

# Tunneling

Tunneling is a way of creating a direct connection between two devices across a network, allowing them to communicate as if they were the only two devices around. The tunnel enables these two devices to communicate over the network without understanding TCP/IP or Ethernet. “That sounds like RealPort®,” you say. Well, not quite. RealPort only works if one of the devices is a computer that supports TCP/IP, like Windows or Linux. If neither device is a computer and neither device supports TCP/IP, then you need to tunnel. Tunneling is a way of wrapping up bundles of information on the way into the network and unwrapping them again on the way out.

Think of the postal service as a network through which you want to send a letter. Since you know how to use the postal service, you stuff the letter in an envelope, address it, and throw it into the network (or your mailbox). The lucky recipient receives the letter and opens it reading what you’ve just written. That is normal networking. Both the sender and recipient of the letter understand how to send and receive letters through the postal service or network.

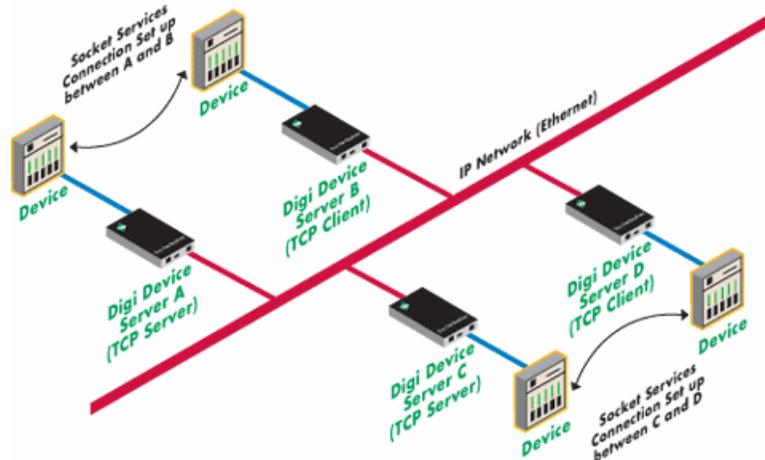
Now, imagine you’ve never sent any mail and have no idea how to do so, and neither does the recipient. You might find someone else who knows how to use the postal service and hand them the letter. That person wraps up the letter in an envelope and sends it for you. Someone else receives the letter, unwraps it and hands it to your friend. The assistance you and your friend received could be called tunneling through the postal service, since they managed all the details of sending the letter through and receiving it from the network and you pleaded complete ignorance in the matter. From your perspective, it was as if the network (or postal service) didn’t exist at all and someone hand carried the letter for you.

Digi device servers support tunneling and provide the same type of service – the ability to pass data over a network without any knowledge of the network. Using this feature, you can connect two serial devices over a great distance using the network simply as a replacement for a very long serial cable.

The two main protocols used for passing data over a TCP/IP network are **Transmission Control Protocol (TCP)** and **User Datagram Protocol (UDP)**. TCP is commonly referred to as the connection-oriented, guaranteed delivery, reliable protocol. UDP is often referred to as the connection-less, unreliable but fast protocol. So depending on the nature of communication needed one protocol or the other is chosen. Digi device servers support tunneling over either TCP or UDP. How do you choose between the two?

## TCP Tunneling

This is the standard method for tunneling. TCP provides a direct circuit between two endpoints, much like a phone call. Once established, the phone call provides "guaranteed delivery". You know if you speak into the phone that the words will come out the other side, and the words won't be switched around on the other side.



## UDP Tunneling

UDP tunneling is primarily used because of an additional feature of Digi device servers called UDP Multicast. UDP Multicast, sometimes called directed-broadcast, allows data to be sent to multiple recipients simultaneously. This can be effective, for example, in replacing an EIA-485 multi-drop network with device servers and Ethernet.

UDP tunneling also allows multiple listeners to monitor what one device sends. Consider a small store with an electronic sign. A computer sends updates to the sign every few seconds or minutes to update text displayed on the sign – perhaps to display time-based advertising. The store owner finds it effective and wants to add several other signs around the store. Connecting it all up with Digi device servers with UDP Multicast allows one computer to send the updates, and all signs receive the message at the same time and update together.

