



▶ **TCI/IP Support**

▶ **Introduction**

Introduction

TCP/IP is an acronym for Transmission Control Protocol/Internet Protocol. These two protocols provide for network connection between computer systems using a wide variety of network media.

The TCPSocket object provides an event-driven interface to the WinSock network API, which itself is an implementation of TCP/IP for Microsoft Windows.

The TCPSocket object allows you to communicate with other TCP/IP applications running on any computer in your network, including the World Wide Web.

It also provides the mechanism for client/server operation between two Dyalog workspaces.

Two types of TCP/IP connections are possible; Stream (see below) and UDP (See below). Stream connections are by far the most commonly used, but both types are supported by Dyalog.

Stream Sockets

A Stream socket is a connection-based transport that is analogous to a telephone service. A Stream socket handles error correction, guarantees delivery, and preserves data sequence. This means that if you send two messages to a recipient, the messages are sure to arrive and in the sequence that you sent them. However, individual messages may be broken up into several packets (or accumulated into one), and there is no predetermined protocol to identify message boundaries. This means that Stream-based applications must implement some kind of message protocol that both ends of a connection understand and adhere to.

User Datagram Protocol (UDP)

User Datagram Protocol (UDP) is a connectionless transport mechanism that is somewhat similar to a postal service. It permits a sending application to transmit a message or messages to a recipient. It neither guarantees delivery nor acknowledgement, nor does it preserve the sequence of messages. Messages are also limited to fit into a single packet which is typically no more than 1500 bytes in size. However, a UDP message will be delivered in its entirety.

You may wonder why anybody would use a service that does not guarantee delivery. The answer is that although UDP is technically an unreliable service, it is perfectly possible to implement reliable applications on top of it by building in acknowledgements, timeouts and re-transmissions.

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Clients and Servers

A Stream based TCP/IP connection has two endpoints one of which is called the *server* and the other the *client*. However, this distinction is only relevant in describing how the connection is made.

The server initiates a connection by creating a socket which is identified by its IP address and a port number.

A port number identifies the service provided by a particular server. It is an integer number in the range 0-65536. Port numbers in the range 0-1023 are reserved for "well-known" services (eg., FTP and HTTP). Port numbers 1025-5000 are typically assigned for user-defined services.

The server is effectively making its service available to any client that wishes to connect. Notice that the server does not, at this stage, specify in any way which client or clients it will accept.

A client connects to a server by creating its own socket, specifying the IP address and port number of the service to which it wishes to connect.

Once the connection is established, both ends are capable of sending and receiving data and the original client/server relationship need no longer apply. Nevertheless, certain protocols, such as HTTP, do maintain the client/server model for the duration of the connection.

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