

TheGreenBow IPsec VPN Client

Configuration Guide Dynfi

Protocol - IKEv2

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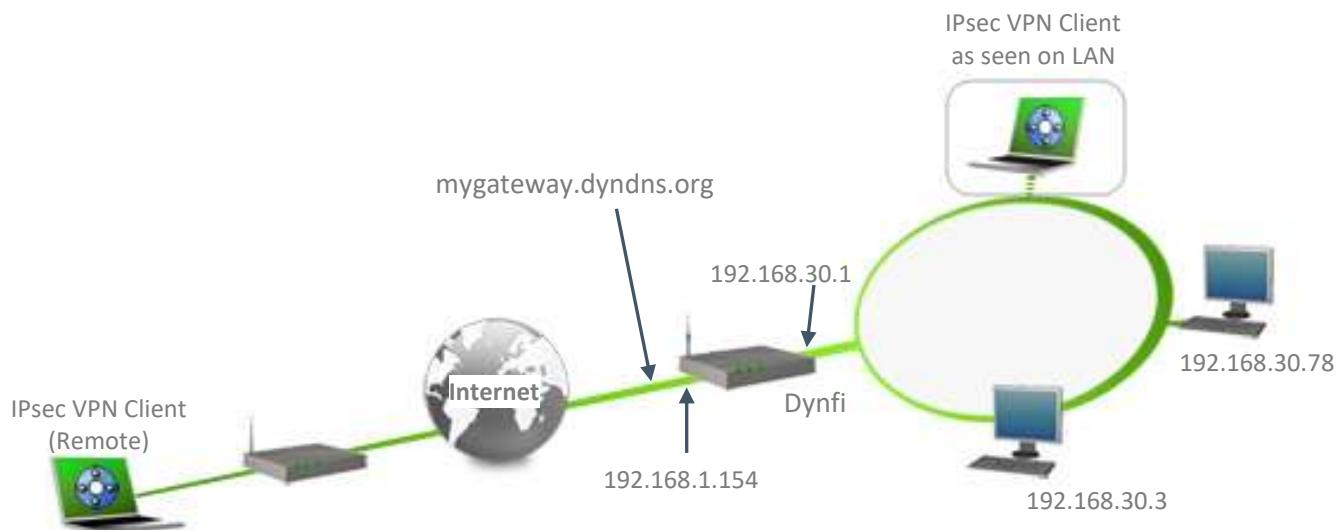
1 Introduction

1.1 Goal of this document

This configuration guide describes how to configure TheGreenBow IPsec VPN Client software with a Dynfi VPN router to establish VPN connections for remote access to corporate network.

1.2 VPN Network topology

In our VPN network example (diagram hereafter), we will connect TheGreenBow IPsec VPN Client software to the LAN behind the Dynfi 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 Dynfi Restrictions

No known restrictions

1.4 Dynfi VPN Gateway

Our tests and VPN configuration have been conducted with Dynfi 20.0.

1.5 Dynfi VPN Gateway product info

It is critical that users find all necessary information about Dynfi Gateway. All product info, User Guide and knowledge base for the Dynfi Gateway can be found on the Dynfi website:
<https://dynfi.com/documentation/>

Dynfi Product page
Dynfi User Guide
Dynfi FAQ

<https://dynfi.com/>
<https://dynfi.com/documentation/>
<https://dynfi.com/faq>

2 Dynfi VPN configuration

This section describes how to build an IPsec VPN configuration with your Dynfi router.

Once connected to your Dynfi gateway, if it is not already done, you need to import or create the Certification Authorities (CA). To do so, click on the “System > Trust > Authorities” menu then on the “Add” button.

Name	Internal	Issuer	Certificates	Distinguished Name
CATGDBDynFi	YES	self-signed	4	emailAddress=support@thegreenbow.com, ST=IDF, O=OU, L=PARIS, CN=ca-tgb-dynfi, C=FR

The Certificate Authority "CATGDBDynFi" will be used to certify the configuration certificates

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Now click on the “System > Trust > Authorities” menu to create or import the certificates. For our example, we will create / import 2 certificates :

- The gateway certificate: 192.168.1.154.
- The user certificate: qa.

The "qa" certificate is a user certificate, it will be imported in the TheGreenBow VPN Client.

Name	Issuer	Distinguished Name	In Use
qa	CATGBDynFI	emailAddress=support@thegreenbow.com, ST=IDF, O=OU, L=PARIS, CN=qa, C=FR, CA: No, Server: No Valid: Mon, 30 Nov 2020 16:40:04 From: +0000 Valid: Sun, 05 Mar 2023 16:40:04 Until: +0000	User Cert
192.168.1.154	CATGBDynFI	subjectAltName=IP:192.168.1.154, emailAddress=support@thegreenbow.com, ST=IDF, O=OU, L=PARIS, CN=fwdynfi, C=FR. CA: No, Server: Yes Valid: Mon, 30 Nov 2020 16:45:16 From: +0000 Valid: Sun, 05 Mar 2023 16:45:16 Until: +0000	IPsec Tunnel

The "192.168.1.154" certificate is a gateway certificate, it will be used in the gateway configuration "Phase 1 proposal (Authentication)"

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You need to click on the “VPN > Tunnel Settings” menu and configure the gateway as follow:

The screenshot shows the DynFi web interface for configuring an IPsec Tunnel. The left sidebar navigation includes: Dashboard, Reporting, System, Interfaces, Firewall, VPN (selected), IPsec (disabled), Mobile Clients, Pre-Shared Keys, RSA Key Pairs, Advanced Settings, OpenVPN, Services, Manager, Power, and Support. The main content area is titled "VPN: IPsec: Tunnel Settings". It contains several sections: "General information" (Status: Enabled, Mode: Tunnel IPv4, Description: empty), "Local Network" (Type: Network, Address: 192.168.30.0/24), "Phase 2 proposal (SA/Key Exchange)" (Protocol: ESP), "Encryption algorithms" (AES 256 bits selected, options: aes128gcm16, aes192gcm16, aes256gcm16, Blowfish, 3DES, CAST128, DES, NULL), "Hash algorithms" (SHA384 SHA512 selected), "PFS key group" (empty), "Lifetime" (3600 seconds), and "Advanced Options" (Automatically ping host). A "Save" button is at the bottom.

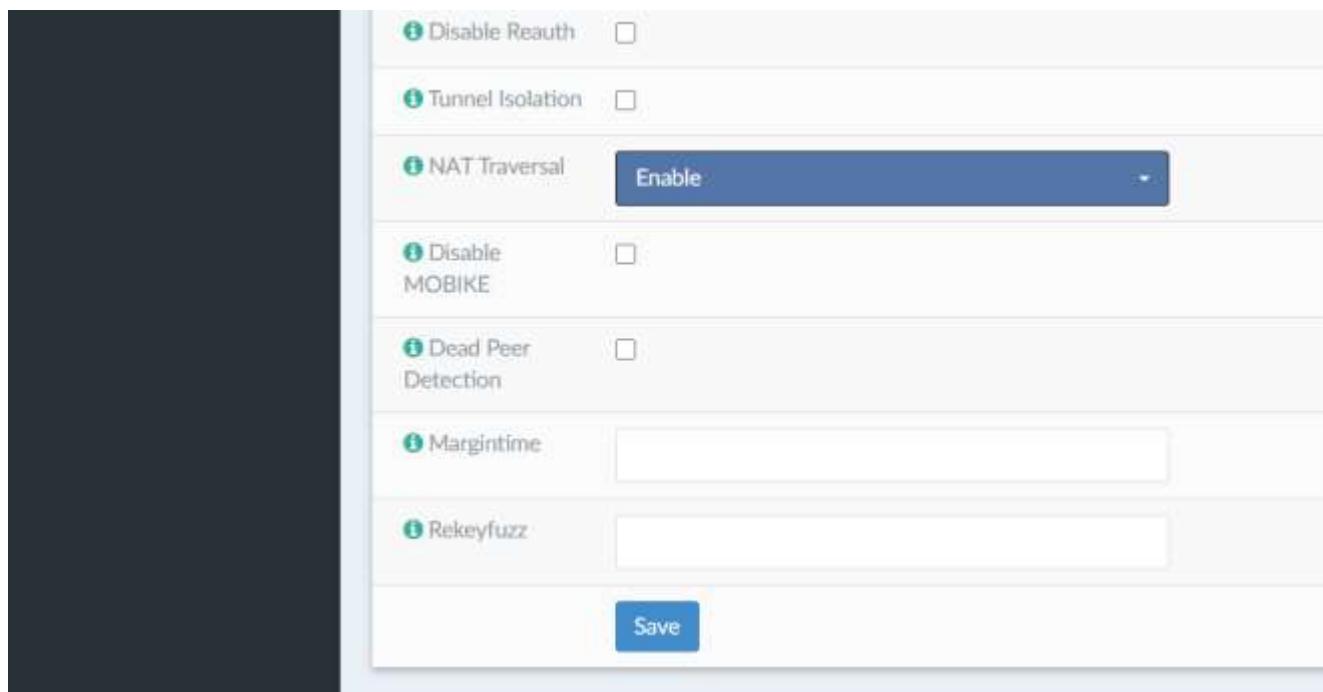
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The screenshot shows the DynFi web interface for configuring IPsec Tunnel Settings. The left sidebar navigation includes: Dashboard, Reporting, System, Interfaces, Firewall, VPN (selected), IPsec (disabled), Mobile Clients, Pre-Shared Keys, RSA Key Pairs, Advanced Settings, OpenVPN, Services, Manager, Power, and Support.

The main content area is titled "VPN: IPsec: Tunnel Settings". It contains several sections:

- General information:** Includes fields for Connection method (set to "default"), Key Exchange version (set to "V2"), Internet Protocol (set to "IPv4"), and Interface (set to "WAN").
- Phase 1 proposal (Authentication):** Includes fields for Authentication method (set to "Mutual RSA"), My identifier (set to "My IP address"), My Certificate (set to "192.168.1.154"), and My Certificate Authority (set to "CATGBDynFi"). A callout bubble for "My Certificate Authority" states: "Select the certificate authority previously created / imported".
- Phase 1 proposal (Algorithms):** Includes fields for Encryption algorithm (set to "AES" and "256"), Hash algorithm (set to "SHA384"), DH key group (set to "14 (2048 bits)"), and Lifetime (set to "28800").
- Advanced Options:** Includes checkboxes for Install policy (checked), Disable Rekey (unchecked), Disable Reauth (unchecked), and Tunnel Isolation (unchecked).

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Validate the configuration by clicking on the “Save” button.

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Then click on the “Mobile Clients” menu

The screenshot shows the DynFi Dynamic Firewall web interface. The left sidebar has a dark theme with various icons and menu items: Dashboard, Reporting, System, Interfaces, Firewall, VPN (selected), IPsec (disabled), Tunnel Settings, Mobile Clients (selected), Pre-Shared Keys, RSA Key Pairs, Advanced Settings, OpenVPN (disabled), Services, Manager, Power, and Support. The main content area is titled "VPN: IPsec: Mobile Clients". It includes sections for IKE Extensions (with "Enable" checked and "Enable IPsec Mobile Client Support" checked), Extended Authentication (Xauth) (with "Backend for authentication" set to "Local Database" and "Enforce local group" set to "vpnuser"), Client Configuration (mode-cfg) (with "Virtual Address Pool" set to "10.70.70.0 / 24", "Network List" checked, "Save Xauth Password" unchecked, "DNS Default Domain" unchecked, "Split DNS" unchecked, "DNS Servers" unchecked, "WINS Servers" unchecked, "Phase 2 PFS Group" set to "14 (2048 bits)", and "Login Banner" unchecked), and a "Save" button at the bottom.

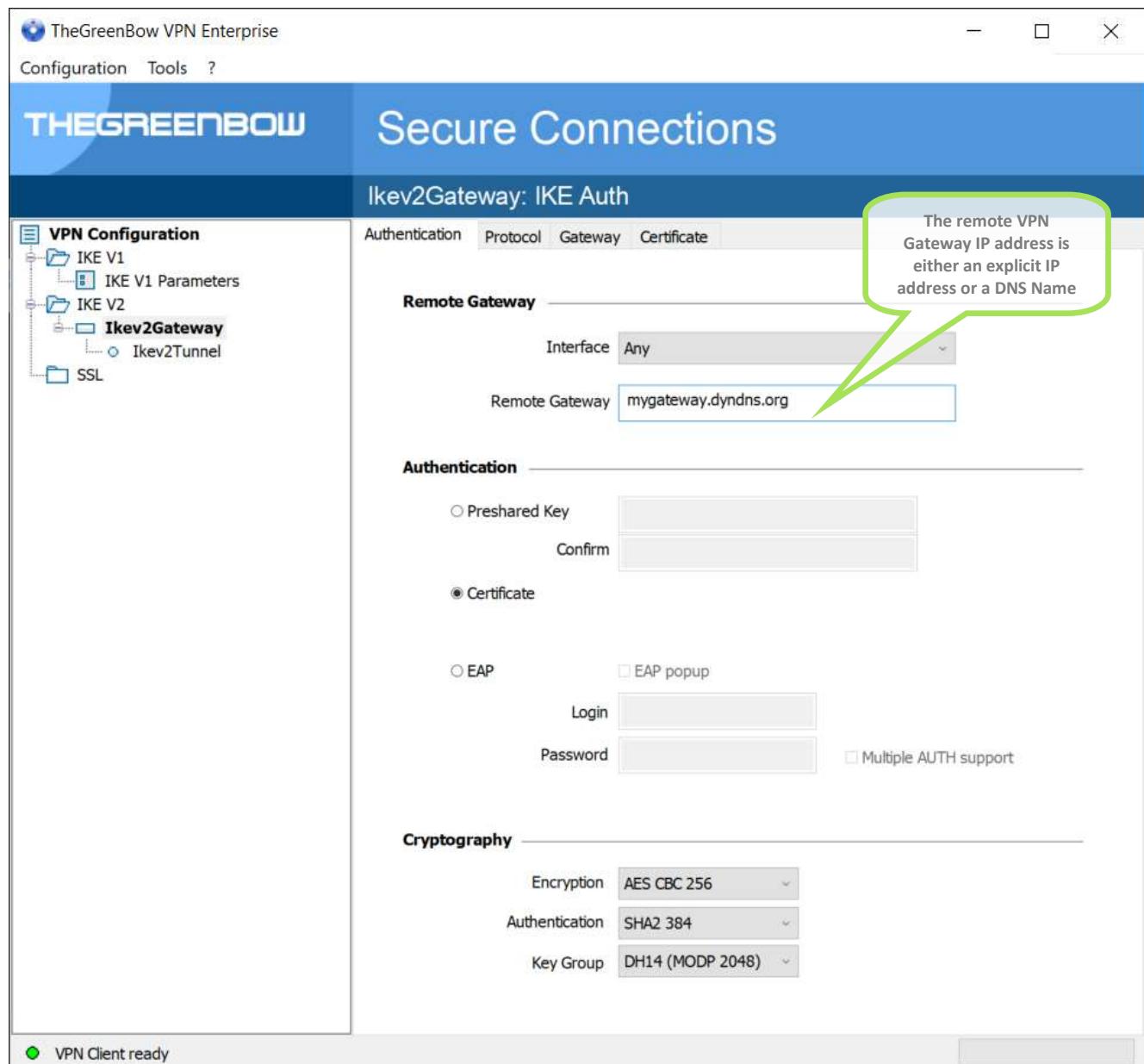
Validate the configuration by clicking on the “Save” button.

3 TheGreenBow IPsec VPN Client configuration

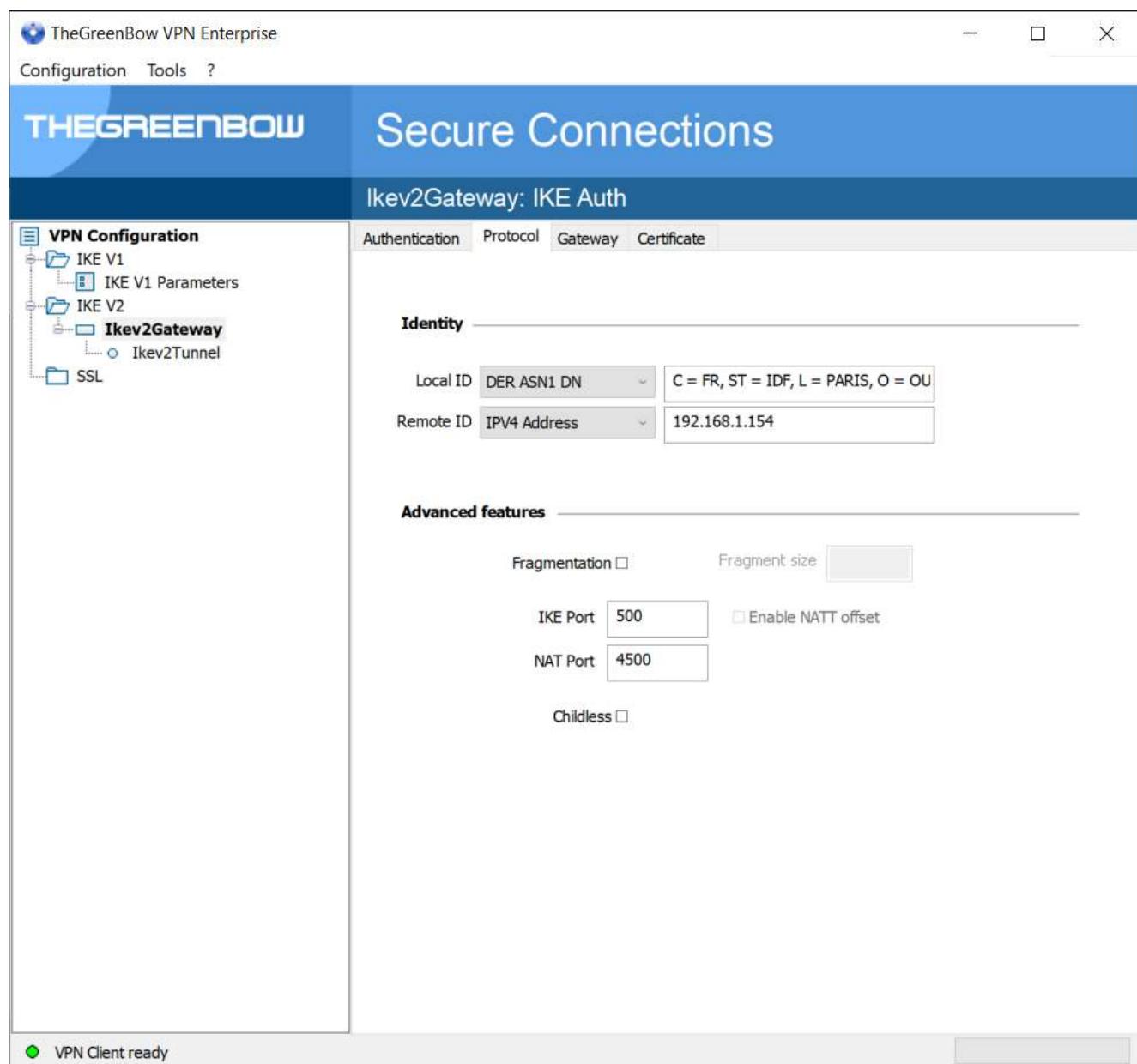
This section describes the required configuration to connect to a Dynfi router via VPN connections.

To download the latest release of TheGreenBow IPsec VPN Client software, please go to http://www.thegreenbow.com/vpn_products.html

3.1 VPN Client - IKE Auth Configuration



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The screenshot shows the TheGreenBow VPN Enterprise software interface. The title bar reads "TheGreenBow VPN Enterprise". The main header says "THEGREENBOW Secure Connections". Below it, a sub-header says "Ikev2Gateway: IKE Auth". On the left, a sidebar titled "VPN Configuration" lists "IKE V1", "IKE V2" (with "Ikev2Gateway" selected), and "SSL". The main pane has tabs "Authentication", "Protocol", "Gateway", and "Certificate" (selected). A message says "Choose a Certificate in the list below, or select a new Certificate by clicking on the button 'Import Certificate...'". A table lists certificates: "VPN Configuration File" (selected, "qa" radio button), "ca-tgb-dynfi", "Expires 03-05-2023"; and "Axalto Cryptoflex .NET". A callout bubble points to the "Import Certificate..." button with the text "Import in the TheGreenBow VPN Client the user certificate previously created / imported". At the bottom are buttons for "View Certificate...", "Import Certificate...", "CA Management...", and "More PKI Options...". A status bar at the bottom left says "VPN Client ready".

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3.2 VPN Client Phase 2 (Child SA) Configuration

The screenshot shows the 'Secure Connections' interface of TheGreenBow VPN Enterprise. On the left, a sidebar titled 'VPN Configuration' lists 'IKE V1', 'IKE V2' (with 'Ikev2Gateway' selected), and 'SSL'. The main panel is titled 'Ikev2Tunnel: Child SA' and contains tabs for 'Child SA', 'Advanced', 'Automation', and 'Remote Sharing'. The 'IPV4' tab is selected. The 'Traffic selectors' section includes fields for 'VPN Client address' (0.0.0.0), 'Address type' (Subnet address), 'Remote LAN address' (0.0.0.0), and 'Subnet mask' (0.0.0.0). A checked checkbox says 'Request configuration from the gateway'. The 'Cryptography' section includes dropdowns for 'Encryption' (AES CBC 256), 'Integrity' (SHA2 384), 'Diffie-Hellman' (DH14 (MODP 2048)), and 'Extended Sequence Number' (Auto). The 'Lifetime' section shows 'Child SA Lifetime' set to 1800 sec. A green callout bubble points to the 'Virtual IP address and Remote LAN address/subnet will be sent by Gateway through Mode CP' note.

Virtual IP address and
Remote LAN
address/subnet will be
sent by Gateway
through Mode CP

The configuration of the other tabs is left by default

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3.3 Open IPsec VPN tunnels

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

- 1/ Select menu "**Configuration**" and "**Save**" to take into account all modifications we've made on your VPN Client configuration.
- 2/ Double Click on your Child SA tunnel name or Click "**Open**" button in Connection panel to open tunnel.
- 3/ Select menu "**Tools**" and "**Console**" if you want to access to the IPsec VPN logs. The following example shows a successful connection between TheGreenBow IPsec VPN Client and a Dynfi router.



The screenshot shows the "VPN Console ACTIVE" window. At the top, there are buttons for "Save", "Stop", "Clear", and "Reset IKE". The main area displays a log of IPsec VPN events. The log entries are as follows:

```
20200805 14:32:59:722 TKEv2_1kev2Gateway SEND IKE_SA_INIT [HDR][SA][NONCE][NAT_DETECTION_SOURCE_IP][NAT_DETECTION_DESTINATION_IP][ME]
20200805 14:32:59:737 TKEv2_1kev2Gateway RCV IKE_SA_INIT [HDR][INVALID_ID_PAYLOAD]
20200805 14:32:59:737 TKEv2_1kev2Gateway SEND IKE_SA_INIT [HDR][SA][NONCE][NAT_DETECTION_SOURCE_IP][NAT_DETECTION_DESTINATION_IP][ME]
20200805 14:32:59:839 TKEv2_1kev2Gateway RECV IKE_SA_INIT [HDR][SA][NONCE][NAT_DETECTION_SOURCE_IP][NAT_DETECTION_DESTINATION_IP][NHTTP_CERT_LOOKUP_SUPPORTED][CERTREQ][VID][HD][VID]
20200805 14:32:59:853 TKEv2_1kev2Gateway IKE SA 1-SP1 922CF12E1519EBA3 R_SPT 97EFAD547FF7A30
20200805 14:32:59:853 TKEv2_1kev2Gateway RECV IKE_AUTH [HDR][DOI][AUTH][CP][SA][TS][T9][NOINITIAL_CONTACT][NESP_TFC_PADDING_NOT_SUPPORTED]
20200805 14:32:59:972 TKEv2_1kev2Gateway RECV IKE_AUTH [HDR][DOI][AUTH][CP][SA][TS][T9][NESP_TFC_PADDING_NOT_SUPPORTED][NON_FIRST_FRAGMENTS ALSO]
20200805 14:32:59:984 TKEv2_1kev2Gateway Outbound SPI CAM94472 192.168.2.9/255.255.255 => 192.168.1.0/255.255.255.0
20200805 14:33:00:006 TKEv2_1kev2Gateway IKE CHILD renewal in 1566 seconds (14:59:00)
20200805 14:33:00:006 TKEv2_1kev2Gateway IKE AUTH renewal in 1702 seconds (15:01:22)
20200805 14:33:00:006 TKEv2_1kev2Gateway [VirtualIf] Virtual Interface properly configured for instance 1 and tifIndex 13.
```

At the bottom right of the log window, it says "Current line: 12" and "Max. lines: 10000".

Sample log

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: Wireshark

Wireshark 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 tool is available on website www.wireshark.org. It can be used to follow protocol exchange between two devices. For installation and use details, read its specific documentation (www.wireshark.org/docs/).

No.	Time	Source	Destination	Protocol	Length	Info
16	-18.903591	192.168.200.8	88.162.188.74	ISAKMP	1270	IKE_SA_INIT MID=00 Initiator Request
17	-14.932894	88.162.188.74	192.168.200.8	ISAKMP	1515	IKE_SA_INIT MID=00 Responder Response
19	-14.901354	192.168.200.8	88.162.188.74	ISAKMP	101	IKE_AUTH MID=01 Initiator Request
21	-14.842711	88.162.188.74	192.168.200.8	ISAKMP	102	IKE_AUTH MID=01 Responder Response
227	-7.946751	192.168.200.8	88.162.188.74	ISAKMP	142	INFORMATIONAL MID=02 Initiator Request
228	-7.946642	192.168.200.8	88.162.188.74	ISAKMP	142	INFORMATIONAL MID=03 Initiator Request
236	-7.894043	88.162.188.74	192.168.200.8	ISAKMP	142	INFORMATIONAL MID=02 Responder Response
237	-7.894042	88.162.188.74	192.168.200.8	ISAKMP	142	INFORMATIONAL MID=03 Responder Response

5 VPN IPsec Troubleshooting

5.1 “NO_PROPOSAL_CHOSEN” error (wrong IKE Auth)

```
20XX0913 16:08:53:387 TIKEV2_Tunnel SEND IKE_SA_INIT  
[HDR] [SA] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [KE] [VID] [N(FR  
AGMENTATION_SUPPORTED)]  
20XX0913 16:08:53:419 TIKEV2_Tunnel RECV IKE_SA_INIT [HDR] [N(NO_PROPOSAL_CHOSEN)]
```

If you have an “NO_PROPOSAL_CHOSEN” error you might have a wrong Phase 1 [IKE Auth], check if the encryption algorithms are the same on each side of the VPN tunnel.

5.2 “AUTHENTICATION_FAILED” error

```
20XX0913 16:15:22:032 TIKEV2_Tunnel RECV IKE_AUTH [HDR] [N(AUTHENTICATION_FAILED)]  
20XX0913 16:15:22:032 TIKEV2_Tunnel Remote endpoint sends error AUTHENTICATION_FAILED
```

If you have an “AUTHENTICATION_FAILED” error, it means that the certificate or the Pre-shared key is not matching. Check the Gateway if the user certificate or Pre-shared key is valid.

5.3 “No user certificate available for the connection” error

```
20XX0913 16:18:07:491 TIKEV2_Tunnel RECV IKE_SA_INIT  
[HDR] [SA] [KE] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [CERTREQ] [  
N(FRAGMENTATION_SUPPORTED)] [N(MULTIPLE_AUTH_SUPPORTED)]  
20XX0913 16:18:07:491 TIKEV2_Tunnel IKE_SA_I-SPI 8D4467C52C91C316 R-SPI 9DF0F0E4A91F8867  
20XX0913 16:18:07:491 TIKEV2_Tunnel No user certificate available for the connexion  
20XX0913 16:18:07:491 TIKEV2_Tunnel Connection aborted.
```

Check if the certificate is selected or the Token (smartcard) is available on the computer.

5.4 “Remote ID rejected” error

```
20180913 16:24:32:087 TIKEV2_Tunnel ID types do not match. Expecting ID_RFC822_ADDR.  
Receiving ID_DER ASN1_DN  
20180913 16:24:32:087 TIKEV2_Tunnel Remote IDr rejected
```

The “Remote ID” value (see “Protocol” tab) does not match what the remote endpoint is expected.

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5.5 “NO_PROPOSAL_CHOSEN” error (wrong CHILD SA)

```
20XX0913      16:25:14:933      TIKEV2_Tunnel      SEND      IKE_SA_INIT
[HDR] [SA] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [KE] [N(FRAGMENTATION_SUPPORTED)]
20XX0913      16:25:15:118      TIKEV2_Tunnel      RECV      IKE_SA_INIT
[HDR] [SA] [KE] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [CERTREQ] [N(MULTIPLE_AUTH_SUPPORTED)]
20XX0913 16:25:15:118 TIKEV2_Tunnel IKE_SA_I-SPI E389FC49EE7078F1 R-SPI 00F37D557ED307FC
20XX0913      16:25:15:118      TIKEV2_Tunnel      SEND      IKE_AUTH
[HDR] [IDi] [CERT] [CERTREQ] [AUTH] [CP] [SA] [TSi] [TSr] [N(INITIAL_CONTACT)] [N(ESP_TFC_PADDING_NOT_SUPPORTED)]
20XX0913      16:25:15:165      TIKEV2_Tunnel      RECV      IKE_AUTH
[HDR] [IDr] [CERT] [AUTH] [CP] [N(AUTH_LIFETIME)] [N(NO_PROPOSAL_CHOSEN)]
20XX0913 16:25:15:165 TIKEV2_Tunnel IKE_AUTH renewal in 1654 seconds (16:52:49)
20XX0913      16:25:15:165      TIKEV2_Tunnel      SEND      CHILD_SA
[HDR] [SA] [NONCE] [KE] [TSi] [TSr] [N(ESP_TFC_PADDING_NOT_SUPPORTED)]
20XX0913 16:25:15:202 TIKEV2_Tunnel RECV CHILD_SA [HDR] [N(NO_PROPOSAL_CHOSEN)]
20XX0913 16:25:15:202 TIKEV2_Tunnel Remote endpoint sends error NO_PROPOSAL_CHOSEN
20XX0913 16:25:15:202 TIKEV2_Tunnel SEND INFORMATIONAL [HDR] [DELETE]
```

If you have an “NO_PROPOSAL_CHOSEN” error, check that the “Child SA” encryption algorithms are the same on each side of the VPN Tunnel.

5.6 “FAILED_CP_REQUIRED” error

```
20XX0913      16:29:46:780      TIKEV2_Tunnel      RECV      IKE_AUTH
[HDR] [IDr] [CERT] [AUTH] [N(AUTH_LIFETIME)] [N(FAILED_CP_REQUIRED)] [N(TS_UNACCEPTABLE)]
20180913 16:29:46:780 TIKEV2_Tunnel Remote endpoint sends error FAILED_CP_REQUIRED
20XX0913 16:29:46:780 TIKEV2_Tunnel Remote endpoint is expecting a configuration request from the client
```

If you have an “FAILED_CP_REQUIRED” error, then the Gateway is configured to use Mode CP. Go to Traffic selectors and enable "Request configuration from the gateway".

5.7 I clicked on “Open tunnel”, but nothing happens.

```
20XX1003 11:08:34:031 [VPNCONF] TGBIKE_STARTED received
20XX1003      11:21:34:379      TIKEV2_vRHEL75      SEND      IKE_SA_INIT
[HDR] [SA] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [KE]
20XX1003      11:21:39:397      TIKEV2_vRHEL75      SEND      IKE_SA_INIT
[HDR] [SA] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [KE]
20XX1003      11:21:44:409      TIKEV2_vRHEL75      SEND      IKE_SA_INIT
[HDR] [SA] [NONCE] [N(NAT_DETECTION_SOURCE_IP)] [N(NAT_DETECTION_DESTINATION_IP)] [KE]
20XX1003 11:21:49:423 TIKEV2_vRHEL75 3 attempts with no response. Aborting connection.
```

Read logs of each VPN tunnel endpoint. IKE requests can be dropped by firewalls. An IPsec Client uses UDP port 500.

Check if the remote server is online.

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 Child SA 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 and if the protocol 50 is allowed to pass traffic in your firewalls.
- If you still cannot ping, follow ICMP traffic on VPN server LAN interface and on LAN computer interface (with Wireshark 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 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 Wireshark (www.wireshark.org) on one of your target computers. You can check that your pings arrive inside the LAN.

6 Contacts

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

Technical support by email at: support@thegreenbow.com

Sales contacts by email at: sales@thegreenbow.com

Secure, Strong, Simple

TheGreenBow Security Software