Scenario: The Digi cellular gateway connects one or more remote devices via a cellular IP network. Communications is typically initiated either from the host system but can also be initiated from the device(s).

Sample Diagram:
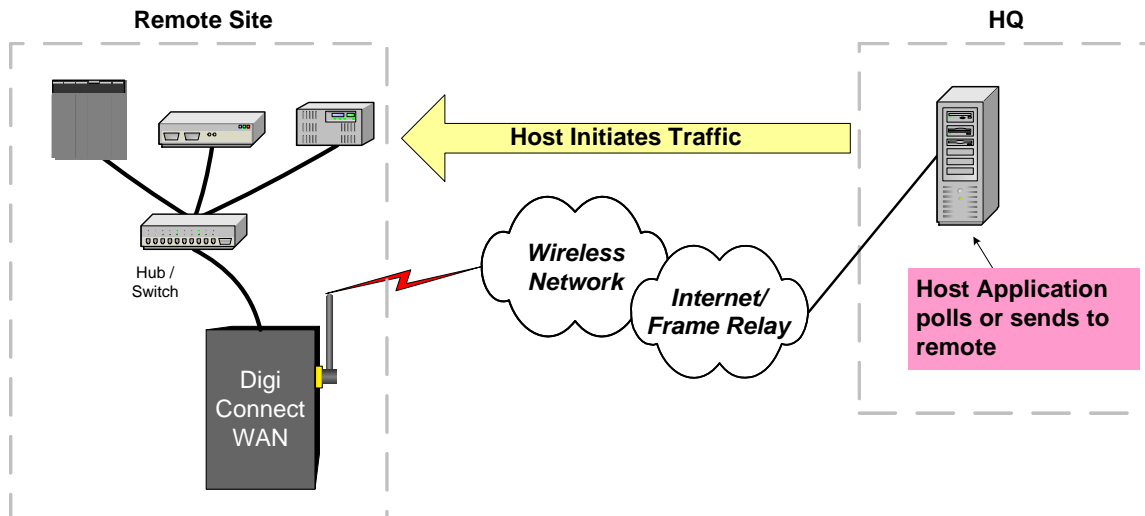
Theory of Operation: Communications applications such as SCADA polling, remote printing, or other host-initiated traffic can be sent over the cellular network to the remote device or devices via the Digi cellular gateway. The Digi cellular gateway forwards IP traffic destined for a specific port or port range on the cellular interface, to a private IP address on the Ethernet "side" of the Digi cellular gateway.

This process uses NAT (Network Address Translation) where only the mobile IP address is visible to the outside and TCP/UDP port forwarding. Port-forwarding entries direct traffic from the Digi cellular gateway's mobile IP address to the appropriate device.

For example a SCADA application on the host computer uses Modbus/TCP to poll three remote devices. Modbus/TCP uses TCP port 502 by default. If multiple Modbus devices are at the remote location, the application must allow the user to define a different Modbus/TCP port number for each device. Port-forwarding entries on the Digi cellular gateway then direct the traffic to the appropriate device based on the external (or source) TCP port number.

This same concept can be used for most any remote polling or host initiated / remote terminated communication application.

GSM APN Type Needed: A wireless plan that supports *Mobile Terminated Data* is required. Some plans allow only outgoing connections and/or use private IP addresses behind NAT firewalls. For example, AT&T (Cingular) *Internet* and *wwan.ccs* APNs, and most Sprint and Verizon Wireless plans support mobile terminated connections. Check with your cellular provider for details.

Example Configuration 1 – Modbus/TCP

Three devices are attached to the Digi's Ethernet port (refer to the diagram). The devices' IP addresses are 192.168.1.2, .3, and .4. The Digi cellular gateway's Ethernet port is 192.168.1.1; its mobile IP address is 163.213.229.218. The Digi cellular gateway will be configured with a TCP port-forwarding table for Modbus/TCP such as:

External TCP Port	Internal IP Address	Internal TCP Port
12001	192.168.1.2	502
12002	192.168.1.3	502
12003	192.168.1.4	502
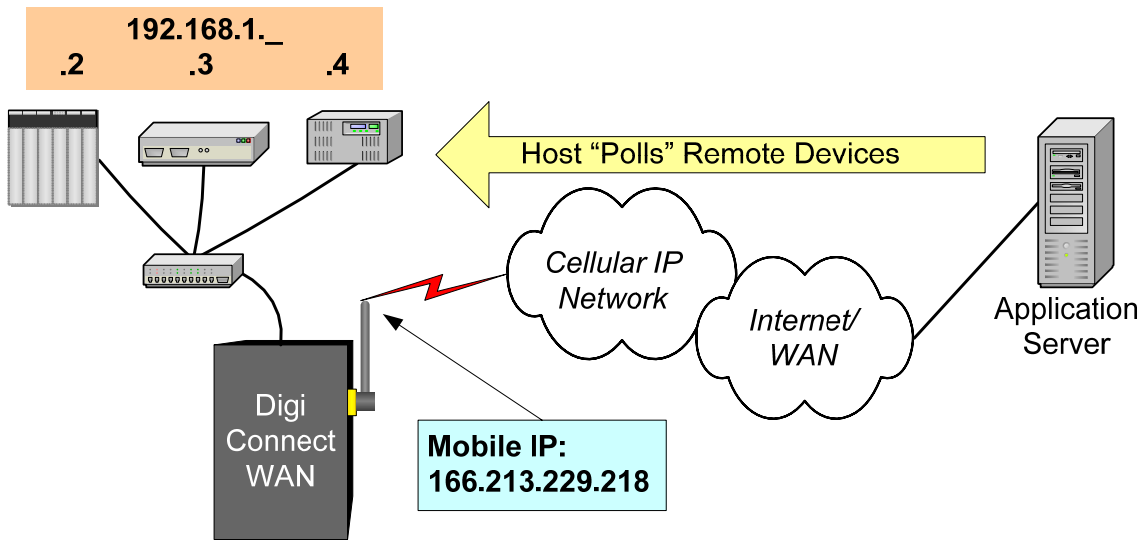
Note the devices can still use the default Modbus/TCP port number of 502 since the Digi cellular gateway's port forwarding can use different source and destination port numbers.

The Modbus application must be then able to direct traffic to the Digi cellular gateway mobile IP address and the appropriate port. So, the application would use the following ports:

Remote Device	Internal IP Address	Internal TCP Port
One	163.213.229.218	12001
Two	163.213.229.218	12002
Three	163.213.229.218	12003

The Digi cellular gateway will now direct the Modbus polls to the appropriate destination.

Other applications and protocols, such as HTTP, FTP, printing, etc. can be handled in similar fashion.

Remote Devices' Default Gateway: The remote devices' default gateway must point to the Digi cellular gateway's Ethernet port IP address, which in this case is 192.168.1.1.

Example Configuration 2 – Remote Device HTTP Server

The remote device attached to the Digi's Ethernet port has an HTTP (web) server that needs to be accessed remotely. The device's IP address is 192.168.1.100. The Digi cellular gateway's Ethernet port is 192.168.1.1; its mobile IP address is 163.213.229.218.
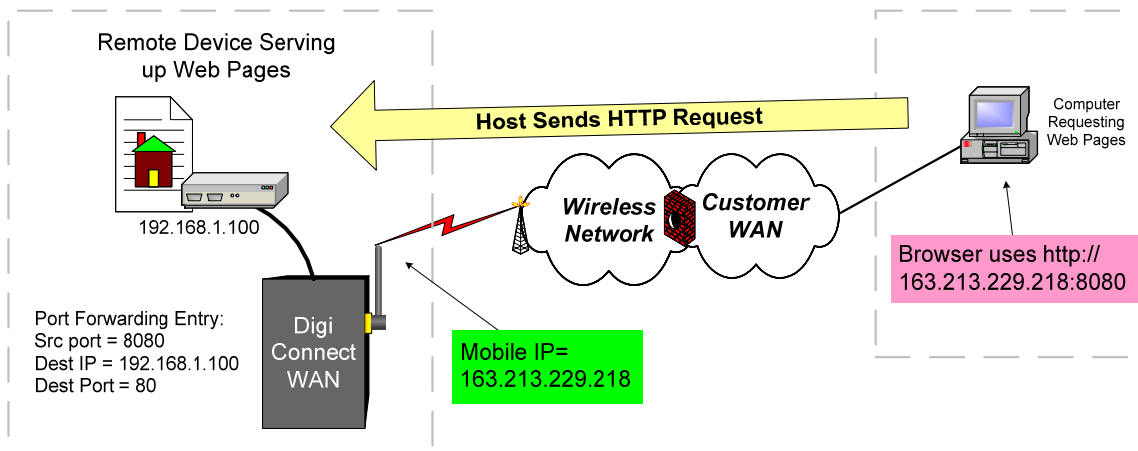
The device's HTTP server uses the default TCP port 80. The Digi cellular gateway also uses TCP port 80 for its built-in web server. To avoid conflicts there are two methods:

1. Change the Digi's web server to use TCP port 8080 and use the standard port 80* to access the device:

   a. Change the Digi's default HTTP server port to 8080 via Configuration > Network > Network Services.

   b. Add a TCP port forwarding entry as:

External TCP Port	Internal IP Address	Internal TCP Port
80	192.168.1.100	80

   c. Access the device's web server via the cellular WAN via http://166.213.229.218 into the browser's address bar.

2. Keep port 80* for the Digi's web server; and use port 8080 in the browser for the application to access the remote device's web server.

   a. Add a TCP port forwarding entry as:

External TCP Port	Internal IP Address	Internal TCP Port
8080	192.168.1.100	80

   b. To access to the device's web server via the cellular WAN enter http://166.213.229.218:8080 into the browser's address bar.

* NOTE: Some cellular network plans *block* port 80. Check with your provider. If so, change the Digi's HTTP web server to use port 8088 (or any port other than 80 or well-known port) as shown in 1.a. above; and use port 8080 as shown in 2.a. for the device's web server. HTTPS can also be used to access the Digi.

Further information and assistance is available on the included Digi documentation CD, or at www.digi.com or by calling Digi at 952-912-3444.