RADIO DATA NETWORKS

Application notes

RipEX2/M!DGE3 OpenVPN

version 1.0
03/14/2024
fw 2.1.1.0

Table of Contents

OpenVPN

OpenVPN is a virtual private network (VPN) system that allows to create secure encrypted point-to-multipoint connections in routed (TUN) or bridged (TAP) modes. Up to four instances (clients and/or servers) can be used simultaneously in one unit. Each server is capable of establishing connections with several tens of clients.

OpenVPN allows peers to authenticate to each other using pre-shared secret keys and certificates. An OpenVPN server is capable to release an authentication certificate for every client, using signatures and certificate authority (certificates can be generated / uploaded in the SETTINGS > Security > Credentials menu).

A time synchronization of individual units is required for proper OpenVPN function.

All the configuration parameters are explained within the manual. The application notes will describe you several use-cases and step-by-step configurations, including screenshots and basic explanations. Eventually, OpenVPN debugging is explained.

Note: All the M!DGE3 or RipEX2 units run 2.1.1.0 firmware.

1. M!DGE3/RipEX2 OpenVPN examples

1.1. Routed (TUN) OpenVPN topology

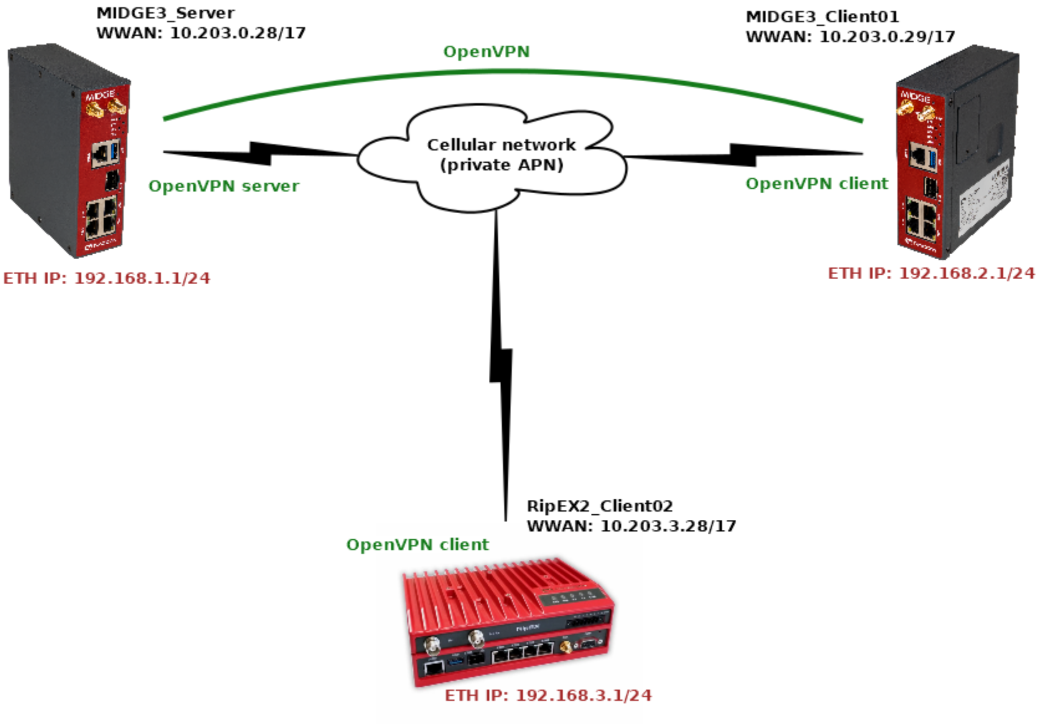


Fig. 1: Routed (TUN) OpenVPN topology

The topology depicts one OpenVPN server and two OpenVPN clients. M!DGE3 and RipEX2 share the same GUI and are configured exactly the same way. RipEX2 in the diagram is equipped with the LTE extension so it can be connected both to the cellular and radio networks.

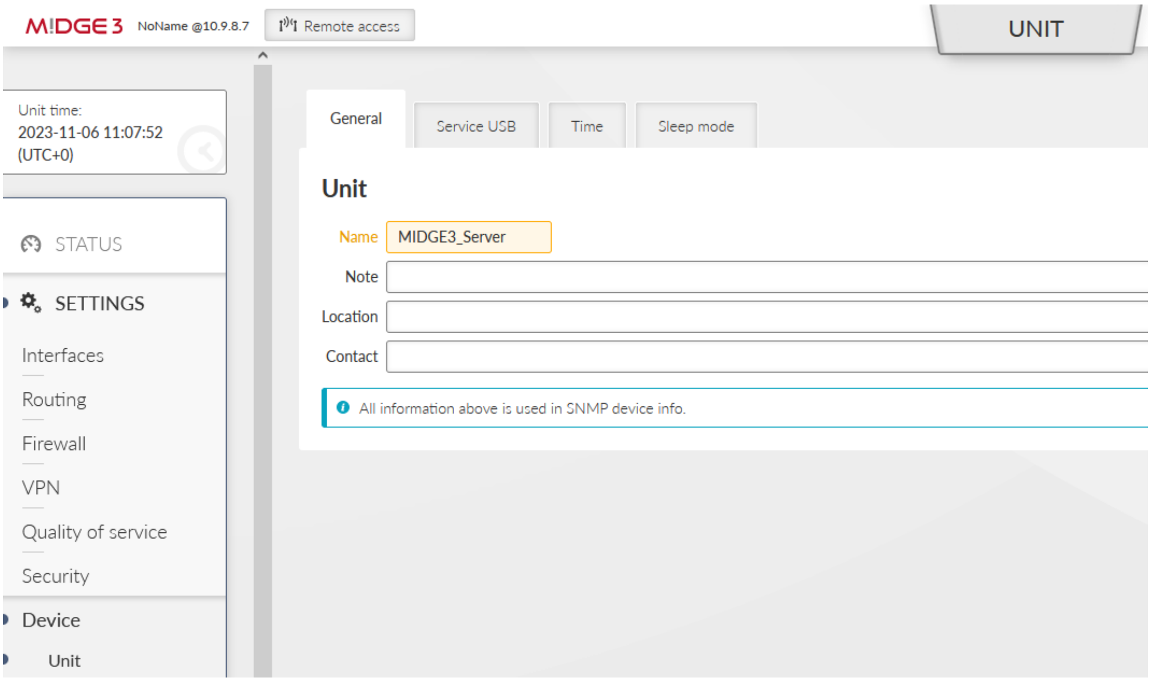
The 1st example shows a configuration in which all the units utilize different LAN subnets, i.e., interconnecting them via one shared and secured OpenVPN network to build one secure end-to-end routed network.

The cellular APN is a private APN with specified IP addresses within 10.203.0.0/17. Each device can “see” (ping) each other, but cannot access public Internet. While testing or configuring your scenario, you need to edit all the 10.203.0.0/17 IP addresses to suit your topology.

Note: Keep in mind the connections via the cellular network require some kind of VPN or at least NAPT so that packets can go LAN2LAN. Adding just static routing rules would end by discarding such traffic being discarded in operator’s network.

1.1.1. MIDGE3_Server

MIDGE3_Server will be set as the OpenVPN server. Set the Unit name “MIDGE3_Server” in the SETTINGS > Device > Unit menu.



Unit time:
2023-11-06 11:07:52
(UTC+0)

Unit

Name: MIDGE3_Server

Note:

Location:

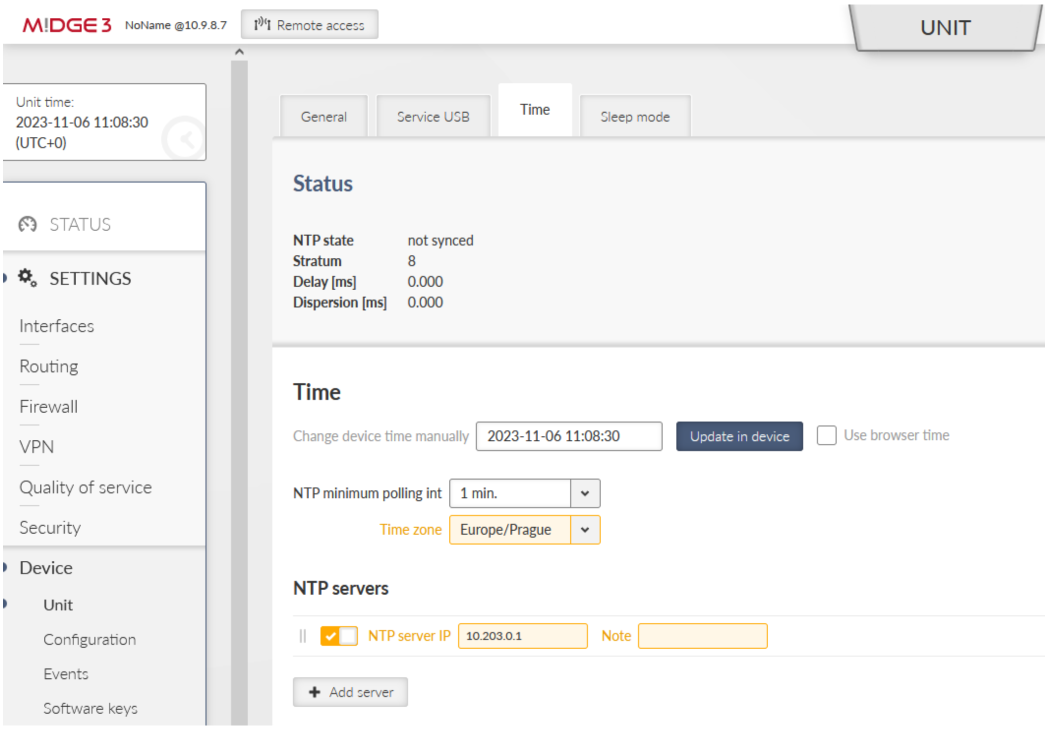
Contact:

All information above is used in SNMP device info.

Fig. 2: MIDGE3_Server Unit name

Make sure to have correct and the same time in all units. OpenVPN works with certificates and their validation times so the correct time sync is required.

Set a correct Time zone (Europe/Prague) and NTP server (10.203.0.1) in the SETTINGS > Device > Unit > Time menu. Even if you do not have a working NTP server in your network, at least manually set a correct time, because each M!DGE3 and RipEX2 are equipped with the RTC and should be able to keep the proper time over the years even without the NTP server. NTP server is a recommended solution though – consider one unit within the network to be equipped with GPS – such unit would provide precise time to the rest of the network.



Unit time:
2023-11-06 11:08:30
(UTC+0)

Status

NTP state	not synced
Stratum	8
Delay [ms]	0.000
Dispersion [ms]	0.000

Time

Change device time manually: 2023-11-06 11:08:30 ☐ Use browser time

NTP minimum polling int: 1 min.

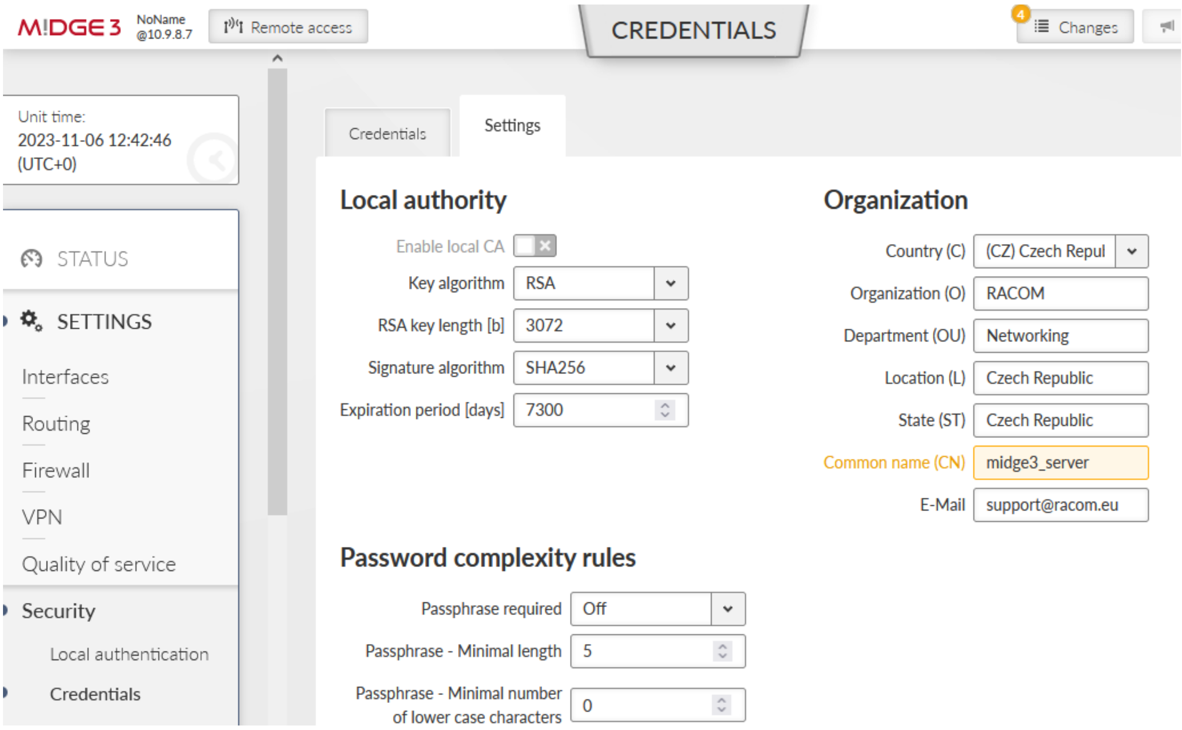
Time zone: Europe/Prague

NTP servers

☑ NTP server IP: 10.203.0.1 Note:

Fig. 3: MIDGE3_Server Time settings

Go to the SETTINGS > Security > Credentials > Settings menu and configure a Common Name for our MIDGE3_Server – “midge3_server”. CNs are very important for proper OpenVPN certificates.



Unit time:
2023-11-06 12:42:46
(UTC+0)

Local authority

Enable local CA	☒
Key algorithm	RSA
RSA key length [b]	3072
Signature algorithm	SHA256
Expiration period [days]	7300

Organization

Country (C)	(CZ) Czech Repul
Organization (O)	RACOM
Department (OU)	Networking
Location (L)	Czech Republic
State (ST)	Czech Republic
Common name (CN)	midge3_server
E-Mail	support@racom.eu

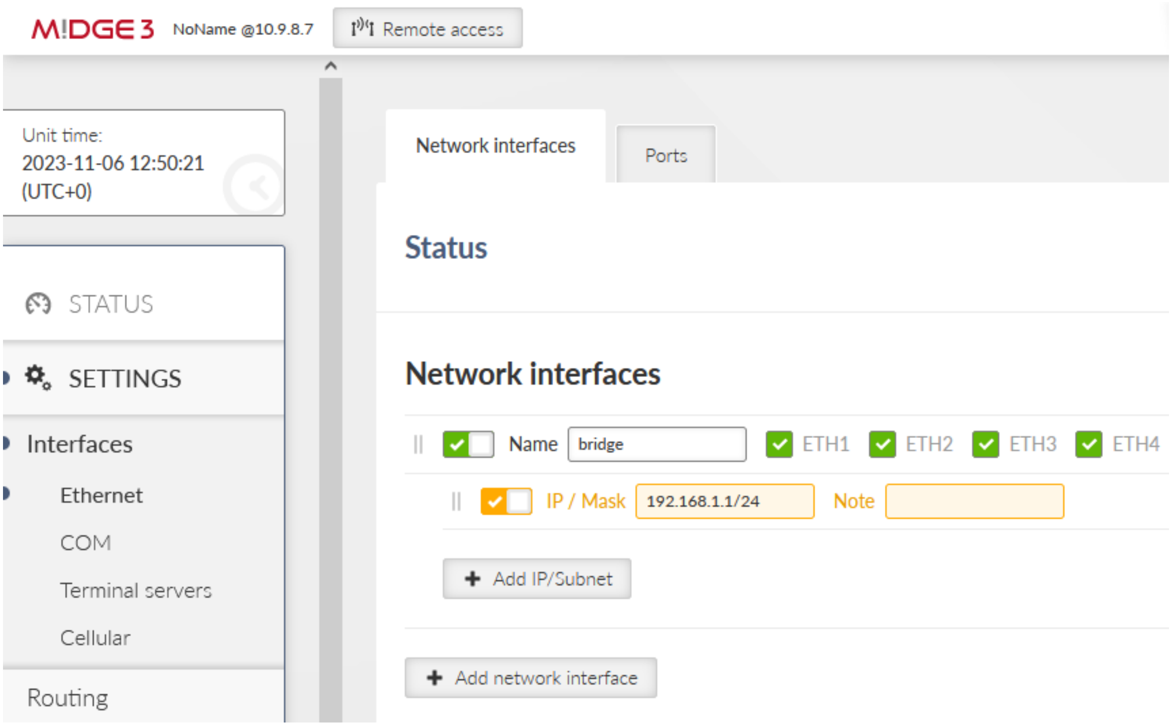
Password complexity rules

Passphrase required	Off
Passphrase - Minimal length	5
Passphrase - Minimal number of lower case characters	0

Fig. 4: MIDGE3_Server Common Name (CN)

All the units are in the Factory settings so we need to configure proper Ethernet and Cellular interfaces and also Routing.

Go to the SETTINGS > Interfaces > Ethernet > Network interfaces menu. Set the IP of the 'bridge' interface to be 192.168.1.1/24.



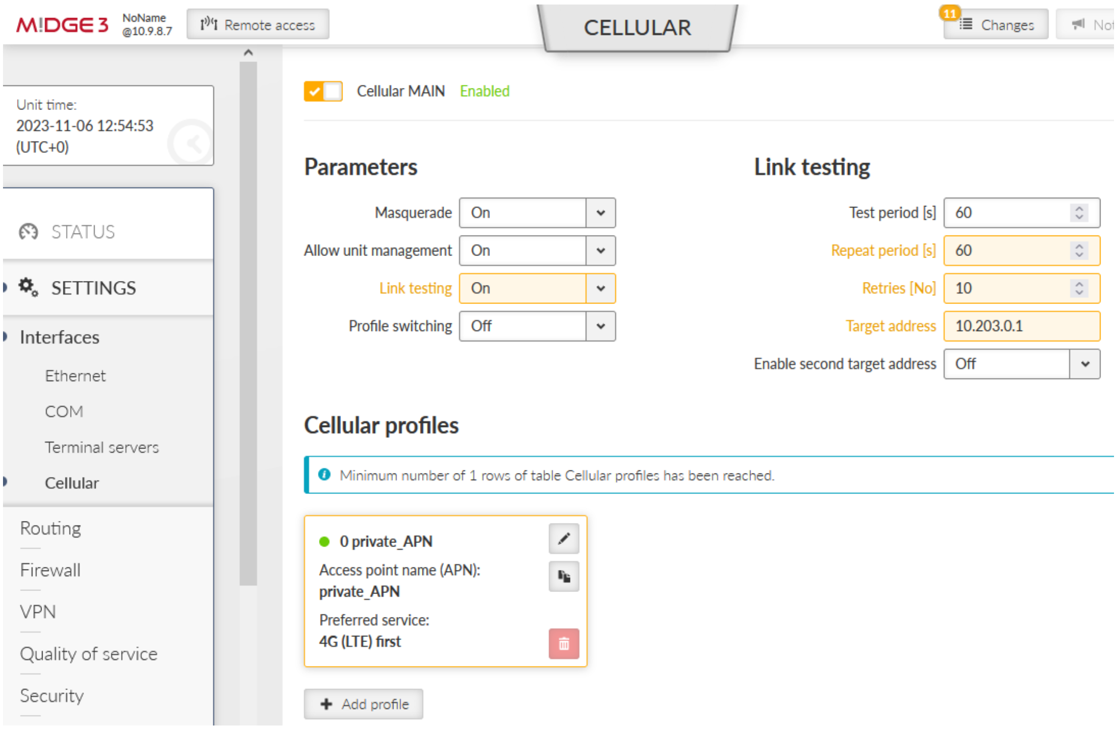
Unit time: 2023-11-06 12:50:21 (UTC+0)

☑ Name bridge ☑ ETH1 ☑ ETH2 ☑ ETH3 ☑ ETH4

☑ IP / Mask 192.168.1.1/24 Note

Fig. 5: MIDGE3_Server Ethernet IP

Go to the SETTINGS > Interfaces > Cellular menu. Set the interface to suit your APN setup (APN name, credentials, MTU, …). We also suggest setting the "Link testing" option so that M!DGE3 periodically pings a defined IP address via the cellular interface. If the ping is not working correctly, the cellular connection is restarted (which may help in particular situations).



Unit time: 2023-11-06 12:54:53 (UTC+0)

☑ Cellular MAIN Enabled

Parameters

Masquerade: On
Allow unit management: On
Link testing: On
Profile switching: Off

Link testing

Test period [s]: 60
Repeat period [s]: 60
Retries [No]: 10
Target address: 10.203.0.1
Enable second target address: Off

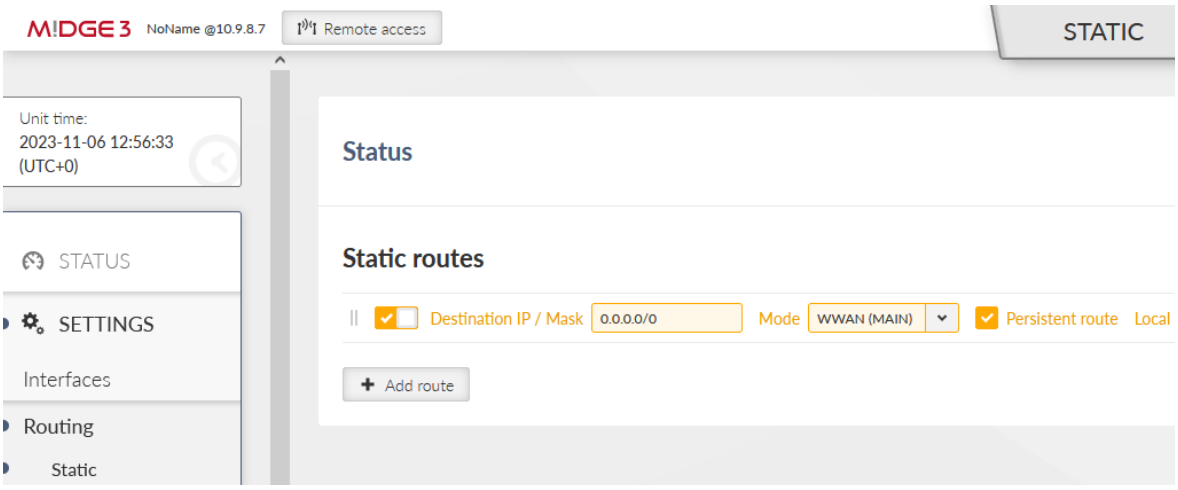
Cellular profiles

Minimum number of 1 rows of table Cellular profiles has been reached.

● 0 private_APN
Access point name (APN): private_APN
Preferred service: 4G (LTE) first

Fig. 6: MIDGE3_Server Cellular interface

Go to the SETTINGS > Routing > Static menu and add one static route. The Destination should either be the APN subnet, or a complete default gateway (0.0.0.0/0). Set the Mode to “WWAN (MAIN)”.



Unit time: 2023-11-06 12:56:33 (UTC+0)

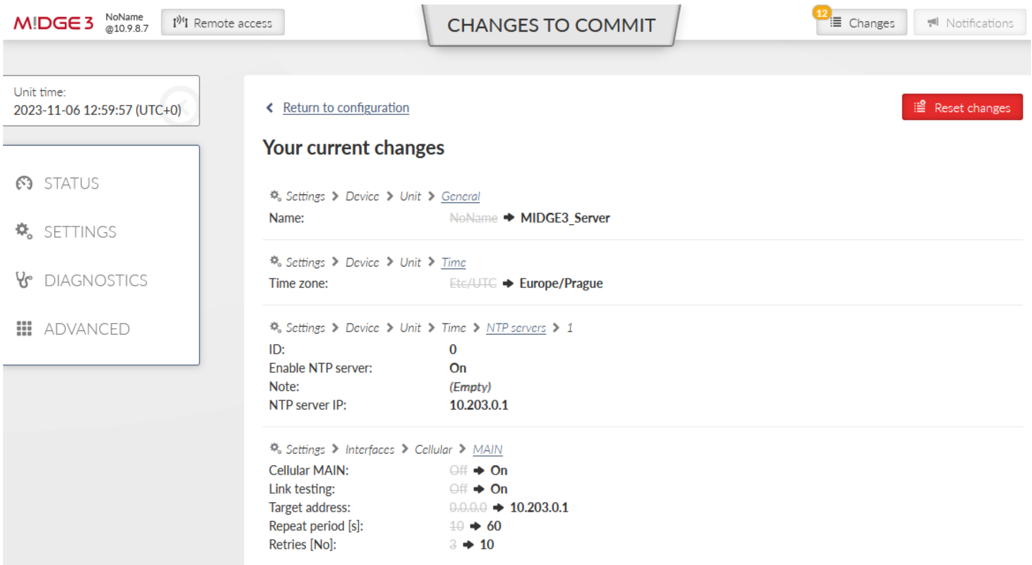
Status

Static routes

☑ Destination IP / Mask: 0.0.0.0/0 Mode: WWAN (MAIN) ☑ Persistent route Local

Fig. 7: MIDGE3_Server Static routing

Save the changes now. OpenVPN configuration follows.



Unit time:
2023-11-06 12:59:57 (UTC+0)

Your current changes

Settings > Device > Unit > General

Name: ~~NoName~~ → MIDGE3_Server

Settings > Device > Unit > Time

Time zone: ~~Etc/UTC~~ → Europe/Prague

Settings > Device > Unit > Time > NTP servers > 1

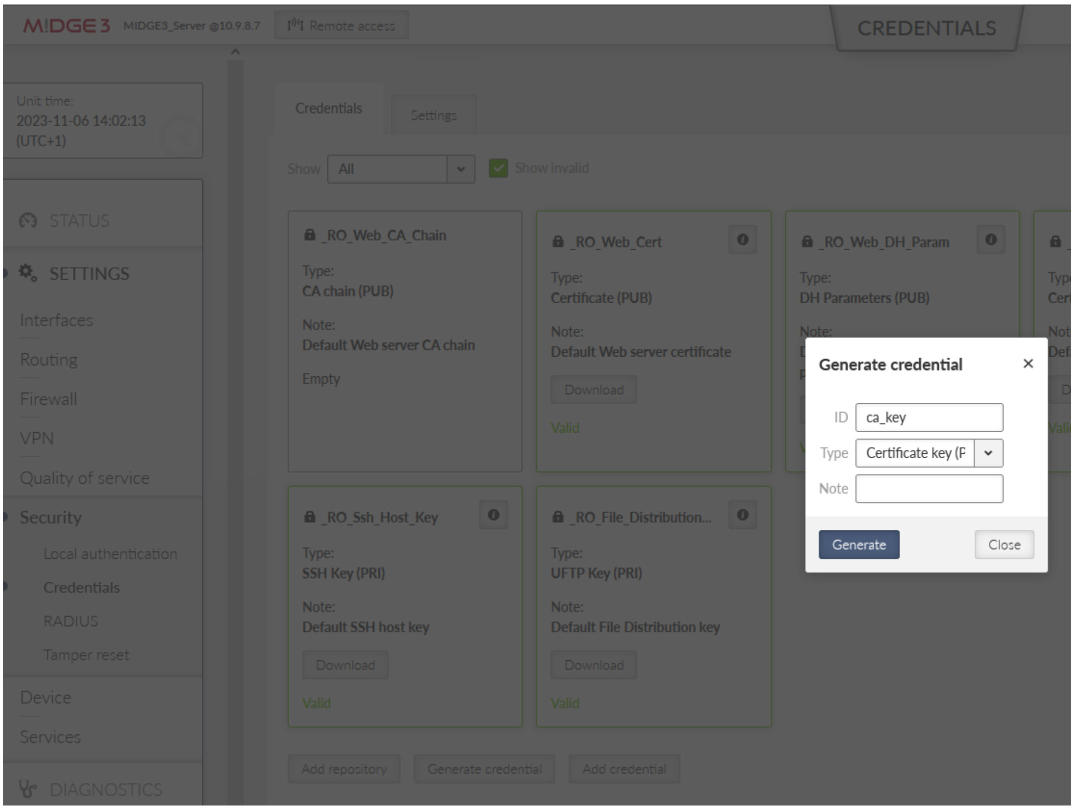
ID: 0
Enable NTP server: On
Note: (Empty)
NTP server IP: 10.203.0.1

Settings > Interfaces > Cellular > MAIN

Cellular MAIN: ~~Off~~ → On
Link testing: ~~Off~~ → On
Target address: ~~0.0.0.0~~ → 10.203.0.1
Repeat period [s]: ~~10~~ → 60
Retries [No]: ~~3~~ → 10

Fig. 8: MIDGE3_Server Changes to commit

Go back to the SETTINGS > Security > Credentials menu. Click on the “Generate credential” button. Select “Certificate key (PRI)” option to generate a private key. This private key is going to be a private key of our Local CA (Certification Authority). Let’s name it “ca_key”.



Unit time:
2023-11-06 14:02:13
(UTC+1)

_RO_Web_CA_Chain
Type:
CA chain (PUB)
Note:
Default Web server CA chain
Empty

_RO_Web_Cert
Type:
Certificate (PUB)
Note:
Default Web server certificate
Valid

_RO_Web_DH_Param
Type:
DH Parameters (PUB)

_RO_Ssh_Host_Key
Type:
SSH Key (PRI)
Note:
Default SSH host key
Valid

_RO_File_Distribution...
Type:
UFTP Key (PRI)
Note:
Default File Distribution key
Valid

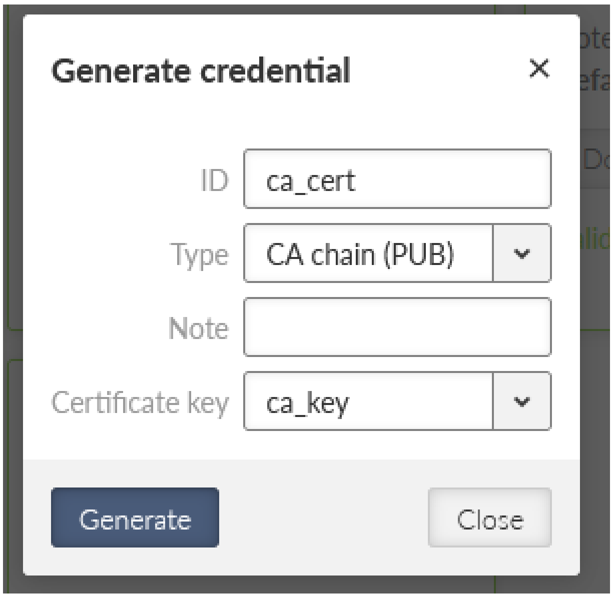
Generate credential

ID: ca_key
Type: Certificate key (P
Note:

Generate Close

Fig. 9: MIDGE3_Server Generating the CA key

Once completed, create the CA’s public certificate by clicking on the Generate credential button again. Set the ID to be “ca_cert” and the Type “CA chain (PUB)”.



Generate credential

ID: ca_cert

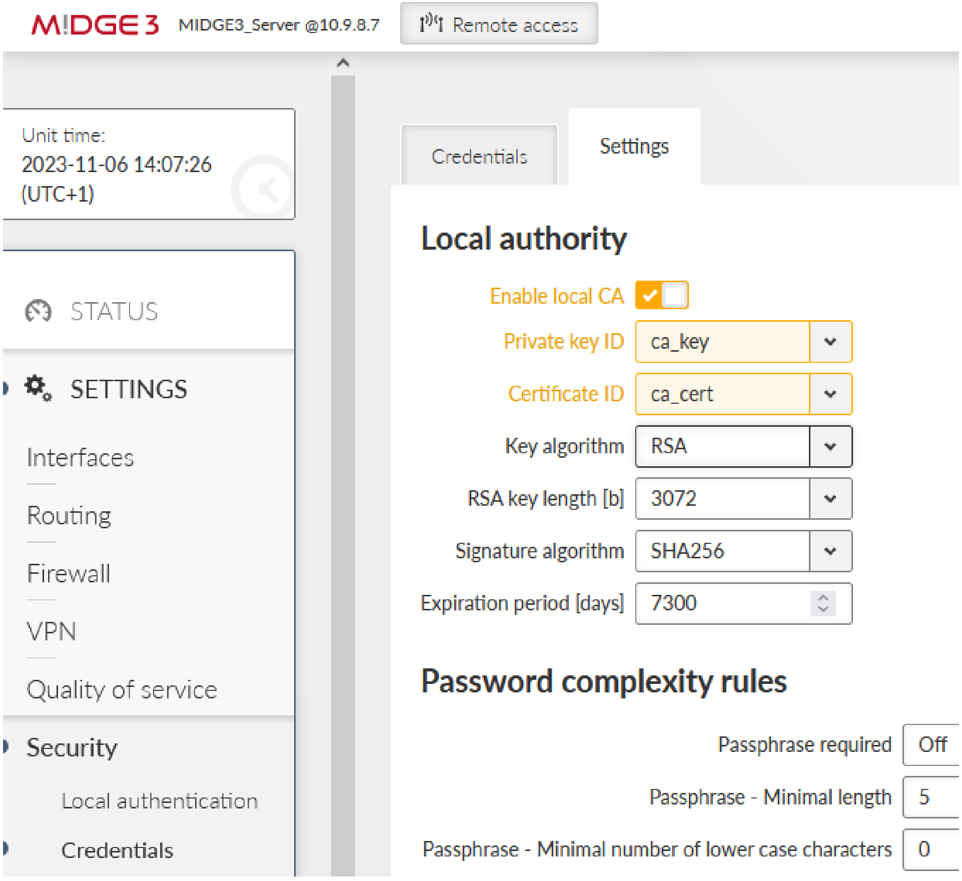
Type: CA chain (PUB)

Note:

Certificate key: ca_key

Fig. 10: MIDGE3_Server, CA certificate

Go to the “Settings” tab within the same menu and enable this MIDGE3_Server to be a local CA and specify created key & certificate.



Unit time:
2023-11-06 14:07:26
(UTC+1)

Local authority

Enable local CA ☑
Private key ID: ca_key
Certificate ID: ca_cert
Key algorithm: RSA
RSA key length [b]: 3072
Signature algorithm: SHA256
Expiration period [days]: 7300

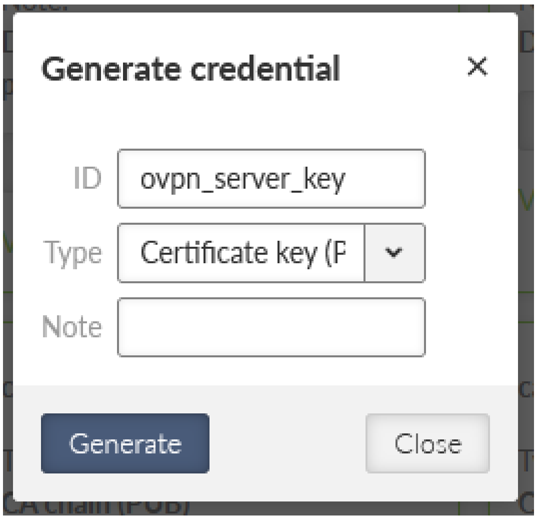
Password complexity rules

Passphrase required: Off
Passphrase - Minimal length: 5
Passphrase - Minimal number of lower case characters: 0

Fig. 11: MIDGE3_Server Enabling local CA

Save the changes.

From now on, we can use MIDGE3_Server as a trusted source for generating and signing keys for OpenVPN server and clients. Go back to the “Credentials” tab and generate another private key, now for the MIDGE3_Master again, but for the OpenVPN server itself (not the CA).



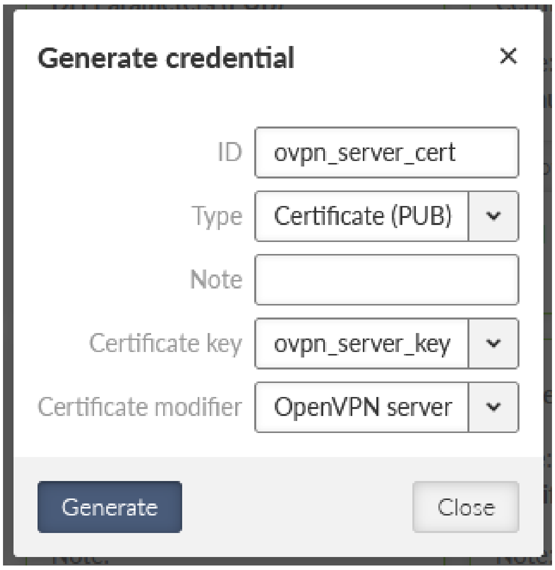
Generate credential

ID: ovpn_server_key
Type: Certificate key (P
Note:

Fig. 12: MIDGE3_Server OpenVPN server private key

Generate a new OpenVPN server certificate. Set

- ID to “ovpn_server_cert”
- Type to “Certificate (PUB)”
- Certificate key to our generated key “ovpn_server_key”
- and Certificate modifier to “OpenVPN server” – this is not mandatory, but it improves the VPN tunnel security – primarily it protects any client to mimic it is a server (strict roles for each certificate usage – server, or client).



Generate credential

ID: ovpn_server_cert

Type: Certificate (PUB)

Note:

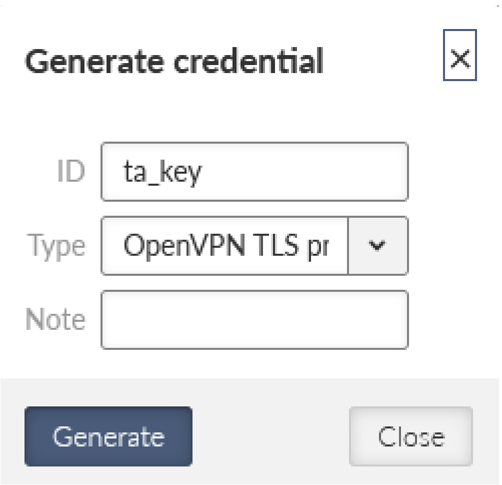
Certificate key: ovpn_server_key

Certificate modifier: OpenVPN server

Fig. 13: MIDGE3_Server, OpenVPN server public certificate

These two files with the “ca_cert” are enough for the OpenVPN server. We can still improve a security by additional TLS Protection – either “TLS auth” or “TLS Crypt”. TLS Auth helps against port scanning, UDP floods or DoS. TLS Crypt does the same, and adds some additional protection against sniffing certificate attributes or OpenVPN presence.

We will configure the TLS-Auth option. Generate a new shared key with ID equal to “ta_key”. Select a type to be “OpenVPN TLS Protection key (PRI)”.



Generate credential

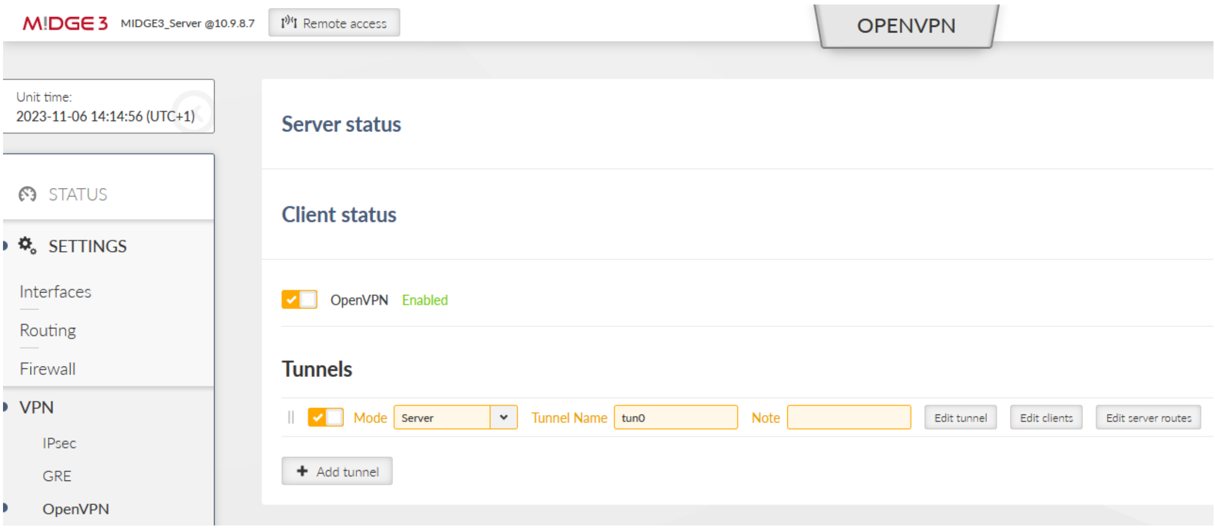
ID: ta_key

Type: OpenVPN TLS pr

Note:

Fig. 14: MIDGE3_Server, OpenVPN TLS Protection key ta_key (TLS-Auth)

All the files for the OpenVPN server are ready. Go to the SETTINGS > VPN > OpenVPN menu. Enable OpenVPN service and click on the “Add tunnel” button. Select a mode to be a “server”.



M!DGE3 MIDGE3_Server @10.9.8.7

Unit time: 2023-11-06 14:14:56 (UTC+1)

Server status

Client status

☑ OpenVPN Enabled

Tunnels

☑ Mode: Server Tunnel Name: tun0 Note:

Fig. 15: MIDGE3_Server, OpenVPN server settings

Open the “Edit tunnel” menu. Select the required tunnel parameters. We leave all in defaults, except:

- ○ Assign dynamic client addresses “On”

  ○ Private key ID “ovpn_server_key”

  ○ Certificate ID “ovpn_server_cert”

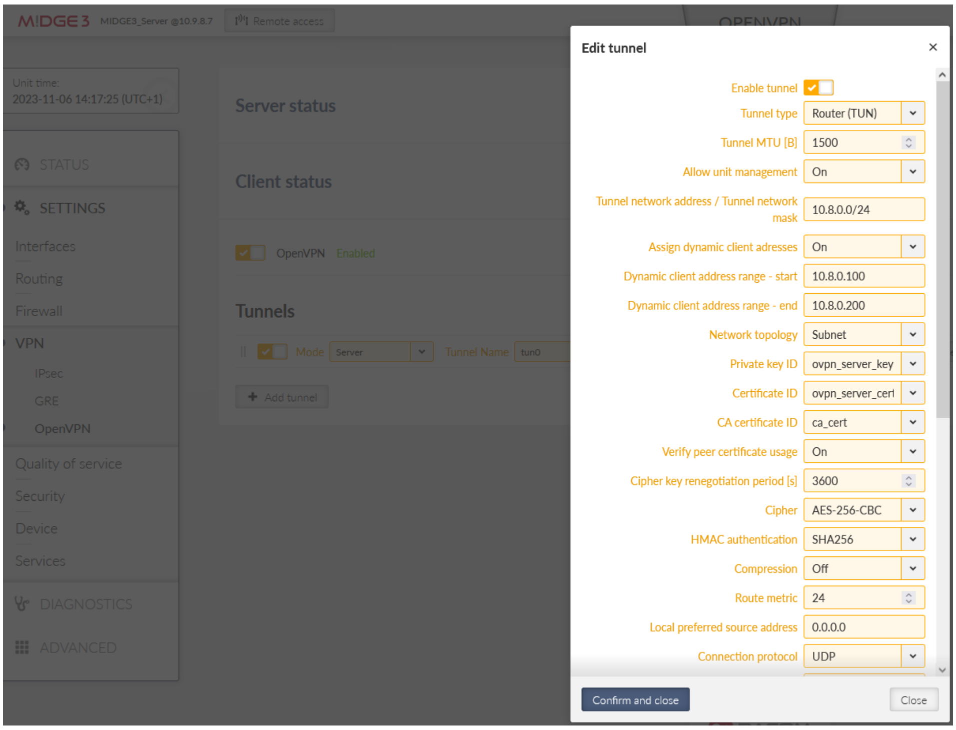
  ○ CA certificate ID “ca_cert”

  ○ Cipher “AES-256-CBC”

  ○ HMAC authentication “SHA256”

- ○ DH parameters ID “_RO_Web_DH_Param”
- ○ Enhanced TLS protection “On”
- ○ TLS protection shared key ID “ta_key”

Confirm the settings.



Edit tunnel

Enable tunnel	☑
Tunnel type	Router (TUN)
Tunnel MTU [B]	1500
Allow unit management	On
Tunnel network address / Tunnel network mask	10.8.0.0/24
Assign dynamic client adresses	On
Dynamic client address range - start	10.8.0.100
Dynamic client address range - end	10.8.0.200
Network topology	Subnet
Private key ID	ovpn_server_key
Certificate ID	ovpn_server_cert
CA certificate ID	ca_cert
Verify peer certificate usage	On
Cipher key renegotiation period [s]	3600
Cipher	AES-256-CBC
HMAC authentication	SHA256
Compression	Off
Route metric	24
Local preferred source address	0.0.0.0
Connection protocol	UDP

Fig. 16: MIDGE3_Server, OpenVPN server settings

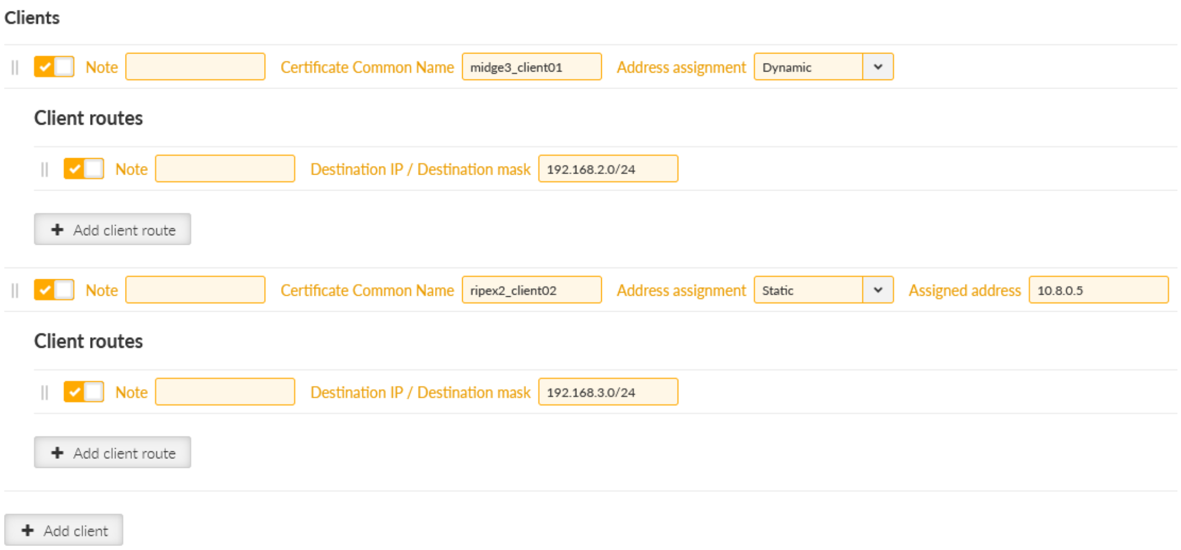
Click on the “Edit clients” button. Add two clients, set the 1st client:

- Certificate Common Name midge3_client01
- Address assignment Dynamic (within 10.8.0.100 – 200 address range)
- Client routes 192.168.2.0/24

And 2nd client:

- Certificate Common Name ripex2_client02
- Address assignment 10.8.0.5
- Client routes 192.168.3.0/24

The configured routes are particular clients’ LANs which are then propagated to the Server and to each Client for direct client-to-client communication.



Clients

☑ Note: Certificate Common Name: midge3_client01 Address assignment: Dynamic

Client routes

☑ Note: Destination IP / Destination mask: 192.168.2.0/24

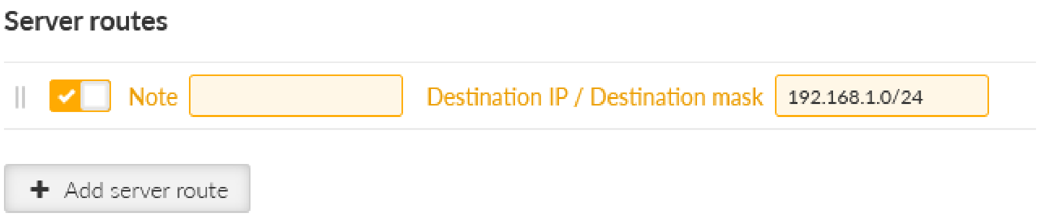
☑ Note: Certificate Common Name: ripex2_client02 Address assignment: Static Assigned address: 10.8.0.5

Client routes

☑ Note: Destination IP / Destination mask: 192.168.3.0/24

Fig. 17: MIDGE3_Server List of clients

Close the window and click on the “Edit server routes” button. Configure a network 192.168.1.0/24 to be pushed to connected clients. This range is the Server’s LAN segment.



Server routes

☑ Note: Destination IP / Destination mask: 192.168.1.0/24

Fig. 18: MIDGE3_Server, OpenVPN server route

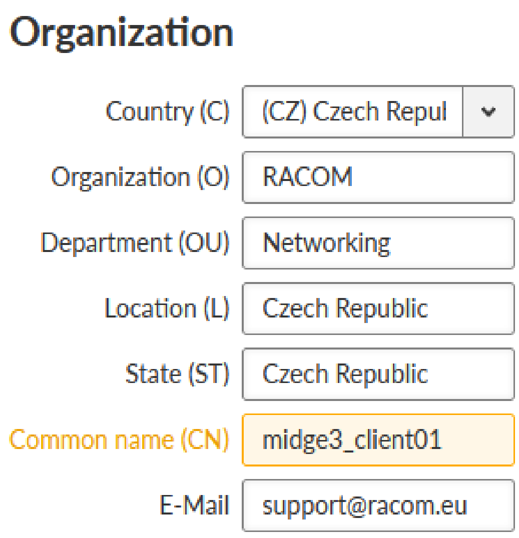
Apply all the changes.

Once completed, the OpenVPN server is ready, but we still need to configure both clients and generate/upload keys&certificates.

First of all, we need correct credentials (keys and certificates) for both the clients. We generate them via two different ways.

- For the 1st client (midge3_client01), we will generate all in the server. Then, we will download them to our PC and upload them to the MIDGE3_Client01’s credentials.
- For the 2nd client (ripex2_client02), we will generate them in the client itself, and we use our MIDGE3_Server CA to sign the generated CSR (Certificate Signing Request) - so it creates a valid certificate without a ripex_client02’s private key being shared/exposed. This procedure is more secure.

For now, stay in the MIDGE3_Server menu and go to the SETTINGS > Security > Credentials > Settings menu. Change the Organization Common Name (CN) to “midge3_client01”. Apply the changes.

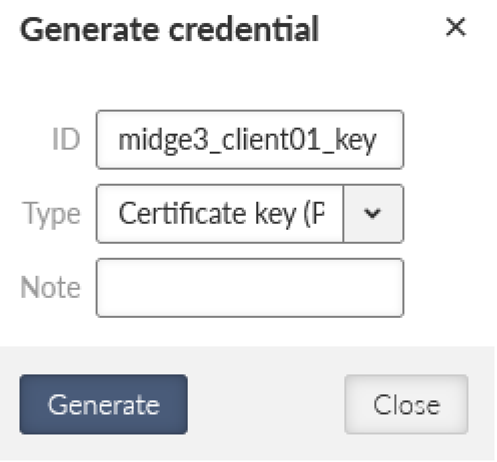


Organization

Country (C)	(CZ) Czech Repul
Organization (O)	RACOM
Department (OU)	Networking
Location (L)	Czech Republic
State (ST)	Czech Republic
Common name (CN)	midge3_client01
E-Mail	support@racom.eu

Fig. 19: MIDGE3_Server Common Name (CN) for the 1st client

Now, we can generate correct files for MIDGE3_Client01. Go back to the Credentials menu and generate a private key for MIDGE3_Client01's OpenVPN. The ID is “midge3_client01_key”.

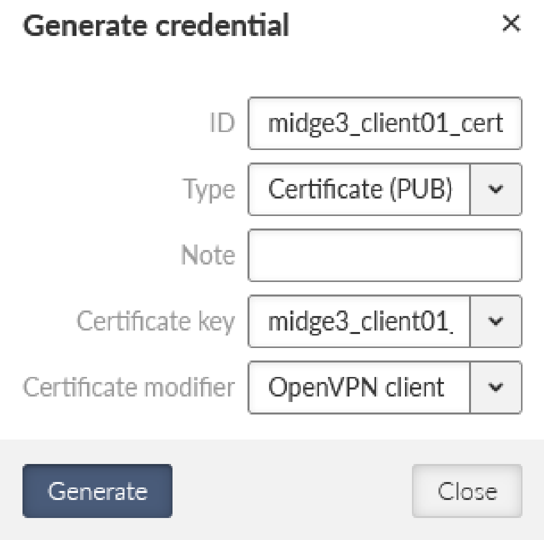


Generate credential

ID	midge3_client01_key
Type	Certificate key (F
Note	

Fig. 20: MIDGE3_Server OpenVPN Private key for MIDGE3_Client01

Generate a valid MIDGE3_Client01's certificate for OpenVPN using the newly generated key. The ID is “midge3_client01_cert”, Type is “Certificate (PUB)”, Certificate key must be our “midge3_client01_key” and because we check the Extended Key Usage of the certificate, select the “OpenVPN client” modifier.



Generate credential

ID: midge3_client01_cert

Type: Certificate (PUB)

Note:

Certificate key: midge3_client01_

Certificate modifier: OpenVPN client

Fig. 21: MIDGE3_Server Generating MIDGE3_Client01's public OpenVPN certificate (client)

Download required files for the 1st client (MIDGE3_Client01):

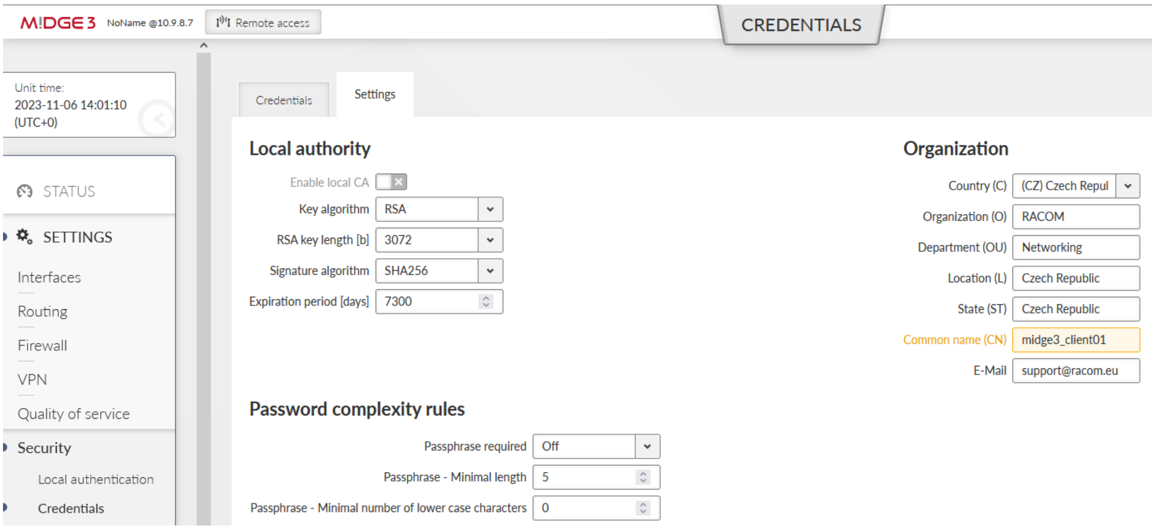
- ca_cert CA certificate
- midge3_client01_cert client's certificate
- midge3_client01_key client's private key
- ta_key TLS Protection key (TLS-Auth)

You can either download them encrypted (using a strong password) or unencrypted. Select proper names if not fully satisfied with automatic file names.

Change the MIDGE3_Server Common name back to "midge3_server" and save the changes.

1.1.2. MIDGE3_Client01

Login to the MIDGE3_Client01 unit and go to the SETTINGS > Security > Credentials > Settings menu. You can change the Common name to "midge3_client01", even though it is not necessary.



Local authority

Enable local CA ☒

Key algorithm: RSA

RSA key length [b]: 3072

Signature algorithm: SHA256

Expiration period [days]: 7300

Password complexity rules

Passphrase required: Off

Passphrase - Minimal length: 5

Passphrase - Minimal number of lower case characters: 0

Organization

Country (C): (CZ) Czech Repul

Organization (O): RACOM

Department (OU): Networking

Location (L): Czech Republic

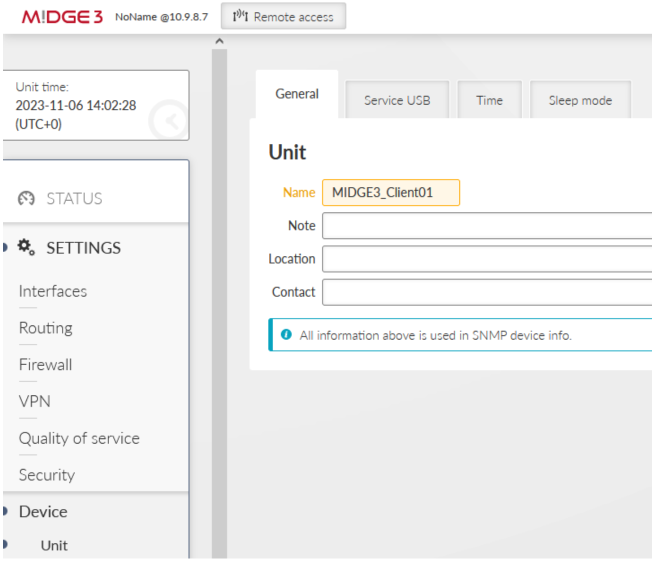
State (ST): Czech Republic

Common name (CN): midge3_client01

E-Mail: support@racom.eu

Fig. 22: MIDGE3_Client01 Common name

Set the unit name to MIDGE3_Client01.



Unit

Name: MIDGE3_Client01

Note:

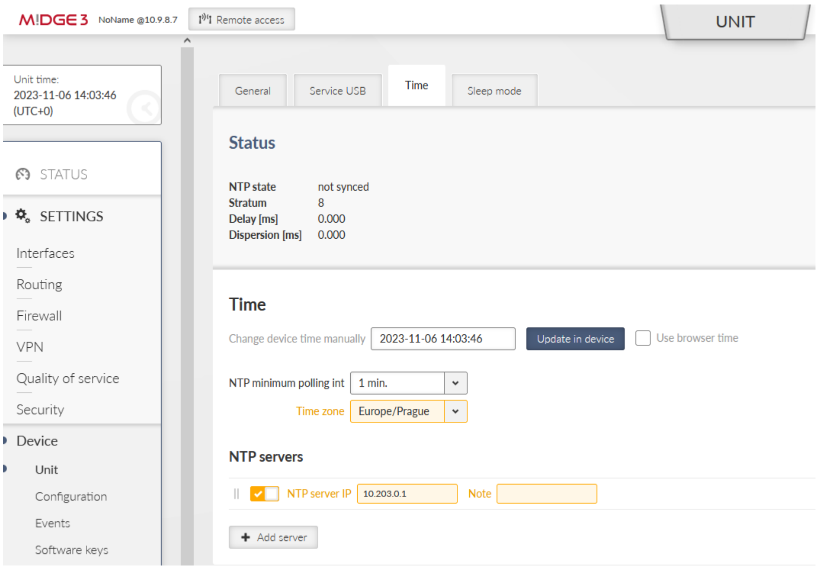
Location:

Contact:

All information above is used in SNMP device info.

Fig. 23: MIDGE3_Client01 Unit name

Configure the Time zone and NTP server to suit your environment.



Unit time:
2023-11-06 14:03:46
(UTC+0)

Status

NTP state	not synced
Stratum	8
Delay [ms]	0.000
Dispersion [ms]	0.000

Time

Change device time manually 2023-11-06 14:03:46 □ Use browser time

NTP minimum polling int 1 min.

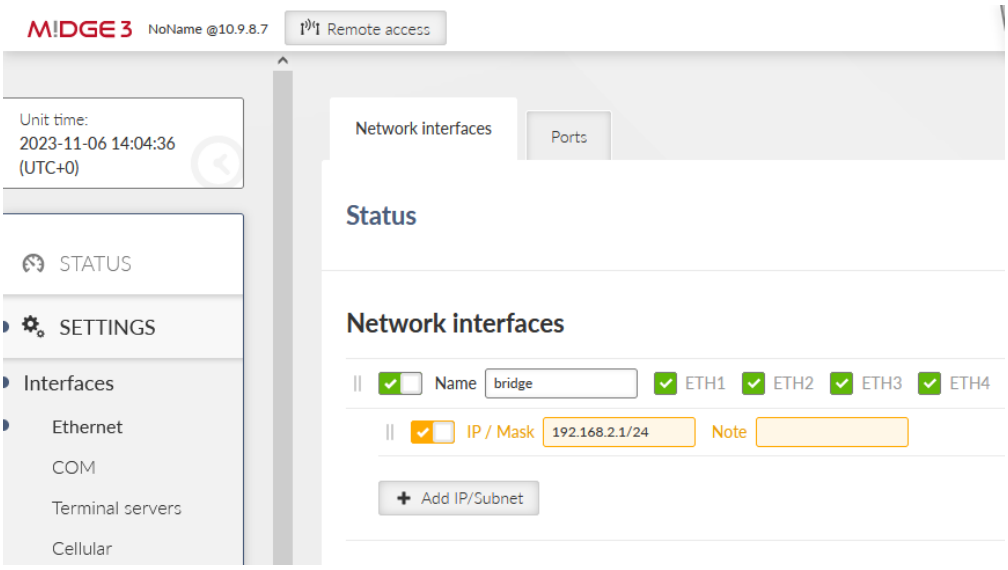
Time zone Europe/Prague

NTP servers

☑ NTP server IP 10.203.0.1 Note

Fig. 24: MIDGE3_Client01 Time settings

Go to the SETTINGS > Interfaces > Ethernet and set the LAN IP to 192.168.2.1/24.



Unit time:
2023-11-06 14:04:36
(UTC+0)

Status

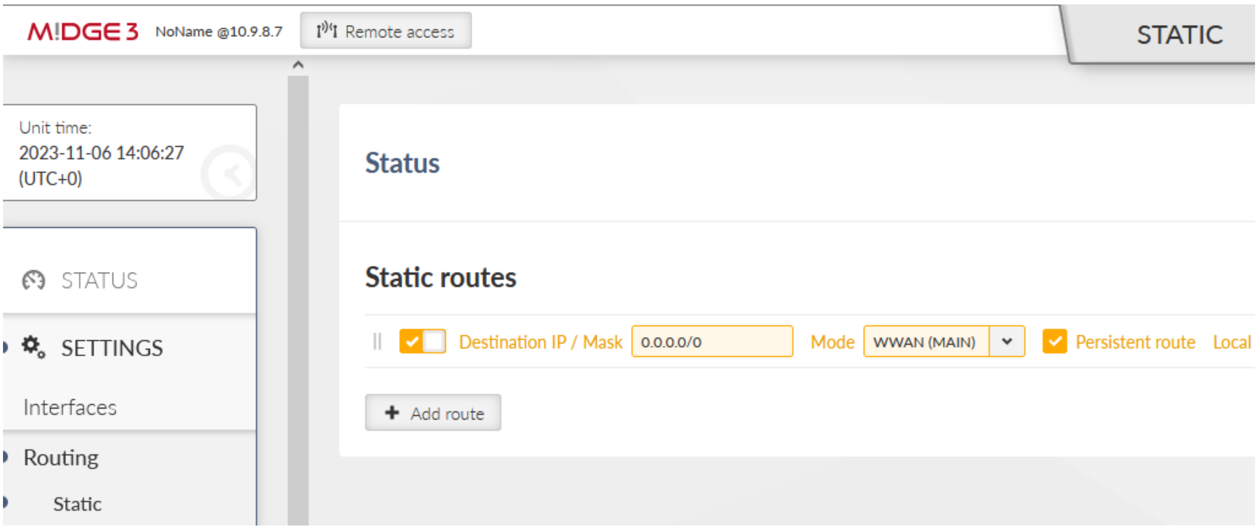
Network interfaces

☑ Name bridge ☑ ETH1 ☑ ETH2 ☑ ETH3 ☑ ETH4

☑ IP / Mask 192.168.2.1/24 Note

Fig. 25: MIDGE3_Client01 Ethernet IP address

Enable and configure the SETTINGS > Interfaces > Cellular interface to suit your APN. Continue with adding the default GW via WWAN (MAIN).



☑ Destination IP / Mask 0.0.0.0/0 Mode WWAN (MAIN) ☑ Persistent route Local

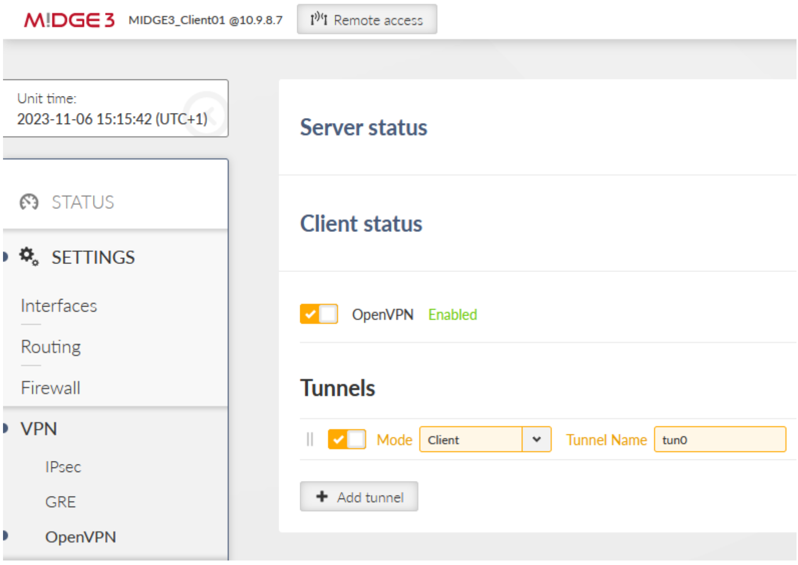
Fig. 26: MIDGE3_Client01 Static route

Save and apply all the changes.

Go to the SETTINGS > Security > Credentials menu and add all four downloaded keys/certificates. You need to import each with a correct "Type".

- CA cert ID: ca_cert, Type: CA chain (PUB)
- Client's certificate ID: midge3_client01_cert, Type: Certificate (PUB)
- Client's key ID: midge3_client01_key, Type: Certificate key (PRI)
- TLS-Auth key ID: ta_key, Type: OpenVPN TLS Protection key (PRI)

Go to the SETTINGS > VPN > OpenVPN menu. Enable the service and add the tunnel (Mode: Client).



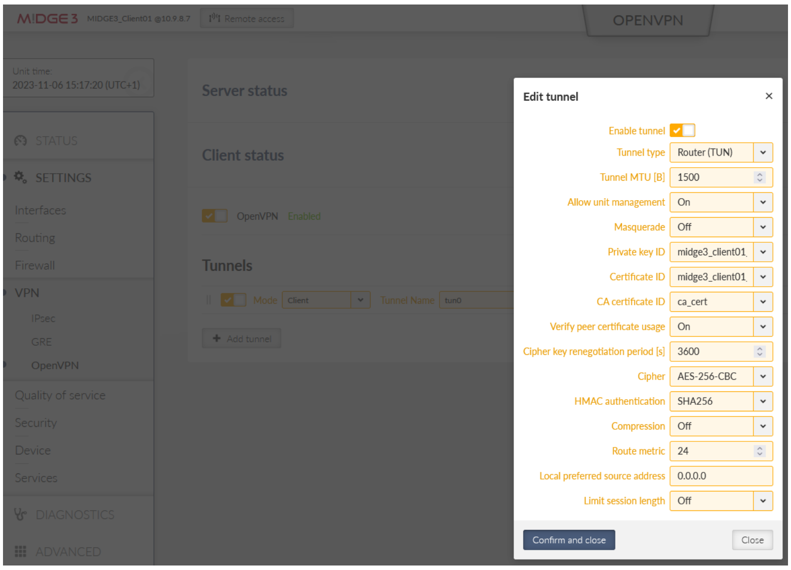
☑ OpenVPN Enabled

☑ Mode Client Tunnel Name tun0

Fig. 27: MIDGE3_Client01 OpenVPN settings

Edit the tunnel to match the Server's settings. Keep all parameters in defaults, except:

- Private key ID midge3_client01_key
- Certificate ID midge3_client01_cert
- CA certificate ID ca_cert
- Cipher AES_256_CBC
- HMAC authentication SHA256



OpenVPN Enabled

Mode Client, Tunnel Name tun0

Edit tunnel

Enable tunnel	☑
Tunnel type	Router (TUN)
Tunnel MTU [B]	1500
Allow unit management	On
Masquerade	Off
Private key ID	midge3_client01_
Certificate ID	midge3_client01_
CA certificate ID	ca_cert
Verify peer certificate usage	On
Cipher key renegotiation period [s]	3600
Cipher	AES-256-CBC
HMAC authentication	SHA256
Compression	Off
Route metric	24
Local preferred source address	0.0.0.0
Limit session length	Off

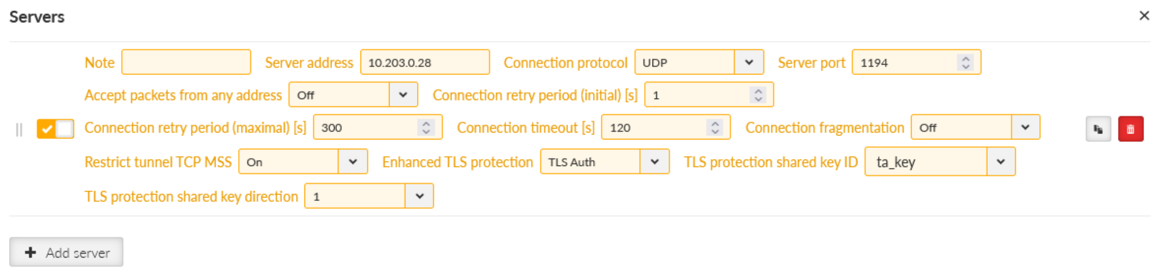
Fig. 28: MIDGE3_Client01 OpenVPN tunnel parameters

Confirm the changes.

Click on the “Edit servers” button and add one server. Fill in

- Server address 10.203.0.28
- Enhanced TLS Protection TLS Auth
- TLS Protection shared key ID ta_key

Note: Your server address can be different, suit the setting to your APN.

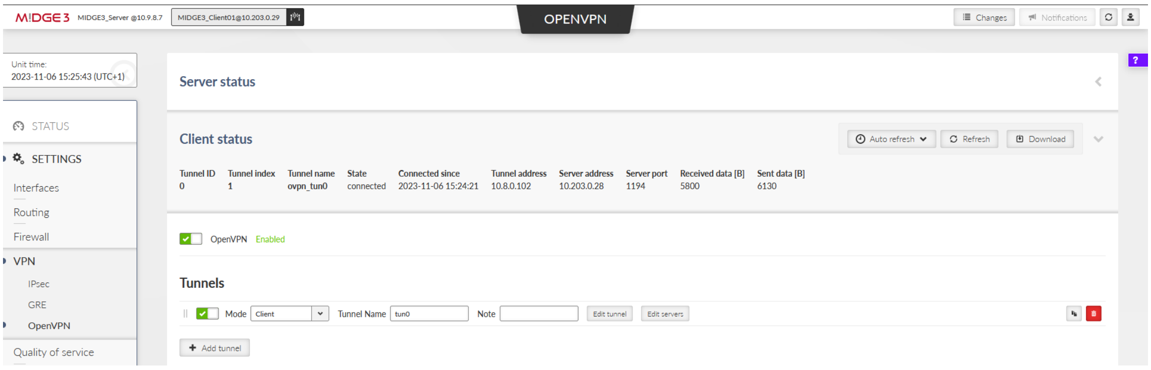


Note	
Server address	10.203.0.28
Connection protocol	UDP
Server port	1194
Accept packets from any address	Off
Connection retry period (initial) [s]	1
Connection retry period (maximal) [s]	300
Connection timeout [s]	120
Connection fragmentation	Off
Restrict tunnel TCP MSS	On
Enhanced TLS protection	TLS Auth
TLS protection shared key ID	ta_key
TLS protection shared key direction	1

Fig. 29: MIDGE3_Client01 OpenVPN Servers

Apply the changes.

You can check if this OpenVPN client has connected successfully, or not. If not, download a Diagnostic package and go through the OpenVPN logs to find possible reasons. You should also check all the OpenVPN parameters so that they match.



Unit time:
2023-11-06 15:25:43 (UTC+1)

Server status

Client status

Tunnel ID	Tunnel index	Tunnel name	State	Connected since	Tunnel address	Server address	Server port	Received data [B]	Sent data [B]
0	1	ovpn_tun0	connected	2023-11-06 15:24:21	10.8.0.102	10.203.0.28	1194	5800	6130

☑ OpenVPN Enabled

Tunnels

☑ Mode Client Tunnel Name tun0 Note

Fig. 30: MIDGE3_Client01, successfully connected via OpenVPN

1.1.3. RipEX2_Client02

Login to the RipEX2_Client02 unit and go to the SETTINGS > Security > Credentials > Settings menu and set the Common name to be “ripex2_client02”. It is mandatory this time, because we will generate the client’s key and CSR on this unit, not in the server.

Note: Due to multiple same steps, some of the configuration screens are not provided.

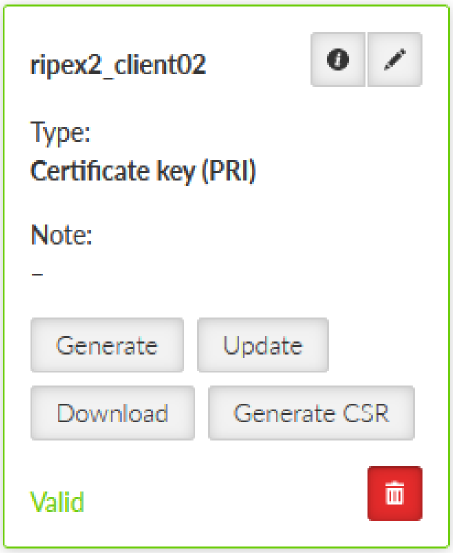
Repeat most of the steps from the M!DGE3 unit as well.

- Unit name to be RipEX2_Client02
- Correct Time zone and NTP server
- Ethernet bridge IP 192.168.3.1/24
- Cellular settings to suit your APN with Link testing
- Default (static) route, Mode: WWAN (EXT)
  - EXT is a must now, because setting RipEX2, not M!DGE3 device

Apply the changes.

Go back to the SETTINGS > Security > Credentials menu. Generate a private key. ID is “ripex2_client02_key”. Type is “Certificate key (PRI)”.

Generate CSR for this particular key. Click on the “Generate CSR” button located at this particular Credential window.



ripex2_client02

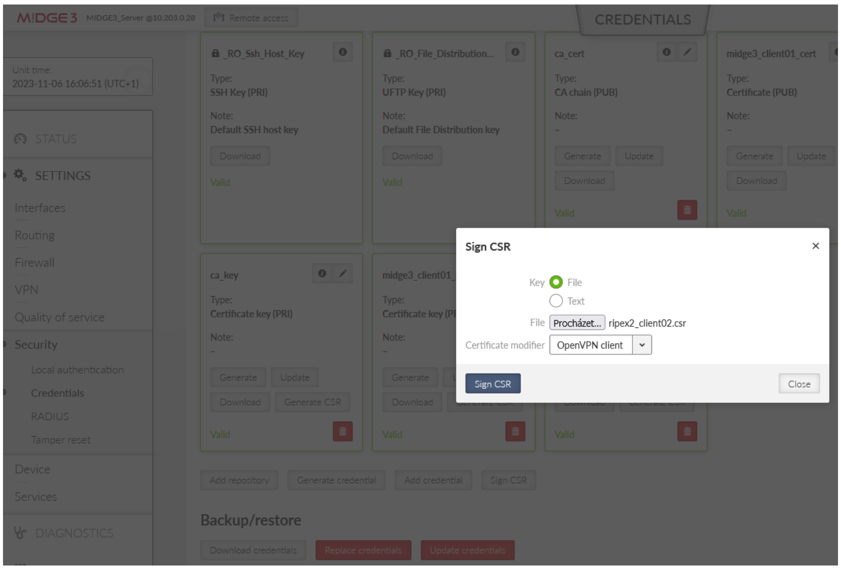
Type:
Certificate key (PRI)

Note:
–

Fig. 31: RipEX2_Client02 Generate CSR button

It downloads the CSR file into your PC. Login (locally or remotely) to MIDGE3_Server and go to the SETTINGS > Security > Credentials menu. Find the button “Sign CSR” next to the buttons with generating/uploading credentials.

Click on it and select the CSR file located in your PC. Select the Certificate modifier to be the OpenVPN client. Click on the Sign CSR button.



Sign CSR

Key ● File ○ Text

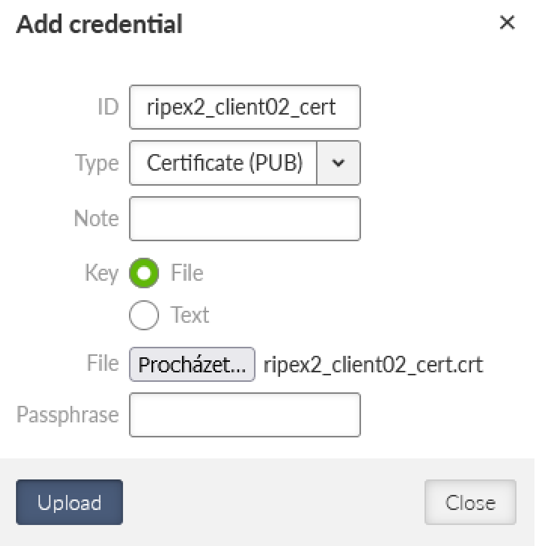
File Procházet... ripex2_client02.csr

Certificate modifier OpenVPN client

Fig. 32: MIDGE3_Server Signing 2nd client’s CSR

This downloads a valid certificate into your PC. Name it accordingly, e.g., “ripex2_client02_cert.crt”.

Go back to RipEX2_Client02’s web interface and add/upload this certificate. Set the ID to “ripex2_client02_cert” and Type to “Certificate (PUB)”.



Add credential

ID ripex2_client02_cert

Type Certificate (PUB)

Note

Key ● File ○ Text

File Procházet... ripex2_client02_cert.crt

Passphrase

Fig. 33: RipEX2_client02 Uploading a client's certificate (signed CSR)

Upload the CA certificate and the TLS Protection key the same way as in MIDGE3_Client01.

Go to the SETTINGS > VPN > OpenVPN menu, enable it and add one tunnel.

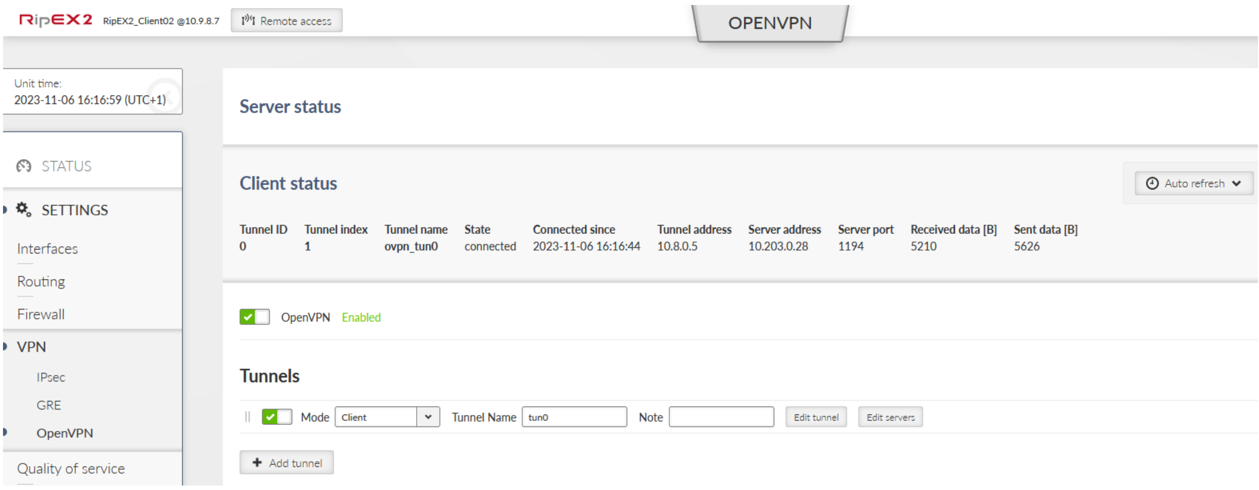
Edit the tunnel's parameters:

- Private key ID ripex2_client02_key
- Certificate ID ripex2_client02_cert
- CA certificate ID ca_cert
- Cipher AES_256_CBC
- HMAC authentication SHA256

Confirm the changes.

Edit the server settings. Add one server and set its address to 10.203.0.28 (it may differ for your APN). Enable Enhanced TLS protection with the ta_key.

Close the window and apply all the changes. Check if the client got connected and the assigned IP address for the tunnel is 10.8.0.5.



Server status

Client status

Tunnel ID	Tunnel index	Tunnel name	State	Connected since	Tunnel address	Server address	Server port	Received data [B]	Sent data [B]
0	1	ovpn_tun0	connected	2023-11-06 16:16:44	10.8.0.5	10.203.0.28	1194	5210	5626

☑ OpenVPN Enabled

Tunnels

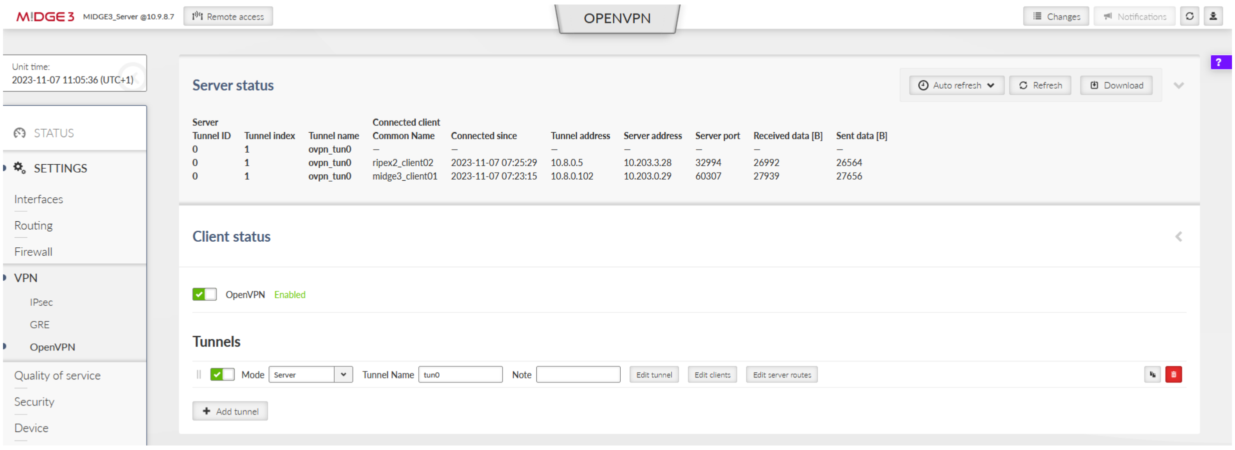
☑ Mode Client Tunnel Name tun0 Note

Fig. 34: RipEX2_Client02, successfully connected

1.1.4. Diagnostics

Within the SETTINGS > VPN > OpenVPN menu, open either the Server or Client status to see the details about currently connected units.

The MIDGE3_Server Status while both the clients are connected:



Server status

Server Tunnel ID	Tunnel index	Tunnel name	Connected client Common Name	Connected since	Tunnel address	Server address	Server port	Received data [B]	Sent data [B]
0	1	ovpn_tun0	–	–	–	–	–	–	–
0	1	ovpn_tun0	ripex2_client02	2023-11-07 07:25:29	10.8.0.5	10.203.3.28	32994	26992	26564
0	1	ovpn_tun0	midge3_client01	2023-11-07 07:23:15	10.8.0.102	10.203.0.29	60307	27939	27656

Client status

☑ OpenVPN Enabled

Tunnels

☑ Mode Server Tunnel Name tun0 Note

Fig. 35: MIDGE3_Server OpenVPN Status

Important fields

- Tunnel name Linux interface name (useful for firewalls, NAPT, …)
- Common name CN of the client. Especially in case only know CNs are allowed to be connected.
- Connected since Since what date&time the client is connected
- Tunnel address Assigned OpenVPN tunnel IP address
- Server address WAN IP address of the client

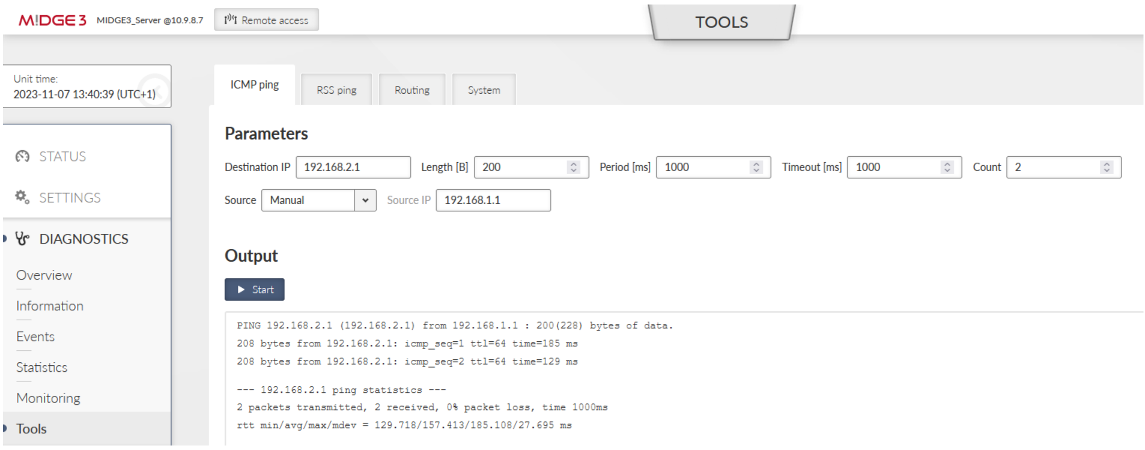
In case of the Client instance, there is “State” column – it can either be connected or disconnected.

Example of a client which cannot connect

A particular client is displayed in the Status, but has no Tunnel address assigned. And it also happens that such client is deleted from the Status within several seconds and may appear again within a while, …

- The particular client’s Common name is not allowed to connect to the server – add it or fix a possible typo in the list of clients.

You should also try the DIAGNOSTICS > Tools > ICMP ping to check the accessibility of all LAN subnets. Either from the server to the client and back, or from client to client (it’s allowed by default).



Unit time:
2023-11-07 13:40:39 (UTC+1)

Parameters

Destination IP 192.168.2.1 Length [B] 200 Period [ms] 1000 Timeout [ms] 1000 Count 2

Source Manual Source IP 192.168.1.1

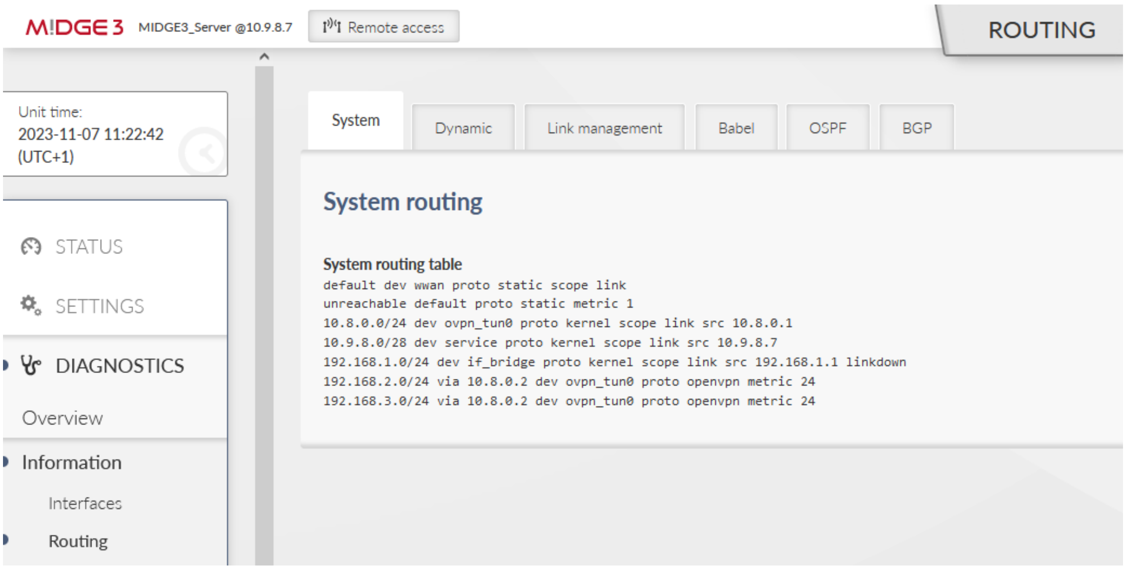
Output

```
PING 192.168.2.1 (192.168.2.1) from 192.168.1.1 : 200(228) bytes of data.
208 bytes from 192.168.2.1: icmp_seq=1 ttl=64 time=185 ms
208 bytes from 192.168.2.1: icmp_seq=2 ttl=64 time=129 ms

--- 192.168.2.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 129.718/157.413/185.108/27.695 ms
```

Fig. 36: MIDGE3_Server ICMP ping

Another place to check a current state is the DIAGNOSTICS > Information > Routing menu. Within the System routing tab, you should also see the particular VPN routes – via some “ovpn_” interface.



Unit time:
2023-11-07 11:22:42
(UTC+1)

System routing

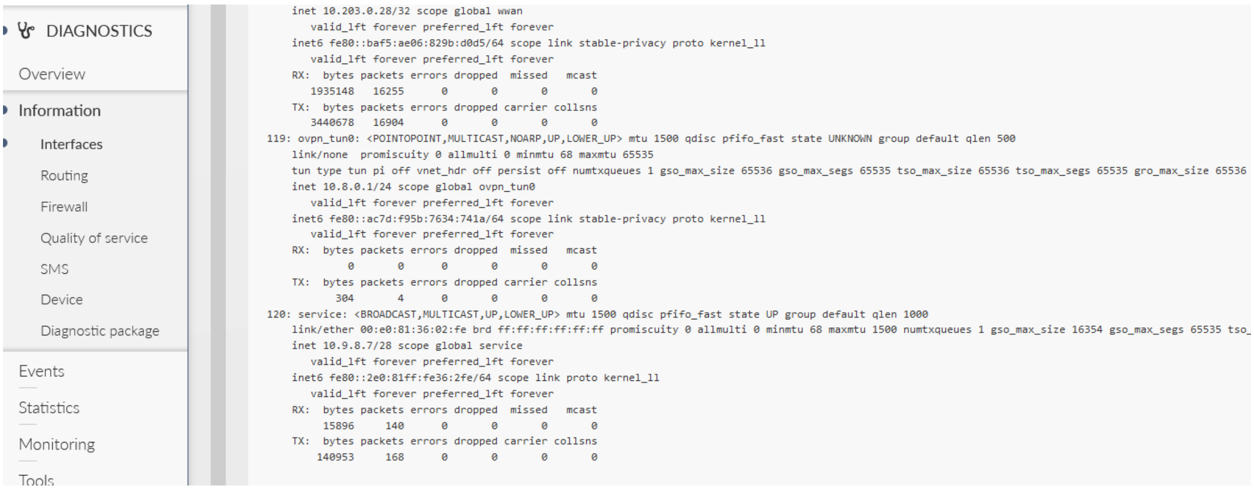
System routing table

```
default dev wwan proto static scope link
unreachable default proto static metric 1
10.8.0.0/24 dev ovpn_tun0 proto kernel scope link src 10.8.0.1
10.9.8.0/28 dev service proto kernel scope link src 10.9.8.7
192.168.1.0/24 dev if_bridge proto kernel scope link src 192.168.1.1 linkdown
192.168.2.0/24 via 10.8.0.2 dev ovpn_tun0 proto openvpn metric 24
192.168.3.0/24 via 10.8.0.2 dev ovpn_tun0 proto openvpn metric 24
```

Fig. 37: MIDGE3_Server Routing information

If some routing is missing, or is wrong, double check your server configuration – especially the Client and Server routes.

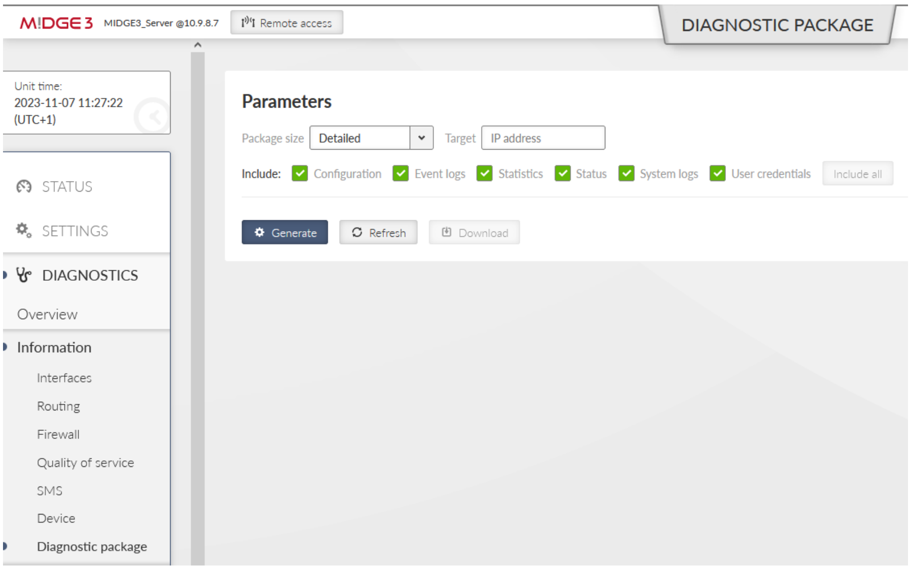
List of all interfaces can be displayed within the DIAGNOSTICS > Information > Interfaces menu. Try to find interfaces with “ovpn_” prefixes.



```
    inet 10.203.0.28/32 scope global wwan
       valid_lft forever preferred_lft forever
    inet6 fe80::baf5:ae06:829b:d0d5/64 scope link stable-privacy proto kernel_ll
       valid_lft forever preferred_lft forever
    RX:  bytes packets errors dropped  missed   mcast
       1935148   16255      0       0       0       0
    TX:  bytes packets errors dropped carrier collsns
       3440678   16904      0       0       0       0
119: ovpn_tun0: <POINTOPOINT,MULTICAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN group default qlen 500
    link/none  promiscuity 0 allmulti 0 minmtu 68 maxmtu 65535
    tun type tun pi off vnet_hdr off persist off numtxqueues 1 gso_max_size 65536 gso_max_segs 65535 tso_max_size 65536 tso_max_segs 65535 gro_max_size 65536
    inet 10.8.0.1/24 scope global ovpn_tun0
       valid_lft forever preferred_lft forever
    inet6 fe80::ac7d:f95b:7634:741a/64 scope link stable-privacy proto kernel_ll
       valid_lft forever preferred_lft forever
    RX:  bytes packets errors dropped  missed   mcast
             0       0      0       0       0       0
    TX:  bytes packets errors dropped carrier collsns
           304       4      0       0       0       0
120: service: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:e0:81:36:02:fe brd ff:ff:ff:ff:ff:ff promiscuity 0 allmulti 0 minmtu 68 maxmtu 1500 numtxqueues 1 gso_max_size 16354 gso_max_segs 65535 tso_
    inet 10.9.8.7/28 scope global service
       valid_lft forever preferred_lft forever
    inet6 fe80::2e0:81ff:fe36:2fe/64 scope link proto kernel_ll
       valid_lft forever preferred_lft forever
    RX:  bytes packets errors dropped  missed   mcast
         15896     140      0       0       0       0
    TX:  bytes packets errors dropped carrier collsns
        140953     168      0       0       0       0
```

Fig. 38: MIDGE3_Server List of interfaces

If you encounter any advanced connectivity/configuration issues, you can download the **Diagnostic package** within the DIAGNOSTICS > Information > Diagnostic package menu.



Unit time:
2023-11-07 11:27:22
(UTC+1)

Parameters

Package size: Detailed
Target: IP address

Include: ☑ Configuration ☑ Event logs ☑ Statistics ☑ Status ☑ System logs ☑ User credentials

Fig. 39: MIDGE3_Server Diagnostic package

Once downloaded, you need to extract the file and open the directory with logs. Go through the OpenVPN logs and try to find any reason for issues.

More details about possible issues in the *Troubleshooting* chapter.

1.2. Bridged (TAP) OpenVPN topology

One typical network type is that all the end devices are within the same subnet (e.g. 192.168.1.0/24), but require a communication to each other via the RipEX2 Radio network or M!DGE3 cellular network. This is now possible using a secured channel via OpenVPN and its option to bridge particular interfaces together so that it creates a flat L2 topology over the routed scenario.

Note: It is possible to do it for the RipEX2 radio network operating in the Router mode as well.

The following example is just a continuation of the *1.1. chapter*. We only do the required changes to match the desired IP topology and connectivity.

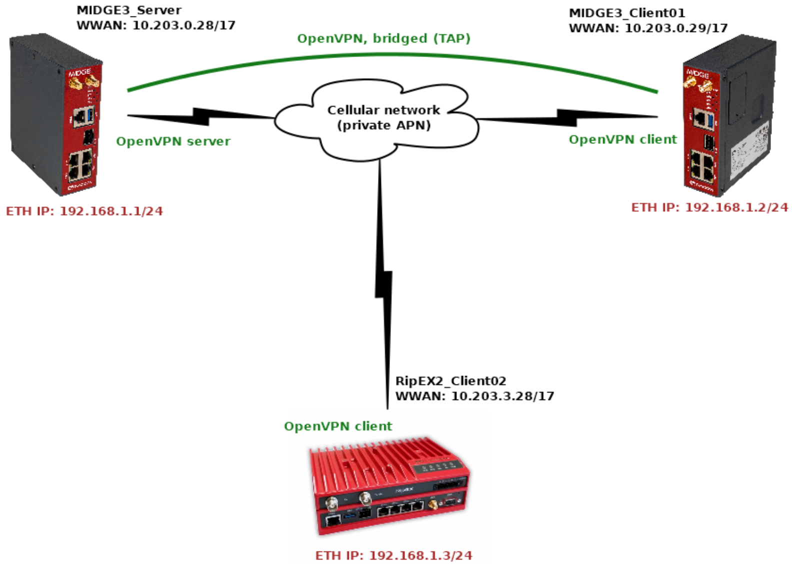


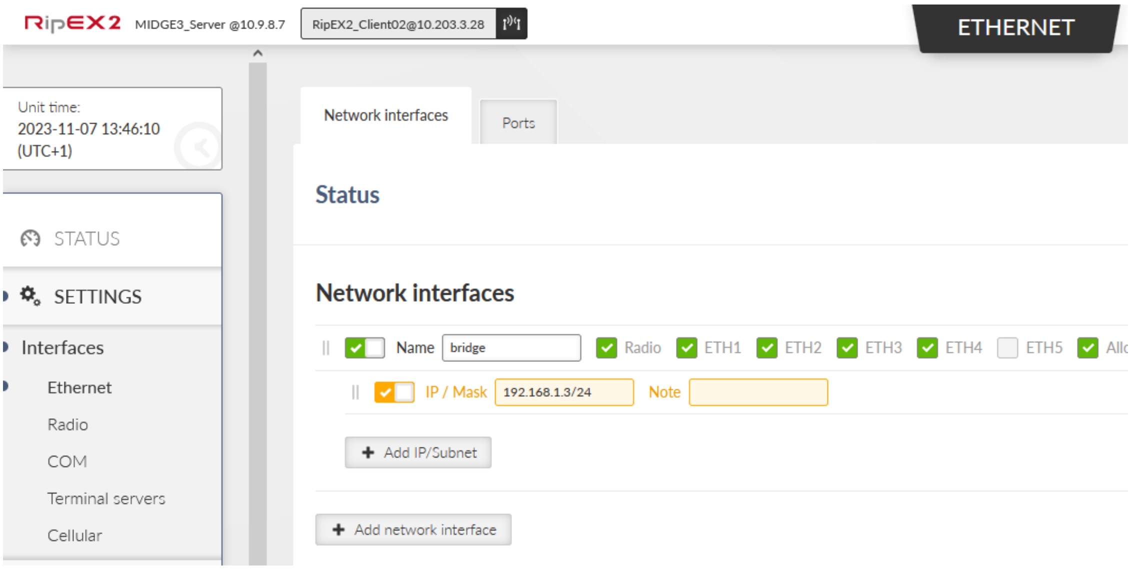
Fig. 40: Bridged (TAP) OpenVPN topology

We will need to

- Change the Network interfaces' addresses in both the clients
- Change the OpenVPN configurations in all the units to match the bridged (TAP) topology

1.2.1. RipEX2_Client02

Start with the RipEX2_Client02 unit. Go to the SETTINGS > Interfaces > Ethernet. Change the IP address to 192.168.1.3/24.



Unit time:
2023-11-07 13:46:10
(UTC+1)

Status

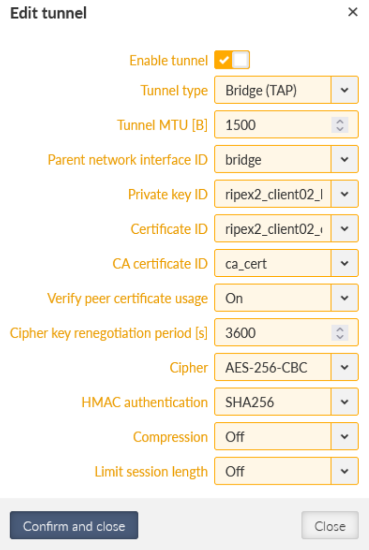
Network interfaces

☑ Name bridge ☑ Radio ☑ ETH1 ☑ ETH2 ☑ ETH3 ☑ ETH4 □ ETH5 ☑ All

☑ IP / Mask 192.168.1.3/24 Note

Fig. 41: RipEX2_Client02 Ethernet if_bridge IP address

Go to the SETTINGS > VPN > OpenVPN menu and change the Type of the tunnel from Router (TUN) to Bridge (TAP). We only have one Network Interface (bridge) so the “Parent network interface ID” is automatically set to “bridge” and there is no other option. In case of multiple interfaces, select a correct one from the given list.

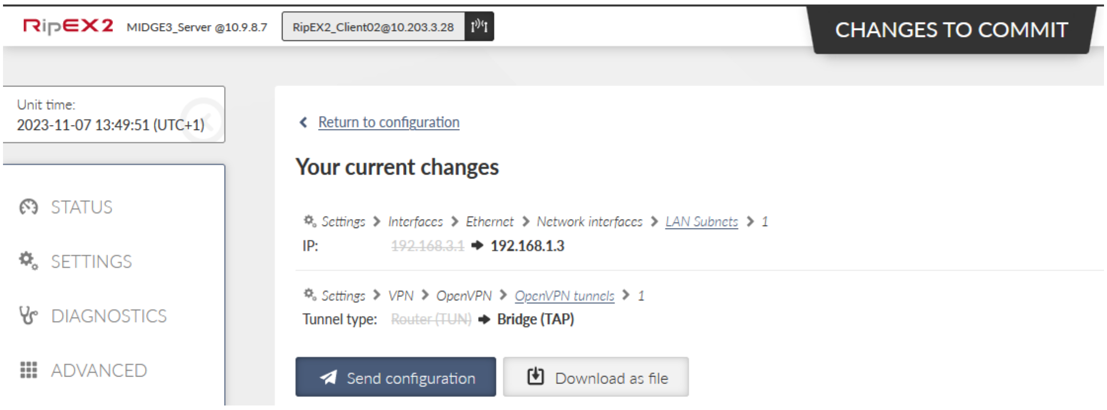


Edit tunnel ×

Enable tunnel	☑
Tunnel type	Bridge (TAP)
Tunnel MTU [B]	1500
Parent network interface ID	bridge
Private key ID	ripex2_client02_l
Certificate ID	ripex2_client02_(
CA certificate ID	ca_cert
Verify peer certificate usage	On
Cipher key renegotiation period [s]	3600
Cipher	AES-256-CBC
HMAC authentication	SHA256
Compression	Off
Limit session length	Off

Fig. 42: RipEX2_Client02 OpenVPN Tunnel type change

Apply all the changes.



Unit time:
2023-11-07 13:49:51 (UTC+1)

Your current changes

Settings > Interfaces > Ethernet > Network interfaces > LAN Subnets > 1
IP: ~~192.168.3.1~~ → 192.168.1.3

Settings > VPN > OpenVPN > OpenVPN tunnels > 1
Tunnel type: ~~Router (TUN)~~ → Bridge (TAP)

Fig. 43: RipEX2_Client02 Changes to commit

Note: Based on type of connection to the client unit, you may be disconnected now.

1.2.2. MIDGE3_Client01

Go to the MIDGE3_Client01 unit and do the similar changes

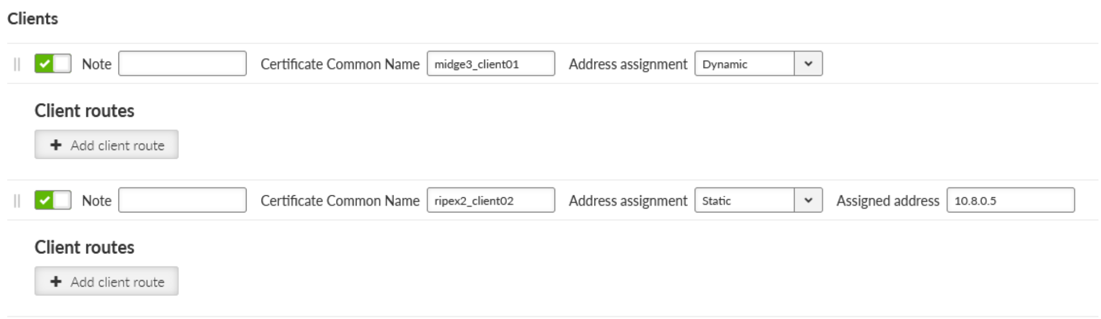
- Change the Ethernet “bridge” Network interface IP to 192.168.1.2/24
- Change the OpenVPN Tunnel type to Bridge (TAP)

Commit the changes as well.

1.2.3. MIDGE3_Server

Eventually, go back to the MIDGE3_Server and go to the SETTINGS > VPN > OpenVPN menu. Change the Tunnel type to Bridge (TAP) as well. Close window.

Click on the “Edit clients” button and delete both Client routes. Close the window.



Clients

☑ Note Certificate Common Name midge3_client01 Address assignment Dynamic

Client routes

+ Add client route

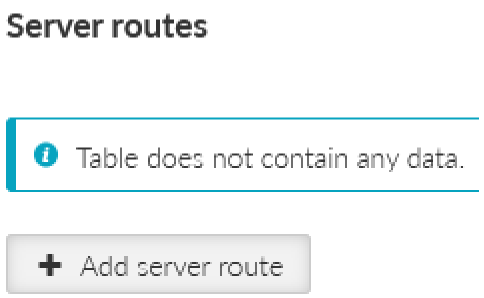
☑ Note Certificate Common Name ripex2_client02 Address assignment Static Assigned address 10.8.0.5

Client routes

+ Add client route

Fig. 44: MIDGE3_Server Edit clients

Click on the “Edit server routes” button and delete the single line with 192.168.1.0/24.



Server routes

Table does not contain any data.

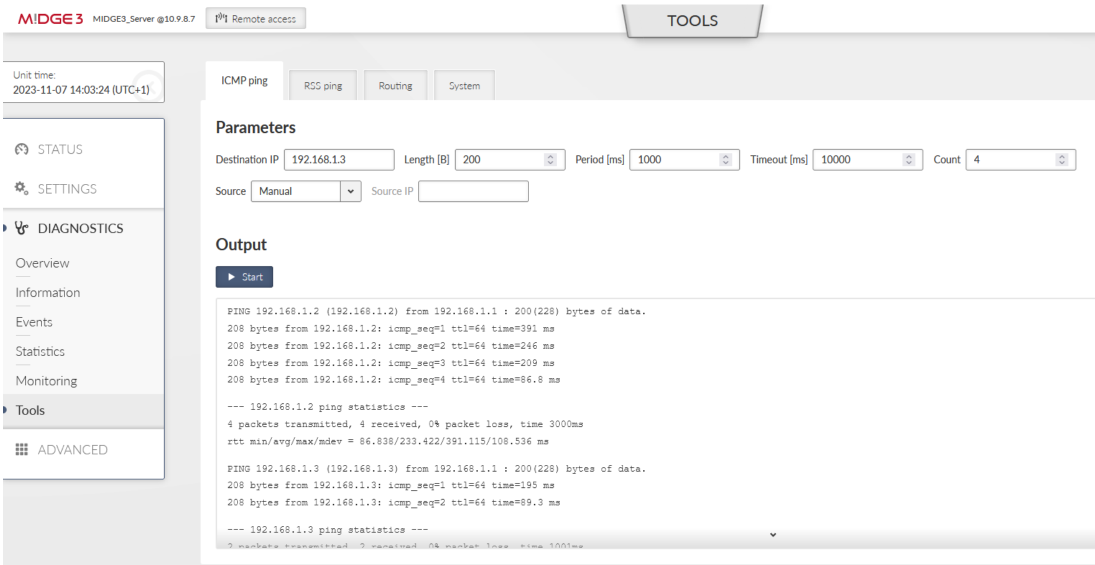
+ Add server route

Fig. 45: MIDGE3_Server Empty Server routes

Commit all the changes.

1.2.4. Diagnostics

Go to the DIAGNOTICS > Tools > ICMP ping and try to ping both the remotes 192.168.1.2 and 192.168.1.3.



Unit time: 2023-11-07 14:03:24 (UTC+1)

Parameters

Destination IP 192.168.1.3 Length [B] 200 Period [ms] 1000 Timeout [ms] 10000 Count 4

Source Manual Source IP

Output

```
PING 192.168.1.2 (192.168.1.2) from 192.168.1.1 : 200(228) bytes of data.
208 bytes from 192.168.1.2: icmp_seq=1 ttl=64 time=391 ms
208 bytes from 192.168.1.2: icmp_seq=2 ttl=64 time=246 ms
208 bytes from 192.168.1.2: icmp_seq=3 ttl=64 time=209 ms
208 bytes from 192.168.1.2: icmp_seq=4 ttl=64 time=86.8 ms

--- 192.168.1.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3000ms
rtt min/avg/max/mdev = 86.838/233.422/391.115/108.536 ms

PING 192.168.1.3 (192.168.1.3) from 192.168.1.1 : 200(228) bytes of data.
208 bytes from 192.168.1.3: icmp_seq=1 ttl=64 time=195 ms
208 bytes from 192.168.1.3: icmp_seq=2 ttl=64 time=89.3 ms

--- 192.168.1.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
```

Fig. 46: MIDGE3_Server ICMP ping

Go through the OpenVPN Status, Information and logs in case of any issues.

2. Troubleshooting

We have already explained multiple debugging/troubleshooting options. See below several hints while going through OpenVPN logs and solving connectivity issues.

2.1. Logs

OpenVPN logs are called *openvpn_X* and *openvpn_diag_X* where X is the OpenVPN tunnel ID. The 2nd log does not provide much information, it's mostly our own diagnostics with basic connected/disconnected information.

openvpn_x logs

Server: client got connected

- Ciphers negotiated
- Connection information.
- Assigning a client tunnel interface address
- Reporting from the connection event script

2023-10-09T05:18:17+00:00 2023-10-09 05:18:17 10.10.1.55:54280 Control Channel: TLSv1.3, cipher TLSv1.3 TLS_AES_256_GCM_SHA384, peer certificate: 3072 bit RSA, signature: RSA-SHA256

2023-10-09T05:18:17+00:00 2023-10-09 05:18:17 10.10.1.55:54280 [Epsilon] Peer Connection Initiated with [AF_INET]10.10.1.55:54280 (via [AF_INET]10.10.1. 11%radio)

2023-10-09T05:18:17+00:00 2023-10-09 05:18:17 Epsilon/10.10.1.55:54280 MULTI_sva: pool returned IPv4=10.201.0.100, IPv6=(Not enabled)

2023-10-09T05:18:17+00:00 ===== Client Epsilon (10.10.1.55:54280) connected. =====

Server: client got disconnected

2023-10-09T11:22:16+00:00 ===== Client Epsilon (10.10.1.55:54280) disconnected. =====

Client: connection to the server finished

- Going to the “Connected state”
- Ciphers negotiated

2023-10-09T05:18:04+00:00 2023-10-09 05:18:04 Initialization Sequence Completed 2023-10-09T05:18:04+00:00 2023-10-09 05:18:04 MANAGEMENT: >STATE:1696828684,CONNECTED,SUCCESS,10.201.0.100,10.10.1.11,1194,,

2023-10-09T05:18:04+00:00 2023-10-09 05:18:04 Data Channel: cipher 'AES-256-GCM', peer-id: 0

Client: The server does not respond to client’s connection trials

2023-10-09T05:12:10+00:00 2023-10-09 05:12:10 read UDPv4 [EHOSTUNREACH]: No route to host (fd=4,code=148)

2023-10-09T05:12:32+00:00 2023-10-09 05:12:32 TLS Error: TLS key negotiation failed to occur within 60 seconds (check your network connectivity)

2023-10-09T05:12:32+00:00 2023-10-09 05:12:32 TLS Error: TLS handshake failed

Client authentication failure in the server:

- Server:

2023-10-09T11:25:49+00:00 2023-10-09 11:25:49 10.10.1.55:40917 VERIFY ERROR: depth=1, error=self-signed certificate in certificate chain: O=RACOM, OU=Development, L=Bystrice n. P., ST=CR, C=CZ, CN=Alfa, emailAddress=sectech@racom.eu, serial=22739517585033819111443524660849504900645973455

2023-10-09T11:25:49+00:00 2023-10-09 11:25:49 10.10.1.55:40917 OpenSSL: error:0A000086:SSL routines::certificate verify failed

2023-10-09T11:25:49+00:00 2023-10-09 11:25:49 10.10.1.55:40917 TLS_ERROR: BIO read tls_read_plaintext error

2023-10-09T11:25:49+00:00 2023-10-09 11:25:49 10.10.1.55:40917 TLS Error: TLS object -> incoming plaintext read error

2023-10-09T11:25:49+00:00 2023-10-09 11:25:49 10.10.1.55:40917 TLS Error: TLS handshake failed

- Client:

2023-10-09T11:26:43+00:00 2023-10-09 11:26:43 TLS Error: TLS key negotiation failed to occur within 60 seconds (check your network connectivity)

2023-10-09T11:26:43+00:00 2023-10-09 11:26:43 TLS Error: TLS handshake failed

Server authentication failure in the client:

- Server:

```
2023-10-09T11:33:26+00:00 2023-10-09 11:33:26 read UDPv4 [CMSG=8|ECONNREFUSED]: Connection refused (fd=6,code=146)
```

- Client:

```
2023-10-09T11:33:44+00:00 2023-10-09 11:33:44 VERIFY ERROR: depth=1, error=self-signed certificate in certificate chain: O=RACOM, OU=Development, L=Bystrice n. P., ST=CR, C=CZ, CN=Alfa, emailAddress=sectech@racom.eu, serial=22739517585033819111443524660849504900645973455

2023-10-09T11:33:44+00:00 2023-10-09 11:33:44 OpenSSL: error:0A000086:SSL routines::certificate verify failed

2023-10-09T11:33:44+00:00 2023-10-09 11:33:44 TLS_ERROR: BIO read tls_read_plaintext error

2023-10-09T11:33:44+00:00 2023-10-09 11:33:44 TLS Error: TLS object -> incoming plaintext read error

2023-10-09T11:33:44+00:00 2023-10-09 11:33:44 TLS Error: TLS handshake failed
```

Server: Maximum number of connected clients exceeded:

```
2023-10-02T09:36:38+00:00 2023-10-02 09:36:38 10.10.1.55:32786 MULTI: new incoming connection would exceed maximum number of clients (1)
```

Server: The client’s connection is refused, because it’s not listed within the OpenVPN clients:

```
2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 TLS Auth Error: --client-config-dir authentication failed for common name 'Epsilon' file='/var/run/openvpn/1/ccd/Epsilon'

2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 TLS: move_session: dest=TM_ACTIVE src=TM_INITIAL reinit_src=1

2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 TLS: tls_multi_process: initial untrusted session promoted to semi-trusted

2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 Delayed exit in 5 seconds

2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 SENT CONTROL [UNDEF]: 'AUTH_FAILED' (status=1)

2023-10-09T11:39:21+00:00 2023-10-09 11:39:21 10.10.1.55:54272 SENT CONTROL [Epsilon]: 'AUTH_FAILED' (status=1)
```

Client: The server is refused due to the Extended Key Usage (EKU) check:

```
2023-10-09T11:37:14+00:00 2023-10-09 11:37:14 VERIFY KU ERROR

2023-10-09T11:37:14+00:00 2023-10-09 11:37:14 OpenSSL: error:0A000086:SSL routines::certificate verify failed

2023-10-09T11:37:14+00:00 2023-10-09 11:37:14 TLS_ERROR: BIO read tls_read_plaintext error

2023-10-09T11:37:14+00:00 2023-10-09 11:37:14 TLS Error: TLS object -> incoming plaintext read error

2023-10-09T11:37:14+00:00 2023-10-09 11:37:14 TLS Error: TLS handshake failed
```

Link fragmentation is turned on, but the Peer has it turned off:

2023-10-02T08:05:54+00:00 2023-10-02 08:05:54 Beta/10.10.1.22:37547 IP packet with unknown IP version=0 seen

2023-10-02T08:06:05+00:00 2023-10-02 08:06:05 Beta/10.10.1.22:37547 FRAG_IN error flags=0x2a187bf3: FRAG_TEST not implemented

Server: Server has the compression enabled, but the client has it disabled:

2023-10-09T11:47:19+00:00 2023-10-09 11:47:19 Epsilon/10.10.1.55:57609 IP packet with unknown IP version=15 seen

Client: It has the compression disabled, but the server has it enabled and wants to enforce it:

2023-10-09T11:43:27+00:00 2023-10-09 11:43:27 Compression is not allowed since allow-compression is set to 'stub-only'

2023-10-09T11:43:27+00:00 2023-10-09 11:43:27 OPTIONS ERROR: server pushed compression settings that are not allowed and will result in a non-working connection. See also allow-compression in the manual.

2023-10-09T11:43:27+00:00 2023-10-09 11:43:27 ERROR: Failed to apply push options

2023-10-09T11:43:27+00:00 2023-10-09 11:43:27 Failed to open tun/tap interface

TLS Auth: The peer side uses a different key:

2023-08-08 09:33:47 Authenticate/Decrypt packet error: packet HMAC authentication failed

2023-08-08 09:33:47 TLS Error: incoming packet authentication failed from [AF_INET]10.10.1.44:47771

TLS Auth: The peer side does not have TLS-Auth enabled:

2023-08-08 09:37:38 TLS Error: cannot locate HMAC in incoming packet from [AF_INET]10.10.1.44:47878

TLS Crypt: The peer side uses a different key:

2023-08-08 11:17:33 tls-crypt unwrap error: packet authentication failed

2023-08-08 11:17:33 TLS Error: tls-crypt unwrapping failed from [AF_INET]10.10.1.44:56203

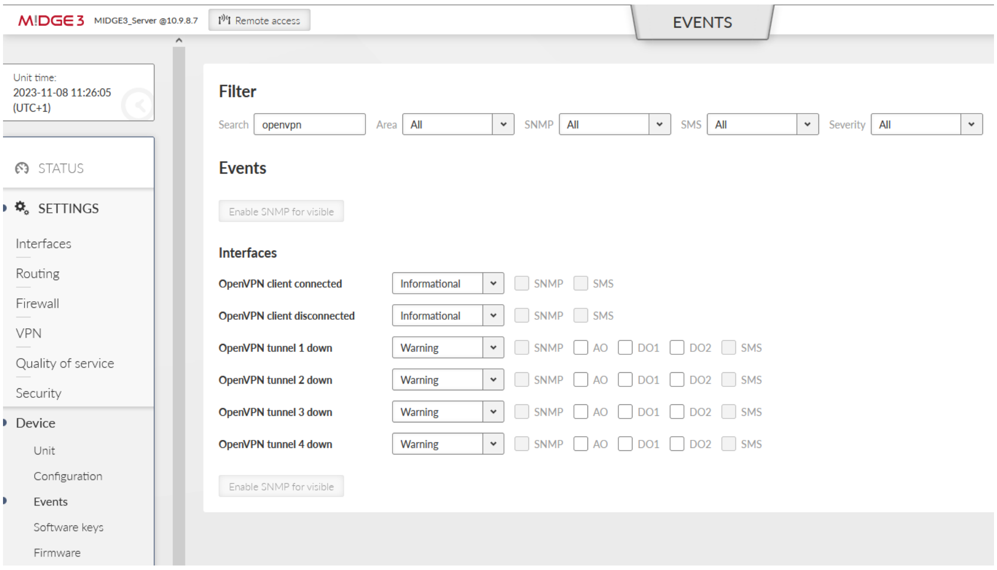
TLS Crypt: The peer side does not have TLS-Crypt enabled:

2023-08-08 11:18:34 tls-crypt unwrap error: packet too short

2023-08-08 11:18:34 TLS Error: tls-crypt unwrapping failed from [AF_INET]10.10.1.44:59311

2.2. Events

M!DGE3/RipEX2 devices support so called Events.



Unit time: 2023-11-08 11:26:05 (UTC+1)

Filter

Search: openvpn | Area: All | SNMP: All | SMS: All | Severity: All

Events

Interfaces

OpenVPN client connected	Informational	□ SNMP	□ SMS			
OpenVPN client disconnected	Informational	□ SNMP	□ SMS			
OpenVPN tunnel 1 down	Warning	□ SNMP	□ AO	□ DO1	□ DO2	□ SMS
OpenVPN tunnel 2 down	Warning	□ SNMP	□ AO	□ DO1	□ DO2	□ SMS
OpenVPN tunnel 3 down	Warning	□ SNMP	□ AO	□ DO1	□ DO2	□ SMS
OpenVPN tunnel 4 down	Warning	□ SNMP	□ AO	□ DO1	□ DO2	□ SMS

Fig. 47: Events

You can be notified about the clients being (dis)connected and about the tunnels being down via SNMP notifications, Alarm and Digital outputs or SMS.

You can also change the severities for particular events so it can e.g., display this important Event within the STATUS menu, or change the physical SYS LED diode color to red.

All Events can also be displayed and filtered within the DIAGNOSTICS > Events menu. Read more information about the Events in the manual.

3. M!DGE2 compatibility

OpenVPN is a well-known protocol and is compatible with any other OpenVPN enabled device, including older M!DGE2 cellular router.

You can do both, adding M!DGE2 into the existing M!DGE3/RipEX2 network or adding M!DGE3/RipEX2 to the existing M!DGE2 network.

Just configure the correct OpenVPN parameters and upload the keys and certificates.

Keep in mind that older M!DGE2 “Expert files” are no longer supported in M!DGE3/RipEX2 units. Configure the parameters manually (based on 2.1.1.0 firmware features).

Note: Keep the M!DGE2 software up-to-date. Check the Download section on our website: https://www.racom.eu/eng/products/cellular-router-midge.html#dnl_fwr.

3.1. Adding M!DGE2 to the existing M!DGE3/RipEX2 network

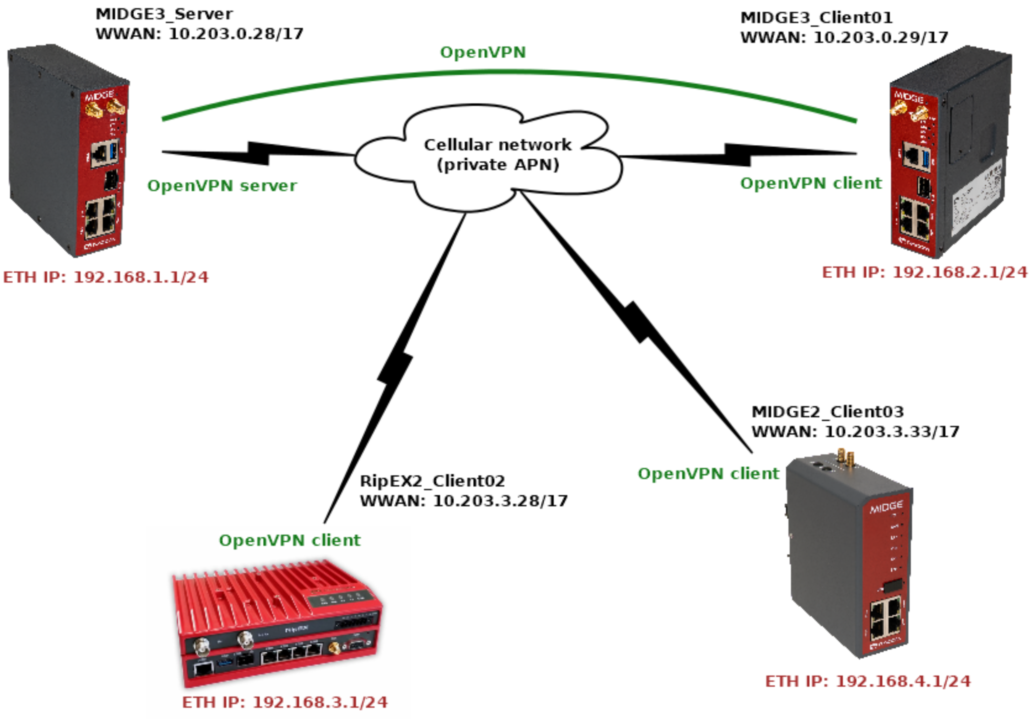
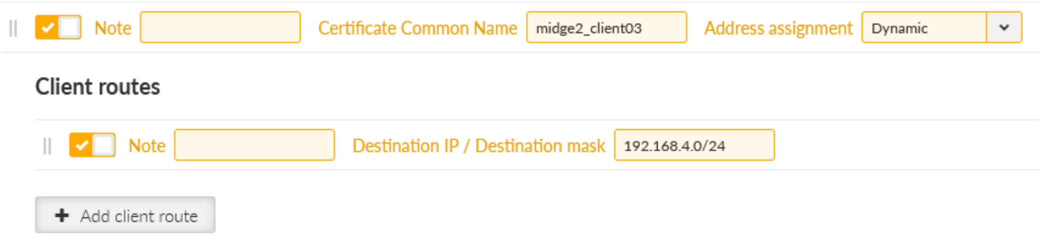


Fig. 48: Routed (TUN) OpenVPN topology, M!DGE2 added

Note: There can be multiple ways of doing the same. Consider the following text to be just one of the options. You can choose a different approach.

3.1.1. MIDGE3_Server

We start in the server by going to the SETTINGS > VPN > OpenVPN menu. Open the “Edit clients” menu and add a new client with a Certificate Common name equal to “midge2_client03”. Add its route to be 192.168.4.0/24.

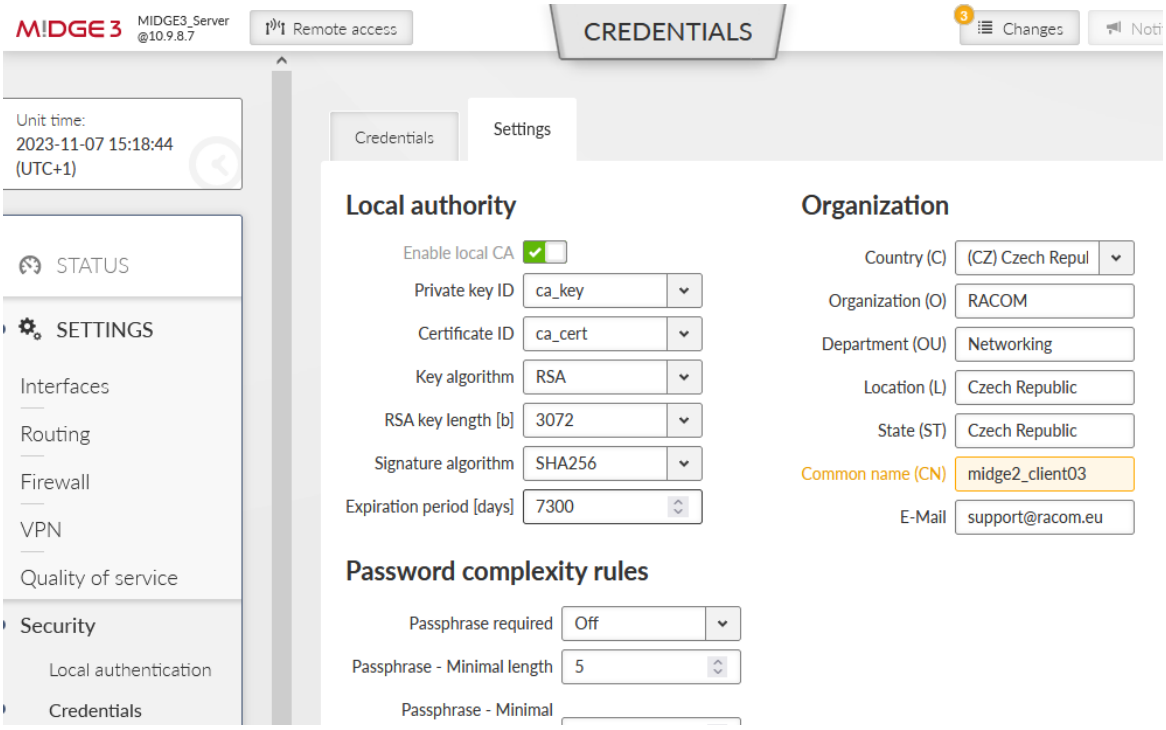

☑ Note Certificate Common Name midge2_client03 Address assignment Dynamic

Client routes

☑ Note Destination IP / Destination mask 192.168.4.0/24

Fig. 49: MIDGE3_Server – adding MIDGE2_Client03 client

Go to the SETTINGS > Security > Credentials > Settings menu. Change the Common name (CN) parameter to “midge2_client03” so that newly created certificate has a correct CN.



Local authority

Enable local CA ☑
Private key ID: ca_key
Certificate ID: ca_cert
Key algorithm: RSA
RSA key length [b]: 3072
Signature algorithm: SHA256
Expiration period [days]: 7300

Password complexity rules

Passphrase required: Off
Passphrase - Minimal length: 5
Passphrase - Minimal

Organization

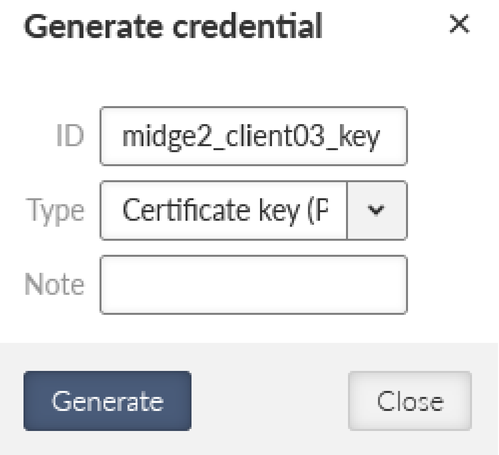
Country (C): (CZ) Czech Repul
Organization (O): RACOM
Department (OU): Networking
Location (L): Czech Republic
State (ST): Czech Republic
Common name (CN): midge2_client03
E-Mail: support@racom.eu

Fig. 50: MIDGE3_Server Common name change

Commit the changes to the OpenVPN.

Go to the SETTINGS > Security > Credentials menu. Generate a private key and a certificate for this M!DGE2 unit.

- midge2_client03_key Certificate key (PRI)

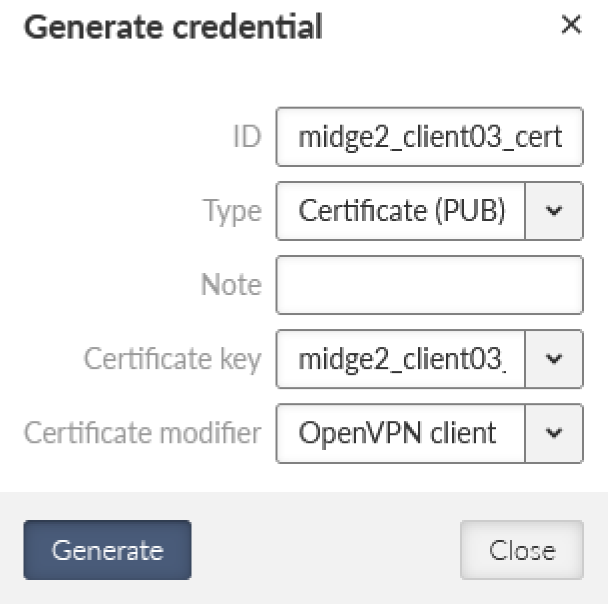


Generate credential

ID: midge2_client03_key
Type: Certificate key (F
Note:

Fig. 51: MIDGE3_Server – generating MIDGE2_Client03 private key

- midge2_client03_cert Certificate (PUB)



Generate credential

ID: midge2_client03_cert

Type: Certificate (PUB)

Note:

Certificate key: midge2_client03

Certificate modifier: OpenVPN client

Fig. 52: MIDGE3_Server – generating MIDGE2_Client03 OpenVPN certificate

Download them into your PC together with the OpenVPN TLS Protection key (PRI) “ta_key” and CA chain (PUB) “ca_cert”.

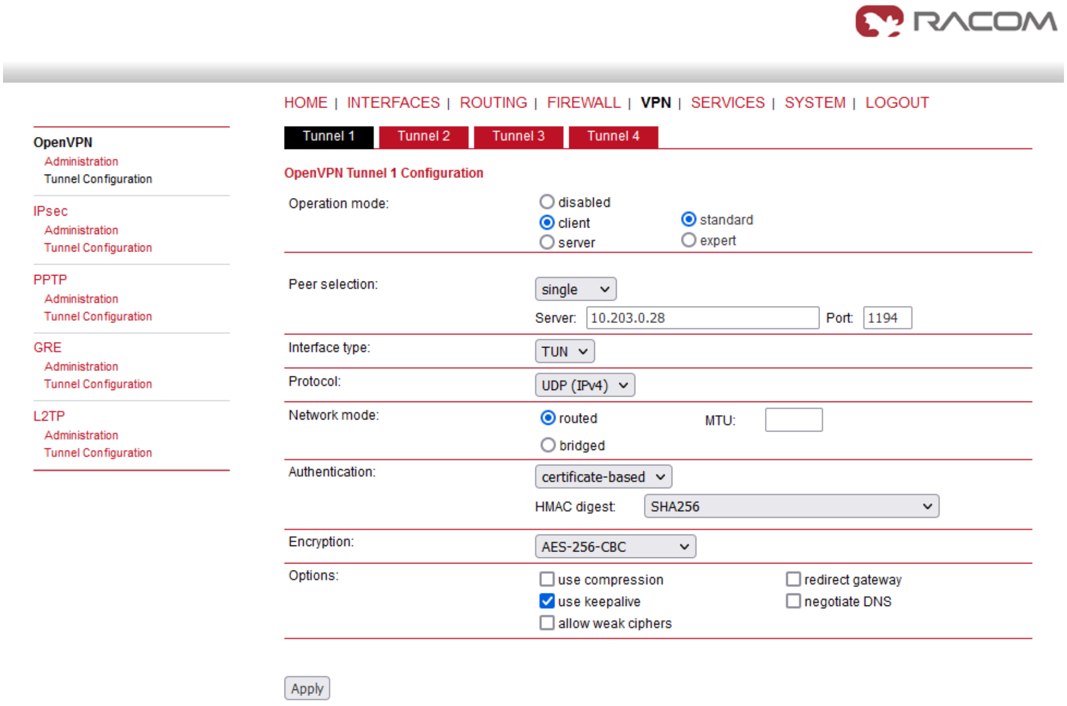
Change the MIDGE3_Server’s Common name back to “midge3_server” and commit changes.

3.1.2. MIDGE2_Client03

The application note is not intended for M!DGE2 complete tutorial, but if you configure it from the factory settings, do not forget to:

- set the Ethernet IP to 192.168.4.1/24 and change its DHCP address range
- configure the Mobile interface correctly to suit your APN
  - our WWAN IP address will be 10.203.3.33/17
- set the hostname to “MIDGE2_Client03”
- set the correct NTP server and Time zone
- set the correct Common Name (CN) within the Keys&Certificates to be “midge2_client03”

Go to the VPN > OpenVPN > Tunnel Configuration menu.



OpenVPN Tunnel 1 Configuration

Operation mode: ○ disabled ● client ○ server ● standard ○ expert

Peer selection: single

Server: 10.203.0.28 Port: 1194

Interface type: TUN

Protocol: UDP (IPv4)

Network mode: ● routed ○ bridged MTU:

Authentication: certificate-based

HMAC digest: SHA256

Encryption: AES-256-CBC

Options: □ use compression ☑ use keepalive □ allow weak ciphers □ redirect gateway □ negotiate DNS

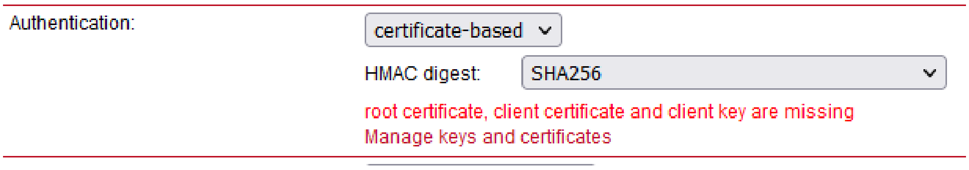
Fig. 53: MIDGE2_Client03 OpenVPN settings

Set the Operation mode to “client”.

- Set the Server IP to 10.203.0.28
- Uncheck the “use compression” and “allow weak ciphers” options
- Check the “use keepalive” option

Other parameters should stay in default and shall follow the server’s setup.

Apply the changes. Click on the Error message within the Authentication part of the menu.



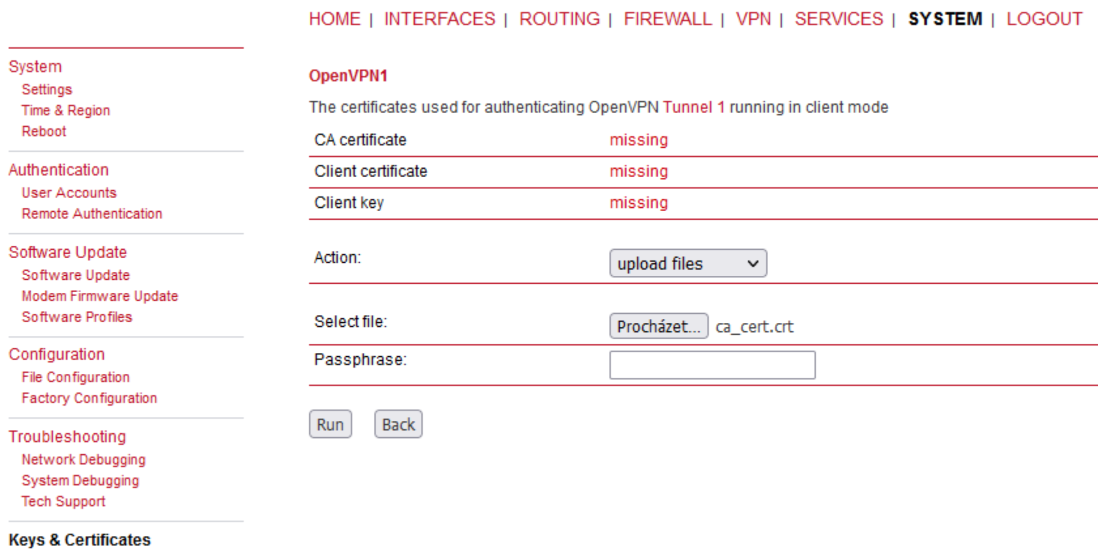
Authentication: certificate-based

HMAC digest: SHA256

root certificate, client certificate and client key are missing

Manage keys and certificates

Fig. 54: Upload the required certificates and keys

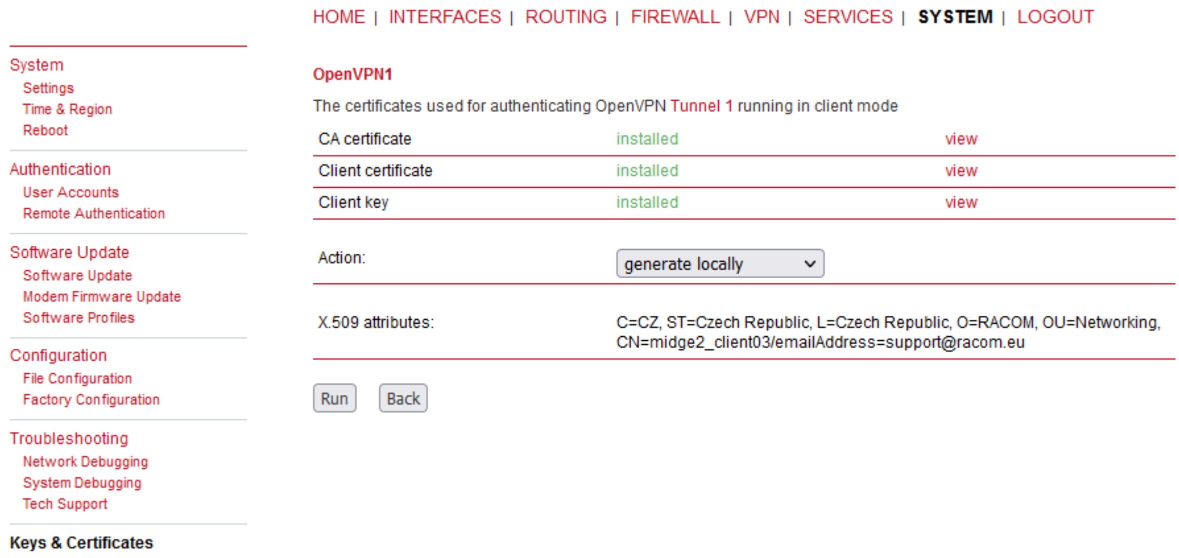


OpenVPN1

The certificates used for authenticating OpenVPN Tunnel 1 running in client mode

CA certificate	missing
Client certificate	missing
Client key	missing
Action:	upload files
Select file:	Procházet... ca_cert.crt
Passphrase:	

Fig. 55: MIDGE2_Client03 Keys & Certificates upload



OpenVPN1

The certificates used for authenticating OpenVPN Tunnel 1 running in client mode

CA certificate	installed	view
Client certificate	installed	view
Client key	installed	view
Action:	generate locally	
X.509 attributes:	C=CZ, ST=Czech Republic, L=Czech Republic, O=RACOM, OU=Networking, CN=midge2_client03/emailAddress=support@racom.eu	

Fig. 56: MIDGE2_Client03 Keys and Certificates uploaded successfully

But what about the OpenVPN TLS Protection key (PRI)? (TLS-Auth, ta.key)

This is not supported within the M!DGE2 web interface, but can be done different way.

Go to the VPN > OpenVPN > Tunnel configuration and click on the **Download** button. Save the ZIP file to your PC and unzip it. Open the openvpn-expert.conf file using a text editor and add one new line:

tls-auth ta.key 1

A complete file should be the same, or similar to:

client

remote 10.203.0.28 1194

proto udp

```
verb 3

auth-retry nointeract

nobind

auth-nocache

sndbuf 0

rcvbuf 0

ipchange "/etc/openvpn/tunnel0-ipchange"

passtos

up-restart

auth-retry nointeract

remap-usr1 SIGHUP

resolv-retry infinite

persist-key

persist-tun

auth SHA256

cipher AES-256-CBC

keepalive 10 60

ca ca.crt

cert openvpn-expert.crt

key openvpn-expert.key

dev tun

tls-auth ta.key 1
```

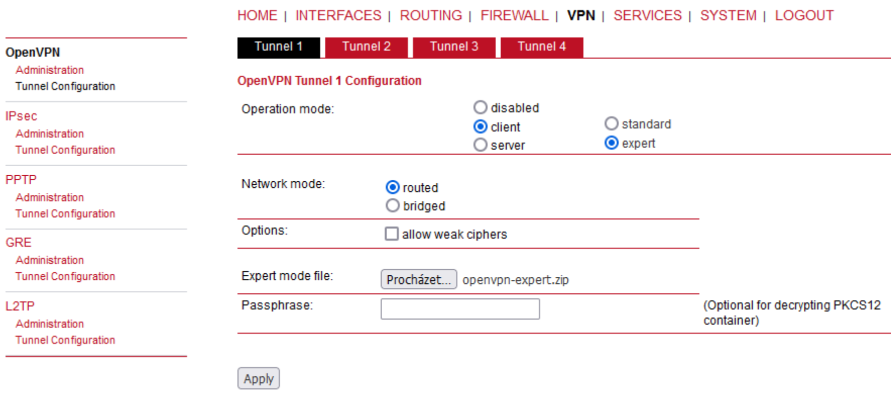
Now, copy & paste the OpenVPN TLS Protection key (PRI) file to the same folder/directory with the rest of the files within the Expert file. Name it “ta.key”. Zip all the files to the openvpn-expert.zip file again.

So, the differences are:

- the configuration file includes the tls-auth ta.key 1 directive
- the ZIP includes the ta.key file

Go back to the MIDGE2_Client03’s web interface and VPN > OpenVPN > Tunnel Configuration menu. **Erase** the current OpenVPN settings.

Set the Operation mode to “client” again, but set the “expert mode” now.



OpenVPN Tunnel 1 Configuration

Operation mode: ○ disabled ● client ○ server ○ standard ● expert

Network mode: ● routed ○ bridged

Options: □ allow weak ciphers

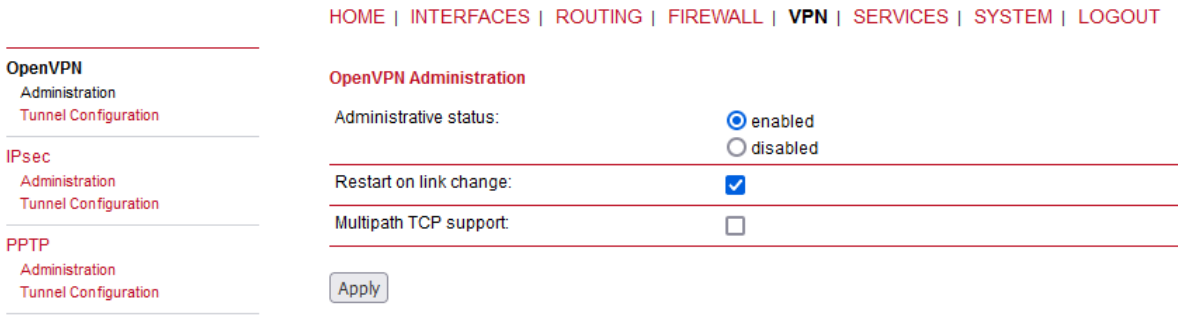
Expert mode file: Procházet... openvpn-expert.zip

Passphrase: (Optional for decrypting PKCS12 container)

Fig. 57: MIDGE2_Client03 OpenVPN expert file

Keep the “Routed” option set and uncheck the “allow weak ciphers” option. Select the updated ZIP file and **apply** the changes.

Go to the OpenVPN’s Administration menu and enable the tunnel.



OpenVPN Administration

Administrative status: ● enabled ○ disabled

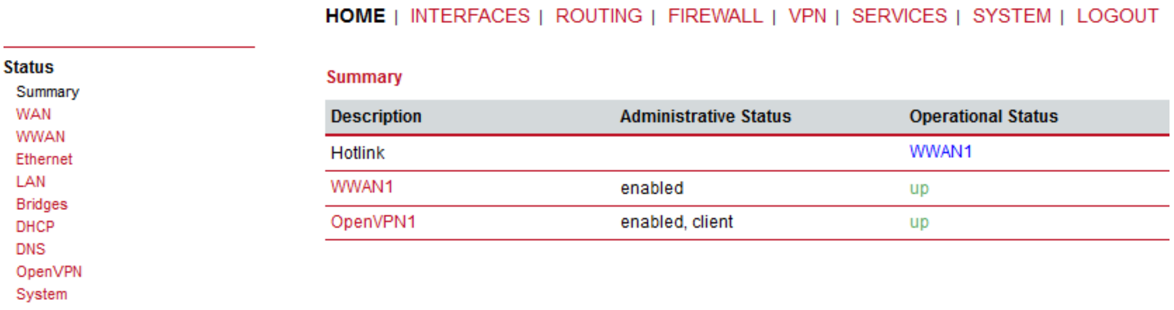
Restart on link change: ☑

Multipath TCP support: □

Fig. 58: MIDGE2_Client03 OpenVPN Administration

3.1.3. Diagnostics

Go to the HOME menu and check if the client gets connected, or not.

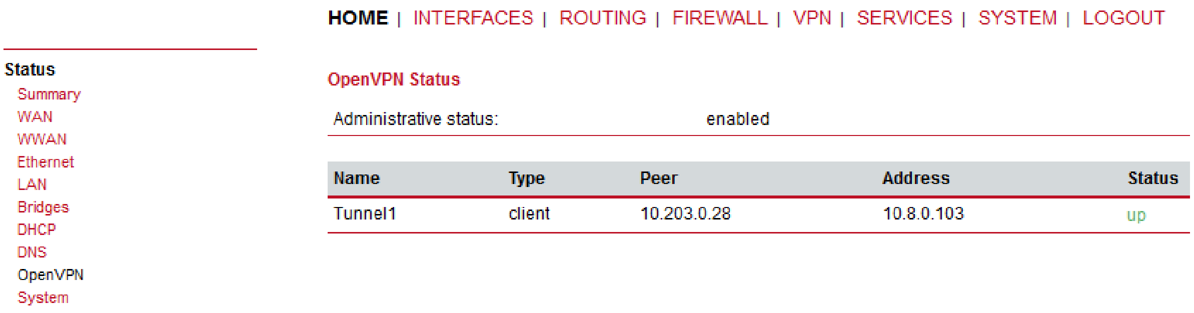

HOME | INTERFACES | ROUTING | FIREWALL | VPN | SERVICES | SYSTEM | LOGOUT
Status
Summary
WAN
WWAN
Ethernet
LAN
Bridges
DHCP
DNS
OpenVPN
System

Summary

Description	Administrative Status	Operational Status
Hotlink		WWAN1
WWAN1	enabled	up
OpenVPN1	enabled, client	up

Fig. 59: MIDGE2_Client03 successfully connected

If you go to the OpenVPN details, you should e.g. see the assigned OpenVPN IP address.


HOME | INTERFACES | ROUTING | FIREWALL | VPN | SERVICES | SYSTEM | LOGOUT
Status
Summary
WAN
WWAN
Ethernet
LAN
Bridges
DHCP
DNS
OpenVPN
System

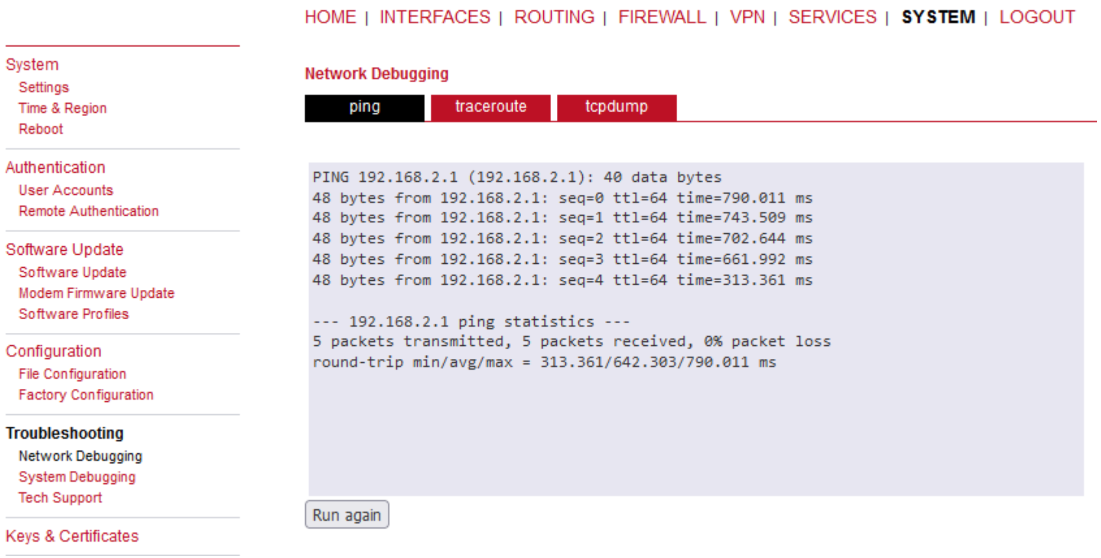
OpenVPN Status

Administrative status: enabled

Name	Type	Peer	Address	Status
Tunnel1	client	10.203.0.28	10.8.0.103	up

Fig. 60: MIDGE2_Client03 Detailed status

You can go to the SYSTEM > Network debugging > ping menu and try to ping 192.168.1.1 IP address of the server or 192.168.2.1 MIDGE3_Client02 IP address.

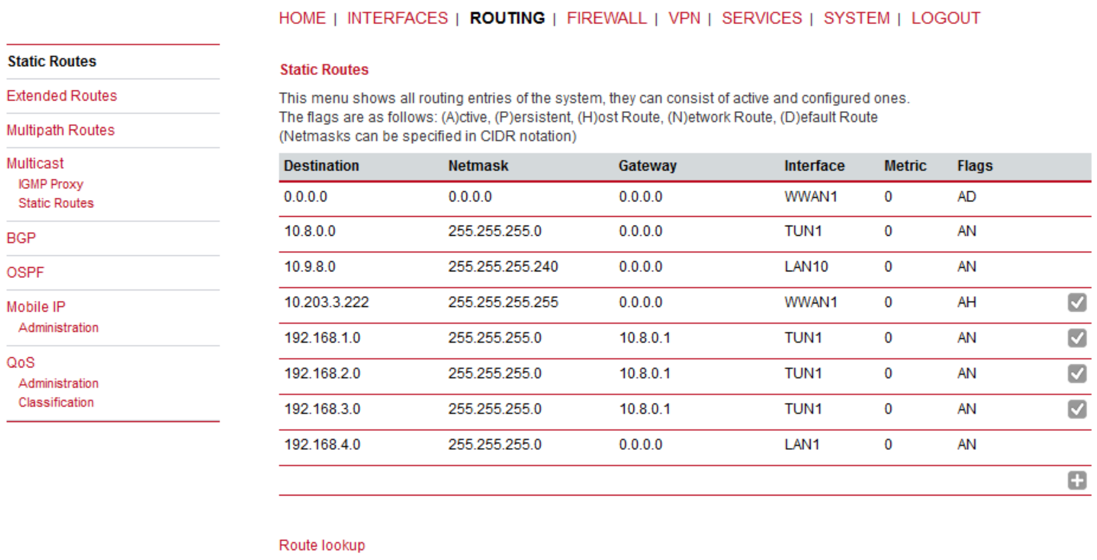


```
PING 192.168.2.1 (192.168.2.1): 40 data bytes
48 bytes from 192.168.2.1: seq=0 ttl=64 time=790.011 ms
48 bytes from 192.168.2.1: seq=1 ttl=64 time=743.509 ms
48 bytes from 192.168.2.1: seq=2 ttl=64 time=702.644 ms
48 bytes from 192.168.2.1: seq=3 ttl=64 time=661.992 ms
48 bytes from 192.168.2.1: seq=4 ttl=64 time=313.361 ms

--- 192.168.2.1 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 313.361/642.303/790.011 ms
```

Fig. 61: MIDGE2_Client03 pinging another client

You can check the routes within the ROUTING > Static routes menu. You should see all the remote networks accessible via TUN interface.



Static Routes

This menu shows all routing entries of the system, they can consist of active and configured ones.
The flags are as follows: (A)ctive, (P)ersistent, (H)ost Route, (N)etwork Route, (D)efault Route
(Netmasks can be specified in CIDR notation)

Destination	Netmask	Gateway	Interface	Metric	Flags	
0.0.0.0	0.0.0.0	0.0.0.0	WWAN1	0	AD	
10.8.0.0	255.255.255.0	0.0.0.0	TUN1	0	AN	
10.9.8.0	255.255.255.240	0.0.0.0	LAN10	0	AN	
10.203.3.222	255.255.255.255	0.0.0.0	WWAN1	0	AH	☑
192.168.1.0	255.255.255.0	10.8.0.1	TUN1	0	AN	☑
192.168.2.0	255.255.255.0	10.8.0.1	TUN1	0	AN	☑
192.168.3.0	255.255.255.0	10.8.0.1	TUN1	0	AN	☑
192.168.4.0	255.255.255.0	0.0.0.0	LAN1	0	AN	
						⊞

Fig. 62: MIDGE2_Client03 Routing

Last, but not least, you can also download a Techsupport package and check the logs for any issues. Do it from the SYSTEM > Tech Support menu.

Logs can also be viewed online if you connect to the M!DGE2 SSH. You can also do advanced debugging directly from the Linux command line in M!DGE2.

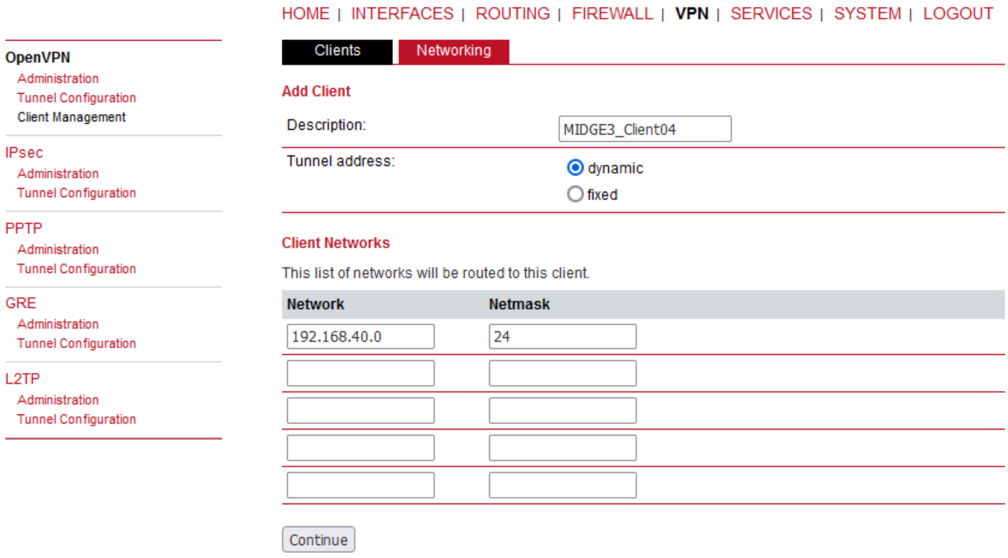
3.2. Adding M!DGE3/RipEX2 to the existing M!DGE2 network

Requirement can also be the other way. You have a working M!DGE2 network utilizing the OpenVPN connections. Now you bought M!DGE3 as well and just need to add a new client.

The application note will not show the step-by-step configuration with all the screenshots, but will help you with required steps. Most of the following steps are covered within the application note so just go through previous examples if you encounter any obstacle.

- Configure your M!DGE3/RipEX2 to connect to your APN and configure all other required parameters such as NTP, Network Interfaces, Common name, …
- Add a new client in your M!DGE2 server and set its network(s)
- Generate valid credentials (Keys & certificates) in your M!DGE2 server (or e.g. in some external CA)
- Upload/Add the client’s key, client’s certificate, CA chain and if required, the TLS-Auth/TLS-Crypt key to your M!DGE3/RipEX2
- Configure your M!DGE3/RipEX2’s OpenVPN with valid credentials and correct parameters to suit your server settings

Several screenshots to help you.



Add Client

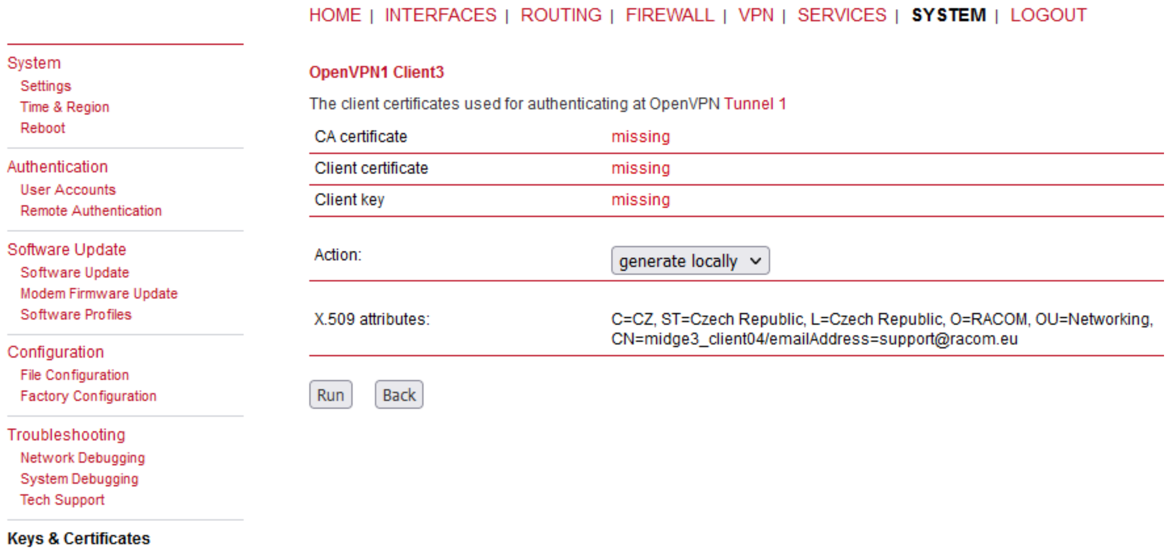
Description:	MIDGE3_Client04
Tunnel address:	● dynamic ○ fixed

Client Networks

This list of networks will be routed to this client.

Network	Netmask
192.168.40.0	24

Fig. 63: Adding a new OpenVPN client in M!DGE2



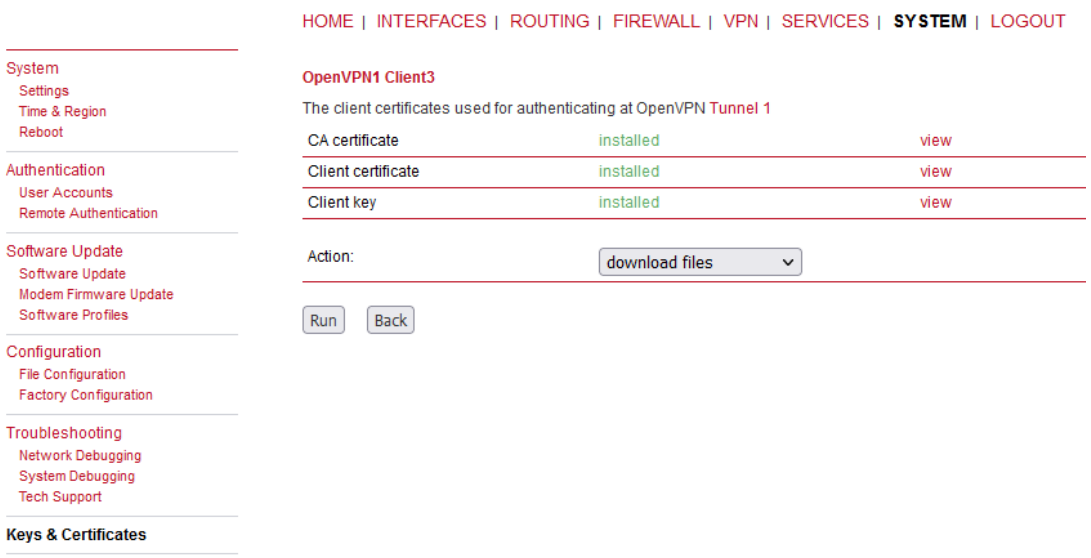
OpenVPN1 Client3

The client certificates used for authenticating at OpenVPN Tunnel 1

CA certificate	missing
Client certificate	missing
Client key	missing
Action:	generate locally
X.509 attributes:	C=CZ, ST=Czech Republic, L=Czech Republic, O=RACOM, OU=Networking, CN=midge3_client04/emailAddress=support@racom.eu

Fig. 64: Generating new certificates in M!DGE2

Note: You may also change the Common name of the M!DGE2 server before generating the client's certificate even though there is no "Certificate modifier" option in M!DGE2 so the "Verify peer certificate usage" parameter in M!DGE3/RipEX2 should probably be disabled.



OpenVPN1 Client3

The client certificates used for authenticating at OpenVPN Tunnel 1

CA certificate	installed	view
Client certificate	installed	view
Client key	installed	view

Action: download files

Fig. 65: M!DGE2 downloading Keys & certificates

M!DGE2 OpenVPN server only supports a “Network topology” option **“Net /30**”. This is not configurable in clients, but is driven by the server. Just keep this in mind while interconnecting various devices within one OpenVPN network. The network is either “Net /30” or more up-to-date option “Subnet”. It cannot be combined. M!DGE2 and M!DGE3/RipEX2 support both options, but M!DGE2 cannot set it for the Server, it can only adapt to it as a client.

If you have any issues, contact our technical support at *support@racom.eu*[1].

4. OpenVPN Failover/backup option

In the most basic scenario, each client connects to one server defined by its parameters and its IP address. In more robust solution, we may have multiple servers due to high availability requirement, because in case of one server failure, the other one can work instead.

Another example could be that a particular M!DGE3/RipEX2 utilizes multiple WAN links and based on the active WAN (link priorities, dynamic routes, …) it can only reach one of more OpenVPN servers.

In such clients, we can configure multiple OpenVPN servers with different IPs and, if required, other parameters (Enhanced TLS protection, UDP/TCP protocol, port number, …). Priorities of the servers can be set. In normal operation and built-in OpenVPN “failover” option, once it connects to the lower priority server, it stays connected to it until there is some issue with this connectivity. In M!DGE3/RipEX2, we can define a fixed time after the currently active connection is closed and the higher priority servers can be used again.

[1] mailto:support@racom.eu

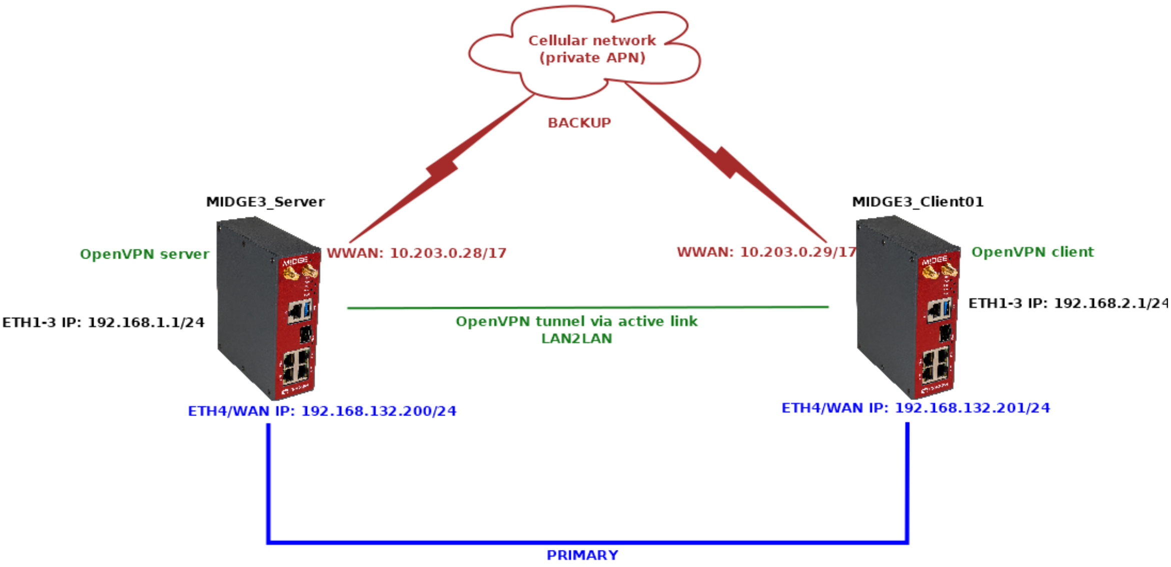
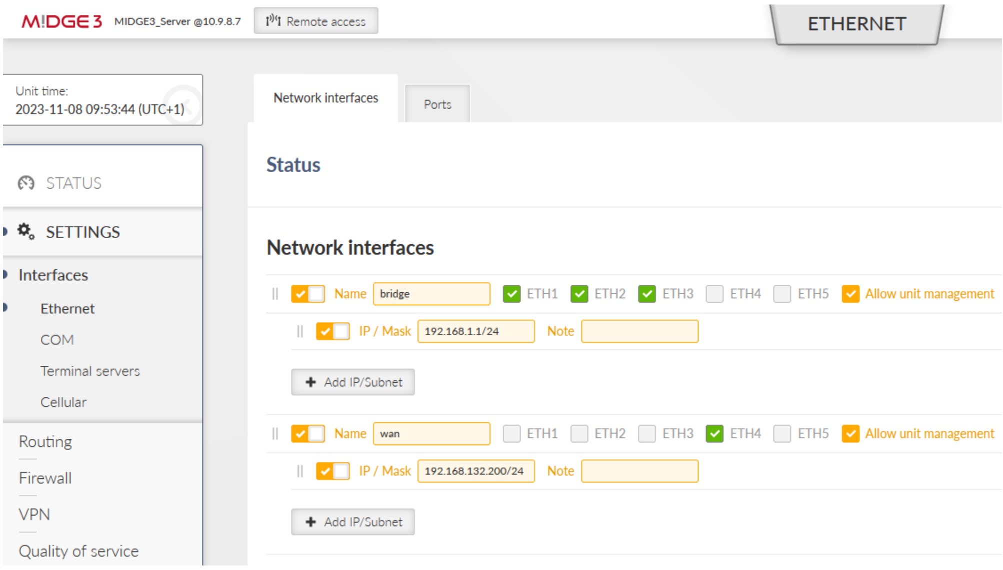


Fig. 66: Routed (TUN) OpenVPN topology, backup

If not already done, set up two M!DGE3 units by following the Chapter 1.1. The server can have RipEX2_Client02 configured as well, but we won't focus on this client at all, only the MIDGE3_Client01 client.

4.1. MIDGE3_Server

Configure a new Network Interface within SETTINGS > Interfaces > Ethernet menu called “wan”, using ETH4 port. Set its IP address to 192.168.132.200/24.



☑ Name bridge ☑ ETH1 ☑ ETH2 ☑ ETH3 □ ETH4 □ ETH5 ☑ Allow unit management

☑ IP / Mask 192.168.1.1/24 Note

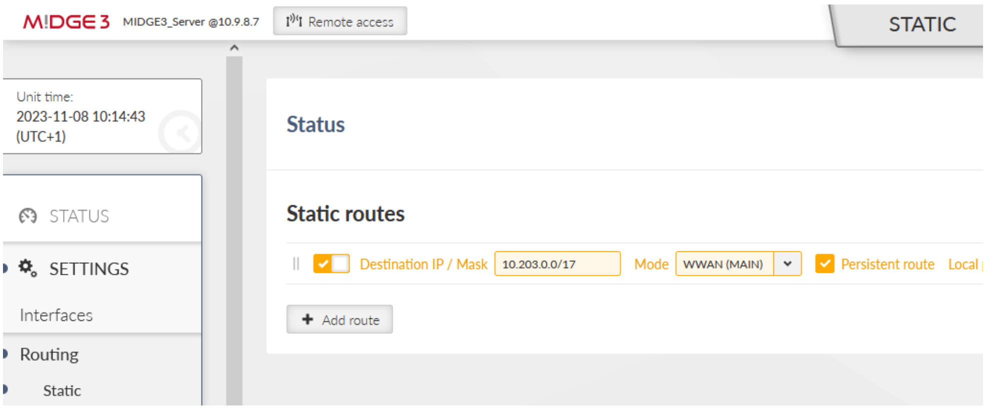
☑ Name wan □ ETH1 □ ETH2 □ ETH3 ☑ ETH4 □ ETH5 ☑ Allow unit management

☑ IP / Mask 192.168.132.200/24 Note

Fig. 67: MIDGE3_Server WAN Network interface

Go to the SETTINGS > Routing > Static menu. Based on your APN settings, this may differ a lot, but we set a static route to cellular APN subnet 10.203.0.0/17 via WWAN (MAIN) persistently. We do not need to set any routes via the WAN for this scenario.

Note: More complex solutions can require multiple static routes, and/or Link management and dynamic routing.



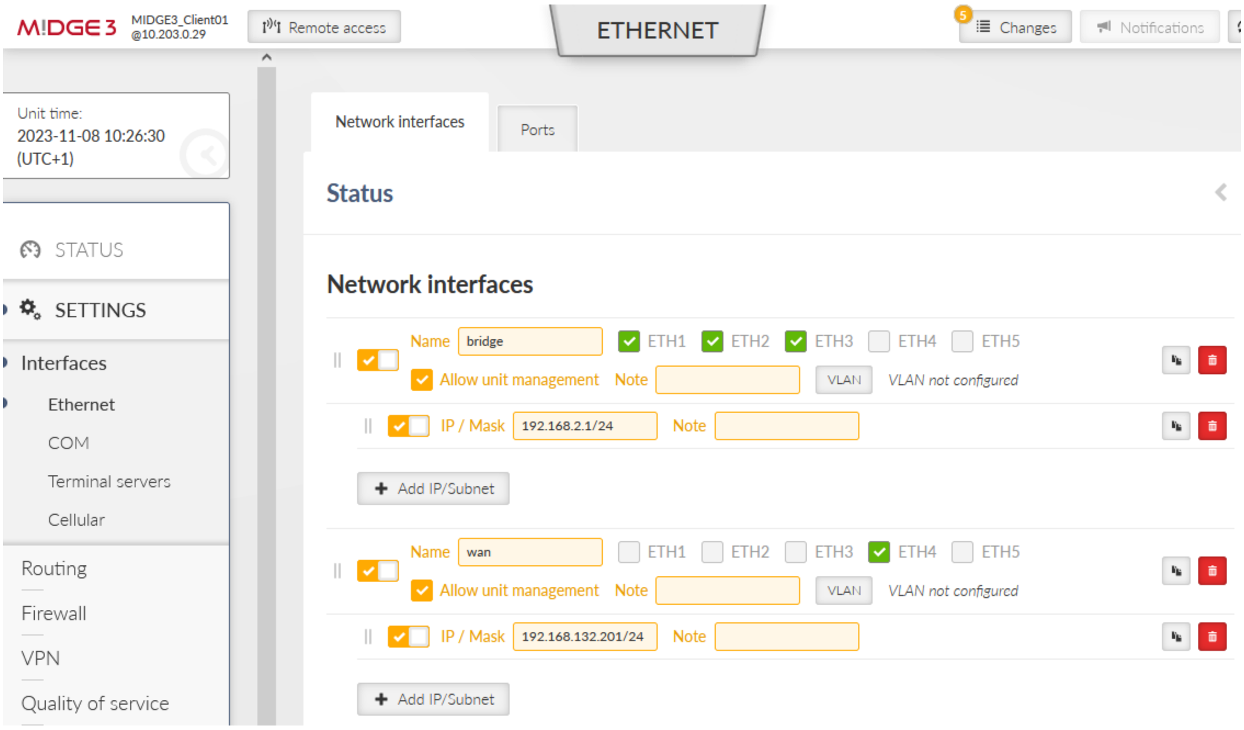
Destination IP / Mask: 10.203.0.0/17, Mode: WWAN (MAIN), ☑ Persistent route, Local

Fig. 68: MIDGE3_Server static routes

Commit the changes.

4.2. MIDGE3_Client01

Configure a new Network Interface within SETTINGS > Interfaces > Ethernet menu called “wan”, using ETH4 port. Set its IP address to 192.168.132.201/24.



Name: bridge, ☑ ETH1, ☑ ETH2, ☑ ETH3, ☐ ETH4, ☐ ETH5, ☑ Allow unit management, Note, VLAN, VLAN not configured
IP / Mask: 192.168.2.1/24, Note

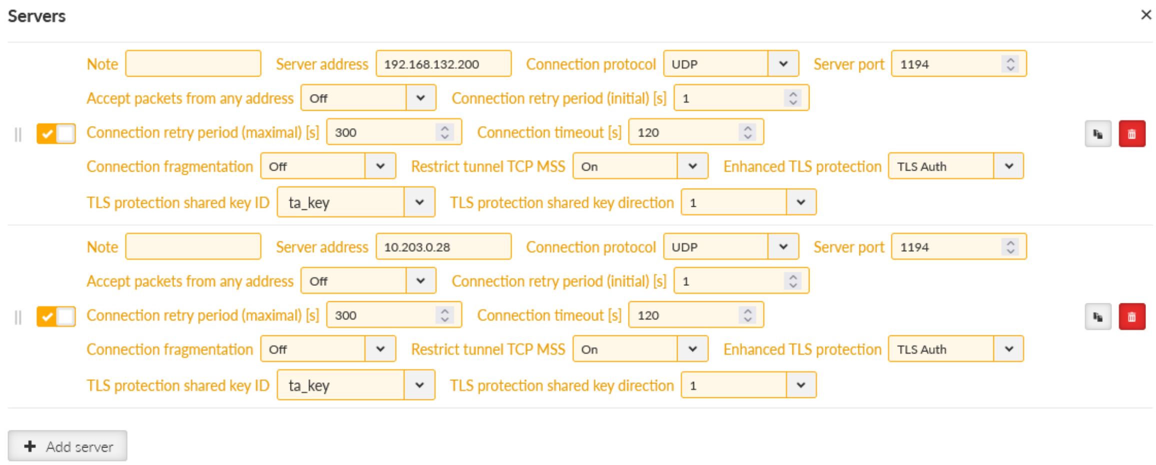
Name: wan, ☐ ETH1, ☐ ETH2, ☐ ETH3, ☑ ETH4, ☐ ETH5, ☑ Allow unit management, Note, VLAN, VLAN not configured
IP / Mask: 192.168.132.201/24, Note

Fig. 69: MIDGE3_Client01 WAN Network interface

Go to the SETTINGS > Routing > Static menu. Based on your APN settings, this may differ a lot, but we set a static route to cellular APN subnet 10.203.0.0/17 via WWAN (MAIN) persistently. We do not need to set any routes via the WAN for this scenario.

Go to the SETTINGS > VPN > OpenVPN menu and click on the “Edit servers” button. Add one new server with server address 192.168.132.200. Set the TLS Protection shared key ID the same way as for the 10.203.0.28 server (TLS-Auth, direction ‘1’).

Switch the priorities so the 192.168.132.200 server is on the 1st line and 10.203.0.28 is on the 2nd line.



Servers

Note: — Server address: 192.168.132.200 Connection protocol: UDP Server port: 1194
Accept packets from any address: Off Connection retry period (initial) [s]: 1
Connection retry period (maximal) [s]: 300 Connection timeout [s]: 120
Connection fragmentation: Off Restrict tunnel TCP MSS: On Enhanced TLS protection: TLS Auth
TLS protection shared key ID: ta_key TLS protection shared key direction: 1

Note: — Server address: 10.203.0.28 Connection protocol: UDP Server port: 1194
Accept packets from any address: Off Connection retry period (initial) [s]: 1
Connection retry period (maximal) [s]: 300 Connection timeout [s]: 120
Connection fragmentation: Off Restrict tunnel TCP MSS: On Enhanced TLS protection: TLS Auth
TLS protection shared key ID: ta_key TLS protection shared key direction: 1

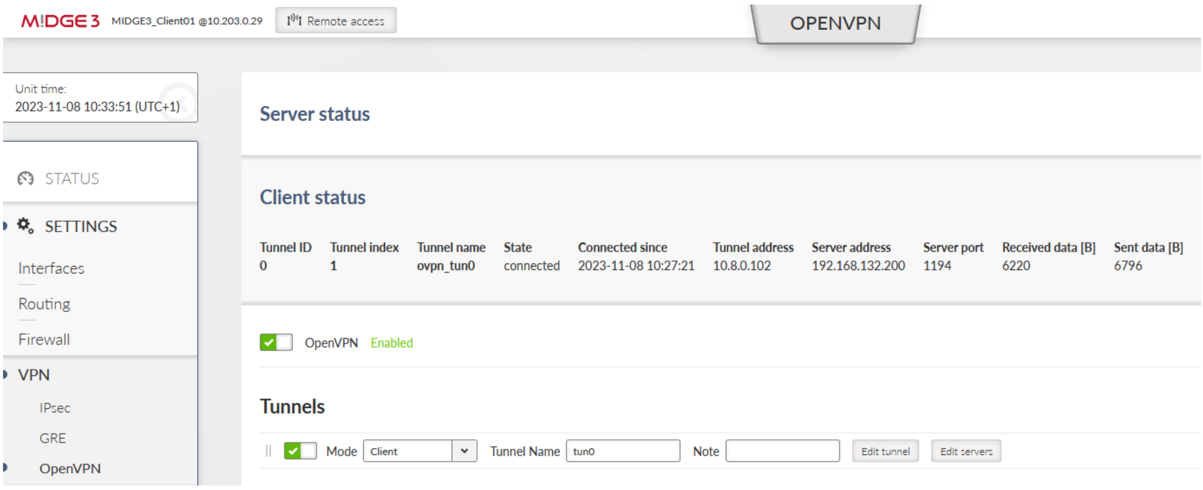
Fig. 70: MIDGE3_Client01 List of servers

Commit the changes.

Connect M!DGE3_Server and M!DGE3_Client01 via the Ethernet cable using the ETH4 ports!

4.3. Diagnostics

Currently, the OpenVPN tunnel should be established via the primary option. Go to the client's OpenVPN settings and check the Status.



Unit time: 2023-11-08 10:33:51 (UTC+1)

Server status

Client status

Tunnel ID	Tunnel index	Tunnel name	State	Connected since	Tunnel address	Server address	Server port	Received data [B]	Sent data [B]
0	1	ovpn_tun0	connected	2023-11-08 10:27:21	10.8.0.102	192.168.132.200	1194	6220	6796

☑ OpenVPN Enabled

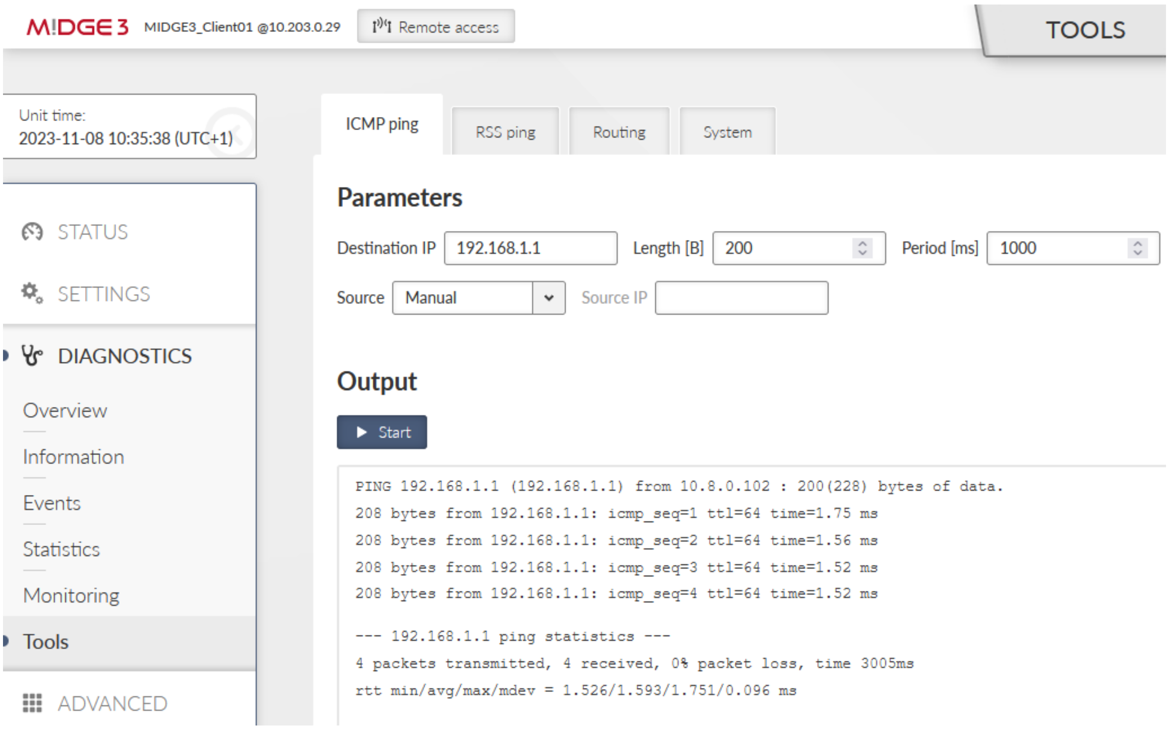
Tunnels

☑ Mode: Client Tunnel Name: tun0 Note: —

Fig. 71: MIDGE3_Client01 OpenVPN Status

Focus on "Server address" – it should be 192.168.132.200. If not, you can reboot the unit and wait until the tunnel gets connected again.

Go to the DIAGNOSTICS > Tools > ICMP ping and try to ping 192.168.1.1 from the client. It should work with a very low RTT – it's approximately 1.5 ms in our example – because it's just via the Ethernet cable.



Parameters

Destination IP: 192.168.1.1 Length [B]: 200 Period [ms]: 1000

Source: Manual Source IP:

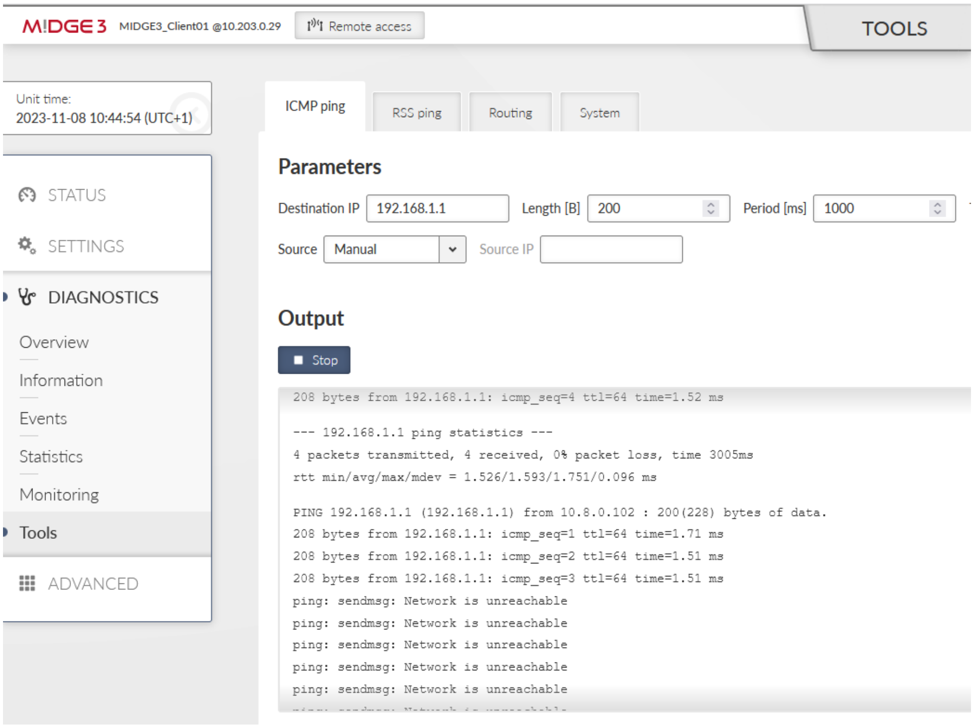
Output

```
PING 192.168.1.1 (192.168.1.1) from 10.8.0.102 : 200(228) bytes of data.
208 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=1.75 ms
208 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=1.56 ms
208 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=1.52 ms
208 bytes from 192.168.1.1: icmp_seq=4 ttl=64 time=1.52 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 1.526/1.593/1.751/0.096 ms
```

Fig. 72: MIDGE3_Client01 ICMP ping to the server's bridge IP

Disconnect the ETH cable between the units. The ping should start failing until the OpenVPN mechanism reconnects via the cellular network. The RTTs should be much higher compared to ETH speed.



Parameters

Destination IP: 192.168.1.1 Length [B]: 200 Period [ms]: 1000

Source: Manual Source IP:

Output

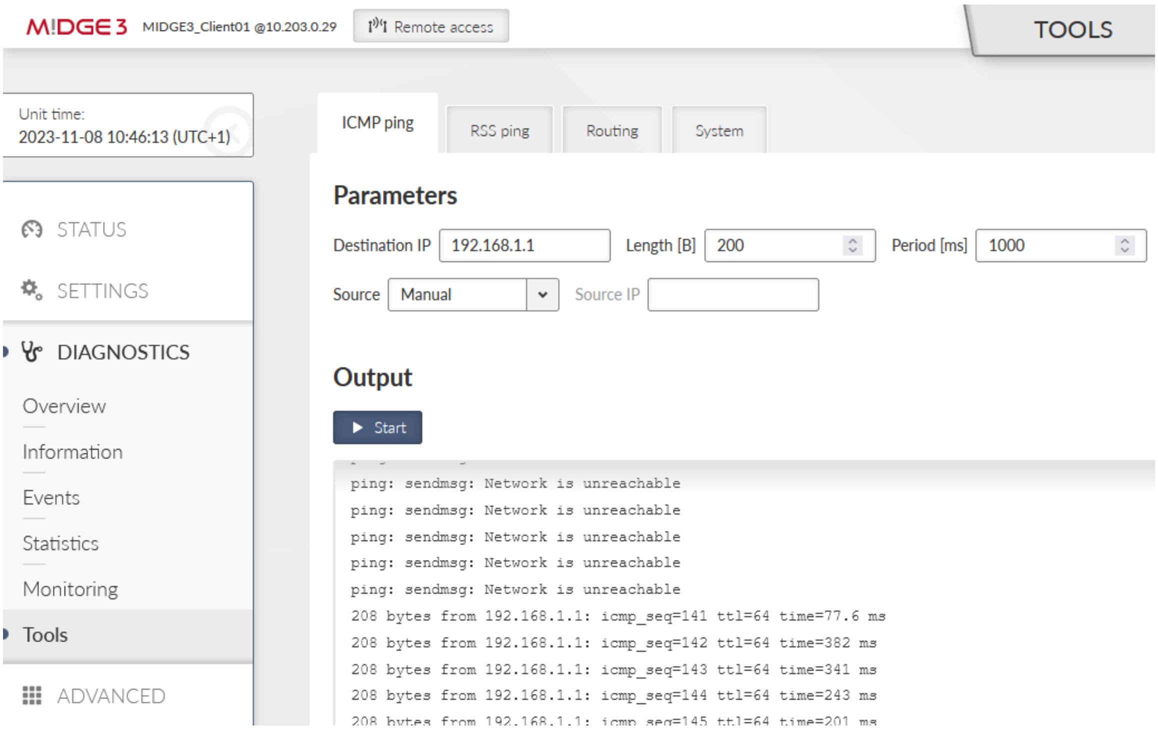
```
208 bytes from 192.168.1.1: icmp_seq=4 ttl=64 time=1.52 ms

--- 192.168.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 1.526/1.593/1.751/0.096 ms

PING 192.168.1.1 (192.168.1.1) from 10.8.0.102 : 200(228) bytes of data.
208 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=1.71 ms
208 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=1.51 ms
208 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=1.51 ms
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
```

Fig. 73: MIDGE3_Client01 ICMP ping failures

The switchover time can differ based on Keepalives set in the OpenVPN settings.



Unit time:
2023-11-08 10:46:13 (UTC+1)

Parameters

Destination IP: 192.168.1.1 Length [B]: 200 Period [ms]: 1000

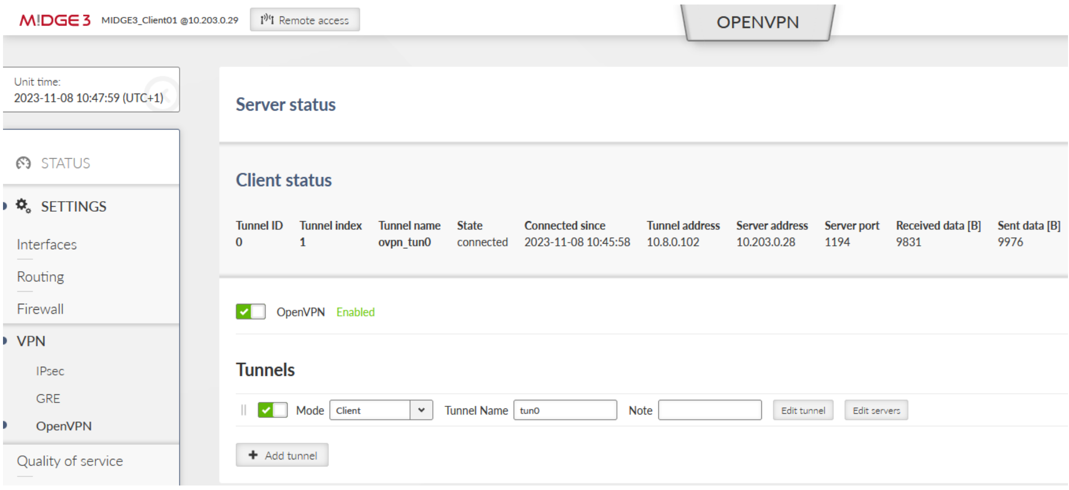
Source: Manual Source IP:

Output

```
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
208 bytes from 192.168.1.1: icmp_seq=141 ttl=64 time=77.6 ms
208 bytes from 192.168.1.1: icmp_seq=142 ttl=64 time=382 ms
208 bytes from 192.168.1.1: icmp_seq=143 ttl=64 time=341 ms
208 bytes from 192.168.1.1: icmp_seq=144 ttl=64 time=243 ms
208 bytes from 192.168.1.1: icmp_seq=145 ttl=64 time=201 ms
```

Fig. 74: MIDGE3_Client01 ICMP ping working correctly

You should also check the OpenVPN status – there should be 10.203.0.28 the Server address.



Unit time:
2023-11-08 10:47:59 (UTC+1)

Server status

Client status

Tunnel ID	Tunnel index	Tunnel name	State	Connected since	Tunnel address	Server address	Server port	Received data [B]	Sent data [B]
0	1	ovpn_tun0	connected	2023-11-08 10:45:58	10.8.0.102	10.203.0.28	1194	9831	9976

☑ OpenVPN Enabled

Tunnels

☑ Mode: Client Tunnel Name: tun0 Note:

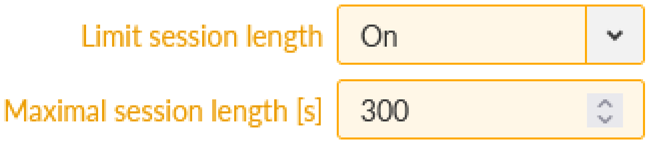
Fig. 75: MIDGE3_Client01 OpenVPN connection via the cellular network

Connect the Ethernet cable again.

The OpenVPN connection does not get re-established via the primary link now, because it only goes to the primary server if the current failover/backup fails. You can either disconnect the cellular antenna, or reboot the client. Wait until it gets connected via the primary ETH link again.

If you need to check the primary (higher priorities) link, set the “Limit session length” parameter in the client’s tunnel configuration. Set the “Maximal session length” to suit your requirements. The minimum time is 5 minutes and the maximum time is 1 day.

We will set it for 5 minutes only due to testing purposes.



Limit session length: On

Maximal session length [s]: 300

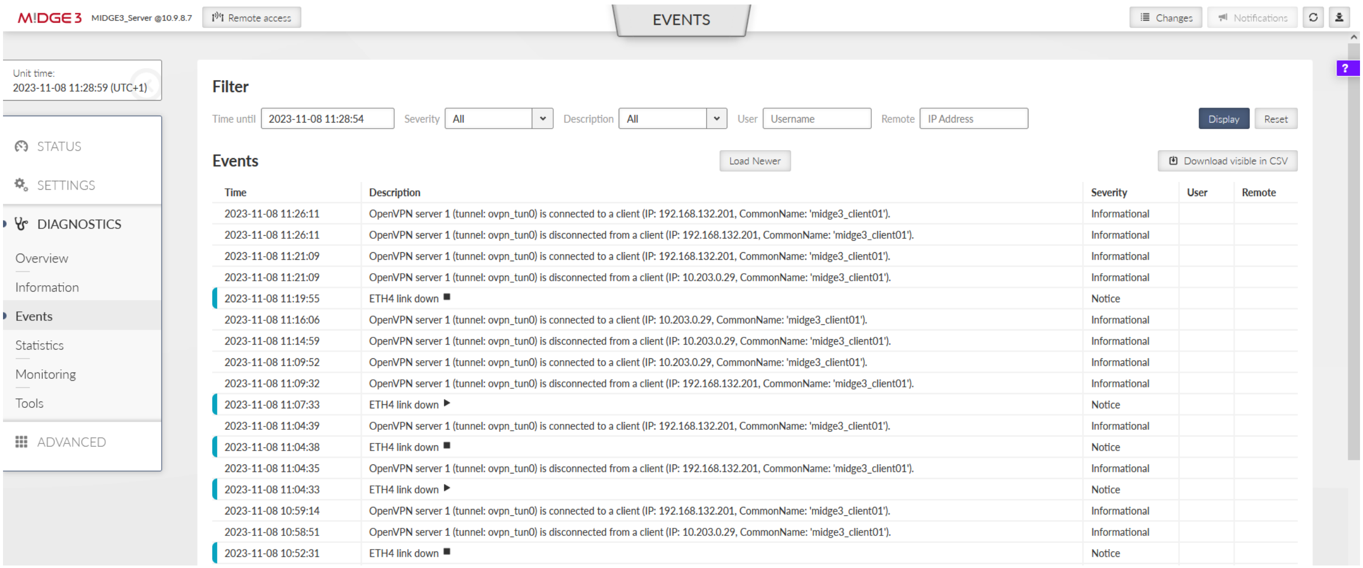
Fig. 76: MIDGE3_Client01 Limit session length

Commit changes.

You can do the test with the Ethernet cable again. Once the OpenVPN gets connected via the cellular network, attach the cable again. Within 5 minutes' time, you should be re-connected via the primary Ethernet link again.

Keep in mind such settings reconnect the tunnel no matter which server is being used – so in our example, while operating via the primary Ethernet link – the VPN tunnel is still re-established every 5 minutes.

You may check the DIAGNOSTICS > Events menu.



Unit time: 2023-11-08 11:28:59 (UTC+1)

Filter

Time until: 2023-11-08 11:28:54 | Severity: All | Description: All | User: Username | Remote: IP Address

Events

Time	Description	Severity	User	Remote
2023-11-08 11:26:11	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:26:11	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:21:09	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:21:09	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 10.203.0.29, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:19:55	ETH4 link down ■	Notice		
2023-11-08 11:16:06	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 10.203.0.29, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:14:59	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 10.203.0.29, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:09:52	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 10.203.0.29, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:09:32	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:07:33	ETH4 link down ▶	Notice		
2023-11-08 11:04:39	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:04:38	ETH4 link down ■	Notice		
2023-11-08 11:04:35	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 11:04:33	ETH4 link down ▶	Notice		
2023-11-08 10:59:14	OpenVPN server 1 (tunnel: ovpn_tun0) is connected to a client (IP: 192.168.132.201, CommonName: 'midge3_client01').	Informational		
2023-11-08 10:58:51	OpenVPN server 1 (tunnel: ovpn_tun0) is disconnected from a client (IP: 10.203.0.29, CommonName: 'midge3_client01').	Informational		
2023-11-08 10:52:31	ETH4 link down ■	Notice		

Fig. 77: MIDGE3_Server Events history

5. Compatibility with Linux or Windows servers/clients

The OpenVPN implementation uses generally know protocol and thus, it is compatible with any 3rd party device, including Linux and Windows servers/clients. So e.g., you can successfully connect from your laptop to the M!DGE3/RipEX2 via OpenVPN and get a secure connection to the complete network.

Within the 2.1.1.0 firmware, there is no option to export the .conf, .ovpn, .p12 and similar OpenVPN configuration files with or without the certificates. The same is valid for importing such configuration files. All must be done manually.

If you configure the Windows/Linux client, just configure the tunnel parameters to match the server settings (cipher, HMAC authentication, protocol, …) and upload valid credentials which can be downloaded from M!DGE3/RipEX2 Credentials menu.

Revision History

Revision 1.0	2024-03-13
First issue	