

## PPTP VPN Tunnelling

The following application note demonstrates the configuration of the ELPRO 615M-1 modem utilizing **PPTP VPN connection**, Point to Point Tunnelling Protocol Virtual Private Network.

PPTP VPN is useful when attempting to connect to several devices behind a 615M-1 Modem, to allow direct connectivity between a PC and the Devices. When established, it appears that the PC is directly connected to the devices, just as if it is connected to the same switch that the devices behind the 615M-1 are connected to.

PPTP initiates and manages a GRE (Generic Routing Encapsulation) tunnel that encapsulates a wide variety of network layer protocols inside the point to point link.

When using a Public Cellular network it is recommend that some form of security be used to protect the data from eavesdropping. PPTP can use encryption to make the data connection between the PC and the 615M-1 secure.

PPTP is a good choice compared to some other types of VPN because it is easy to set up, and the Client (PC) software is built into Windows and some other operating systems by default.

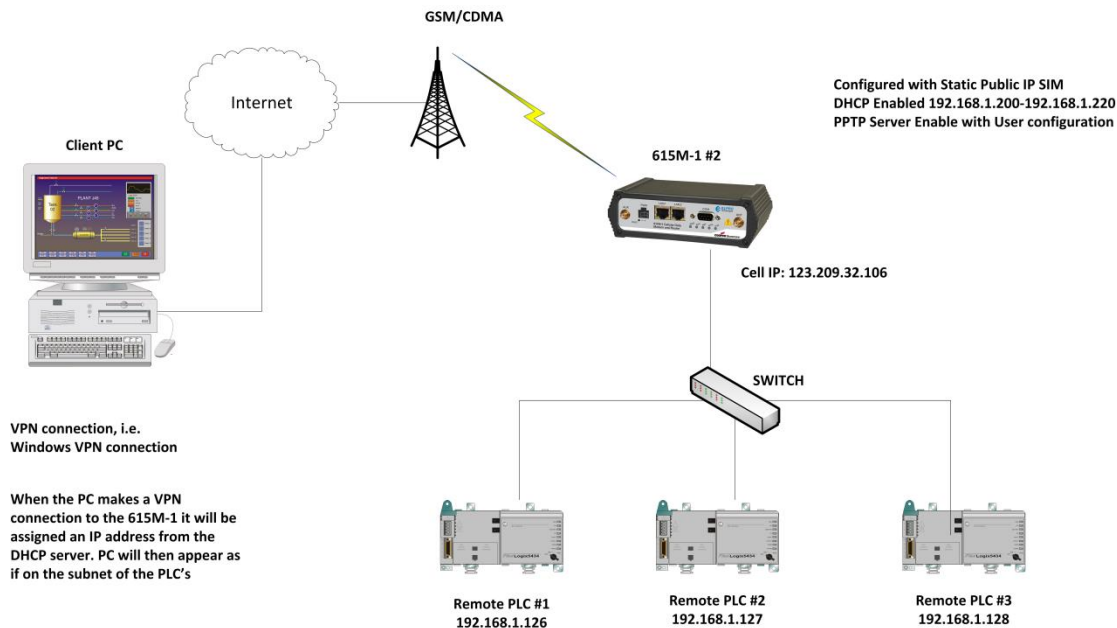
## Network Example - Overview

A typical application that uses a PPTP-VPN connection would be where a Computer may need to be able to program a number of remote PLC's over a GSM/CDMA Cellular connection, i.e. Rockwell RSLinx programming Compactlogix PLC's. This application note will cover this example and give a sample configuration.

In this example the PC needs to be able to connect to each of the remote PLC's and the 615M-1 Cellular modem. The PC already has a connection to the Internet the company network and the IT department has allowed outgoing PPTP VPN connections.

The 615M-1 has been commissioned with a SIM card and data plan that allows direct internet connection, ideally with a statically allocated public IP address.

We will be configuring the 615M-1 to act as a PPTP-VPN Server, and the PC will be a PPTP-VPN Client.



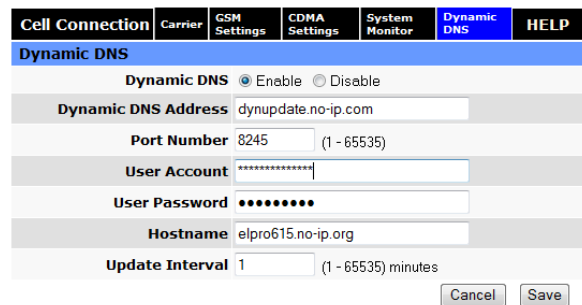
## Requirements

- Ideally, the 615M-1 has a fixed public cellular IP Address. If your modem has a public IP address that is not fixed you can use Dynamic DNS to find the device (see below for details).
- The 615M-1 must be behind any Network Address Translation (NAT) in the cellular provider's network. (The IP address assigned to the 615M-1 must be a public internet address.)
- If the computer is on a company network it must have the ability to make an outgoing PPTP-VPN connection. Some IT departments block these outgoing connections. If this is unknown you will need to contact your Company IT department.

### Dynamic DNS (only required if modem has a public IP Address)

The Public IP Address assigned by cellular providers will be either a Fixed or a Dynamic IP address. Dynamic assigned IP addresses can change upon differing conditions set by the cellular carrier. When this occurs the PPTP-VPN server IP address configured in the Client (PC) will no longer point to the 615M-1 which now has been allocated a new IP address.

The use of Dynamic DNS assigns a DNS name to the 615M-1 allows the modem to be accessed using a DNS Name rather than the unit's IP address. A number of providers offer Dynamic DNS services ("DDNS"), which allow the 615M-1 to automatically detect a new public IP, and update the DNS record to the current IP. For example, a free service provided by No-IP allows users to setup between one and five DNS names. No-IP is the default DNS service.



The screenshot shows the 'Dynamic DNS' configuration page. It includes a 'Dynamic DNS' toggle set to 'Enable'. Below it are fields for 'Dynamic DNS Address' (dynupdate.no-ip.com), 'Port Number' (8245), 'User Account', 'User Password', 'Hostname' (elpro615.no-ip.org), and 'Update Interval' (1 minutes). 'Cancel' and 'Save' buttons are at the bottom right.

Dynamic DNS can be configured in the 615M-1 from the Dynamic DNS tab found under the Cell Connections heading. An account will need to be set up with one of the Dynamic DNS providers and details of the account are entered into this section.

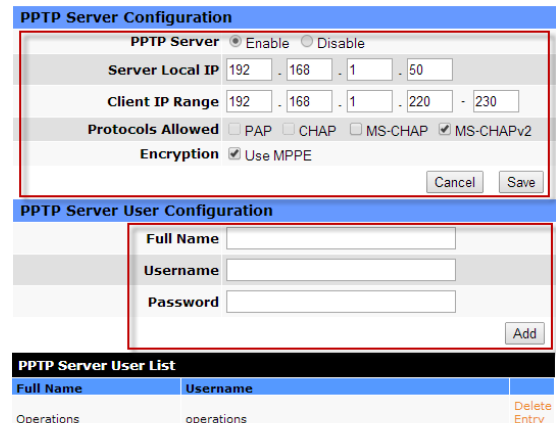
## 615M-1 Configuration

In order to create a PPTP-VPN connection between the PC and the 615M-1, we will have to first configure the 615M-1 as a PPTP server.

Setting up the PPTP Server is done by selecting **Security** from the 615M-1 menu, and then the **PPTP** tab.

You will need to configure the following in the Server section:

1. Check the "enable" box.
2. Configure a "local Server IP" address which is the IP address that PC Clients will use to communicate with the Server after they connect. It can be the same as the Ethernet IP set for the 615M-1.
3. Setup an IP range. This is the range of IP addresses that will be assigned to the PC Clients when they connect to the 615M-1. This range must be on the same subnet as the Ethernet port.
4. Setup a list of users that will have access to the VPN Server. Enter the individual credentials into the appropriate fields and press "Add" which will then add the user to the PPTP Server User List. For this example, use the following:



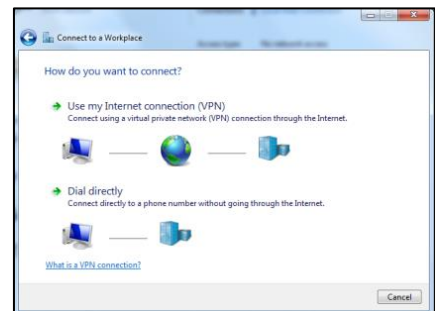
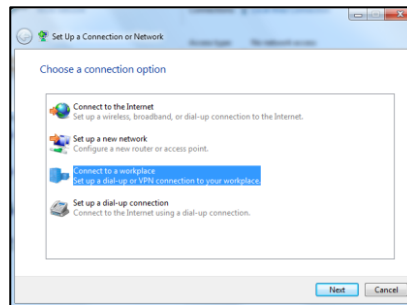
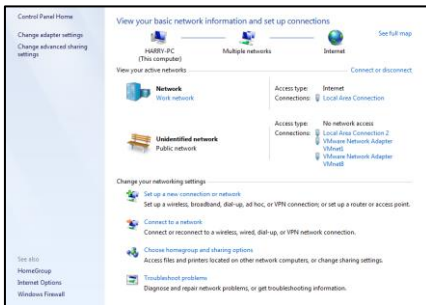
The first screenshot shows the 'PPTP Server Configuration' page. The 'PPTP Server' toggle is 'Enable'. 'Server Local IP' is 192.168.1.50. 'Client IP Range' is 192.168.1.220-230. 'Protocols Allowed' includes MS-CHAPv2. 'Encryption' is 'Use MPPE'. The second screenshot shows the 'PPTP Server User Configuration' page with fields for 'Full Name', 'Username', and 'Password', and an 'Add' button. The third screenshot shows the 'PPTP Server User List' table with one entry: 'operations'.

- a. Enter a name (Operator)
- b. Username (operator)
- c. Password (operator)

## Computer setup

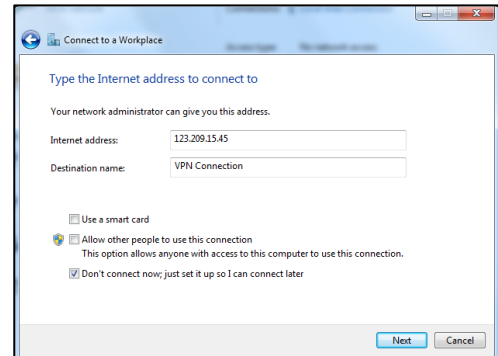
Connection to the 615M-1 can be done using any PPTP-VPN Client software package. This example shows how it can be done using the Microsoft VPN Client built into Windows 7. (No installation is needed)

1. Navigate to the Control Panel and select Network and Sharing Centre and select “Setup a new Connection or network”, and then select “Connect to a workplace” followed by “Use my Internet connection (VPN)”.

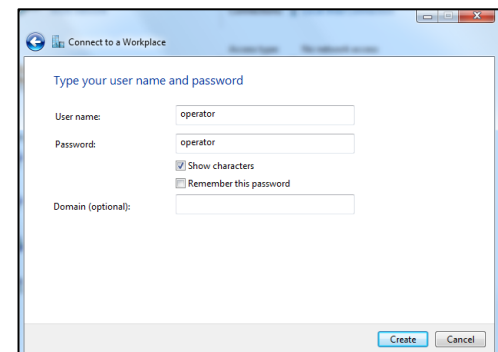


2. From the “Connect to a workplace” screen you will need to enter in the Public IP Address of the 615M-1 Cellular modem. This address can be found on the main web page of the 615M-1 under “PPP IP Address”. If using dynamic DNS, enter the DNS name of the 615M-1 rather than the IP address.

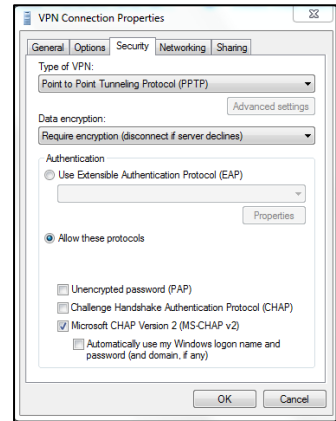
Also select the checkbox that says “don’t connect now” then press the “Next” button.



3. Now enter the User name and Password that was configured into the 615M-1 modem PPTP Server User Configuration list. In this example we used the username (operator) and password (operator) (The same as used in the 615M-1 configuration above.)



- When at the connect screen select the Close button, and then open the Network Connections window. Select the VPN connection, right click and select Properties. Open the Security Tab and change the Type of VPN from Automatic to Point to Point Tunneling Protocol (PPTP). This prevents Windows to attempting to figure out what type of VPN is in use and will make establishment of the connection faster. Press OK.



- Right click the VPN connection again and select Connect.
- You should now have the Connect VPN screen up. Enter the User name and Password and select "connect".

Observe that the connection is established to the 615M-1.



## Communication Tests

You should now have a PPTP VPN connection from the PC to the 615M-1 LAN connection.

You can check the connection by pinging the LAN IP address of the 615M-1 and any of the Ethernet devices connected on the LAN, i.e. in this example the three PLC's at IP address 192.168.1.126 to 192.168.1.128.

```

C:\Windows\system32\cmd.exe
Pinging 192.168.1.50 with 32 bytes of data:
Reply from 192.168.1.50: bytes=32 time=152ms TTL=64
Reply from 192.168.1.50: bytes=32 time=151ms TTL=64
Reply from 192.168.1.50: bytes=32 time=150ms TTL=64
Reply from 192.168.1.50: bytes=32 time=174ms TTL=64
Ping statistics for 192.168.1.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 150ms, Maximum = 174ms, Average = 156ms
C:\Users>ping 192.168.1.50
Pinging 192.168.1.50 with 32 bytes of data:
Reply from 192.168.1.50: bytes=32 time=152ms TTL=64
Reply from 192.168.1.50: bytes=32 time=150ms TTL=64
Reply from 192.168.1.50: bytes=32 time=149ms TTL=64
Reply from 192.168.1.50: bytes=32 time=158ms TTL=64
Ping statistics for 192.168.1.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 149ms, Maximum = 158ms, Average = 152ms
C:\Users>
  
```

You will also be able to look at the 615M-1 Security – Status page to see that you have a connected user.

Security	Status	PPTP	IPsec	GRE	HELP
<b>PPTP Client</b>					
Status DOWN					
IP Address N/A					
Subnet Mask N/A					
P-t-P N/A					
<b>PPTP Server</b>					
Status ENABLED					
Connected Users 1					
<b>IPsec Tunnels</b>					
Status DISABLED					
Refresh					