

NR500 Series Industrial Cellular VPN Router

Application Note 026

Multi-VRRP Between NR500 Series Routers

Version: V1.0.0
Date: 2018/10/10
Status: Confidential



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1. Introduction

1.1 Overview

This document contains information regarding the configuration and use of Multi-VRRP between NR500 series routers.

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 (930.3) or newer

Other Compatible Models: None

1.3 Version

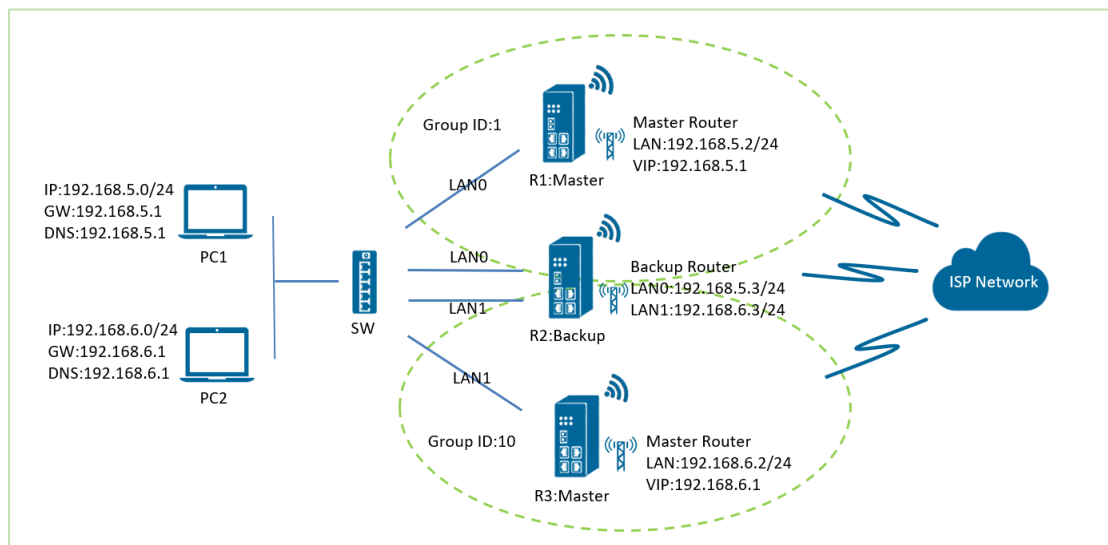
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2018/10/10	V1.0.0	V1.0.0(930.3)	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**

2. Topology

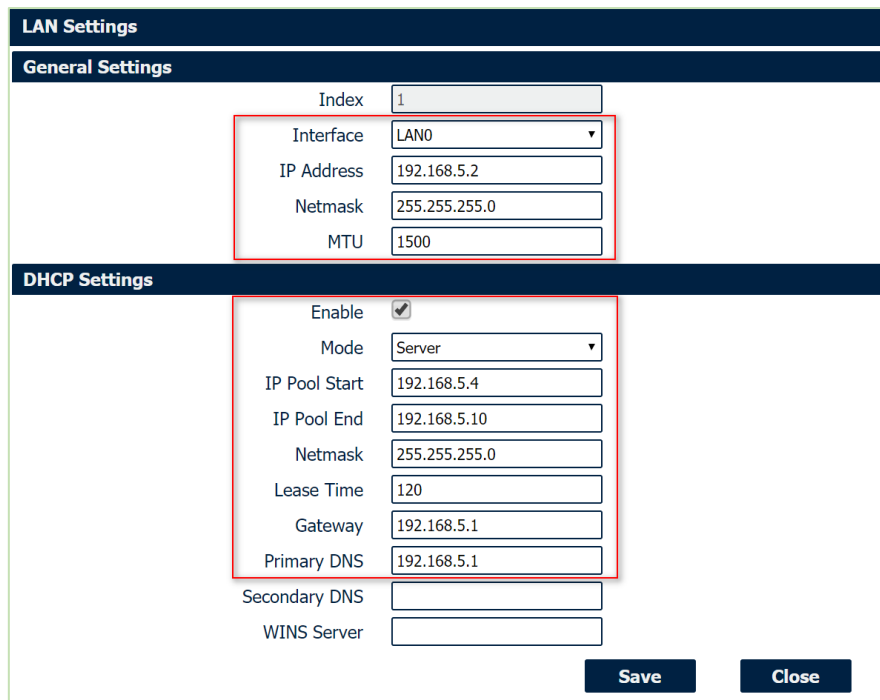


1. R1 and R3 runs as VRRP Master router. R2 runs as VRRP Backup router. Both of them connect to Internet with SIM card.
2. R1 establish VRRP with R2 via LAN0 interface. R3 establish VRRP with R2 via LAN1 interface.
3. PC1 communicate with Internet via R1 Master router in normal case. If R1 Master router is down, PC1 will switchover to R2 Backup router to Internet. If R1 Master router up again, then PC1 will switch back to R1 Master router to Internet.
4. PC2 communicate with Internet via R3 Master router in normal case. If R3 Master router is down, PC2 will switchover to R2 Backup router to Internet. If R3 Master router up again, then PC2 will switch back to R3 Master router to Internet.

3. Configuration

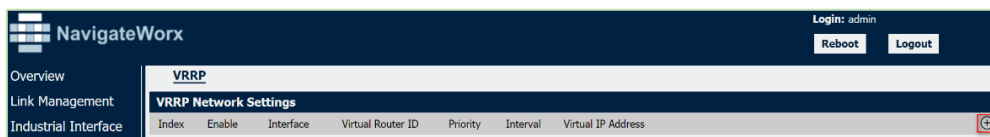
3.1 R1 Master Router Configuration

1. Go to Link **Management>Ethernet>LAN**, to specify the LAN0 information like below.



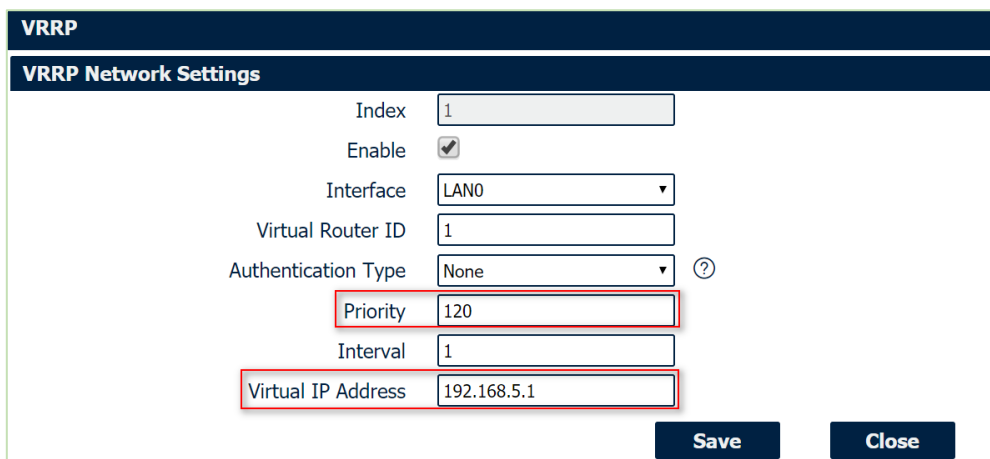
The screenshot shows the 'LAN Settings' configuration page. It is divided into two sections: 'General Settings' and 'DHCP Settings'. In the 'General Settings' section, the 'Interface' is set to 'LAN0', 'IP Address' is '192.168.5.2', 'Netmask' is '255.255.255.0', and 'MTU' is '1500'. In the 'DHCP Settings' section, 'Enable' is checked, 'Mode' is 'Server', 'IP Pool Start' is '192.168.5.4', 'IP Pool End' is '192.168.5.10', 'Netmask' is '255.255.255.0', 'Lease Time' is '120', 'Gateway' is '192.168.5.1', and 'Primary DNS' is '192.168.5.1'. There are 'Save' and 'Close' buttons at the bottom right.

2. Go to **Network>VRRP>VRRP**, Click the Edit button of VRRP, like below:



The screenshot shows the 'VRRP Network Settings' table in the 'VRRP' configuration page. The table has columns for Index, Enable, Interface, Virtual Router ID, Priority, Interval, and Virtual IP Address. The first row shows Index: 1, Enable: checked, Interface: LAN0, Virtual Router ID: 1, Priority: 120, Interval: 1, and Virtual IP Address: 192.168.5.1. There are 'Reboot' and 'Logout' buttons in the top right corner.

3. Configure VRRP like below picture:

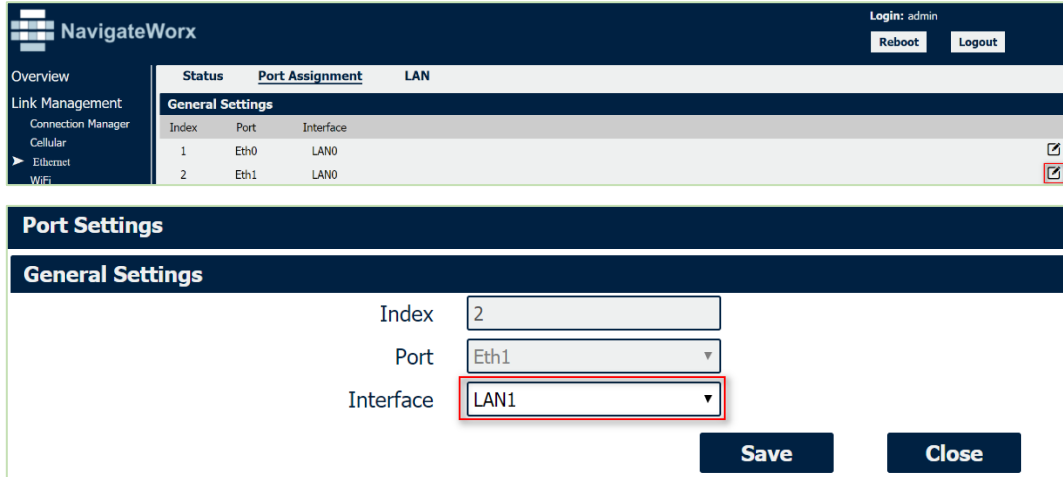


The screenshot shows the 'VRRP Network Settings' configuration page. The 'Index' is '1', 'Enable' is checked, 'Interface' is 'LAN0', 'Virtual Router ID' is '1', 'Authentication Type' is 'None', 'Priority' is '120', 'Interval' is '1', and 'Virtual IP Address' is '192.168.5.1'. There are 'Save' and 'Close' buttons at the bottom right.

5. Click Save>Apply.

3.2 R3 Master Router Configuration

1. Go to Link **Management>Ethernet>Port Assignment**, click the Index2 to assign the LAN1 to ETH1, click Save>Apply.



Status	Port Assignment	LAN
General Settings		
Index	Port	Interface
1	Eth0	LAN0
2	Eth1	LAN0

Port Settings

General Settings

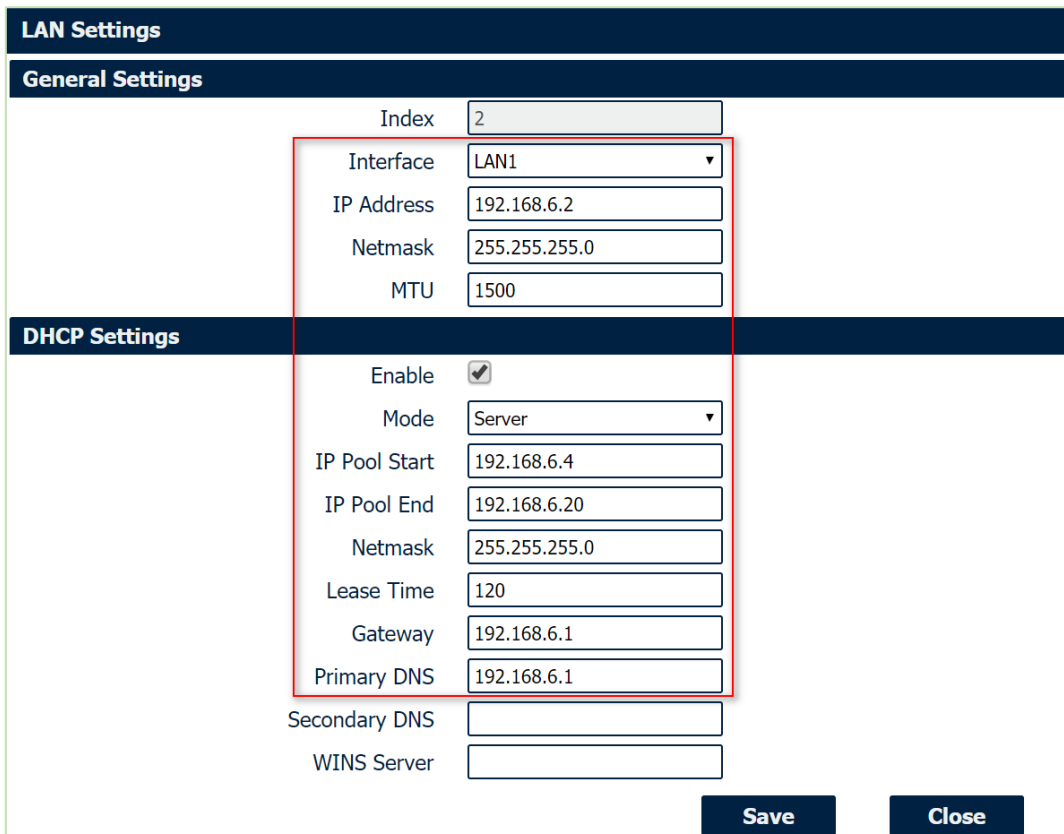
Index: 2

Port: Eth1

Interface: LAN1

Save **Close**

2. Go to Link **Management>Ethernet>LAN**, to specify the LAN1 information like below.



LAN Settings

General Settings

Index: 2

Interface: LAN1

IP Address: 192.168.6.2

Netmask: 255.255.255.0

MTU: 1500

DHCP Settings

Enable:

Mode: Server

IP Pool Start: 192.168.6.4

IP Pool End: 192.168.6.20

Netmask: 255.255.255.0

Lease Time: 120

Gateway: 192.168.6.1

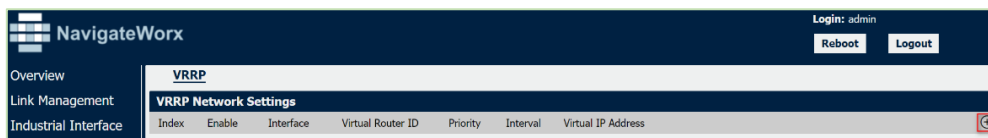
Primary DNS: 192.168.6.1

Secondary DNS:

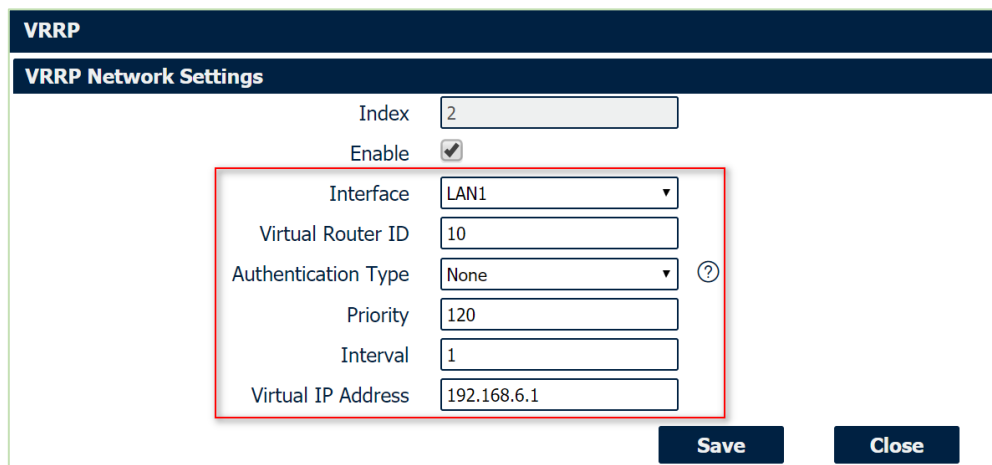
WINS Server:

Save **Close**

3. Go to **Network>VRRP>VRRP**, Click the Edit button of VRRP, like below:



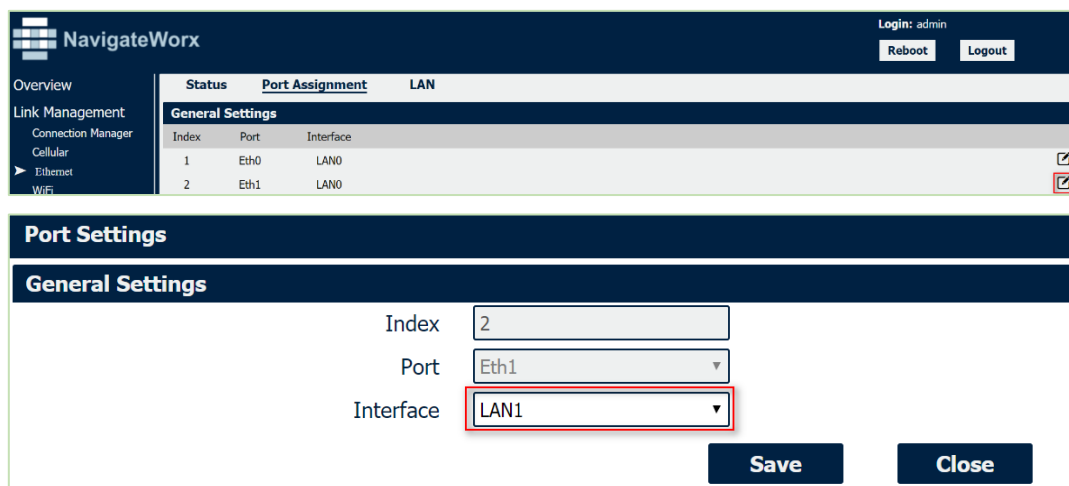
4. Configure VRRP like below picture:



5. Click Save>Apply.

3.3 R2 Backup Router Configuration

1. Go to Link **Management>Ethernet>Port Assignment**, click the Index2 to assign the LAN1 to ETH1, click Save>Apply.



2. Go to Link **Management>Ethernet>LAN**, click the **Edit button** to add one more LAN1 interface, to specify the LAN0 and LAN1 information like below.

LAN Settings	
General Settings	
Index	1
Interface	LAN0
IP Address	192.168.5.3
Netmask	255.255.255.0
MTU	1500
DHCP Settings	
Enable	<input checked="" type="checkbox"/>
Mode	Server
IP Pool Start	192.168.5.21
IP Pool End	192.168.5.200
Netmask	255.255.255.0
Lease Time	120
Gateway	192.168.5.1
Primary DNS	192.168.5.1
Secondary DNS	
WINS Server	
<input type="button" value="Save"/> <input type="button" value="Close"/>	

LAN Settings	
General Settings	
Index	2
Interface	LAN1
IP Address	192.168.6.3
Netmask	255.255.255.0
MTU	1500
DHCP Settings	
Enable	<input checked="" type="checkbox"/>
Mode	Server
IP Pool Start	192.168.6.21
IP Pool End	192.168.5.200
Netmask	255.255.255.0
Lease Time	120
Gateway	192.168.6.1
Primary DNS	192.168.6.1
Secondary DNS	
WINS Server	
<input type="button" value="Save"/> <input type="button" value="Close"/>	

3. Click Save>Apply.

4. Go to **Network>VRRP>VRRP**, Click the **Edit button** of VRRP to add double VRRP

configuration, like below:



5. Configure VRRP on LAN0 and LAN1 like below picture:

VRRP

VRRP Network Settings

Index	<input type="text" value="1"/>
Enable	<input checked="" type="checkbox"/>
Interface	<input type="text" value="LAN0"/>
Virtual Router ID	<input type="text" value="1"/>
Authentication Type	<input type="text" value="None"/> ?
Priority	<input type="text" value="100"/>
Interval	<input type="text" value="1"/>
Virtual IP Address	<input type="text" value="192.168.5.1"/>

VRRP

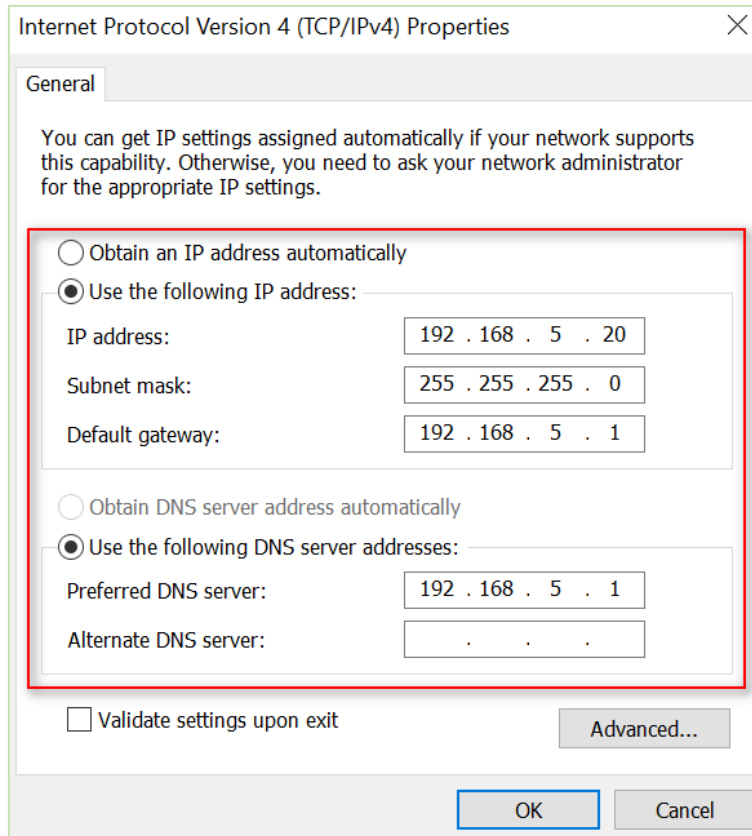
VRRP Network Settings

Index	<input type="text" value="2"/>
Enable	<input checked="" type="checkbox"/>
Interface	<input type="text" value="LAN1"/>
Virtual Router ID	<input type="text" value="10"/>
Authentication Type	<input type="text" value="None"/> ?
Priority	<input type="text" value="100"/>
Interval	<input type="text" value="1"/>
Virtual IP Address	<input type="text" value="192.168.6.1"/>

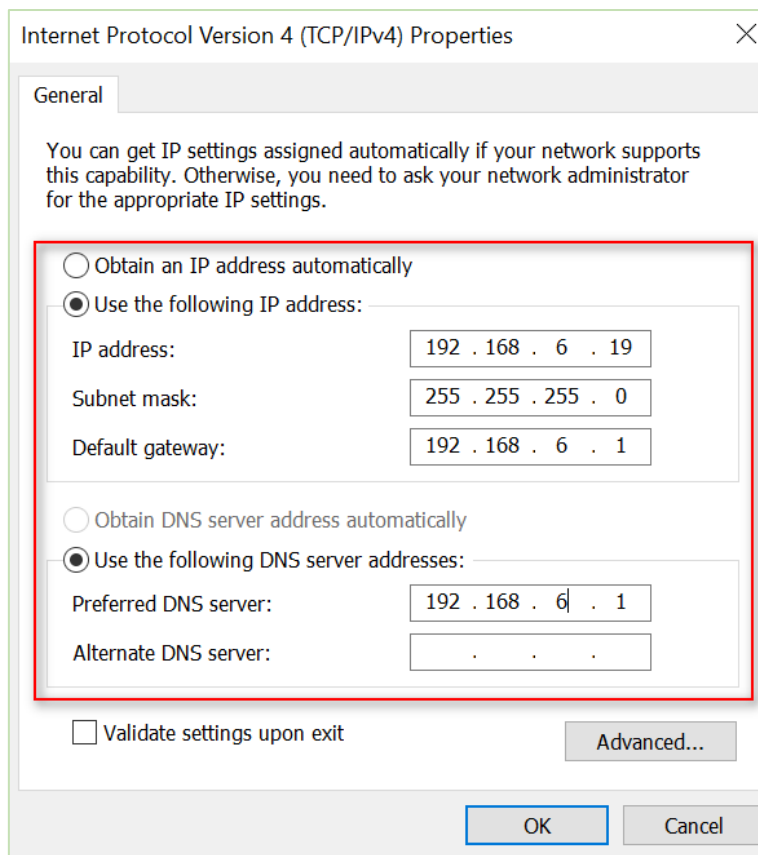
6. Click Save>Apply.

3.4 PC Configuration

1. Please enable the DHCP on PC1 or configure the static IP on PC1 like below:



2. Please enable the DHCP on PC2 or configure the static IP on PC2 like below:



4. Test

Test on PC1:

1. PC1 communicate with Internet via Master Router.

```
Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=98ms TTL=40
Reply from 8.8.8.8: bytes=32 time=52ms TTL=40
Reply from 8.8.8.8: bytes=32 time=58ms TTL=40
Reply from 8.8.8.8: bytes=32 time=51ms TTL=40

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 51ms, Maximum = 98ms, Average = 64ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to google-public-dns-a.google.com [8.8.8.8]
over a maximum of 30 hops:
  0  1 ms    1 ms    1 ms    navigateworx.router [192.168.5.2]
  1  85 ms   89 ms   130 ms  bogon [172.29.5.17]
  2  *
  3
```

2. Remove the ethernet cable between Master router and Switch, PC1 will access to Internet via Backup Router.

```
Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=53ms TTL=40
Reply from 8.8.8.8: bytes=32 time=71ms TTL=40
Reply from 8.8.8.8: bytes=32 time=59ms TTL=40
Reply from 8.8.8.8: bytes=32 time=58ms TTL=40

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 53ms, Maximum = 71ms, Average = 60ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to 8.8.8.8 over a maximum of 30 hops
  0  1 ms    *       1 ms    192.168.5.3
  1  220 ms  227 ms  238 ms  10.241.157.57
  2
  3
```

3. Inserted back the ethernet cable, PC1 will access to Internet again via Master Router.

```
Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=327ms TTL=41
Reply from 8.8.8.8: bytes=32 time=110ms TTL=41
Reply from 8.8.8.8: bytes=32 time=60ms TTL=41
Reply from 8.8.8.8: bytes=32 time=105ms TTL=41

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 60ms, Maximum = 327ms, Average = 150ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to google-public-dns-a.google.com [8.8.8.8]
over a maximum of 30 hops:
  0  1 ms    1 ms    1 ms    navigateworx.router [192.168.5.2]
  1  *      *      *      Request timed out.
  2
```

4. Test successfully.

Test on PC2:

1. PC2 communicate with Internet via Master Router.

```

Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=60ms TTL=248
Reply from 8.8.8.8: bytes=32 time=27ms TTL=247
Reply from 8.8.8.8: bytes=32 time=41ms TTL=247
Reply from 8.8.8.8: bytes=32 time=39ms TTL=248

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 27ms, Maximum = 60ms, Average = 41ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to google-public-dns-a.google.com [8.8.8.8]
over a maximum of 30 hops:
  0  1 ms    1 ms    1 ms  navigateworx.router [192.168.6.2]
  1  *

```

2. Remove the ethernet cable between Master router and Switch, PC2 will access to Internet via Backup Router.

```

Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=54ms TTL=40
Reply from 8.8.8.8: bytes=32 time=67ms TTL=40
Reply from 8.8.8.8: bytes=32 time=60ms TTL=40
Reply from 8.8.8.8: bytes=32 time=53ms TTL=40

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 53ms, Maximum = 67ms, Average = 58ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to google-public-dns-a.google.com [8.8.8.8]
over a maximum of 30 hops:
  0  1 ms    *       1 ms   192.168.6.3
  1  42 ms   18 ms   37 ms  10.241.157.89

```

3. Inserted back the ethernet cable, PC2 will access to Internet again via Master Router.

```

Administrator: Command Prompt - tracert 8.8.8.8
C:\Users\Administrator>
C:\Users\Administrator>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=26ms TTL=247
Reply from 8.8.8.8: bytes=32 time=41ms TTL=247
Reply from 8.8.8.8: bytes=32 time=23ms TTL=247
Reply from 8.8.8.8: bytes=32 time=27ms TTL=247

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 23ms, Maximum = 41ms, Average = 29ms

C:\Users\Administrator>tracert 8.8.8.8

Tracing route to google-public-dns-a.google.com [8.8.8.8]
over a maximum of 30 hops:
  0  1 ms    1 ms    2 ms  navigateworx.router [192.168.6.2]
  1  *      *      *

```

4. Test successfully.