

# NR500 Series Industrial Cellular VPN Router

## Application Note 011

### OpenVPN with TUN under P2P mode

**Version:** V1.0.0  
**Date:** Aug 2018  
**Status:** Confidential



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# 1. Introduction

## 1.1 Overview

This document contains information regarding the configuration and use of OpenVPN with TUN under P2P mode.

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product, and of the requirements for their specific application.

## 1.2 Compatibility

This application note applies to:

**Models Shown:** NR500 series.

**Firmware Version:** V1.0.0(903.0) or newer

**Other Compatible Models:** None

## 1.3 Version

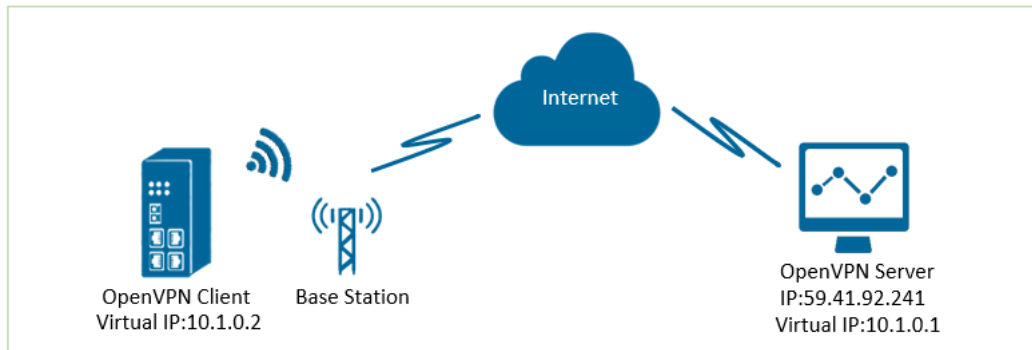
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2018/08/03	V1.0.0	V1.0.0(903.0)	First released

## 1.4 Corrections

Appreciate for corrections or rectifications to this application note, and if any request for new application notes please email to: [support@navigateworx.com](mailto:support@navigateworx.com)

## 2. Topology

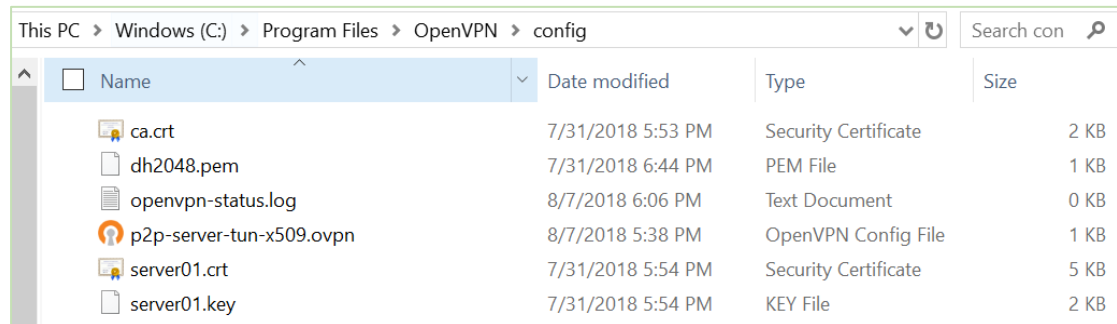


1. NR500 Pro runs as OpenVPN Client with any kind of IP, which can ping OpenVPN server IP successfully.
2. A PC runs as OpenVPN Server with a static public IP and open a specified a listening port for OpenVPN.
3. OpenVPN tunnel is established between Server and Client, the virtual IP can PING each other successfully.

### 3. Configuration

#### 3.1 PC Configuration

1. Install OpenVPN software on PC and copy the related certifications and configuration to the PC like below:



Name	Date modified	Type	Size
ca.crt	7/31/2018 5:53 PM	Security Certificate	2 KB
dh2048.pem	7/31/2018 6:44 PM	PEM File	1 KB
openvpn-status.log	8/7/2018 6:06 PM	Text Document	0 KB
p2p-server-tun-x509.ovpn	8/7/2018 5:38 PM	OpenVPN Config File	1 KB
server01.crt	7/31/2018 5:54 PM	Security Certificate	5 KB
server01.key	7/31/2018 5:54 PM	KEY File	2 KB

Note: Kindly install and run OpenVPN software with **administrator authority**.

2. The configuration of “p2p-server-tun-x.509” like below:

```

=====
mode p2p
port 1194
proto udp
dev tun
# tun
ifconfig 10.8.0.1 10.8.0.2
keepalive 20 120
persist-key
persist-tun
tls-server
ca ca.crt
cert server01.crt
key server01.key
dh dh2048.pem
#tls-auth ta.key 0
cipher BF-CBC
comp-lzo
status openvpn-status.log
verb 3
tun-mtu 1500
fragment 1500
=====

```

## 3.2 Router Configuration

1. Go to **VPN>OpenVPN>OpenVPN>General Settings**, click the Edit Button and configure OpenVPN as below picture. Click Save.

**OpenVPN Settings**

**General Settings**

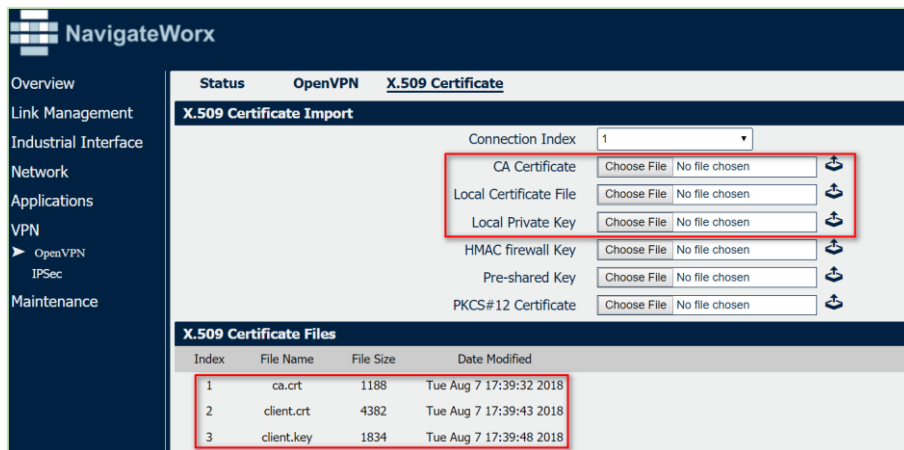
Index	<input type="text" value="1"/>
Enable	<input checked="" type="checkbox"/>
Description	<input type="text"/>
Mode	<input type="text" value="P2P"/>
Protocol	<input type="text" value="UDP"/>
Connection Type	<input type="text" value="TUN"/>
Server Address	<input type="text" value="59.41.92.241"/>
Server Port	<input type="text" value="1194"/>
Authentication Method	<input type="text" value="X.509"/> ?
Encryption Type	<input type="text" value="BF-CBC"/>
Local IP Address	<input type="text" value="10.8.0.2"/>
Remote IP Address	<input type="text" value="10.8.0.1"/>
Renegotiate Interval	<input type="text" value="3600"/>
Keepalive Interval	<input type="text" value="20"/>
Keepalive Timeout	<input type="text" value="60"/>
Fragment	<input type="text" value="1500"/> ?
Private Key Password	<input type="text" value="123456"/>
Output Verbosity Level	<input type="text" value="3"/>

**Advanced Settings**

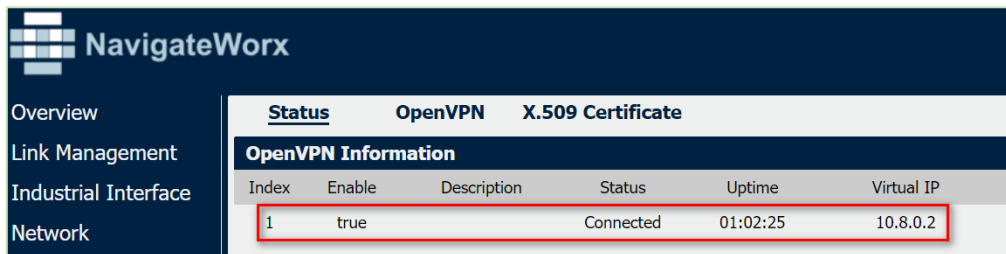
Enable NAT	<input checked="" type="checkbox"/>
Enable PKCS#12	<input type="checkbox"/>
Enable X.509 Attribute nsCertType	<input type="checkbox"/>
Enable HMAC Firewall	<input type="checkbox"/>
Enable Compression LZ0	<input checked="" type="checkbox"/>
Additional Configurations	<input type="text"/> ?

2. Click Save>Apply.

3. Go to **VPN>OpenVPN>X.509 Certificate**, to import the related certification, Click Apply.



4.Route had connected to OpenVPN server. Go to **VPN>OpenVPN>Status** to check the connection status.



## 4. Route Table

1. Route Table on PC side for reference.

```

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.111.1    192.168.111.19   291
0.0.0.0                    0.0.0.0          192.168.10.1     192.168.10.10   291
10.8.0.0                   255.255.255.252  On-link         10.8.0.1         291
10.8.0.1                   255.255.255.255  On-link         10.8.0.1         291
10.8.0.3                   255.255.255.255  On-link         10.8.0.1         291
127.0.0.0                  255.0.0.0        On-link         127.0.0.1       331
127.0.0.1                  255.255.255.255  On-link         127.0.0.1       331
  
```

2. Route Table on router side for reference.

Index	Destination	Netmask	Gateway	Interface
1	0.0.0.0	0.0.0.0	192.168.111.1	wan
2	10.8.0.1	255.255.255.255	0.0.0.0	tun1
3	192.168.5.0	255.255.255.0	0.0.0.0	lan0
4	192.168.111.0	255.255.255.0	0.0.0.0	wan

## 5. Testing

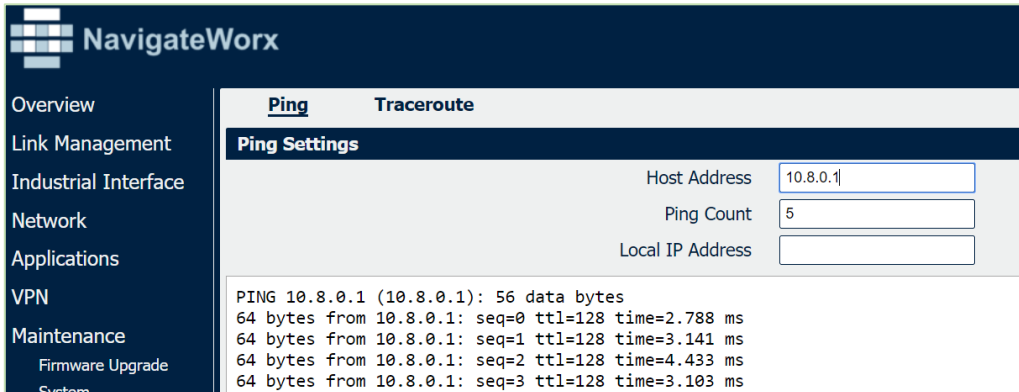
1. Enable CMD and Ping from PC side to router side.

```
C:\Users\Administrator>ping 10.8.0.2

Pinging 10.8.0.2 with 32 bytes of data:
Reply from 10.8.0.2: bytes=32 time=2ms TTL=64
Reply from 10.8.0.2: bytes=32 time=3ms TTL=64
Reply from 10.8.0.2: bytes=32 time=3ms TTL=64
Reply from 10.8.0.2: bytes=32 time=2ms TTL=64

Ping statistics for 10.8.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

2. Go to **Maintenance>Debug Tool>Ping** and Ping from router side to PC side.



The screenshot shows the NavigateWorx web interface. On the left is a navigation menu with categories: Overview, Link Management, Industrial Interface, Network, Applications, VPN, and Maintenance (with sub-items: Firmware Upgrade, System). The main content area is titled 'Ping' and 'Traceroute'. Under 'Ping Settings', there are three input fields: 'Host Address' with the value '10.8.0.1', 'Ping Count' with the value '5', and 'Local IP Address' which is empty. Below the settings, the ping results are displayed as follows:

```
PING 10.8.0.1 (10.8.0.1): 56 data bytes
64 bytes from 10.8.0.1: seq=0 ttl=128 time=2.788 ms
64 bytes from 10.8.0.1: seq=1 ttl=128 time=3.141 ms
64 bytes from 10.8.0.1: seq=2 ttl=128 time=4.433 ms
64 bytes from 10.8.0.1: seq=3 ttl=128 time=3.103 ms
```

3. Test successfully.