NavigateWorx

NR500 Series
Industrial Cellular VPN Router

Application Note 003

Three Links Backup Between WAN, WWAN1 and WWAN2

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

Directory

1 Introduction

1.1 Overview

This document contains information regarding the configuration and use of three links backup between WAN, WWAN1 and WWAN2.

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 Rectifications

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
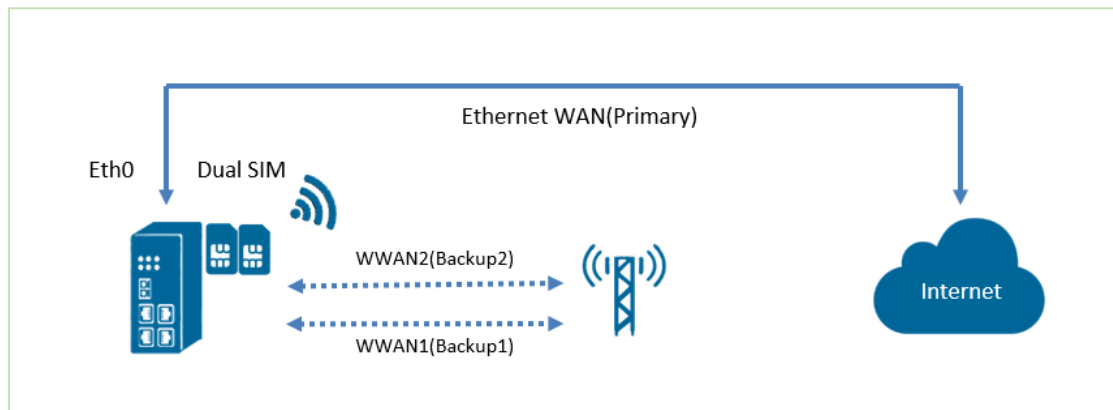
1. Specify Eth0 as Primary WAN interface and wwan1 as secondary backup interface, wwan2 as third backup interface.
2. If NR500 Pro detect primary WAN is down, it will switch to wwan1 to provide continual network connection.
3. If NR500 Pro detects both WAN and wwan1 is down, it will switch to wwan2 to provide continual network connection.
4. NR500 Pro will keep using WAN to ping the ICMP address, if success, then will switch back from backup link(wwan1 or wwan2) to primary link(WAN)
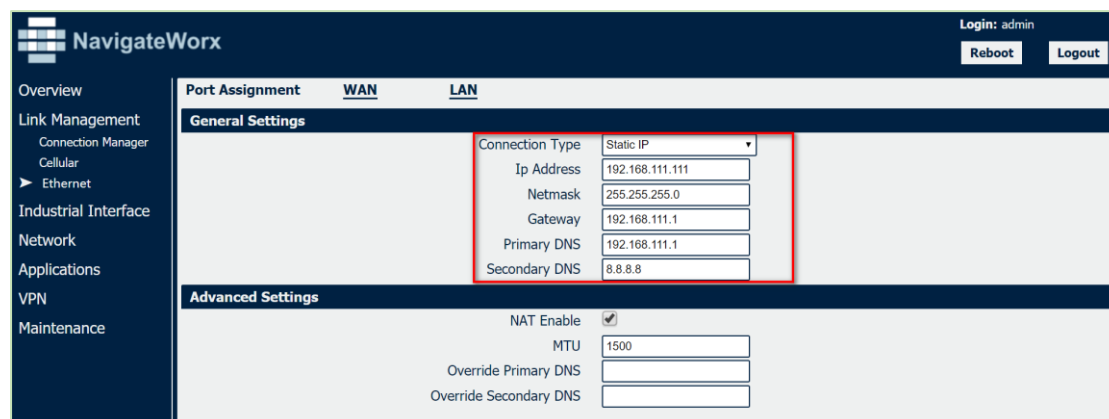
3 Configuration

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.**
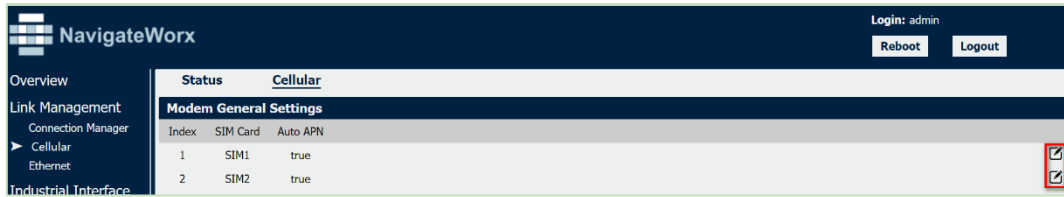

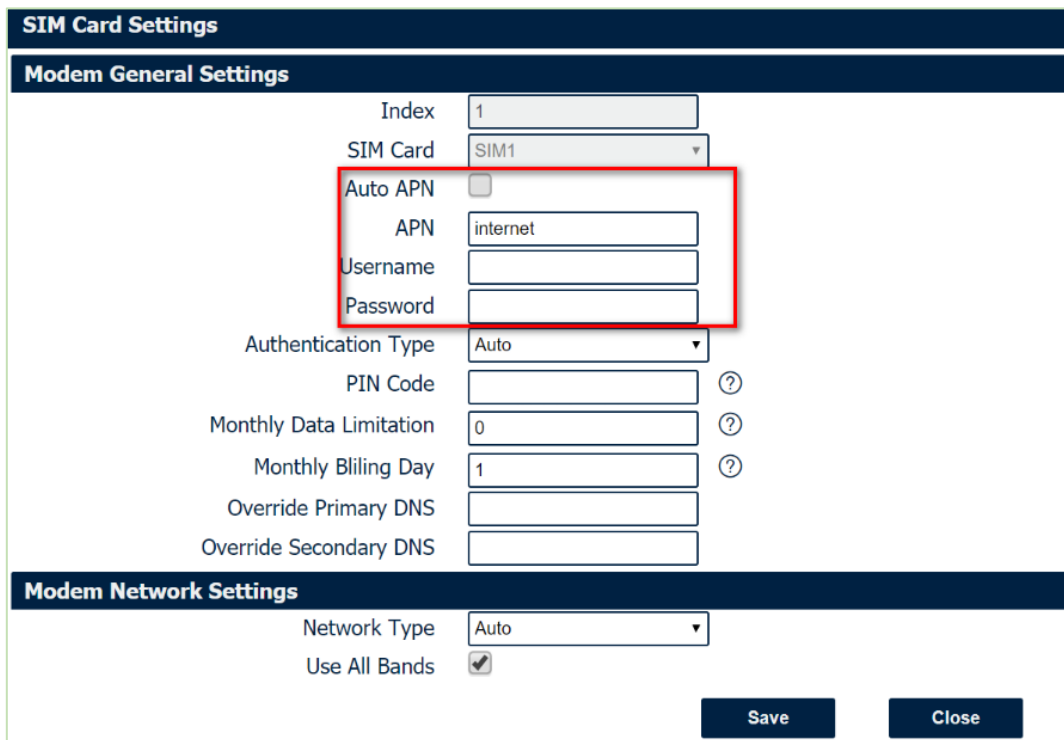3. Go to Link Management>Ethernet>WAN, enter the relevant information of WAN to make sure connect to Internet.

4. Click **Save>Apply**.

3.2 Cellular Configuration

1. Go to Link **Management>Cellular>Cellular**, click the **Edit button** of **SIM1 and SIM2**.

2. Enter the correct **APN, Username, Password** of **SIM1and SIM2** accordingly, to make sure connect to Internet. Click **Save**.
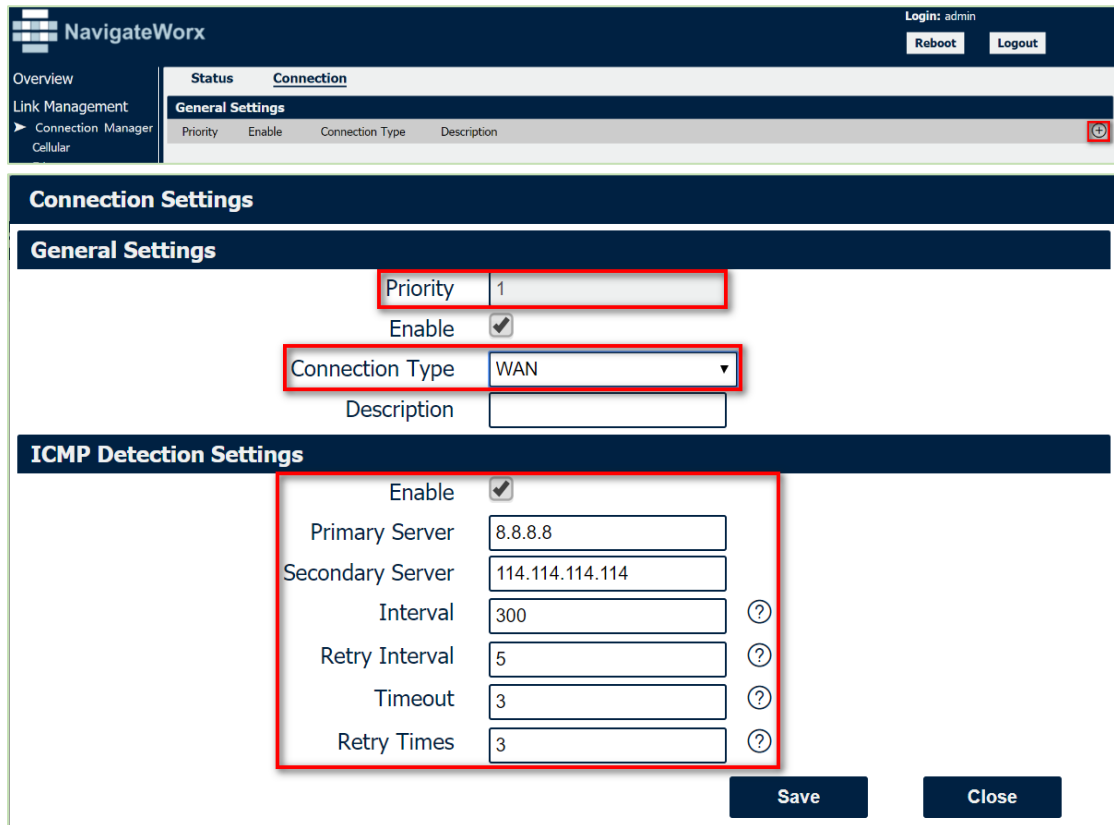

3. Click **Save>Apply.**

3.3 Link Backup Strategy Configuration

1. Go to **Link Management>Connection Manager>Connection**, delete the WWAN1 and WWAN2 interface. Click **Save>Apply**.
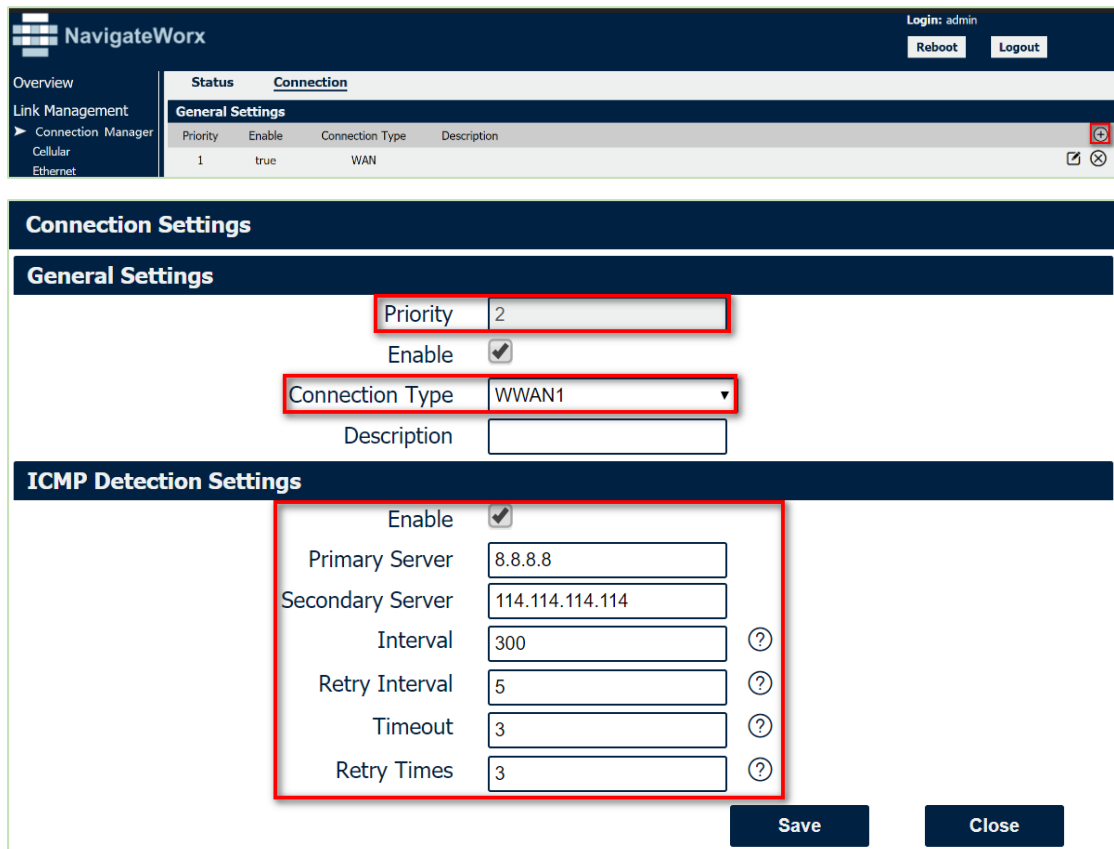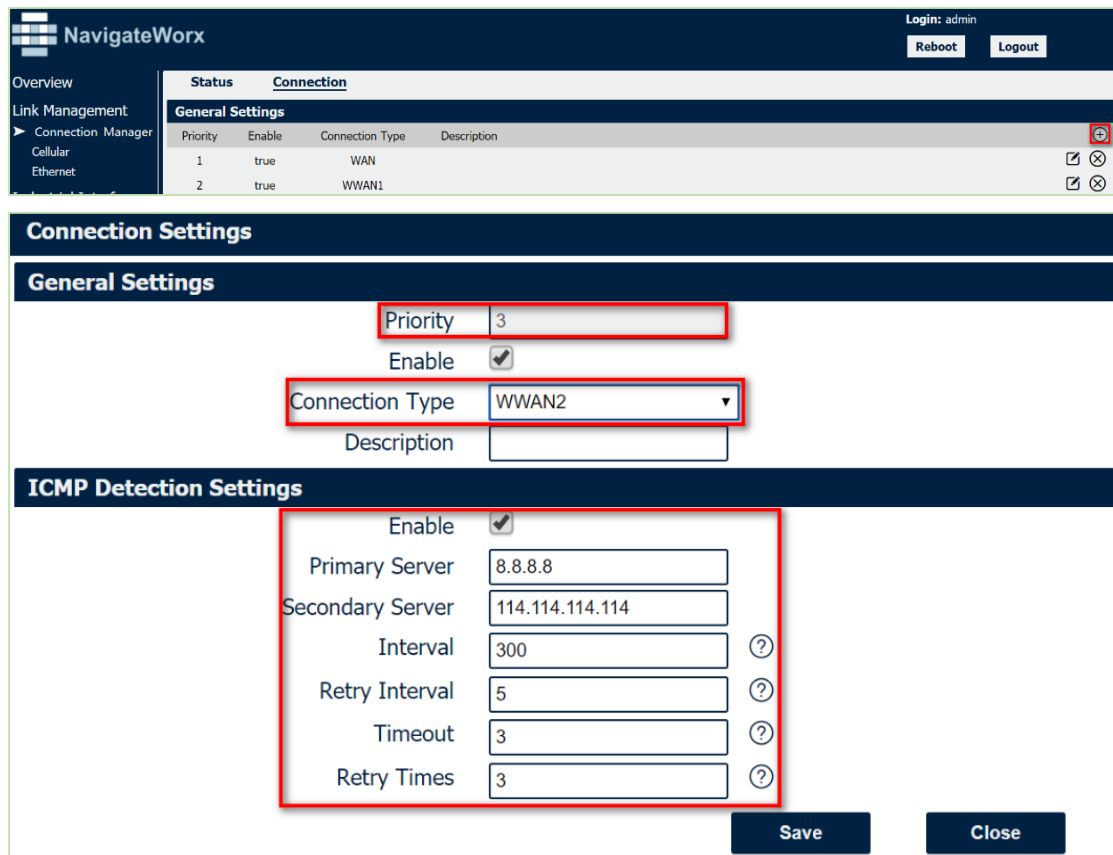
2. Add the WAN link and make it's priority as 1, meanwhile enable ICMP detection used for link detection. Click **Save**.

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

4. Add the WWAN2 link and make it's priority as 3, meanwhile enable ICMP detection used for link detection. Click **Save**

5. Click **Save>Apply**.

4 Testing

At the beginning both WAN and WWAN1 are online, NR500 Pro will connect to Internet with primary WAN..

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

If NR500 Pro detect both WAN and WWAN1 is down, then it will switch to WWAN2 for Internet connection.

If the Primary WAN up again, then NR500 Pro will switch back to primary WAN.

4.1 Internet Status

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

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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 WWAN1 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. When NR500 Pro detect WWAN1 is down, then switch to WWAN2 for Internet access.

Active Link Information	
Link Type	WWAN2
IP Address	10.132.13.31
Netmask	255.255.255.192
Gateway	10.132.13.32

4. Insert again the Ethernet Cable, NR500 Pro will switch back from WWAN2 to primary WAN 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 08:00:07 navigateworx user.debug connection_manager[1126]: setup active link wan

Jun 12 08:00:07 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)

Jun 12 08:00:07 navigateworx daemon.info dnsmasq[1139]: reading /etc/resolv.conf

Jun 12 08:00:11 navigateworx user.debug connection_manager[1126]: WAN ICMP detecting failed (1/3)

Jun 12 08:00:12 navigateworx user.debug modem[1294]: AT+CGDCONT=1,"IP"

Jun 12 08:00:12 navigateworx user.debug modem[1294]: OK

Jun 12 08:00:12 navigateworx user.debug modem[1294]: AT+CMGF=0

Jun 12 08:00:12 navigateworx user.debug modem[1294]: OK

Jun 12 08:00:12 navigateworx user.debug modem[1294]: AT+CNMI=2,1

Jun 12 08:00:12 navigateworx user.debug modem[1294]: OK

Jun 12 08:00:12 navigateworx user.debug modem[1294]: AT+CGREG?

Jun 12 08:00:12 navigateworx user.debug modem[1294]: +CGREG: 2,1,"2508","6016C02",7

Jun 12 08:00:13 navigateworx user.debug modem[1294]: OK

Jun 12 08:00:13 navigateworx user.debug modem[1294]: modem is ready

Jun 12 08:00:14 navigateworx daemon.notice procd: /etc/rc.d/S96led: /etc/rc.common: line 165: uci_load: not found

Jun 12 08:00:14 navigateworx user.debug connection_manager[1126]: timer proc status = 2

Jun 12 08:00:14 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)

Jun 12 08:00:14 navigateworx user.debug modem[1294]: OK

Jun 12 08:00:14 navigateworx user.err modem[1294]: stopping quectel_cm failed

Jun 12 08:00:14 navigateworx user.debug modem[1294]: set apn(3gnet) interface(wwan1)

Jun 12 08:00:17 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jun 12 08:00:17 navigateworx user.debug connection_manager[1126]: WAN ICMP detecting failed (2/3)

Jun 12 08:00:20 navigateworx user.debug connection_manager[1126]: timer proc status = 2

Jun 12 08:00:20 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)

Jun 12 08:00:23 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jun 12 08:00:23 navigateworx user.debug connection_manager[1126]: WAN ICMP detecting failed (3/3)

Jun 12 08:00:23 navigateworx user.debug connection_manager[1126]:

Jun 12 08:00:28 navigateworx daemon.err udhcpc[1955]: started, v1.25.1

Jun 12 08:00:28 navigateworx daemon.err udhcpc[1955]: sending discover

Jun 12 08:00:28 navigateworx daemon.err udhcpc[1955]: sending select for 10.169.103.152

Jun 12 08:00:28 navigateworx daemon.err udhcpc[1955]: lease of 10.169.103.152 obtained, lease time 7200

Jun 12 08:00:29 navigateworx user.debug udhcpc: dhcpc get configuration of wwan1

Jun 12 08:00:29 navigateworx user.debug connection_manager[1126]: connection_manager proc_connected

Jun 12 08:00:29 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jun 12 08:00:29 navigateworx user.debug connection_manager[1126]: WWAN1 ICMP detecting success

Jun 12 08:00:29 navigateworx user.debug connection_manager[1126]: connection wwan1, active link 1, health state 0

Jul 29 19:22:20 navigateworx user.debug connection_manager[1126]: timer proc status = 0

Jul 29 19:22:20 navigateworx user.debug connection_manager[1126]: reconnect .... wan

Jul 29 19:22:20 navigateworx user.debug connection_manager[1126]: co

Jul 29 19:23:03 navigateworx user.debug modem[1294]: OK

Jul 29 19:23:06 navigateworx user.debug connection_manager[1126]: timer proc status = 2

Jul 29 19:23:06 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wwan1->8.8.8.8/114.114.114.114)

Jul 29 19:23:06 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jul 29 19:23:06 navigateworx user.debug connection_manager[1126]: WWAN1 ICMP detecting failed (1/3)

Jul 29 19:23:09 navigateworx user.debug connection_manager[1126]: timer proc status = 2

Jul 29 19:23:09 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wwan1->8.8.8.8/114.114.114.114)

Jul 29 19:23:09 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jul 29 19:23:09 navigateworx user.debug connection_manager[1126]: WWAN1 ICMP detecting failed (2/3)

Jul 29 19:23:11 navigateworx user.debug connection_manager[1126]: timer proc status = 0

Jul 29 19:23:11 navigateworx user.debug connection_manager[1126]: reconnect .... wan

Jul 29 19:23:11 navigateworx user.debug connection_manager[1126]: connection_manager proc_connect

Jul 29 19:23:11 navigateworx user.debug connection_manager[1126]: connection

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wwan1->8.8.8.8/114.114.114.114)

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: WWAN1 ICMP detecting failed (3/3)

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: connection_manager proc_disconnect

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: optimal connection wwan2 health state 1 cs 0, current connection wwan1 health state 4 cs 0

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: SIM switch from SIM1 to SIM2, reload modem with SIM2

Jul 29 19:23:12 navigateworx user.debug connection_manager[1126]: ll wwan2 reconnect in 10s

Jul 29 19:23:13 navigateworx user.debug modem[1294]: AT+CSQ

Jul 29 19:23:13 navigateworx user.debug modem[1294]: +CSQ: 31,99

Jul 29 19:23:13 navigateworx user.debug modem[1294]: OK

Jul 29 19:23:13 navigateworx user.debug modem[1294]: AT+CGREG?

Jul 29 19:23:13 navigateworx user.debug modem[1294]: +CGREG: 2,1,"2508","6016C02",7

Jul 29 19:23:55 navigateworx user.debug connection_manager[1126]: setup active link wwan2

Jul 29 19:23:55 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wwan2->8.8.8.8/114.114.114.114)

Jul 29 19:23:55 navigateworx daemon.info dnsmasq[1139]: reading /etc/resolv.conf

Jul 29 19:23:58 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jul 29 19:23:58 navigateworx user.debug connection_manager[1126]: WWAN2 ICMP detecting success

Jul 29 19:23:58 navigateworx user.debug connection_manager[1126]: connection wwan2, active link 1, health state 0

Jul 29 19:24:01 navigateworx user.debug modem[3832]: AT+CNUM

Jul 29 19:24:01 navigateworx user.debug modem[3832]: OK

Jul 29 19:24:01 navigateworx user.debug modem[3832]: AT+CSQ

Jul 29 19:24:01 navigateworx user.debug modem[3832]: +CSQ: 31,99

Jul 29 19:24:01 navigateworx user.debug modem[3832]: OK

Jul 29 19:24:01 navigateworx user.debug modem[3832]: AT+CGREG?

Jul 29 19:24:01 navigateworx user.debug modem[3832]: +CGREG: 2,1,"2508","6016C02",7

Jul 29 19:24:01 navigateworx user.debug modem[3832]: OK

orx user.debug modem[3832]: OK

Jul 29 19:24:14 navigateworx user.debug connection_manager[1126]: timer proc status = 2

Jul 29 19:24:14 navigateworx user.debug connection_manager[1126]: start ICMP detecting(wan->8.8.8.8/114.114.114.114)

Jul 29 19:24:14 navigateworx user.debug connection_manager[1126]: connection_manager proc_icmp_detection

Jul 29 19:24:14 navigateworx user.debug connection_manager[1126]: WAN ICMP detecting success

Jul 29 19:24:14 navigateworx user.debug connection_manager[1126]: connection wan, active link 0, health state 0