

# NR500 Series Industrial Cellular VPN Router

## Application Note 002

### Link Backup Between WAN and Cellular

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



## Directory

1 Introduction .....	3
1.1 Overview .....	3
1.2 Compatibility .....	3
1.3 Version .....	3
1.4 Rectifications .....	3
2 Topology.....	4
3 Configuration.....	5
3.1 Eth0 Configuration.....	5
3.2 Cellular Configuration .....	5
3.3 Link Backup Strategy Configuration.....	6
4 Testing .....	8
4.1 Internet Status.....	8
4.2 Syslog.....	9

# 1 Introduction

## 1.1 Overview

This document contains information regarding the configuration and use of link backup between WAN and Cellular.

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

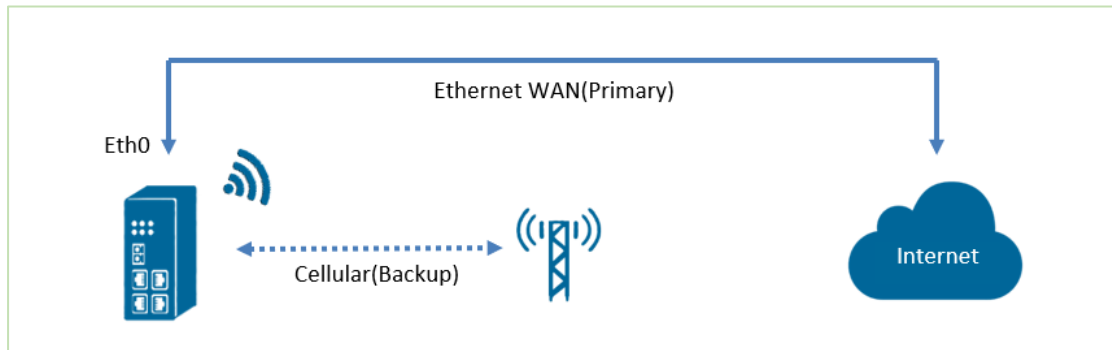
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2018/0728	V1.0.0	V1.0.0(903.0)	First released

## 1.4 Rectifications

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

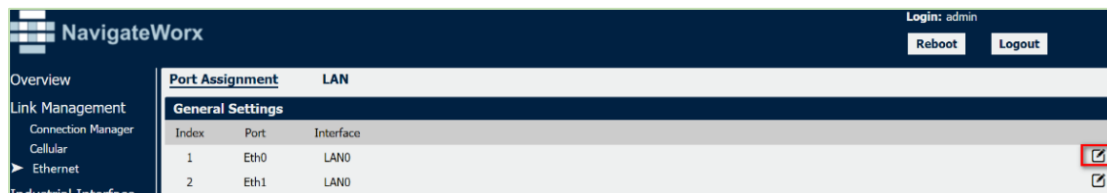


1. Specify Eth0 as Primary WAN interface and cellular(wwan1) as backup interface.
2. If NR500 Pro detect primary WAN is down, it will switch to cellular to provide continual network connection.
3. NR500 Pro will keep using WAN to ping the ICMP address, if success, then will switch back from backup link(cellular) to primary link(WAN)

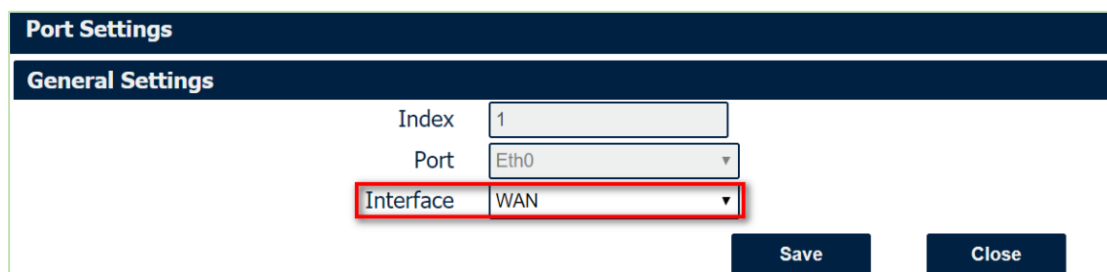
## 3 Configuration

### 3.1 Eth0 Configuration

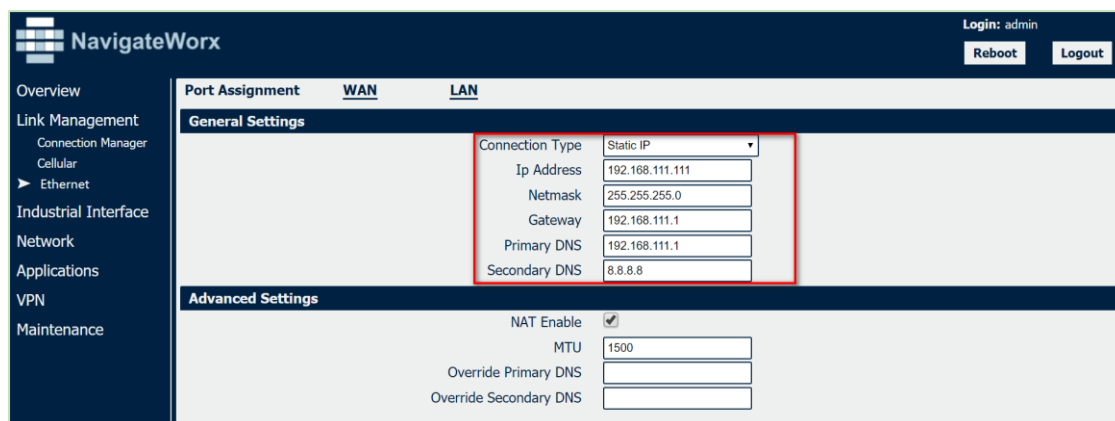
1. Go to **Link Management>Ethernet>Port Assignment**, click the **Edit Button** of Eth0.



2. Specify the interface and set it as **WAN**, Click **Save**.



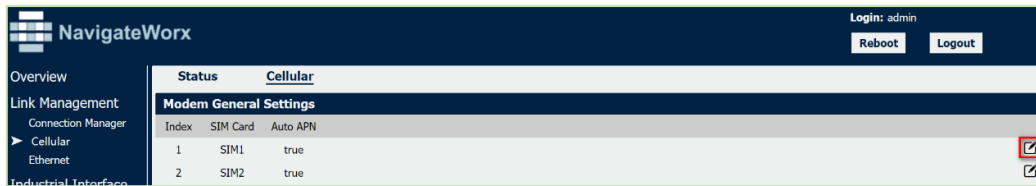
3. Go to **Link Management>Ethernet>WAN**, enter the relevant information of WAN to make sure connect to Internet.



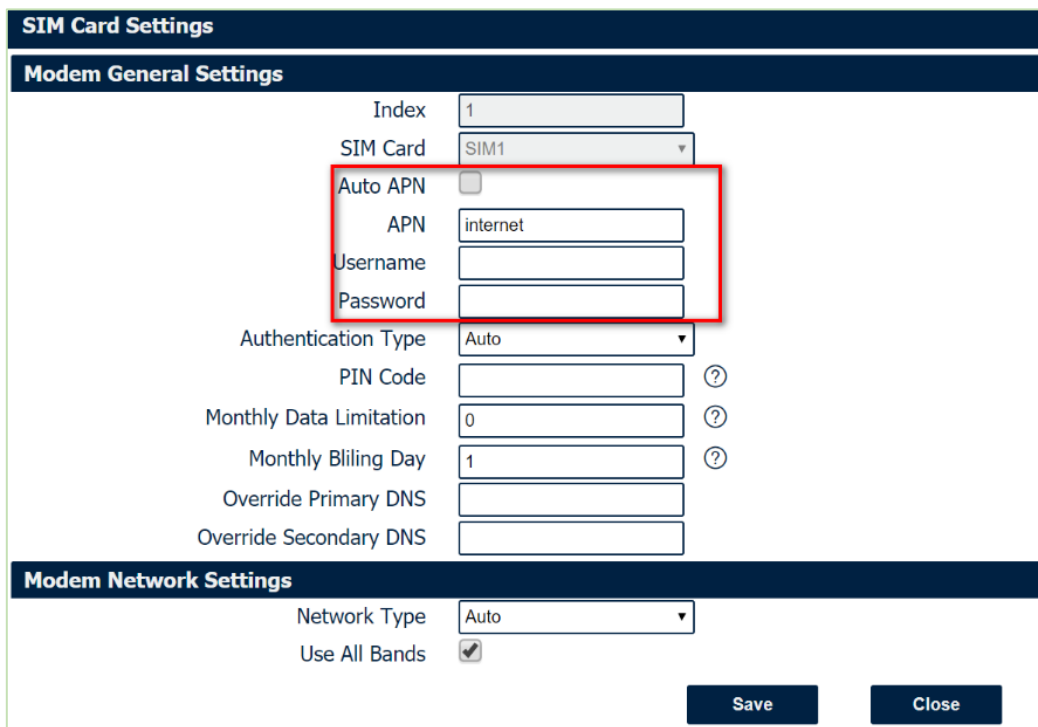
4. Click **Save>Apply**.

### 3.2 Cellular Configuration

1. Go to **Link Management>Cellular>Cellular**, click the **Edit button** of SIM1



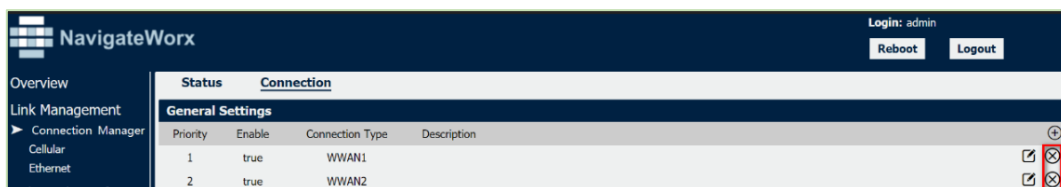
2. Enter the correct **APN, Username, Password** of SIM1 accordingly, to make sure connect to Internet. Click **Save**.



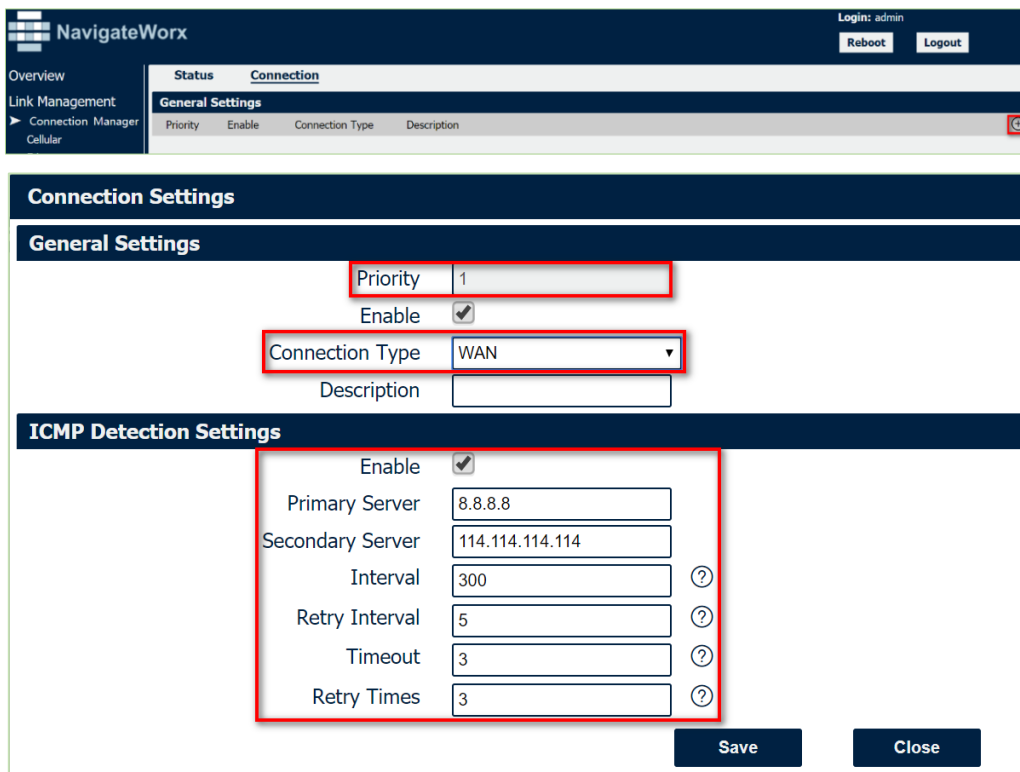
3. Click **Save>Apply**.

### 3.3 Link Backup Strategy Configuration

1. Go to **Link Management>Connection Manager>Connection**, delete the WWAN1 and WWAN2 interface. Click **Save>Apply**.



2. Add the WAN link and make it's priority as 1, meanwhile enable ICMP detection used for link detection. Click **Save**.



**NavigateWorx** Login: admin Reboot Logout

Overview  
Link Management  
▶ Connection Manager  
Cellular

Status **Connection**

**General Settings**

Priority	Enable	Connection Type	Description
1	<input checked="" type="checkbox"/>	WAN	

**Connection Settings**

**General Settings**

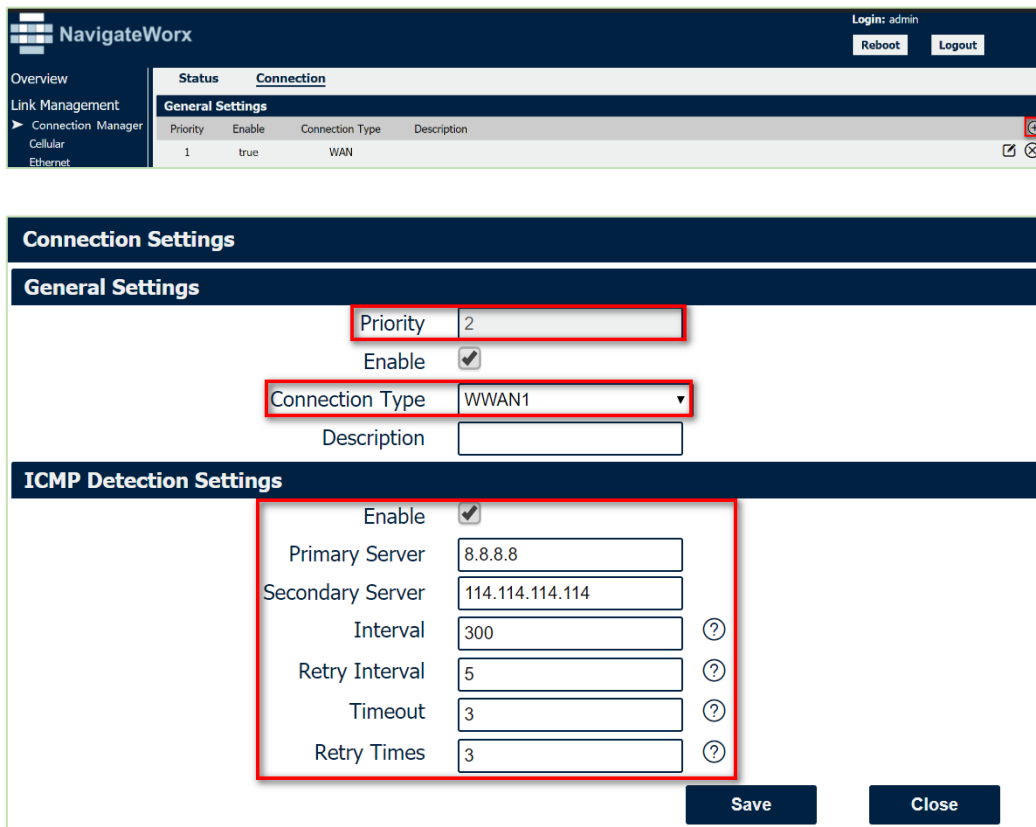
Priority: 1  
 Enable:   
 Connection Type: WAN  
 Description:

**ICMP Detection Settings**

Enable:   
 Primary Server: 8.8.8.8  
 Secondary Server: 114.114.114.114  
 Interval: 300 ?  
 Retry Interval: 5 ?  
 Timeout: 3 ?  
 Retry Times: 3 ?

Save Close

3. Add the WWAN1 link and make it's priority as 2, meanwhile enable ICMP detection used for link detection. Click **Save**



**NavigateWorx** Login: admin Reboot Logout

Overview  
Link Management  
▶ Connection Manager  
Cellular  
Ethernet

Status **Connection**

**General Settings**

Priority	Enable	Connection Type	Description
1	true	WAN	

**Connection Settings**

**General Settings**

Priority: 2  
 Enable:   
 Connection Type: WWAN1  
 Description:

**ICMP Detection Settings**

Enable:   
 Primary Server: 8.8.8.8  
 Secondary Server: 114.114.114.114  
 Interval: 300 ?  
 Retry Interval: 5 ?  
 Timeout: 3 ?  
 Retry Times: 3 ?

Save Close

4. Click **Save>Apply**.

## 4 Testing

At this moment both WAN and Cellular are online, NR500 Pro will connect to Internet with primary link(WAN).

If NR500 Pro detect the primary link(WAN) is down, then it will switch to backup link(wwan1) for Internet connection.

If the Primary link(WAN) up again, then NR500 Pro will switch back from backup link(wwan1) to primary link(WAN).

### 4.1 Internet Status

1. Go to **Overview>Overview>Active Link Information**, NR500 Pro is using primary link(WAN) for Internet access.

Active Link Information	
Link Type	WAN
IP Address	192.168.111.111
Netmask	255.255.255.0
Gateway	192.168.111.1

2. Remove the Ethernet Cable of WAN, to make the primary link is down, NR500 Pro will switch to WWAN1 to communication with Internet.

Go to **Overview>Overview>Active Link Information** to check again, NR500 Pro is now using backup link for Internet access.

Active Link Information	
Link Type	WWAN1
IP Address	10.162.9.151
Netmask	255.255.255.240
Gateway	10.162.9.152

3.Insert again the Ethernet Cable, NR500 Pro will switch back from bakup link to primary link again.

Go to **Overview>Overview>Active Link Information** to check the status, NR500 Pro is now using primary link for Internet access.

Active Link Information	
Link Type	WAN
IP Address	192.168.111.111
Netmask	255.255.255.0
Gateway	192.168.111.1



## 4.2 Syslog

Syslog shows the switch process of link, please check below:

---

```
Jun 12 08:00:04 navigateworx syslog.info syslogd started: BusyBox v1.25.1
Jun 12 08:00:07 navigateworx user.debug connection_manager[1148]: setup active link wan
Jun 12 08:00:07 navigateworx user.debug connection_manager[1148]: start ICMP
detecting(wan->8.8.8.8/114.114.114.114)
Jun 12 08:00:08 navigateworx user.debug connection_manager[1148]: connection_manager
proc_icmp_detection
Jun 12 08:00:08 navigateworx user.debug connection_manager[1148]: WAN ICMP detecting
success
Jun 12 08:00:08 navigateworx user.debug connection_manager[1148]: connection wan, active
link 1, health state 0
Jun 12 08:00:09 navigateworx user.debug modem[1368]: modem init with SIM1
Jun 12 08:00:09 navigateworx user.debug modem[1368]: power on the modem
Jun 12 08:00:09 navigateworx user.debug modem[1368]: ATZ
Jun 12 08:00:09 navigateworx user.debug modem[1368]: ATZ^M
Jun 12 08:00:09 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]: +CPIN: READY
Jun 12 08:00:11 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]: AT+CIMI
Jun 12 08:00:11 navigateworx user.debug modem[1368]: 460018084095242
Jun 12 08:00:11 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]: AT+CGREG=2
Jun 12 08:00:11 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]: AT+CGDCONT=1,"IP"
Jun 12 08:00:11 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]: AT+QCFG="nwscanmode",0,1
Jun 12 08:00:11 navigateworx user.debug modem[1368]: OK
Jun 12 08:00:11 navigateworx user.debug modem[1368]:
Jun 12 08:00:12 navigateworx user.debug modem[1368]: modem is ready
Jul 29 16:07:54 navigateworx user.debug modem[1368]: AT+GSN
Jul 29 16:07:54 navigateworx user.debug modem[1368]: 861107038051539
Jul 29 16:07:54 navigateworx user.debug modem[1368]: OK
J
Jul 29 16:08:04 navigateworx user.debug modem[1368]: AT+CSQ
Jul 29 16:08:05 navigateworx user.debug modem[1368]: +CSQ: 31,99
Jul 29 16:08:05 navigateworx user.debug modem[1368]: OK
Jul 29 16:08:05 navigateworx user.debug modem[1368]: AT+CGREG?
Jul 29 16:08:19 navigateworx user.debug connection_manager[1148]: start ICMP
detecting(wwan1->8.8.8.8/114.114.114.114)
Jul 29 16:08:20 navigateworx user.debug connection_manager[1148]: connection_manager
proc_icmp_detection
```

Jul 29 16:08:20 navigateworx user.debug connection\_manager[1148]: WWAN1 ICMP detecting success

Jul 29 16:08:20 navigateworx user.debug connection\_manager[1148]: connection wwan1, active link 0, health state 0

Jul 29 16:08:20 navigateworx user.debug connection\_manager[1148]: timer proc status = 2

**Jul 29 16:08:20 navigateworx user.debug connection\_manager[1148]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)**

Jul 29 16:08:23 navigateworx user.debug connection\_manager[1148]: connection\_manager proc\_icmp\_detection

**Jul 29 16:08:23 navigateworx user.debug connection\_manager[1148]: WAN ICMP detecting failed (1/3)**

Jul 29 16:08:25 navigateworx user.debug modem[1368]: AT+CSQ

Jul 29 16:08:25 navigateworx user.debug modem[1368]: +CSQ: 31,99

Jul 29 16:08:25 navigateworx user.debug modem[1368]: OK

Jul 29 16:08:25 navigateworx user.debug modem[1368]: AT+CGREG?

Jul 29 16:08:26 navigateworx user.debug modem[1368]: +CGREG: 2,1,"2508","6016C02",7

Jul 29 16:08:26 navigateworx user.debug modem[1368]: OK

Jul 29 16:08:26 navigateworx user.debug modem[1368]: AT+COPS=3,2

Jul 29 16:08:26 navigateworx user.debug modem[1368]: OK

Jul 29 16:08:26 navigateworx user.debug modem[1368]: AT+COPS?

Jul 29 16:08:26 navigateworx user.debug modem[1368]: +COPS: 0,2,"46001",7

Jul 29 16:08:26 navigateworx user.debug modem[1368]: OK

Jul 29 16:08:26 navigateworx user.debug connection\_manager[1148]: timer proc status = 2

**Jul 29 16:08:26 navigateworx user.debug connection\_manager[1148]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)**

Jul 29 16:08:29 navigateworx user.debug connection\_manager[1148]: connection\_manager proc\_icmp\_detection

**Jul 29 16:08:29 navigateworx user.debug connection\_manager[1148]: WAN ICMP detecting failed (2/3)**

Jul 29 16:08:30 navigateworx user.debug connection\_manager[1148]: timer proc status = 2

Jul 29 16:08:32 navigateworx user.debug connection\_manager[1148]: timer proc status = 2

**Jul 29 16:08:32 navigateworx user.debug connection\_manager[1148]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)**

Jul 29 16:08:35 navigateworx user.debug connection\_manager[1148]: connection\_manager proc\_icmp\_detection

**Jul 29 16:08:35 navigateworx user.debug connection\_manager[1148]: WAN ICMP detecting failed (3/3)**

Jul 29 16:08:35 navigateworx user.debug connection\_manager[1148]: connection of wan start disconnect

Jul 29 16:08:35 navigateworx user.debug connection\_manager[1148]: setup disconnect

Jul 29 16:08:40 navigateworx user.debug connection\_manager[1148]: start ICMP detecting(wwan1->8.8.8.8/114.114.114.114)

Jul 29 16:08:40 navigateworx user.debug connection\_manager[1148]: connection\_manager proc\_icmp\_detection

Jul 29 16:08:40 navigatworx user.debug connection\_manager[1148]: WWAN1 ICMP detecting success

**Jul 29 16:08:40 navigatworx user.debug connection\_manager[1148]: connection wwan1, active link 1, health state 0**

Jul 29 16:08:45 navigatworx user.debug connection\_manager[1148]: timer proc status = 0

Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: start connect static ip of wan

Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: connection of wan is connected

**Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)**

Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: connection\_manager proc\_icmp\_detection

**Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: WAN ICMP detecting success**

Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: connection wan, active link 0, health state 0

Jul 29 16:08:46 navigatworx user.debug connection\_manager[1148]: setup active link wan