TheGreenBow IPSec VPN Client

Configuration Guide

Ingate Firewall

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1 Introduction

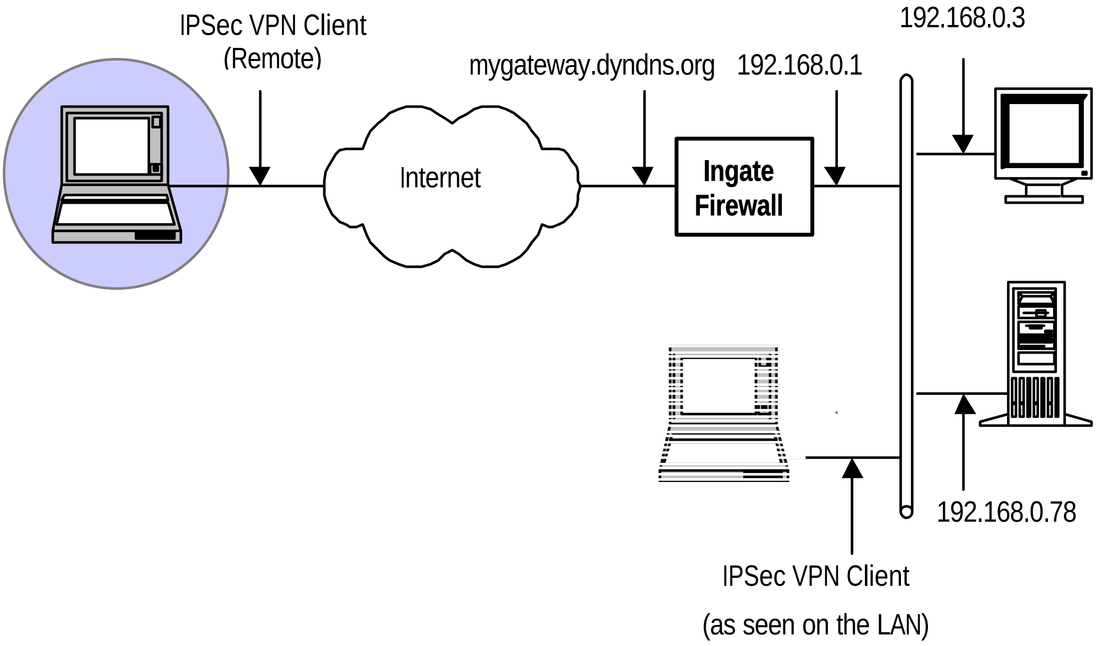
1.1 Goal of this document

This configuration guide describes how to configure TheGreenBow IPSec VPN Client with the Ingate Firewall VPN router.

This document has been written with the support of Ingate team: www.ingate.com.

1.2 VPN Network topology

In our VPN network example (diagram hereafter), we will connect TheGreenBow IPSec VPN Client to the LAN behind the Ingate Firewall router. The VPN client is connected to the Internet with a DSL connection or through a LAN. All the addresses in this document are given for example purpose.



1.3 Ingate Firewall VPN Gateway

Our tests and VPN configuration have been conducted with Ingate Firewall firmware release version 4.2.1.

2 Ingate Firewall VPN configuration

This section describes how to build an IPSec VPN configuration with your Ingate Firewall VPN router.

Once connected to your VPN gateway, you must select “Security” and “VPN” tabs.

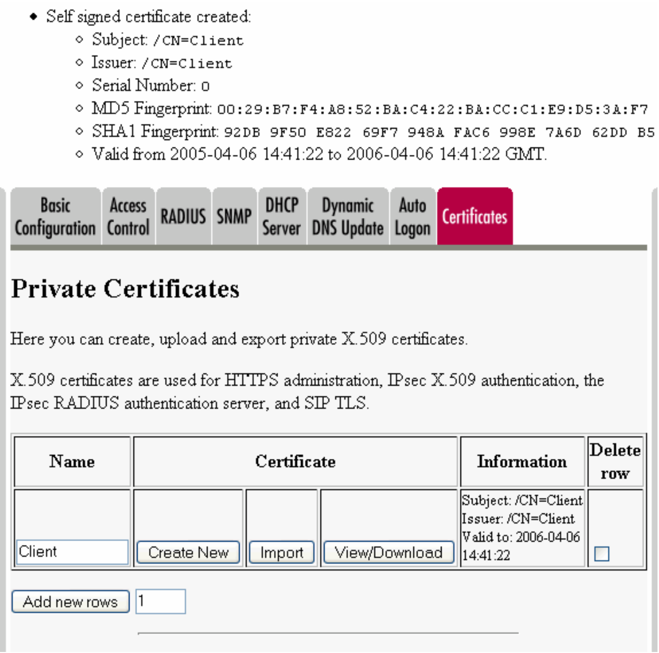
This document assumes that your Ingate Firewall is configured according to the examples available in the product manual here: http://www.ingate.se/files/fwmanual-sv//xx906.html.

This document also assumes that you have downloaded this tool: http://www.thegreenbow.fr/bin/certificate.zip.

2.1 Use the Ingate Firewall to create the client certificate

In order to create a Clien Certificate please proceed through the following steps:

? Create an X.509 certificate on the Ingate Firewall
? Export this in p12 format and rename the file to client.p12
? Remove the certificate from the Ingate (The row below "**Private certificate**" that we just added)
? Export the Firewalls "**Private X509 certificate**" in .p12 format and rename it to ingate.p12
? Transfer these files to the client computer



- Self signed certificate created:
  - Subject: /CN=Client
  - Issuer: /CN=Client
  - Serial Number: 0
  - MD5 Fingerprint: 00:29:B7:F4:A8:52:BA:C4:22:BA:CC:C1:E9:D5:3A:F7
  - SHA1 Fingerprint: 92DB 9F50 E822 69F7 948A FAC6 998E 7A6D 62DD B5
  - Valid from 2005-04-06 14:41:22 to 2006-04-06 14:41:22 GMT.

Private Certificates

Here you can create, upload and export private X.509 certificates.

X.509 certificates are used for HTTPS administration, IPsec X.509 authentication, the IPsec RADIUS authentication server, and SIP TLS.

Name	Certificate			Information	Delete row
Client	Create New	Import	View/Download	Subject: /CN=Client Issuer: /CN=Client Valid to: 2006-04-06 14:41:22	□

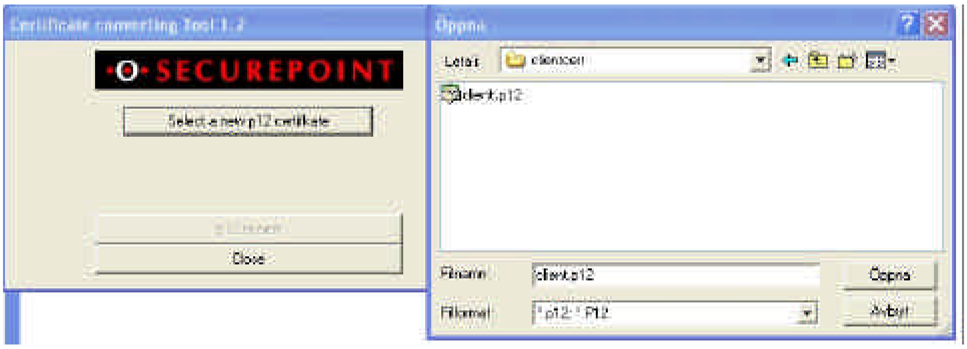
2.2 Extract the pkcs12 files with certificate.exe

Download and extract the certificate.exe from www.thegreenbow.fr/bin/certificate.zip

You can find more information on this tool at www.thegreenbow.fr/doc/greenbow-x509.pdf

Use certificate.exe to extract ingate.p12 and client.p12 to 4 files each. (clientCert.Pem, rootCA.pem, local.key and DER_ASN1_DN.txt)

The tool "**certificate.exe**" creates subfolders for the p12 cert files that are extracted with the same filename.



Filnamn: client.p12

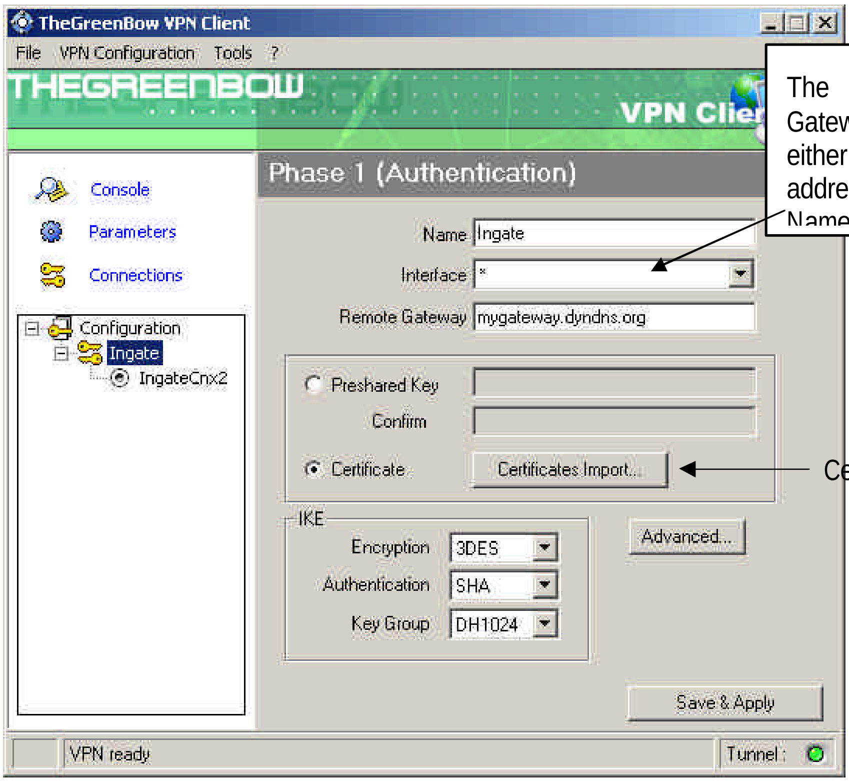
Filformat: *.p12; *.P12

3 TheGreenBow IPSec VPN Client configuration

3.1 VPN Client Phase 1 (IKE) Configuration

Right click on "**Configuration**" and select "**New Phase 1**"

? **Name:** Give this connection a suitable name
? **Interface:** Leave as is (*) if no special configuration is needed
? **Remote Gateway:** Enter your Firewalls outside address
? **Certificate:** Select this option to use certificates
? **Preshared key:** Select and type your secret (not used for this example).



Phase 1 (Authentication)

Name: Ingate

Interface: *

Remote Gateway: mygateway.dyndns.org

○ Preshared Key

Confirm

● Certificate [Certificates Import...]

IKE

Encryption: 3DES

Authentication: SHA

Key Group: DH1024

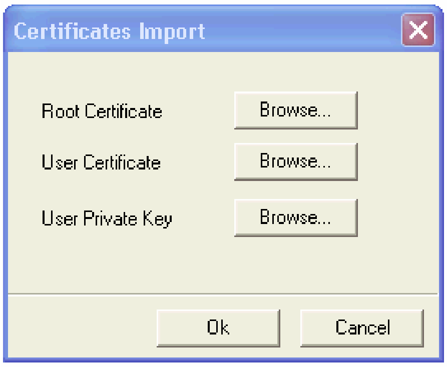
The remote VPN Gateway IP address is either an explicit IP address, or a DNS Name

Certificate Import

Phase 1 configuration

3.2 Certificates Import

Select "**Certificate**" and click on "**Certificates Import …** ".



Root Certificate
Select "Browse" for "Root Certificate" and browse to the file in the folder that was created by certificate.exe, in this case “\Ingate\clientCert.Pem”.

User Certificate
Select "Browse" for "User Certificate" and browse to the file in the folder that was created by certificate.exe , in this case “\client\clientCert.Pem”.
Note that this is NOT the same file as for "Root Certificate".

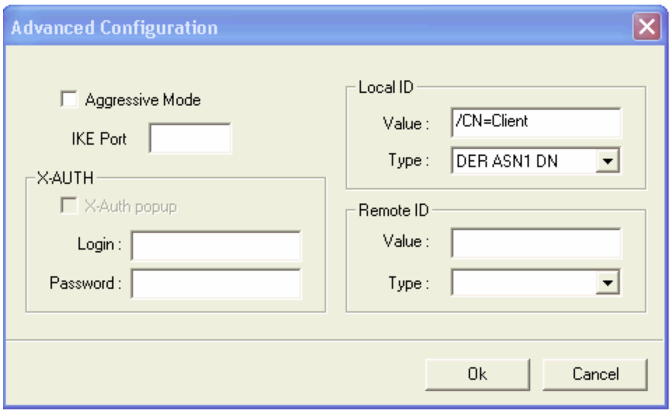
User Private Key
Select "Browse" for "User Private Key" and browse to the file in the folder that was created by certificate.exe, in this case “\client\local.Key”

3.3 Advanced Configuration

Fill in the following field and click "**Ok**".

? Local ID Value: Open the file ...\client\DER_ASN1_DN.txt and copy the text and paste it in the "Value" field.

? Local ID Type: Select "DER ASN1 DN"



Local ID Value : /CN=Client
Local ID Type : DER ASN1 DN

3.4 VPN Client Phase 2 (IPSec) Configuration

Right click on "**Phase 1**" configuration and select "**Add Phase 2**"

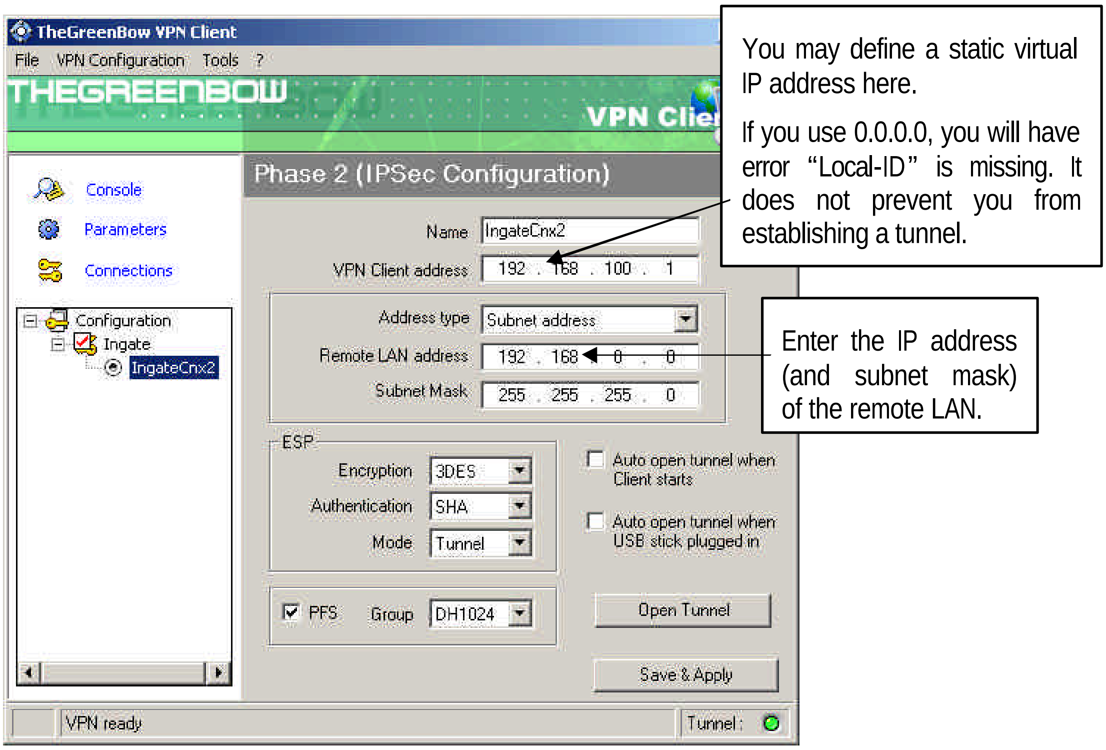
? **Name:** Give this a suitable name

? **VPN Client Address:** Leave as is (0.0.0.0) if no special type is needed.

? **Address type:** If this tunnel is connected to a subnet (check this in your Ingate under VPN -> IPSec-Tunnels "Local Network" for this tunnel) then you should select "Subnet Address" and enter the exact networks that are located in your Firewall's "Local Network". If this tunnel is connected to a single address (check this in your Ingate under VPN -> IPSec-Tunnels "Local Network" for this tunnel) then you should select "Single Address" and enter the exact networks that are located in your Firewall's "Local Network".

? **ESP Encryption**: Select 3DES or AES 256. **ESP Authentication**: Select SHA or MD5. **ESP Mode**: Tunnel.

? **PFS:** Must be selected. **PFS Group**: Select DH1024 or DH2048.



TheGreenBow VPN Client

Phase 2 (IPSec Configuration)

Name: IngateCnx2

VPN Client address: 192 . 168 . 100 . 1

Address type: Subnet address

Remote LAN address: 192 . 168 . 0 . 0

Subnet Mask: 255 . 255 . 255 . 0

ESP

Encryption: 3DES

Authentication: SHA

Mode: Tunnel

☑ PFS Group: DH1024

☐ Auto open tunnel when Client starts

☐ Auto open tunnel when USB stick plugged in

VPN ready

You may define a static virtual IP address here.

If you use 0.0.0.0, you will have error "Local-ID" is missing. It does not prevent you from establishing a tunnel.

Enter the IP address (and subnet mask) of the remote LAN.

Phase 2 Configuration

3.5 Open IPSec VPN tunnels

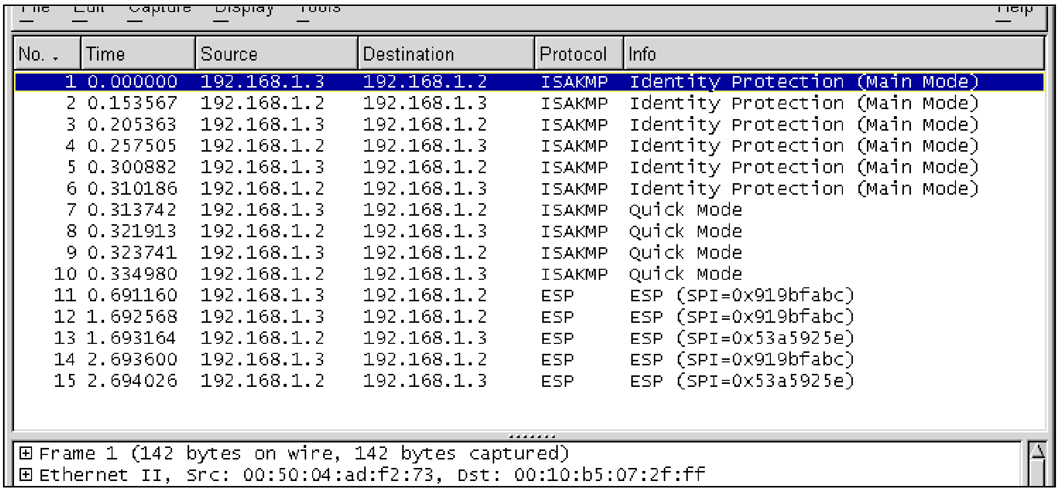
Once both Ingate Firewall router and TheGreenBow IPSec VPN Client have been configured accordingly, you are ready to open VPN tunnels. First make sure you enable your firewall with IPSec traffic.

1. Click on "**Save & Apply**" to take into account all modifications we've made on your VPN Client configuration

2. Click on "**Open Tunnel**", or generate traffic that will automatically open a secure IPSec VPN Tunnel (e.g. ping, IE browser)

3. Select "**Connections**" to see opened VPN Tunnels

4. Select "**Console**" if you want to access to the IPSec VPN logs and adjust filters to display less IPSec messaging. The following example shows a successful connection between TheGreenBow IPSec VPN Client and a Microsoft Windows 2000 Server.



```
No. .   Time       Source        Destination   Protocol  Info
    1 0.000000   192.168.1.3   192.168.1.2   ISAKMP   Identity Protection (Main Mode)
    2 0.153567   192.168.1.2   192.168.1.3   ISAKMP   Identity Protection (Main Mode)
    3 0.205363   192.168.1.3   192.168.1.2   ISAKMP   Identity Protection (Main Mode)
    4 0.257505   192.168.1.2   192.168.1.3   ISAKMP   Identity Protection (Main Mode)
    5 0.300882   192.168.1.3   192.168.1.2   ISAKMP   Identity Protection (Main Mode)
    6 0.310186   192.168.1.2   192.168.1.3   ISAKMP   Identity Protection (Main Mode)
    7 0.313742   192.168.1.3   192.168.1.2   ISAKMP   Quick Mode
    8 0.321913   192.168.1.2   192.168.1.3   ISAKMP   Quick Mode
    9 0.323741   192.168.1.3   192.168.1.2   ISAKMP   Quick Mode
   10 0.334980   192.168.1.2   192.168.1.3   ISAKMP   Quick Mode
   11 0.691160   192.168.1.3   192.168.1.2   ESP      ESP (SPI=0x919bfabc)
   12 1.692568   192.168.1.3   192.168.1.2   ESP      ESP (SPI=0x919bfabc)
   13 1.693164   192.168.1.2   192.168.1.3   ESP      ESP (SPI=0x53a5925e)
   14 2.693600   192.168.1.3   192.168.1.2   ESP      ESP (SPI=0x919bfabc)
   15 2.694026   192.168.1.2   192.168.1.3   ESP      ESP (SPI=0x53a5925e)

⊞ Frame 1 (142 bytes on wire, 142 bytes captured)
⊞ Ethernet II, Src: 00:50:04:ad:f2:73, Dst: 00:10:b5:07:2f:ff
```

4 Tools in case of trouble

Configuring an IPSec VPN tunnel can be a hard task. One missing parameter can prevent a VPN connection from being established. Some tools are available to find source of troubles during a VPN establishment.

4.1 A good network analyser: ethereal

Ethereal is a free software that can be used for packet and traffic analysis. It shows IP or TCP packets received on a network card. This tools is available on website http://www.ethereal.com/. It can be used to follow protocol exchange between two devices. For installation and use details, read its specific documentation.

5 VPN IPSec Troubleshooting

5.1 « PAYLOAD MALFORMED » error (wrong Phase 1 [SA])

```
114920 Default (SA CNXVPN1 -P1) SEND phase  1 Main Mode  [SA][VID]
114920 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [NOTIFY]
114920 Default exchange_run: exchange_validate failed
114920 Default dropped message from 195.100.205.114 port 500 due to notification
type PAYLOAD_MALFORMED
114920 Defa ult SEND Informational  [NOTIFY] with PAYLOAD_MALFORMED error
```

If you have an « PAYLOAD MALFORMED » error you might have a wrong Phase 1 [SA], check if the encryption algorithms are the same on each side of the VPN tunnel.

5.2 « INVALID COOKIE » error

```
115933 Default message_recv: invalid cookie(s) 5918ca0c2634288f 7364e3e486e49105
115933 Default dropped message from 195.100.205.114 port 500 due to notification
type INVALID_COOKIE
115933 Default SEND Informational  [NOTIFY] with INVALID_COOKIE error
```

If you have an « INVALID COOKIE » error, it means that one of the endpoint is using a SA that is no more in use. Reset the VPN connection on each side.

5.3 « no keystate » error

```
115315 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [SA][VID]
115317 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [SA][VID]
115317 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [KEY][NONCE]
115319 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [KEY][NONCE]
115319 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [ID][HASH][NOTIFY]
115319 De fault ipsec_get_keystate: no keystate in ISAKMP SA 00B57C50
```

Check if the preshared key is correct or if the local ID is correct (see « Advanced » button). You should have more information in the remote endpoint logs.

5.4 « received remote ID other than expected » error

```
120348 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [SA][VID]
120349 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [SA][VID]
120349 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [KEY][NONCE]
120351 Default (SA CNXVPN1 -P1) RECV phase 1 Mai n Mode  [KEY][NONCE]
120351 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [ID][HASH][NOTIFY]
120351 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [ID][HASH][NOTIFY]
120351 Default ike_phase_1_recv_ID: received remote ID other than expected
support@thegreenbow.fr
```

The « Remote ID » value (see « Advanced » Button) does not match what the remote endpoint is expected.

5.5 « NO PROPOSAL CHOSEN » error

```
115911 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [SA][VID]
115913 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [SA][VID]
115913 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [KEY][NONCE]
115915 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [KEY][NONCE]
115915 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode   [ID][HASH][NOTIFY]
115915 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [ID][HASH][NOTIFY]
115915 Default phase 1 done: initiator id c364cd70: 195.100.205.112, responder id
c364cd72: 195.100.205.114, src: 195.100.205.112 dst: 195.100.205.114
115915   Default   (SA   CNXVPN1 -CNXVPN1 -P2)   SEND   phase   2   Quick   Mode
[SA][KEY][ID][HASH][NONCE]
115915 Default RECV Informational  [HASH][NOTIFY] with NO_PROPOSAL_CHOSEN error
115915 Default RECV Informational  [HASH][DEL]
115915 Default CNXVPN1 -P1 deleted
```

If you have an « NO PROPOSAL CHOSEN » error, check that the « Phase 2 » encryption algorithms are the same on each side of the VPN Tunnel.

Check « Phase 1 » algorithms if you have this:

```
115911 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [SA][VID]
115911 Default RECV  Informational  [NOTIFY] with NO_PROPOSAL_CHOSEN error
```

5.6 « INVALID ID INFORMATION » error

```
122623 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [SA][VID]
122625 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [SA][VID]
122625 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [KEY][NONCE]
122626 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [KEY][NONCE]
122626 Default (SA CNXVPN1 -P1) SEND phase 1 Main Mode  [ID][HASH][NOTIFY]
122626 Default (SA CNXVPN1 -P1) RECV phase 1 Main Mode  [ID][HASH][NOTIFY]
122626 Default phase 1 done: initiator id c364cd70: 195.100.205.112, responder id
c364cd72: 195.100.205.114, src: 195.100.205.112 dst: 195.100.205.114
122626   Default   (SA   CNXVPN1 -CNXVPN1 -P2)   SEND   phase   2   Quick   Mode
[SA][KEY][ID][HASH][NONCE]
122626 Default RECV Informational  [HASH][NOTIFY] with INVALID_ID_INFORMATION error
122626 Default RECV Informational  [HASH][DEL]
122626 Default CNXVPN1 -P1 deleted
```

If you have an « INVALID ID INFORMATION » error, check if « Phase 2 » ID (local address and network address) is correct and match what is expected by the remote endpoint.

Check also ID type ("Subnet address" and "Single address"). If network mask is not check, you are using a IPV4_ADDR type (and not a IPV4_SUBNET type).

5.7 I clicked on "Open tunnel", but nothing happens.

Read logs of each VPN tunnel endpoint. IKE requests can be dropped by firewalls. An IPSec Client uses UDP port 500 and protocol ESP (protocol 50).

5.8 The VPN tunnel is up but I can't ping !

If the VPN tunnel is up, but you still cannot ping the remote LAN, here are a few guidelines:

? Check Phase 2 settings: VPN Client address and Remote LAN address. Usually, VPN Client IP address should not belong to the remote LAN subnet

? Once VPN tunnel is up, packets are sent with ESP protocol. This protocol can be blocked by firewall. Check that every device between the client and the VPN server does accept ESP

? Check your VPN server logs. Packets can be dropped by one of its firewall rules.

? Check your ISP support ESP

? If you still cannot ping, follow ICMP traffic on VPN server LAN interface and on LAN computer interface (with Ethereal for example). You will have an indication that encryption works.

? Check the "default gateway" value in VPN Server LAN. A target on your remote LAN can receive pings but does not answer because there is a no "Default gateway" setting.

? You cannot access to the computers in the LAN by their name. You must specify their IP address inside the LAN.

? We recommend you to install ethereal (http://www.ethereal.com) on one of your target computer. You can check that your pings arrive inside the LAN.

6 Contacts

News and updates on TheGreenBow web site: http://www.thegreenbow.com

Technical support by email at support@thegreenbow.com

Sales contacts at +33 1 43 12 39 37 or by email at info@thegreenbow.com