and manage to accomplish data transfer. In closed systems, you can eliminate this possibility by properly configuring a very restrictive address range in TPNS for the corresponding listener. In open systems, this is still likely to be a viable alternative since you are likely to know precisely the TCP/IP address of the mainframe originator(s). By all means, use this facility whenever possible.

The security aspects of connecting once private networks to the Internet are complex, varied, and beyond the scope of this manual; volumes have been written on the matter. Those who are implementing TPNS are expected to have a working knowledge of the issues involved.

Still, several aspects of security as it relates to the APPX TPNS must be mentioned:

1. This release of TPNS does not support built-in data encryption. Those with extremely sensitive data must consider whether additional security mechanisms are required (encrypting TPNS hardware, VPNs, and so forth).
2. As is the case with any important desktop workstation, TPNS workstations should be reasonably secured against use by untrained or unauthorized personnel.

As mentioned in this section and elsewhere, TPNS incorporates a security class mechanism to help alleviate security risks. *See Section 10, "TPNS Security Classes" for a description of this mechanism.*

If you need further information on internetworked security, a number of good books on the topic have been published. *Some of these are referenced in Appendix E, "Bibliography."*

## Section 10 – TPNS Security Classes

While the fact that TPNS supports only mainframe-initiated transfer sessions provides a measure of safety, TPNS nonetheless provides a simple security class structure to assist in controlling sessions.

When a TPN Definition is configured in TPNS, one or more security classes are assigned to the TPN. There are twenty-six assignable classes, designated “A-Z”.

Associated with each defined Listener is one or more TCP/IP address ranges from which TPNS will accept connections. Each address range, like the TPN Definitions, has one or more security classes authorized to it.

When an incoming connection request is detected by the Listener, TPNS will determine whether the originator is authorized for the program it is attempting to start. For purposes of authorization, the Listener can have two lists of security classes:

<u>Source</u>	<u>Applies To</u>
Listener Global Panel	All incoming connections detected by the Listener
Listener Address Range	Incoming connections for this Address Range only

If any of the TPN Definitions security classes is in either of these two lists, the originator is authorized to access the program defined by the TPN Definition. As described in Section 9, “TPNS Security Overview”, address ranges or separate listeners (on separate ports) can be used to distinguish various originators, and assign them different security classes.

Since there are a limited number of security classes, it is best not to assign a different class to each TPN Definition. Instead, each class should represent a category of transactions that are all available to the same originator.

Assume that there are two divisions (“Automotive” and “Industrial”) of a major chemical corporation. Each division has its own mainframe computer, but a central office handles certain combined business for the two divisions. The central office has PCs which service various TPN session requests from both divisions.

The following example shows how classes can be used to restrict access of automotive and industrial programs to the appropriate divisions.

The example assumes that the TCP/IP address of the “Automotive” mainframe is 108.200.57.100, while that of the “Industrial” division is form 108.200.57.200.

Automotive TPN Definitions	Class	
AUT1	A	
AUT2	A	
Industrial TPN Definitions	Class	
IND1	B	
IND2	B	
(TPNs available to both divisions)	Class	
SLS1	A,B	
Listener Address Range	Class	Allows
108.200.57.100 – 108.200.57.100	A	AUT1, AUT2, SLS1
108.200.57.200 – 108.200.57.200	B	IND1, IND2, SLS1

### **APPX TPNS Event Log Messages**

The APPX TPN Service makes extensive use of the event logging for problem reporting, and security reporting is no exception. If an originator attempts to start a connection without proper authorization, the event will be logged.

*For more on event log reporting, see Appendix A, “Messages.”*

## Section 11 - The APPX TPNS Test Programs

If you intend to run TPNS only in conjunction with pcMAINFRAME, cfSOFTWARE's flagship data transfer product, then you may wish to skip this section (pcMAINFRAME will serve to test TPNS) . Otherwise, you will need to use the test program provided with TPNS.

### Installing the Test Programs

The PC peer program, CFTTAPPX, is installed automatically as part of the standard PC TPNS installation. The mainframe program, APPXVTM1, must be installed from magnetic tape by your data center's system personnel. Use the appropriate JCL for the mainframe operating system:

#### Sample MVS Installation JCL

This JCL will restore the TPNS test program to your load library (replace "cft.loadlib.load" in the sample with your destination library).

```
//CFTINST JOB .....  
//* ----- COPY LOAD MODULES FROM TAPE - FILE 1  
//STEP1 EXEC PGM=IEBCOPY  
//SYSPRINT DD SYSOUT=*  
//SYSUT2 DD DSN=cft.loadlib.load,DISP=SHR  
//SYSUT1 DD DD UNIT=TAPE,VOL=SER=CFR001,  
// LABEL=(1,SL),DISP=OLD,  
// DSN=CFR.LOAD  
//SYSIN DD *  
C I=((SYSUT1,R)),O=SYSUT2
```

#### Sample VSE Installation JCL

The APPX TPNS test program distribution tape is created in standard, LIBR BACKUP format. Use the librarian program LIBR to add the program to your library (replace "library.sublib" in the sample with your destination library).

```
// JOB RESTORE TPNS TEST PROGRAM  
// ASSGN SYS006,TAPE DISTRIBUTION TAPE  
// MTC REW,SYS006 REWIND TAPE  
// MTC FSF,SYS006,4 SKIP MVS DISTRIBUTION FILES  
// EXEC LIBR  
RESTORE CFSoft.DIST.*.*:library.sublib -  
TAPE=SYS006 LIST=YES REPLACE=YES  
/*  
// MTC RUN,SYS006 UNLOAD DISTRIBUTION TAPE  
/&
```

In addition to APPXVTM1, the installation tape contains several programs used to test the APPX Router; they will not be used in testing TPNS.

## APPXVTM1 Overview

APPXVTM1 is a parameterized mainframe APPX application which supports testing TPNS:

- directly (TCP/IP)
- indirectly through the APPX Router (LU6.2)

Before the test session can be conducted, you will need to prepare the mainframe JCL for your test. The JCL utilizes parameter cards read via SYSIN (MVS) or SYSIPT (VSE). Choose the appropriate JCL that follows based on your mainframe connectivity choice and your operating system. *For additional information, see Appendix C, “APPXVTM1 Parameters”.*

## APPXVTM1 JCL for TCP/IP

### MVS

```
//APPXVTM1 JOB .....
//STEP1 EXEC PGM=APPXVTM1,REGION=4096K
//STEPLIB DD DSN=your.library,DISP=SHR
//SYSTCPD DD DSN=tcp.control.dataset,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
CT=TR
HOST=tpns.machine.domain.name,PORT=2500
TIMEOUT=300
TPN=CFTTAPPX
TCPNAM=tcpname
/*
```

### VSE

```
// JOB APPXVTM1 RUN SAMPLE TPNS SESSION
// LIBDEF *,SEARCH=(your.library),TEMP
// EXEC APPXVTM1
CT=TR
HOST=tpns.machine.domain.name,PORT=2500
TIMEOUT=300
TPN=CFTTAPPX
SUBSID=subsystemid
/*
/&
```

The table below summarize the substitutions you will need to make in the run JCL:

your.library	The installation library where the mainframe program was installed.
tpns.machine.domain.name	Specify the TCP/IP address of the PC platform where you will run the PC peer program (CFTTAPPX); ordinarily this is the TPNS machine.
tcp.control.dataset	MVS Only. Specify the TCP/IP control dataset (used for DNS resolution). You may not need this JCL statement. If unsure, check with your mainframe systems programmer.
tcpname	MVS Only. Specify the TCP/IP subsystem name. The default specification (TCPIP), is usually correct.
subsystemid	VSE Only. Specify the TCP/IP subsystem ID. The default specification (00), is usually correct.

## **APPXVTM1 JCL for LU6.2 via the APPX Router**

### MVS

```

//APPXVTM1 JOB .....
//STEP1 EXEC PGM=APPXVTM1,REGION=4096K
//STEPLIB DD DSNAME=your.library,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
CT=XR
CONDAT='TCP://tpns.machine.domain.name,PORT=2500'
TIMOUT=300
TPN=CFTTAPPX
APPLRQ=applid
SLURQ=luname
MODE=mode
/*
  
```

### VSE

```

// JOB APPXVTM1 RUN SAMPLE TPNS SESSION
// LIBDEF *,SEARCH=(your.library),TEMP
// EXEC APPXVTM1,DSPACE=2M
CT=XR
CONDAT='TCP://tpns.machine.domain.name,PORT=2500'
TIMOUT=300
TPN=CFTTAPPX
APPLRQ=applid
SLURQ=luname
MODE=mode
/*
/&
  
```

**Note:** The entire CONDAT parameter must be bracketed in quotes as shown.

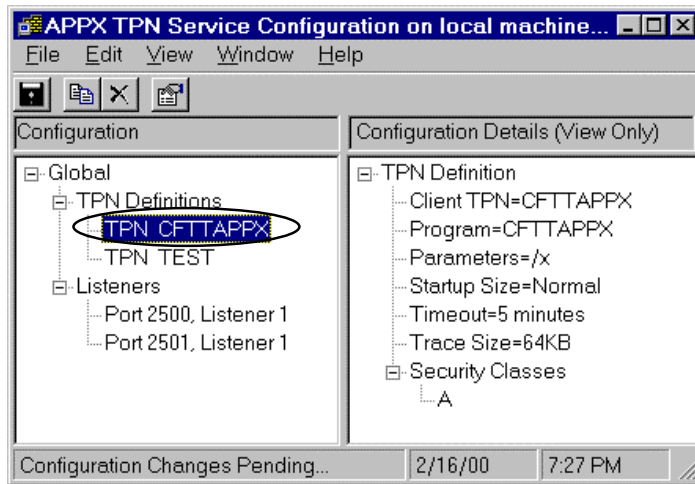
The table below summarize the substitutions you will need to make in the run JCL:

your.library	The installation library where the mainframe program was installed.
tpns.machine.domain.name	Specify the TCP/IP address of the PC platform where you will run the PC peer program (CFTTAPPX); ordinarily this is the TPNS machine.
applid	Specify the VTAM APPL name to be used for the batch application. <i>For more information, see Appendix D, "VTAM Configuration for APPXVTM1".</i>
luname	Specify the VTAM LU name of the APPX Router to which you are connecting
mode	The VTAM mode to be used for the session. Normally, #INTER should be used.

**IMPORTANT:** For proper execution under LU6.2, any necessary VTAM resources (PLUs, etc.) be properly defined in VTAM. For more information, see Appendix D, "VTAM Configuration for APPXVTM1".

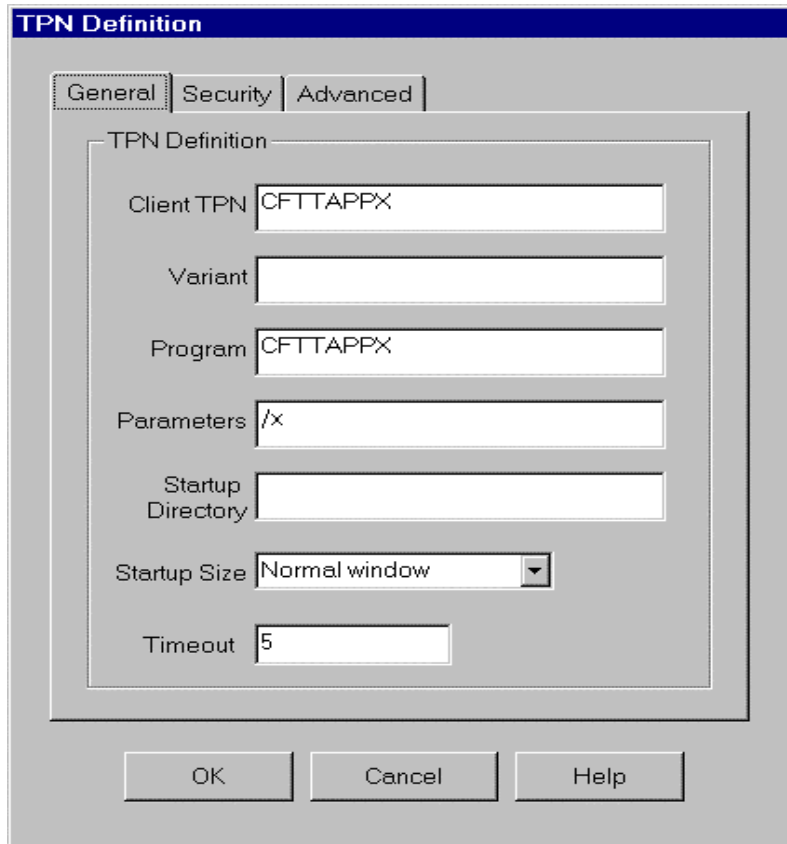
## Configuring TPNS for the Test Session

1. If you are running this test program using a new TPNS installation, enable the sample configuration as described in *Section 6, "APPX TPNS Configuration"*, under heading "Sample Configuration". Then, proceed with the next topic in this section, "Running the Test Session".
2. Using the TPNS Configuration program (Start/Programs/APPX TPNS), open the active configuration file (File/Open Active). If you cannot open the active file because the File/Open Active menu item is "grayed", there is no active configuration. Enable the sample configuration as described in *Section 6, "APPX TPNS Configuration"*, subheading "Sample Configuration". If they are the same, proceed with the next topic, "Running the Test Session".
3. The active configuration file is now open. Check the TPN Definition list to see if the test program is already configured. If so, there will be an entry titled "TPN CFTTAPPX", as shown below:



If TPN CFTAPPX is present, click on it to display the Configuration Details; verify that the configuration details are as shown in the window above. If they are not, right click on TPN CFTAPPX, choose Properties, and proceed to step 4. If they are the same, proceed with "Running the Test Session" in the next heading. If TPN CFTAPPX is not present, right click on TPN Definitions under Global, and take the Insert/TPN Definition menu path.

4. Enter or update the TPN Definition using the following example:



The screenshot shows a dialog box titled "TPN Definition" with three tabs: "General", "Security", and "Advanced". The "General" tab is selected. Inside the dialog, there is a "TPN Definition" section with the following fields:

- Client TPN: CFTTAPPX
- Variant: (empty)
- Program: CFTTAPPX
- Parameters: /x
- Startup Directory: (empty)
- Startup Size: Normal window (dropdown menu)
- Timeout: 5

At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

5. Save the file as the active configuration (File/Save As Active).  
The configuration is now complete.

## **Running the Test Session**

1. If you have just saved a new active configuration file for use with the test session, you will need to restart TPNS before running the test:
  - Start the TPNS Manager utility (default menu path: Start/Programs/APPX TPN Service/APPX TPN Service Manager).
  - If TPNS is running, stop it. (menu path: Action/Stop APPX TPN Service. If it is not running, this menu option will be grayed).
  - Start TPNS (menu path: Action/Start APPX TPN Service).
2. Start the mainframe program by submitting the appropriate mainframe JCL.

3. If the program has managed a successful connection to the host, a data transfer operation will begin immediately. In this case, a progress box will be presented, as shown in Figure 11.1.

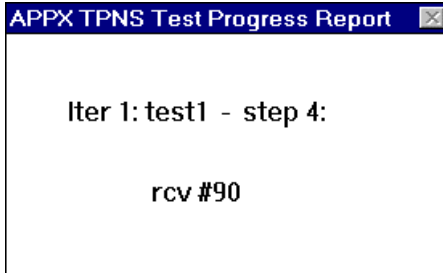


Figure 11.1

Once the test has completed, the progress window (and the program's main window), will be removed as the program terminates; this process is automatic, no operator interaction is required.

### **What to do if you suspect a problem**

Normal test session completion is indicated by presentation and removal of the Progress Report without intervening error messages. The mainframe SYSLST/SYSPRINT output for the job will show the following sequence of messages, once again with no disrupting error messages:

```
Test APPX Starting  
Test APPX Ending  
APPXVTM1 Done
```

If your test run is not successful:

1. Note precisely any error message you receive;
2. Obtain and save the mainframe job output;
3. Examine the TPNS log file (Manager menu path: Window/APPX TPNS Event Viewer); if an error event is logged for your session (based on the runtime), view the log record detail and note its contents.

If you require help interpreting the gathered information, contact cfSOFTWARE technical support.

## **Section 12 - Common Problems/Troubleshooting**

This section describes some of the most frequent difficulties that are encountered during TPNS installation, configuration, and use. Most frequently, these problems occur as the result of misconfiguring, or failing to configure, some component of the environment.

Some common problems:

1. Failure to set an active configuration file. Before starting TPNS, an active configuration file must be set. This is done via the APPX TPNS Configuration program (*see Section 6, "APPX TPNS Configuration"*).
2. Failure to provide a TPN Definition. Each PC program that can be started by the mainframe application must be defined in TPNS configuration file via the TPN Definition panel (*see Section 6, "APPX TPNS Configuration"*).
3. Failure to configure the target PC application properly. The PC application must be an APPX program configured appropriately (*see Section 7, "PC Application Considerations"*).
4. Failure to properly configure other networking hardware/software properly to provide a valid TCP/IP route between the mainframe and the destination PC.

To assist you in identifying the cause of problems you may encounter, here is a step-by-step procedure you should follow when problems occur:

1. Make sure the APPX TPNS is active. This is done via the APPX TPNS Manager applet. (*See Section 8, "The APPX TPNS Manager" for details.*) If TPNS is active, proceed with step 6.
2. The APPX TPNS is not active. Activate it via the APPX TPNS Manager applet.
3. After activating TPNS, make sure it remains active for several moments after startup. Do this by observing the APPX TPNS Manager status display (press F5 on this display to refresh the status).
4. If TPNS remains active, proceed to step 6.
5. The APPX TPNS is starting, but fails to remain active. TPNS is likely not initializing properly.

Check the APPX TPNS event log (the event viewer can be started from the TPNS Manager applet).

If the event log viewer is the NT Event Log applet, look for events with source APPXTPNS; You can filter the event viewer so that only TPNS events will be displayed (View/Filter Events).

*Refer to Appendix A, "Messages", for a detailed explanation of any events you see.* If you identify the cause of the problem, correct it and return to step 1. If not, contact cfSOFTWARE for assistance.

6. TPNS is active. If sessions are failing after they have been running for a time, go to step 10. If they are failing immediately, continue with step 7.

7. Sessions are failing immediately. Check the APPX TPNS Event Log (started from the Manager Window menu). If TPNS has terminated the connection request, one of the event log entries will contain message text similar to the following:

nnnnn-sss Session from "nnn.nnn.nnn.nnn" terminated

Here, "nnn.nnn.nnn.nnn" is the address of the originating host, and "sss" are the last three digits of the session number.

If you cannot locate any events that seem to correspond to the failure, go to step 9.

8. TPNS has terminated the session. To determine why the session failed, examine earlier log entries for the session. These can be identified because all event log entries for the same session have the same "-sss" suffix. *Refer to Appendix A, "Messages", for a detailed explanation of any events you see.* If you identify the cause of the problem, correct it and return to step 1. If not, contact cfSOFTWARE for assistance.
9. No TPNS event log entries are present for the failed connection attempt. Most likely, TPNS is never "seeing" the connection attempt.

Two possible causes:

- the client workstation is not configured properly. On the client workstation, review the configuration using the APPX TPNS Configuration applet. Verify that the port address is correct; compare this with the parameters used in the mainframe application.
- the mainframe job has incorrectly specified the address or domain name of the target PC.

If neither of these apply, make sure there are no firewalls or other infrastructure restrictions that may be preventing access to the destination. The originating mainframe must be able to access this destination directly via the network (be it Intra- or Inter-).

*Review Section 7, "PC Application Considerations", for more information on this topic..*

10. Sessions start successfully, but fail later. A number of factors could cause this:
- a) Some component of the network may have been deactivated during the session. For example, the mainframe program may have ended prematurely due to an application error.
  - b) If using the APPX Router as a gateway, the Router may have been shut down.
  - c) The session might have been terminated by an APPX TPNS Operator (via the APPX TPNS Manager applet).

The event log should provide more details about the problem. *Consult Appendix A, "Messages", for TPNS messages you find there.* Also, review the mainframe logs for problem indications

If the problem persists and you are unable to identify the cause, contact cfSOFTWARE technical support for help.

## Appendix A - Messages

Error reporting for TPNS sessions may take place at three locations:

1. In the mainframe application (via an APPX error message)
2. The APPX Router machine (when using the Router to accommodate mainframe LU6.2 connectivity). There, errors will be logged on the Windows NT application event log.
3. The TPNS machine (event log messages). Under Windows NT, the Windows NT application event log is used; under Windows 95/98, TPNS maintains its own event log file.

There are host messages that may be of interest to TPNS users (for example VTAM messages), but these are not covered in this manual. *For information on those, consult the appropriate IBM reference manuals.*

### Mainframe APPX Messages

The mainframe component of Across the Boards APPX product is a comprehensive data communications program, intended to provide a reliable and robust communications engine to a wide variety of applications. As such, APPX must be able to report a variety of errors to the application layer.

APPX error messages are explained in depth in the Across the Boards APPX Programmer's Guide.

**Message:** 1007: TIMEOUT WAITING FOR terminal\_event

**Explanation:** The PC application program has not completed its APPX connect within the allotted timeout period.

**Action:** If you are attempting to complete a connection that involves the APPX Router, review the Router event log for additional information. Finally, review the TPNS event log.

If none of these sources are helpful, the mainframe may not have a valid path to the target PC. The target TCP/IP address or domain name or port may be incorrectly specified in your mainframe application.

Finally, you may need to increase the timeout value used for your mainframe APPX application.

***NOTE:** If this error has occurred during an attempt to run the APPXVTM1 test program, review the **HOST**, **TIMEOUT**, and **PORT** parameters and correct them if necessary.*

**Message:** 1017: APPCCMD-RECEIVE (PRI:SEC=0004:0009,SN=084C0000, TPN UNAVAILABLE)

**Explanation** Possible causes:

- the APPX Router is not running
- the APPX Router is running, but the TPN specified in the Global Properties panel does not match the TPN specified in the host APPX application

**Action:** Start the Router, or correct the TPN as necessary. If you change the TPN in the Router, you will need to restart the Router before the change takes effect.

**Message:** 1017: APPCCMD-OPRCNTL-CNOS (PRI:SEC=0008:0000,SN=087D0001, CNOS ALLOCATION ERROR)

**Explanation** The mainframe was unable to establish an LU6.2 session with the desired LU. Possible causes:

- the wrong LU was specified in the mainframe APPX connect
- there is a VTAM path problem which prevents access to the desired LU
- the SNA Server which defines the LU is not running

**Action:** Correct the configuration or erroneous APPX connect, and retry the session

**Message:** 1029: INVALID OR UNKNOWN TCP/IP HOST NAME OR ADDRESS

**Explanation** The IP address or DNS host name passed to CFXVTM1 (VTHOST) could not be resolved.

**Action:** Ensure that the IP address or name specified can actually be resolved by testing with the “PING” utility on the mainframe. If necessary, correct the IP address or host name and rerun the job. Additional considerations:

- **VSE.** Some releases of TCP/IP for VSE do not support DNS name resolution. In that case a host name can be defined to TCP/IP for VSE with the DEFINE command:

```
DEFINE NAME,NAME=mypc.mycompany.com,IPADDR=1.2.3.4
```

- **MVS**

Ensure that SYSTCPD is allocated to the correct “...TCPIP.DATA” file for the job:

```
//SYSTCPD DD DSN=mysys.install.TCPIP.DATA,DISP=SHR
```

## **Router Event Log Messages**

If the APPX Router is involved because of LU6.2 connectivity, you may need to examine the Router event log to resolve a session problem.

Generally, a meaningful message will also be produced at the target machine, but this can only occur if the Router is able to link successfully to the target TPNS machine. If it cannot, a message of the form shown below will be produced.

**Message:** 10023-*nnn* Failed to allocate TCP/IP Server session

Including the following XAPI failure description

XAPI message:

066: ATWS3 err 10057 @ senda

**Explanation:** This message indicates that the Router is unable to establish a connection with TPNS. The message will include an XAPI failure description.

If the XAPI message is “066: ATWS3 err 10057 @ senda” (usually the case), one of the following will likely apply:

- the APPX TPNS is not started.
- the originating mainframe application specifies wrong TCP/IP address or port for the target TPNS machine.
- the target TPNS destination is unreachable due to other factors, for example a physical routing problem or firewall restriction.

**Action:** Start the TPNS, or correct the network configuration as necessary; retry the session.

If your Router event log entry is other than the one just described, consult the [Across the Boards APPX Router Implementation Guide and Reference](#) for assistance.

### **TPNS Event Log Messages**

TPNS logs a variety of information during operation, including:

1. TPNS program startup;
2. TPNS shutdown;
3. PC program executions
4. Failed sessions, along with diagnostic data

Under Windows NT, the NT Application Event Log is used for logging; in other Windows environments, TPNS uses its own logging mechanism.

Regardless of which of these two repositories is used, the TPNS Manager applet may be used to view the information. Use the Window/APPX APPXTPNS Event Viewer menu path, as shown in Figure A.1, below, to view log entries.

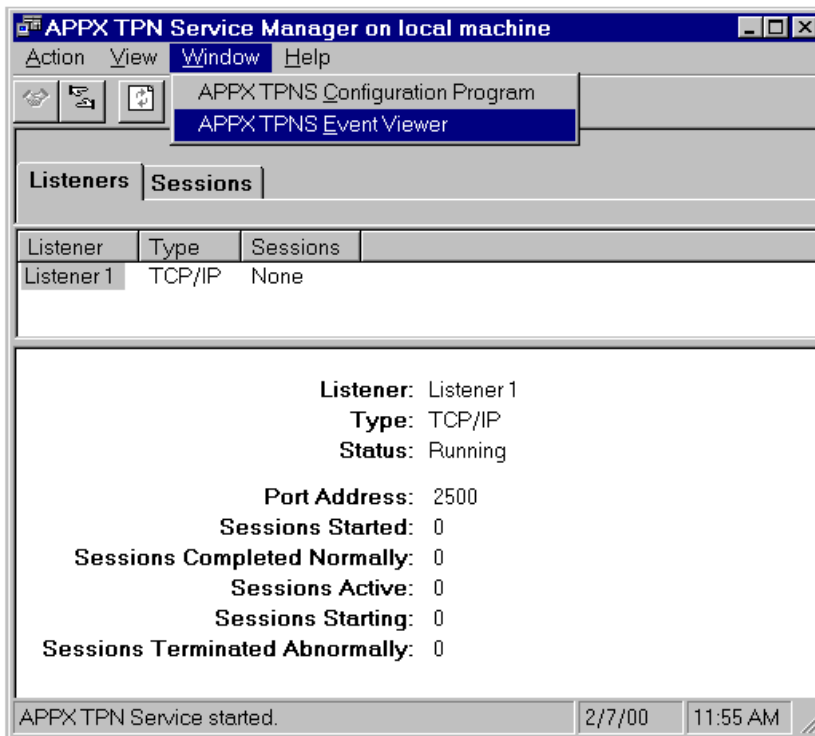


Figure A.1

TPNS' event log viewer is illustrated in Figure A.2.

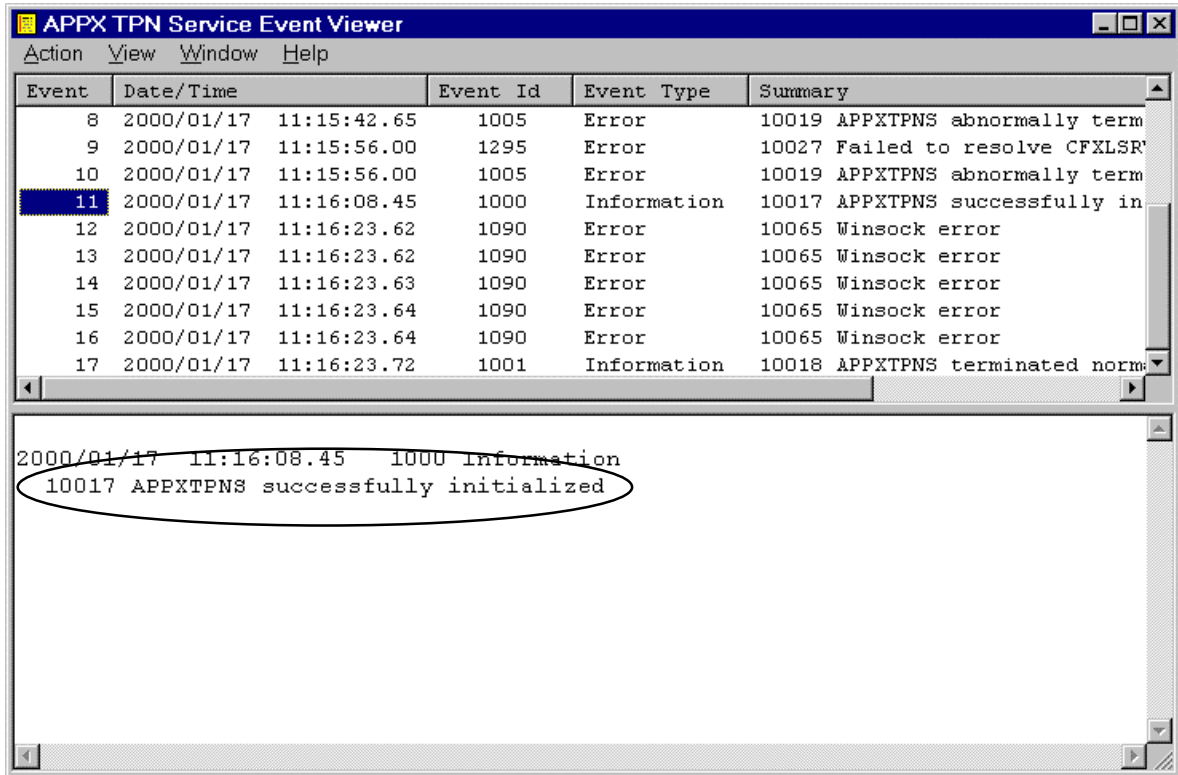


Figure A.2

All event log entries created by TPNS are of the following form:

*nnnnn-sss message text*

where:

*nnnnn*: is a message number which will assist cfSOFTWARE technical support in finding the location of the failure

*sss*: is the last three digits of the TPNS session ID. All event entries associated with the same session will have the same *sss* value. Event entries that are not associated with a specific session do not include the *sss* suffix (an example is the circled portion of Figure A.2).

The exact cause of the failure can often be identified using only the message text. All event log entries that may occur are described in the pages that follow; the entries below are ordered and identified by the message number, as described above.

Many of the events described here are the result of rare conditions; problem determination in those cases may require the assistance of cfSOFTWARE technical support.

Before contacting cfSOFTWARE, note the Event Id, message number, the message text, and any other information you think may be useful. If the event log entry includes any data, note that as well. It is a good idea to save a copy of the event log file, in case you need to reference it again.

**Event ID:** 1000

**Message:** *nnnnn* APPXTPNS successfully initialized

**Explanation:** TPNS was successfully started at the designated time.

**Action:** None.

**Event ID:** 1001

**Message:** *nnnnn* APPXTPNS terminated normally

**Explanation:** TPNS was shut down successfully at the designated time.

**Action:** None.

**Event ID:** 1005

**Message:** *nnnnn* APPXTPNS abnormally terminated

**Explanation:** The APPX TPN Service has ended due to an error.

**Action:** Examine previous event log entries, which should describe the nature of the failure. If necessary, contact cfSOFTWARE technical support for assistance.

**Event ID:** 1007

**Message:** *nnnnn* Unsupported listener type encountered

**Explanation:** An invalid listener configuration entry was found.

**Action:** Contact cfSOFTWARE technical support for assistance.

**Event ID:** 1010

**Message:** *nnnnn-sss* CreateProcess successful

**Explanation:** TPNS has successfully started a PC application. Further details about the initiated program are also provided, including the originating TCP/IP address.

**Action:** None. This is provided for information only.

- Event ID:** 1012
- Message:** *nnnnn-sss* CreateProcess failed
- Explanation:** TPNS has failed in an attempt to start a PC application. The operating system result code is provided.
- Action:** Note the result code from the failed attempt. The most likely cause of this failure is improper specification of the target file name or path.
- Review the configuration file. If you are unable to resolve the problem, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1022
- Message:** *nnnnn-sss* CreateProcess failed. The target application is a single-instance application, and an instance of the program is already running.
- Explanation:** Only one copy of the designated application program may be running at a time. See *Section 7, "PC Application Considerations"* for more information.
- Action:** If necessary, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1040
- Message:** *nnnnn-sss* Operating system error
- Explanation:** The session has failed due to an operating system error.
- Action:** Note any additional information in the event log text, then contact cfSOFTWARE technical support for help.
- 
- Event ID:** 1060
- Message:** *nnnnn-sss* Memory allocation failed
- Explanation:** A short-on-storage condition has caused an attempt to allocate memory to fail. Depending on the context of the failure, either TPNS or the session will fail.
- Action:** Contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1070
- Message:** *nnnnn-sss* CFTATB.DLL load failed
- Explanation:** TPNS was unable to load CFTATB.DLL, a critical system component. The TPNS startup attempt has failed. This is likely due to an error during the installation of TPNS.
- Action:** Contact cfSOFTWARE technical support for assistance.

**Event ID:** 1080

**Message:** *nnnnn-sss ATB Alloc Failed – description*

**Explanation:** TPNS has failed in an attempt to allocate an XAPI session. XAPI is a critical system component, without which TPNS initialization cannot proceed.

**Action:** Contact cfSOFTWARE technical support for assistance.

**Event ID:** 1090

**Message:** *nnnnn-sss Winsock error*

**Explanation:** A Winsock error has occurred. Additional text will be provided that further information. This may be due to a networking error.

**Action:** Examine your networking infrastructure to locate any obvious problems.

If you are unable to identify the source of the failure, note all information in the event log and contact cfSOFTWARE technical support for assistance.

**Event ID:** 1100

**Message:** *nnnnn-sss Winsock error, wrong version=*version**

**Explanation:** The Winsock stack TPNS is attempting to use is not the proper version..

**Action:** TPNS will terminate. Contact cfSOFTWARE for assistance.

**Event ID:** 1110

**Message:** *nnnnn-sss XAPI Client error: failure description.*

**Explanation:** A fatal session error has occurred. The failure may indicate a hardware or other connectivity problem.

**Action:** The session will be terminated.

*failure description* may provide enough additional information for you to remedy the problem. Also, check the event log for other messages relating to the failing session.

If necessary, Contact cfSOFTWARE technical support for assistance.

- Event ID:** 1112
- Message:** *nnnnn-sss* Error message receive from client. *error message*
- Explanation:** The error message displayed was received from the client (mainframe) application.
- Action:** The session will be terminated.
- error message* may provide enough additional information for you to remedy the problem. Also, check the event log for other messages relating to the failing session
- If you are still unable to determine the cause of the failure, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1120
- Message:** *nnnnn-sss* XAPI Server error: *failure description*.
- Explanation:** A fatal session error has occurred on the server (PC application) side. The failure may indicate a hardware or other connectivity problem.
- Action:** The session will be terminated.
- failure description* may provide enough additional information for you to remedy the problem. Also, check the event log for other messages relating to the failing session
- If you are still unable to determine the cause of the failure, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1122
- Message:** *nnnnn-sss* Error message receive from server. *error message*
- Explanation:** The error message displayed was received from the server (client) application.
- Action:** The session will be terminated.
- failure description* may provide enough additional information for you to remedy the problem. Also, check the event log for other messages relating to the failing session
- If you are still unable to determine the cause of the failure, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1140
- Message:** *nnnnn-sss* Timeout waiting for APPX TPNS to initialize
- Explanation:** During startup, TPNS did not complete its initialization sequence.
- Action:** TPNS will terminate. Contact cfSOFTWARE for help.

- Event ID:** 1150
- Message:** *nnnnn-sss* Unsupported transport type
- Explanation:** This version of TPNS supports only TCP/IP, yet another transport type was specified in the TPNS configuration file. The configuration file may be corrupt.
- Action:** If possible, determine if the configuration file has been damaged. If you need assistance, contact cfSOFTWARE for help.
- 
- Event ID:** 1167
- Message:** *nnnnn-sss* Timeout waiting for application to respond. The invoked application has not completed its connect processing within the configured timeout period (*nn* minutes).
- Explanation:** TPNS was not able to complete its connection with the started PC application within the configured timeout period.
- Action:** Retry the client session. If the problem persists, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1170
- Message:** *nnnnn-sss* Client connect block is invalid
- Explanation:** TPNS received the complete connection request block from the originator, but the data was corrupt. The most likely cause of this error is an attempt by a non-APPX application to connect to the TPNS Listener.
- Action:** If necessary, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1172
- Message:** *nnnnn-sss* Invalid Format-3 Connect Data received
- Explanation:** The TPNS connect protocol has detected invalid data. The most likely cause of this error is an attempt by a non-APPX application to connect to the TPNS Listener.
- Action:** If necessary, contact cfSOFTWARE technical support for assistance.
- 
- Event ID:** 1179
- Message:** *nnnnn-sss* The client has detected or generated an error condition which caused the session to fail. As part of the failure, the client sent an error message to APPXTPNS. The text of the message follows: *description*
- Explanation:** The TPNS connect protocol has detected an error condition.
- Action:** If *description* provides adequate information to resolve the problem, take corrective action and retry the session; otherwise, contact cfSOFTWARE technical support for assistance.

- Event ID:** 1190
- Message:** *nnnnn-sss* Expected TPN deallocate
- Explanation:** During session termination, TPNS was expecting a deallocation sequence from the host, but did not receive it.
- Action:** Contact cfSOFTWARE for assistance.
- 
- Event ID:** 1200
- Message:** *nnnnn-sss* Invalid originating address “orig-address”
- Explanation:** The client’s originating address was not valid with respect to the configured address range for the listener
- Action:** Verify that the displayed address represents an authorized originator by examining the listener configuration.
- If you are unable to resolve the problem, contact cfSOFTWARE for assistance.
- 
- Event ID:** 1210
- Message:** *nnnnn-sss* Originator is not authorized for transaction “*transaction*”
- Explanation:** Based on the originator’s TCP/IP address, it is not authorized to start the designated PC application.
- Action:** Use the APPX TPNS Configuration program to review the security classes assigned to the TPN Definition. Compare those with the security classes configured for the Listener, specifically with the address range associated with the originator.
- If appropriate, reconfigure TPNS.
- 
- Event ID:** 1220
- Message:** *nnnnn-sss* Session from nnn.nnn.nnn.nnn terminated
- For more information about why this occurred, review preceding event log entries.
- The beginning of the description for the event is a message identifier which contains a suffix identifying the failing session. The suffix begins after the hyphen in the message number; all events for the same session will have the same suffix.
- Since the message identifier for this message is *nnnnn-sss*, look for events preceding this one which have suffix “-sss”.
- Explanation:** As specified in the preceding event log detail.
- Action:** As specified in the preceding event log detail.

**Event ID:** 1230

**Message:** *nnnnn-sss* Session purged by user request from APPX TPNS Manager

**Explanation:** The designated session has been canceled by an APPX TPNS Operator.

**Action:** The client session will be terminated.

**Event ID:** 1240

**Message:** *nnnnn-sss* Session rejected because session limit has been reached

**Explanation:** The session limit you configured for the APPX TPNS has been reached. Incoming connections in excess of this value will not be accepted.

**Action:** If appropriate, reconfigure TPNS to permit a larger number of simultaneous sessions. Normally, you want to set this value high enough so that sessions are not rejected.

**Event ID:** 1250

**Message:** *nnnnn-sss* Session rejected because listener has been stopped

**Explanation:** The listener has been stopped by an APPX TPNS Operator. Until restarted, all incoming connections designated for this listener will be refused.

**Action:** Restart the listener when it is appropriate to do so.

**Event ID:** 1260

**Message:** *nnnnn-sss* Failed to resolve CFXMLPIPE entry point: *description*

**Explanation:** TPNS was unable to resolve the designated entry point. This is a fatal error.

**Action:** Contact cfSOFTWARE technical support for assistance.

**Event ID:** 1270

**Message:** *nnnnn* Named pipe I/O error

**Explanation:** An I/O error has occurred on the APPXTPNS named pipe, which is the communication path between the APPX TPN Service and the APPX TPNS Manager.

**Action:** TPNS may terminate. This may indicate a hardware problem. If you need assistance determining the cause of the failure, contact cfSOFTWARE technical support.

- Event ID:** 1280  
**Message:** *nnnnn* Unexpected management request code received from APPX TPNS Manager  
**Explanation:** The APPX TPNS has received an unidentifiable request from the APPX TPNS Manager application.  
**Action:** Contact cfSOFTWARE technical support for assistance.
- Event ID:** 1290  
**Message:** *nnnnn* CFXLSRV failure: *description*  
**Explanation:** TPNS encountered an internal system error.  
**Action:** The session will fail. Contact cfSOFTWARE technical support for assistance.
- Event ID:** 1295  
**Message:** *nnnnn* Failed to resolve CFXLSRV entry point: *Entry point*  
**Explanation:** During intialization, TPNS was unable to properly initialize CFXLSRV, a critical system component.  
**Action:** TPNS will terminate. Contact cfSOFTWARE technical support for assistance.
- Event ID:** 1297  
**Message:** *nnnnn* CFXLSRV version is too low. Found: *version-found* Needed: *version-needed*  
**Explanation:** During intialization, TPNS was unable to properly initialize CFXLSRV, a critical system component.  
**Action:** TPNS will terminate. Contact cfSOFTWARE technical support for assistance.
- Event ID:** 1299  
**Message:** *nnnnn* Logic Error Description  
**Explanation:** An internal program logic error has occurred. The description identifies the nature of the failure.  
**Action:** TPNS will terminate. Contact cfSOFTWARE technical support for assistance.

- Event ID:** 1300
- Message:** *Nnnnn* No installation directory found...Installation is corrupt
- Explanation:** The installation directory for TPNS could not be found.
- Action:** Contact cfSOFTWARE
- 
- Event ID:** 1310
- Message:** *Nnnnn* No active configuration file set...Configure with the APPXTPNS Configuration program first
- Explanation:** Before starting TPNS, you must save an active configuration file.
- Action:** Configure TPNS as necessary before attempting to start TPNS. See *Section 6, “APPX TPNS Configuration”*, for more information.
- 
- Event ID:** 1320
- Message:** *Nnnnn* APPXTPNS configuration file error *error description*
- Explanation:** The active configuration file contains an error, identified more accurately by *error description*
- Action:** If *error description* provides sufficient information, correct the error and restart TPNS. Otherwise, contact cfSOFTWARE technical support for more information.
- 
- Event ID:** 1321
- Message:** *nnnnn* Timeout due to session inactivity
- Explanation:** The TPNS session has been inactive for too long, and will be terminated.
- Action:** By default, TPNS will allow 30 minutes of idle time before terminating a session. You can increase the amount of time allowed by changing the “Session Inactivity” value in the configuration Global/General properties.
- 
- Event ID:** 1330
- Message:** *nnnnn* Could not open APPXTPNS named pipe
- Explanation:** The APPX TPN Service was unable to open the APPXTPNS named pipe, which is the communication path between the APPX TPN Service and the APPX TPNS Manager.
- Action:** The APPX TPN Service will terminate. Contact cfSOFTWARE technical support for assistance.

## Appendix B - Frequently Asked Questions

**Q.** What is the APPX TPN Service?

**A.** The APPX TPN Service is a facility of cfSOFTWARE's APPX communications software. APPX provides an API which allows developers to create robust and reliable cooperative data communications applications involving mainframe and PC programs.

APPX is used by cfSOFTWARE's flagship product, pcMAINFRAME, as well a wide variety of custom-developed applications and products.

**Q.** How does APPX benefit from TPNS?

**A.** Historically, APPX sessions have been PC-initiated. Until TPNS, APPX mainframe programs could accept incoming connections, but could not initiate sessions with the PC (except with LU6.2). This restricted capability made it difficult for mainframe batch programs to participate as APPX partners, since those applications are scheduled at the discretion of mainframe operators.

It can be a major advantage for the transfer session to both be scheduled and initiated at the mainframe.

**Q.** What are the connectivity options for TPNS-assisted APPX applications?

**A.** The mainframe application will use either TCP/IP or LU6.2 for the transfer.

**Q.** Aren't TCP/IP and LU6.2 programming complex?

**A.** They can be, but the mainframe application *program* is completely shielded from that complexity through its use of APPX. The application program "sees" only APPX API calls, which are substantially easier to use. Further, APPX mainframe programming is nearly the same whether using TCP/IP or LU6.2; only a few connect parameters are different.

**Q.** Should I use TCP/IP or LU6.2 for my mainframe application?

**A.** TCP/IP is simpler to use. Using LU6.2 requires another APPX facility, the APPX Router, to be installed as well. Configuring LU6.2 on the host is likely to be more difficult as well.

**Q.** If LU6.2 is more difficult to configure, why would I use LU6.2?

**A.** There are several reasons you may opt to use LU6.2

First, you may not have any choice; your mainframe may not be configured for TCP/IP. If your host system is VSE, you may not have the required TCP/IP program product.

If you are very concerned about mainframe overhead, LU6.2 might be a better choice, since its CPU consumption is smaller than that of TCP/IP.

Most likely, your existing infrastructure will dictate your choice. We generally recommend TCP/IP to those who have both available.

**Q.** I want to add a new PC program to TPNS. How do I do this?

**A.** You simply need to add a new TPN Definition. *For details, see Section 6, "APPX TPNS Configuration."*

**Q.** Is the TPNS datastream encrypted?

**A.** Not currently. We plan to add data encryption in a future release. A modest level of data security is available if your APPX applications use cfSOFTWARE's Advanced Compression option, since compressed data cannot be interpreted with the naked eye.

**Q.** What data transfer rate can I expect with the TPNS?

**A.** This is a difficult question to answer. A number of factors come into play, one of the most important of which is the physical connectivity to your host.

All layers of the APPX TPNS are designed to make optimal use of your available bandwidth. Naturally, the higher the throughput you achieve, the higher will be your requirements for resources such as mainframe memory and CPU utilization.

In most environments, the capacity of the mainframe to accommodate TCP/IP sessions will be the determining factor; that capacity, in turn is controlled by factors such as buffer allocations, and the like.

**Q.** How many simultaneous connections can the TPNS support?

**A.** You may configure the TPNS to support virtually as many concurrent sessions as you like.

The number of concurrent sessions actually achievable in practice is based on resource availability (CPU capacity, memory, communications bandwidth, etc.).

**Q.** What happens to in-progress transfer sessions when TPNS is stopped?

**A.** TPNS will wait a small interval of time (about 60 seconds) to allow pending sessions to complete. After that, any unfinished sessions will be terminated. It is best to schedule the outage with end-users and other interested parties.

**Q.** What happens to in-progress transfer sessions when a Listener is stopped?

**A.** They will be unaffected by the change; they will be permitted to run to completion. The only effect of stopping a Listener is that incoming conversations will be rejected. It is a good practice to stop all Listeners and allow pending sessions to complete before stopping the TPNS.

**Q.** If I use the APPX Router to support TPNS sessions, what happens to in-progress transfer sessions when the Router is stopped?

**A.** They will be terminated immediately. Any time a session is stopped through operator intervention at the Router server, data integrity issues come into play. Make sure you consult with end-user application analysts so you understand the consequences of manually terminating sessions.

The same considerations come into play when SNA Server (used by the APPX Router), is shut down.

**Q.** Can TPNS be accessed through a firewall?

**A.** Yes, if the firewall and TPNS are configured properly. The host application is configured to access TPNS using a) its destination host name and, b) the Listener port. The firewall must allow data to flow in both directions between TPNS and the mainframe (or APPX Router machine).

If such traffic is restricted by the firewall, either the firewall or TPNS must be reconfigured as necessary.

**Q.** Can TPNS be accessed via a VPN (Virtual Private Network)?

**A.** Yes. A VPN can be used to add encryption to an APPX TPNS connection, as well as additional authentication.

**Q.** Can TPNS be used with private internet (IP) addresses?

**A.** Yes, but some special considerations apply. Some networks are set up to use private IP addresses (usually 10.x.x.x, 172.16.x.x through 172.31.x.x, or 192.168.x.x), as opposed to “real” registered internet addresses. If TPNS and the host are in the same private network, then no special considerations apply. If the host is in a separate private network, then its IP address will generally be translated to a registered (or public) address by a firewall, and TPNS will see that address as the source address. This effects which address need to be defined in the Addresses section of a listener definition. In some unusual configurations, the address of the client may be translated twice (by two firewalls). In any case the listener definition must use the addresses as finally seen by TPNS.

**Q.** Can TPNS be used with a proxy server or SOCKS?

**A.** No. This functionality is planned for a future release. See also next question.

**Q.** Can TCP/IP-based TPNS workstations safely reside outside our company’s intranet?

**A.** This configuration is common and beneficial, since it allows the mainframe to initiate sessions with offsite PCs that are accessible via the Internet.

In many cases, a firewall will be in place which segregates the intranet from the Internet. If so, the firewall may have to be reconfigured to allow the mainframe to establish a connection to the target TPNS machine.

The fact that the mainframe initiates the data connection simplifies security concerns, but reasonable caution should always be exercised when opening new channels of communication involving the host.

Apply the most restrictive level of security that is appropriate for your installation. TPNS only needs you to enable outbound connections for the ports that it uses.



## Appendix C – APPXVTM1 Parameters

APPXVTM1 (described in *Section 11, “The APPX TPNS Test Programs”*) accepts a wide variety of parameters that control its operation. The base group of parameters is described in Section 11, where the program is discussed in detail; the complete set is described here.

There are some general rules you must follow for parameters:

- Parameter names must be specified in upper-case and be followed immediately by an equal sign
- Parameter values must immediately follow the equal sign with no preceding spaces
- Parameter values that contain spaces or commas must be bracketed with single quotes (the **CONDAT** parameter requires this treatment)

Many parameter values coded here are VTAM-specific items. For additional information, see *Appendix D, “VTAM Configuration for APPXVTM1”*.

Multiple parameter cards may be used as necessary; you may also specify an asterisk (\*) in the first card column, which designates a comment (the remainder of the card will be ignored). A sample set of parameter cards follows:

```

CT=XR
CONDAT='TCP://SLS1.MYCOMPANY.COM,PORT=2500'
TIMOUT=300
TPN=CFTTAPPX
APPLRQ=VTMLU1
SLURQ=RTRLU1
MODE=#INTER
  
```

Ordinarily the **CT** parameter, described below, is specified first since it defines the primary connection type.

Parameter	Type	Applies To	Description
<b>CT</b>	Character	---	A two-character value that establishes the connection type: TR (TCP/IP Reverse connect) 6R (LU6.2 Reverse connect) TB (TCP/IP Batch originate) 6B (LU6.2 Batch originate) XR (APPX Router Remote Connect) XB (APPX Router Batch Originate)

The connection type also determines the mainframe connectivity choice (LU62, APPX Router, or TCP/IP); other parameters may or may not be applicable, depending on the connection type. The remaining parameters are shown in the following table.

Parameter	Type	Applies To	Description
<b>APPLN</b>	Numeric	LU62/Router	Specifies the number of APPLIDs available in the pool.
<b>APPLRQ</b>	Character	LU62/Router	VTAM APPLID to use. <i>For more information, see Appendix D, “VTAM Configuration for APPXVTM1”.</i>
<b>APPSWD</b>	Character	LU62/Router	APPLID password
<b>CONDAT</b>	Character	Router/TCPIP	Connect Data
<b>CONTPN</b>	Character	Router	The TPN of the APPX Router which will route the session to the TPNS machine.  This must correspond with the TPN specified in the LU62 Listener panel of the Router configuration. The default is <b>APPXROUT</b> (also the default in the Router).
<b>DIAG</b>	Character	All	<b>Y</b> specifies diagnostic mode; diagnostic mode produces a mainframe trace.  <b>N</b> suppresses diagnostic mode (this is the default)  Under VSE, the trace data is written to a printer dataset (DTFPR) on SYS081. This may be assigned to SYSLST in the job JCL, or to another printer. Under MVS, the trace data is written to TRCVTM1, which should be allocated to a dataset with 133 byte records and an appropriate block size.  Using this mode may produce a large amount of output and slow the transfer down as well. Use this option only at the request of cfSOFTWARE.

Parameter	Type	Applies To	Description
<b>FMT</b>	Numeric	Router/TCPIP	<p>Connect format. This parameter should ordinarily <u>not</u> be specified, since APPXVTM1 will choose the correct value based on the connection type. Valid specifications are</p> <p>For TCP/IP:</p> <ul style="list-style-type: none"> <li>1 – Format-1 APPX/TCP Connection</li> <li>2 – Format-2 APPX/TCP Connection</li> <li>3 – Format-3 APPX/TCP Connection</li> </ul> <p>For Router:</p> <ul style="list-style-type: none"> <li>0 - Queued connection</li> <li>1 - Immediate connection</li> </ul> <p>Use this parameter only at the request of cfSOFTWARE.</p>
<b>HOST</b>	Character	TCPIP	<p>Specifies the TCP/IP address of the target machine (ordinarily the TPNS machine). Examples:</p> <p style="text-align: center;"><b>sales1.cfsoft.com</b> <b>208.200.57.180</b></p>
<b>MODE</b>	Character	LU62/Router	<p>The VTAM Mode name to be used for the connection. If not specified, <b>#INTER</b> will be used.</p>
<b>PORT</b>	Numeric	TCPIP	<p>The TPNS TCP/IP port address which will accept the connection (this must match the port specification in the Listener definition).</p>
<b>PSWD</b>	Character	LU62/Router	<p>LU6.2 User Password. This is not ordinarily used for TPNS connections; use this parameter only at the request of cfSOFTWARE</p>
<b>SLURQ</b>	Character	LU62/Router	<p>LU Name of the target Router machine.</p>
<b>SSSLU</b>	Character	LU62/Router	<p>Single Session SLU. Use this parameter only at the request of cfSOFTWARE.</p>
<b>SUBSID</b>	Character	TCPIP	<p>VSE Only. Specifies the TCP/IP subsystem ID. The default is <b>00</b>, which is usually appropriate.</p>
<b>TCPNAM</b>	Character	TCPIP	<p>MVS Only. Specifies the TCP/IP subsystem name. The default is <b>TCPIP</b>, which is usually correct.</p>
<b>TESTN</b>	Numeric	All	<p>Test number to run. This parameter is used for APPX host-to-host sessions. It is not ordinarily used for TPNS connections. Use this parameter only at the request of cfSOFTWARE.</p>

Parameter	Type	Applies To	Description
<b>TIMOUT</b>	Numeric	All	The amount of time the mainframe will wait for the started PC program to accept the connection. The connection is accepted when the PC program issues its APPX Connect. This value is in seconds; the default is 60 seconds.  <b>Note:</b> The sample jobstreams shown in Section 11 use 300 seconds (5 minutes) via the included parameter cards.
<b>TPN</b>	Character	All	The TPN to be started. This value must correspond to the Client TPN configured in TPNS.
<b>USERID</b>	Character	LU62/Router	User ID to be used for the LU6.2 session. This is not ordinarily used for TPNS connections; use this parameter only at the request of cfSOFTWARE.

## **Appendix D – VTAM Configuration for APPXVTM1**

APPXVTM1, when run in LU6.2 or APPX/Router mode, requires that the application be defined to VTAM. This is in the form of one or more APPLID definitions. The number is dependent on the number of concurrent APPXVTM1 applications you wish to run. There must be one APPLID defined for each concurrent session (typically only a single APPL is required for APPXVTM1, but APPXVTM1 can use a pool of APPLs defined for another CFXVTM1 application, such as pcMAINFRAME).

These definitions may be added to an existing application major node or placed in a separate major node. It may be simpler to create a new major node containing these definitions so that you can modify and activate it independently from other applications.

### **APPL IDs**

Each concurrently running APPXVTM1 application requires a unique VTAM APPL. This APPL is specified in the APPLRQ= parameter. A sample VTAM definition follows below:

```
VTMAPPL5 VBUILD TYPE=APPL
HIFAP01 APPL AUTH=(PASS,ACQ),MODETAB=modetab,APPC=YES
HIFAP02 APPL AUTH=(PASS,ACQ),MODETAB=modetab,APPC=YES
.
.
.
HIFAP09 APPL AUTH=(PASS,ACQ),MODETAB=modetab,APPC=YES
HIFAP10 APPL AUTH=(PASS,ACQ),MODETAB=modetab,APPC=YES
```

This VTAM table defines a pool of ten APPLs for APPXVTM1, or another CFXVTM1 application, starting with APPL "HIFAP01". The MODETAB= parameter should reference the standard MODETAB for the installation. The APPLs for the installation's CICSs make a good reference for any other parameters required for the installation.

If security is established for the APPLs for APPXVTM1, either by using the "PRTCT=pswrd" parameter on the APPL statement or by an external security manager, the same password must be set for every APPL in a pool. If security is established, the required password must be supplied in the APPSWD=parameter.

### **Multiple Domain SNA Networks**

Several new cross-domain definitions may be required if APPXVTM1 is to communicate to terminals belonging to different domains. These definitions are not specific to APPXVTM1, but may not be defined in an installation because there may never have been a need to acquire particular resources from certain locations before.

In general it may be necessary to add CDRM/CDRSC or APPN definitions to make it possible to connect to the target LU.



## **Appendix E - Bibliography**

The following bibliography is provided as an aid to identifying other documents and publications which might be of assistance.

**NOTE:** The versions of the documents listed (especially for IBM publications), might not be the ones that are appropriate for your installation, so this list is provided only as a guide.

Some of the publications listed may be available via the Web. Consult the following pages for more:

<http://www.microsoft.com>

<http://www.ibm.com>

Publications in electronic form are generally in one of three formats:

Microsoft Word (.DOC)

Adobe Acrobat (.PDF)

IBM Book Manager (.BOO)

Microsoft Word documents may be viewed with Word, or with Word Viewer. Adobe Acrobat documents require Adobe Acrobat Reader. Word Viewer and Acrobat Reader may be downloaded using the following URLs, respectively:

<http://www.microsoft.com/office/000/viewers.htm>

<http://www.adobe.com/prodindex/acrobat/readstep.html>

Finally, IBM Book Manager material requires BookManager Library Reader for Windows, IBM Product Number 5799-PXY; this program is often included with IBM documentation when the latter is distributed on CDROM.

### **Across the Boards<sup>®</sup>**

pcMAINFRAME and Across the Boards Communications Device Drivers  
cfSOFTWARE, Inc.

Across the Boards<sup>®</sup> APPX Programmer's Guide  
cfSOFTWARE, Inc.

The detailed reference for implementing cooperative applications employing the APPX API. Applications which employ TPNS must be APPX applications.

Across the Boards<sup>®</sup> APPX Router Implementation Guide and Reference  
cfSOFTWARE, Inc.

The detailed reference for installing and using the APPX Router. The APPX Router is required for TPNS only if the mainframe will use LU6.2 as its communications vehicle.

## **pcMAINFRAME**

pcMAINFRAME and Across the Boards Communications Device Drivers  
cfSOFTWARE, Inc.

pcMAINFRAME Installation Guide  
cfSOFTWARE, Inc.

## **TCP/IP for the Mainframe**

### **VSE**

TCP/IP for VSE/ESA User's Guide  
IBM Document Number SC33-6601

### **MVS**

IBM TCP/IP for MVS User's Guide  
IBM Document Number SC31-7136

## **Security**

### Building Internet Firewalls

D. Brent Chapman, Elizabeth D. Zwicky, Deborah Russell  
O'Reilly & Associates; ISBN: 1565921240

### Firewalls and Internet Security: Repelling the Wily Hacker

William R. Cheswick, Steven M. Bellovin  
Addison-Wesley Publishing Co., ISBN: 0201633574

### Practical Unix and Internet Security

Simson Garfinkel, Gene Spafford  
O'Reilly & Associates; ISBN: 1565921488

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