

# NR500 Series

## Industrial Cellular VPN Router

### Application Note 006

#### OpenVPN Client with x.509 certificate

**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 client with x.509 certification.

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

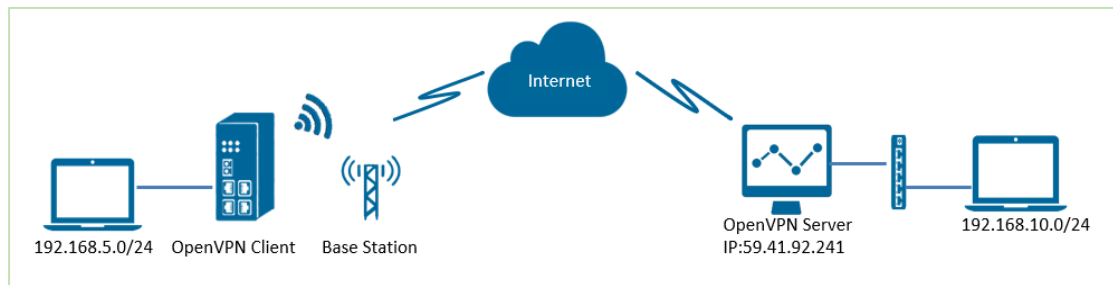
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2018/08/06	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

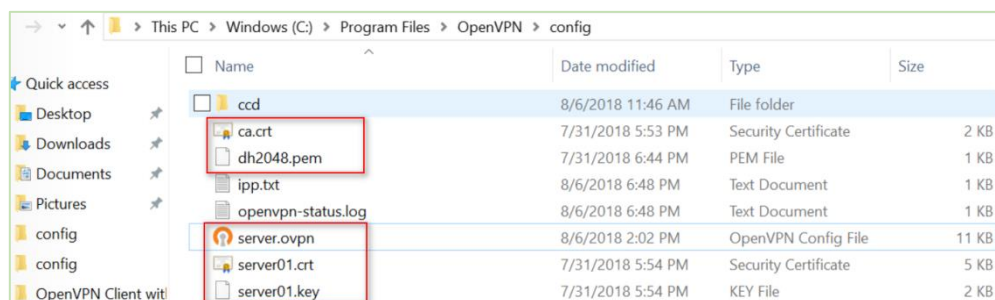


1. NR500 Pro runs as OpenVPN Client with any kind of IP, which can ping OpenVPN server IP successfully.
2. A PC runs as OpenVPN Server with a static public IP and open a specified a listening port for OpenVPN.
3. OpenVPN tunnel is established between Server and Client, the subnet can PING each other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

## 3. Configuration

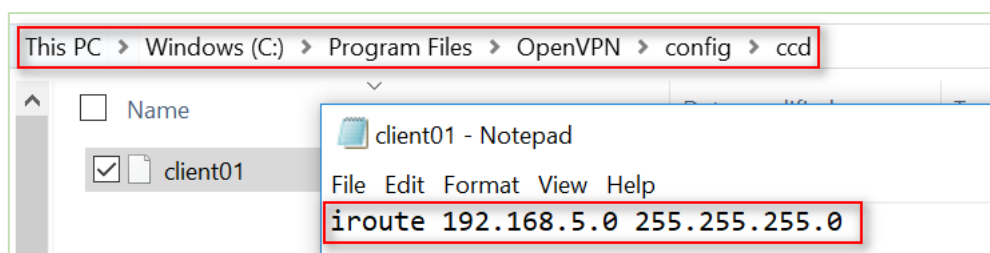
### 3.1 Server Configuration

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



- Note:** a) Kindly download OpenVPN software with: <https://openvpn.net/>  
 b) Kindly install and run OpenVPN software with **administrator authority**.

2. Add a "ccd" folder, and create a new notepad, rename it without suffix, configure it like below:



- Note:** client01 is the common name; 192.168.5.0/24 is the subnet behind NR500.

3. The configuration of **server.ovpn** like below:

```
=====
local 59.41.92.241
mode server
port 1194
proto udp
dev tun
tun-mtu 1500
fragment 1500
ca ca.crt
cert server01.crt
key server01.key # This file should be kept secret
dh dh2048.pem
server 10.8.0.0 255.255.255.0
ifconfig-pool-persist ipp.txt
```

```

push "route 192.168.10.0 255.255.255.0"
client-config-dir ccd
route 192.168.5.0 255.255.255.0
keepalive 10 120
cipher BF-CBC
comp-lzo
max-clients 100
persist-key
persist-tun
status openvpn-status.log
verb 3

```

=====

## 3.2 Client 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**

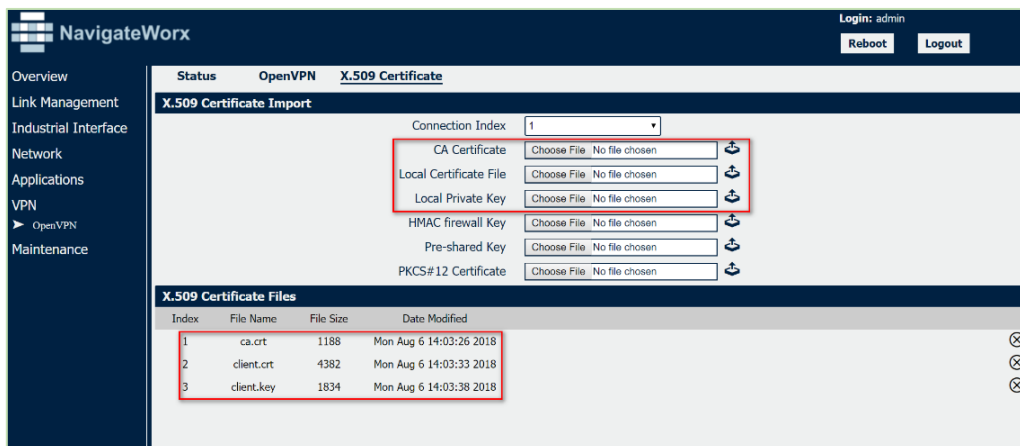
Index	<input type="text" value="1"/>
Enable	<input checked="" type="checkbox"/>
Description	<input type="text"/>
Mode	<input type="text" value="Client"/>
Protocol	<input type="text" value="UDP"/>
Connection Type	<input type="text" value="TUN"/>
Server Address	<input type="text" value="59.41.92.241"/>
Server Port	<input type="text" value="1194"/>
Authentication Method	<input type="text" value="X.509"/> ?
Encryption Type	<input type="text" value="BF-CBC"/>
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**

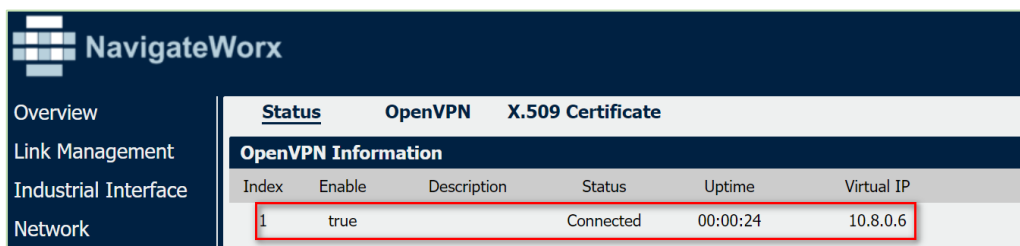
Enable NAT	<input type="checkbox"/>
Enable PKCS#12	<input type="checkbox"/>
Enable X.509 Attribute nsCertType	<input type="checkbox"/>
Enable HMAC Firewall	<input type="checkbox"/>
Enable Compression LZ0	<input checked="" type="checkbox"/>
Additional Configurations	<input type="text"/> ?

2. Click Save>Apply.

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

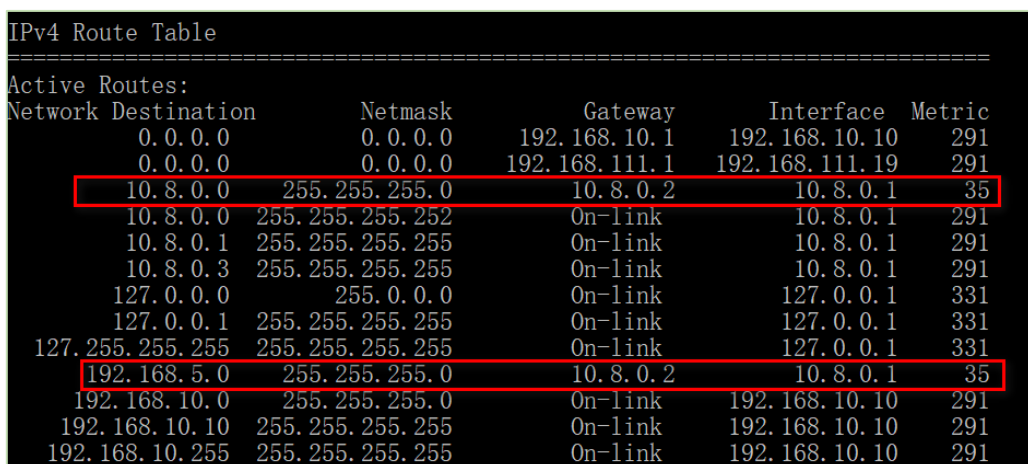


4. Route had connected to OpenVPN server. Go to **VPN>OpenVPN>Status** to check the connection status.



## 4. Route Table

1. Route Table on OpenVPN Server for reference.



- Route Table on OpenVPN Client for reference.

Route Table Information				
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	10.8.0.5	tun1
3	10.8.0.5	255.255.255.255	0.0.0.0	tun1
4	192.168.5.0	255.255.255.0	0.0.0.0	lan0
5	192.168.10.0	255.255.255.0	10.8.0.5	tun1
6	192.168.111.0	255.255.255.0	0.0.0.0	wan

## 5. Testing

- Enable CMD and Ping from OpenVPN Server to LAN of OpenVPN client.

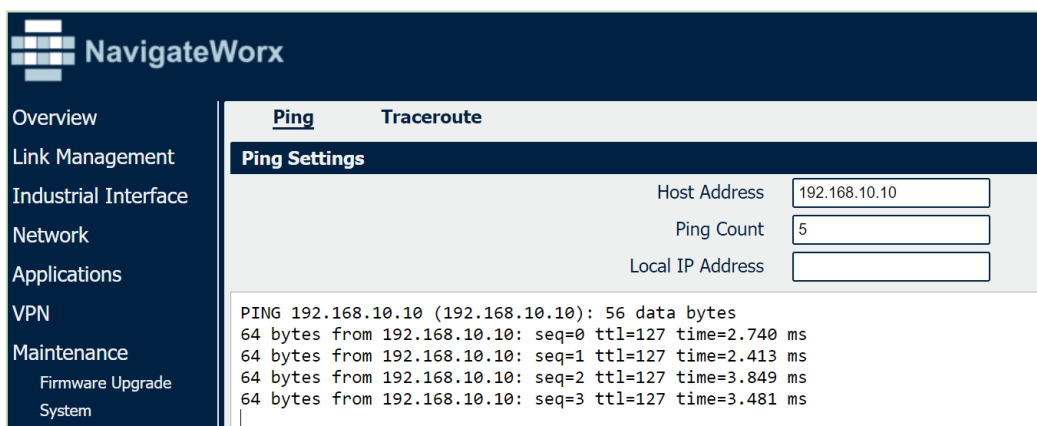
```
Microsoft Windows [Version 10.0.17134.165]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping 192.168.5.1

Pinging 192.168.5.1 with 32 bytes of data:
Reply from 192.168.5.1: bytes=32 time=2ms TTL=64
Reply from 192.168.5.1: bytes=32 time=8ms TTL=64
Reply from 192.168.5.1: bytes=32 time=3ms TTL=64
Reply from 192.168.5.1: bytes=32 time=3ms TTL=64

Ping statistics for 192.168.5.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 8ms, Average = 4ms
```

- Go to **Maintenance>Debug Tool>Ping** and Ping from OpenVPN client to OpenVPN Server.



The screenshot shows the NavigateWorx web interface. On the left is a navigation menu with options: Overview, Link Management, Industrial Interface, Network, Applications, VPN, and Maintenance (with sub-options: Firmware Upgrade, System). The main content area is titled 'Ping' and 'Traceroute'. Under 'Ping Settings', there are three input fields: 'Host Address' (192.168.10.10), 'Ping Count' (5), and 'Local IP Address' (empty). Below the settings, the ping results are displayed:

```
PING 192.168.10.10 (192.168.10.10): 56 data bytes
64 bytes from 192.168.10.10: seq=0 ttl=127 time=2.740 ms
64 bytes from 192.168.10.10: seq=1 ttl=127 time=2.413 ms
64 bytes from 192.168.10.10: seq=2 ttl=127 time=3.849 ms
64 bytes from 192.168.10.10: seq=3 ttl=127 time=3.481 ms
```

- Test successfully.