TheGreenBow IPSec VPN Client

Configuration Guide

AlliedTelesis
AT-AR700 Series
with Radius Server

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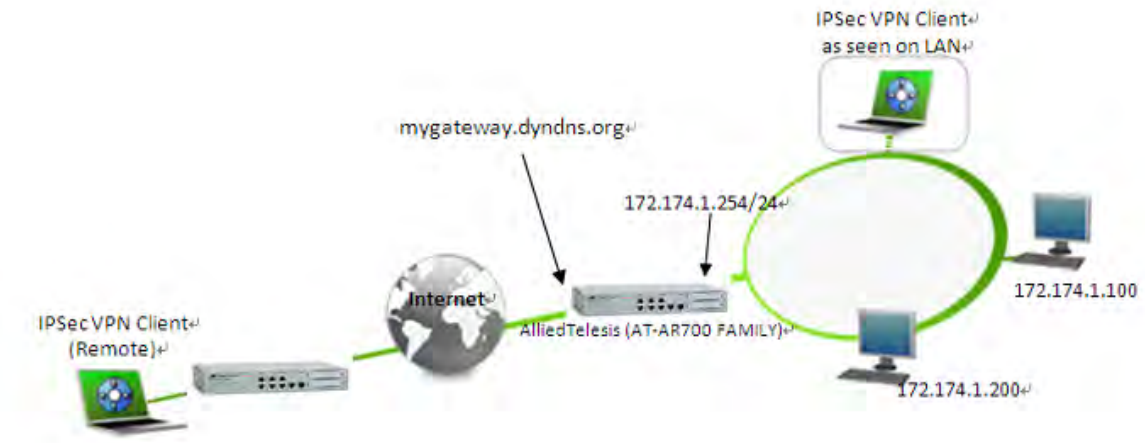
1 Introduction

1.1 Goal of this document

This configuration guide describes how to configure TheGreenBow IPSec VPN Client software with an AlliedTelesis AT-AR700 Series VPN router to establish VPN connections for remote access to corporate network. User Authentication is checked against a Windows 2003 server configured as a Radius Server.

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 AlliedTelesis AT-AR700 Series 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 AlliedTelesis AT-AR700 Series VPN Gateway

Our tests and VPN configuration have been conducted with AlliedTelesis AT-AR700 Series firmware release 2.9.2-00

1.4 AlliedTelesis AT-AR700 Series VPN Gateway product info

It is critical that users find all necessary information about AlliedTelesis AT-AR700 Series VPN Gateway. All product info, User Guide and knowledge base for the AlliedTelesis AT-AR700 Series VPN Gateway can be found on the AlliedTelesis website: www.alliedtelesis.com

AT-AR700 Series Product page	www.alliedtelesis.com/products/category.aspx?cid=8
AT-AR700 Series User Guide	www.alliedtelesis.com/media/datasheets/reference/ar700_family_m_a_v291.zip

2 AT-AR700 Series VPN configuration

This section describes how to build an IPSec VPN configuration with your AT-AR700 Series VPN router.

Once connected to your AT-AR700 Series VPN gateway

2.1 AT-AR700 Series Pre-Requisite Configuration

INFO: Self tests beginning.
INFO: RAM test beginning.
PASS: RAM test, 65536k bytes found.
INFO: Self tests complete.
INFO: Downloading router software.
Force EPROM download (Y) ?
INFO: Initial download successful.
INFO: Initialising Flash File System.
INFO: Executing configuration script <flash:boot.cfg>
INFO: Router startup complete

Login: manager
Password: friend

Manager > set user securedelay=600

User module configuration and counters

Security parameters

login failures before lockout	5	(LOGINFAIL)
lockout period	600 seconds	(LOCKOUTPD)
manager password failures before logoff ……..	3	(MANPWDFAIL)
maximum security command interval	600 seconds	(SECURDELAY)
minimum password length	6 characters	(MINPWDLEN)
TACACS retries	3	(TACRETRIES)
TACACS timeout period	5 seconds	(TACTIMEOUT)
minimum password categories to match	1	(PWDMINCAT)
previous passwords to match	disabled	(PWDHISTORY)
password lifetime	disabled	(PWDLIFETIME)
force password change at logon	disabled	(PWDFORCE)
semi-permanent manager port	none	

Security counters

logins	1	authentications	0
managerPwdChanges	1	defaultAcctRecoveries	1
unknownLoginNames	0	tacacsLoginReqs	0
totalPwdFails	0	tacacsLoginRejs	0
managerPwdFails	0	tacacsReqTimeouts	0
securityCmdLogoffs	0	tacacsReqFails	0
loginLockouts	0	databaseClearTotallys	0

Manager > add user=allied pass=allied lo=yes
Number of Radius-backup users..... 0
User Authentication Database

Username: allied ()
Status: enabled Privilege: user Telnet: no Login: yes RBU: no
Logins: 0 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > set user=allied telnet=no netmask=255.255.255.255
Number of Radius-backup users..... 0
User Authentication Database

Username: allied ()
Status: enabled Privilege: user Telnet: no Login: yes RBU: no
Logins: 0 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > set user=manager pass=friend priv=manager lo=yes
Number of Radius-backup users..... 0
User Authentication Database

Username: manager (Manager Account)
Status: enabled Privilege: manager Telnet: yes Login: yes RBU: no
Logins: 1 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > set user=manager telnet=yes desc="Manager Account"
Number of Radius-backup users..... 0
User Authentication Database

Username: manager (Manager Account)
Status: enabled Privilege: manager Telnet: yes Login: yes RBU: no
Logins: 1 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > add user=secoff pass=secoff priv=securityOfficer lo=yes

Number of Radius-backup users..... 0

User Authentication Database

Username: secoff ()
Status: enabled Privilege: Sec Off Telnet: no Login: yes RBU: no
Logins: 0 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > set user=secoff telnet=no netmask=255.255.255.255
Number of Radius-backup users..... 0
User Authentication Database

Username: secoff ()
Status: enabled Privilege: Sec Off Telnet: no Login: yes RBU: no
Logins: 0 Fails: 0 Sent: 0 Rcvd: 0
Authentications: 0 Fails: 0

Manager > logon secoff

Password: secoff

SecOff > enable system security_mode

Info (1034003): Operation successful.

SecOff > create enco key=1 type=general value=secret

Info (1073003): Operation successful.

SecOff > create vlan=vlan100 vid=100

Info (1089003): Operation successful.

SecOff > add vlan=100 port=1-5

Info (1089003): Operation successful.

SecOff > enable ip

Info (1005287): IP module has been enabled.

SecOff > add ip int=eth0 ip=172.28.40.41

Info (1005275): interface successfully added.

SecOff > add ip int=vlan100 ip=172.174.1.254 mask=255.255.255.0

Info (1005275): interface successfully added.

SecOff > add ip rou=0.0.0.0 mask=0.0.0.0 int=eth0 next=172.28.40.40

Info (1005275): IP route successfully added.

Command file

This is the sequence of command lines shown above without expected results. Cut and paste to use in your environment.

```
enable system security_mode
create enco key=1 type=general value=secret
create vlan=vlan100 vid=100
add vlan=100 port=1-5
enable ip
add ip int=eth0 ip=172.28.40.41
add ip int=vlan100 ip=172.174.1.254 mask=255.255.255.0
add ip rou=0.0.0.0 mask=0.0.0.0 int=eth0 next=172.28.40.40
```

2.2 AT-AR700 Series configuration of IPSec with Pre-Shared Key (PSK) & Firewall

SecOff > create isakmp pol="windows_isakmp" pe=any mod=aggressive key=1 xau=server

Info (1082003): Operation successful.

SecOff > set isakmp pol=windows_isakmp gro=2

Info (1082003): Operation successful.

SecOff > set isakmp pol=windows_isakmp sendi=true

Info (1082003): Operation successful.

SecOff > set isakmp pol=windows_isakmp localid=172.28.40.41 remotei=sample@a.com

Info (1082003): Operation successful.

SecOff > create ipsec sas=1 key=isakmp prot=esp enc=des hasha=sha

Info (1081003): Operation successful.

SecOff > create ipsec bund=0 key=isakmp string=1

Info (1081003): Operation successful.

SecOff > create ipsec pol="peer" int=eth0 ac=ipsec key=isakmp bund=0 peer=ANY isa=windows_isakmp

Info (1081003): Operation successful.

SecOff > set ipsec pol="peer" lad=172.174.1.0 lma=255.255.255.0

Info (1081003): Operation successful.

SecOff > set ipsec pol="peer" usepfsk=TRUE gro=2

Info (1081003): Operation successful.

SecOff > create ipsec pol="internet" int=eth0 ac=permit

Info (1081003): Operation successful.

SecOff > create ipsec pol="isakmp" int=eth0 ac=permit

Info (1081003): Operation successful.

SecOff > set ipsec pol="isakmp" lp=500

Info (1081003): Operation successful.

SecOff > enable ipsec

Info (1081003): Operation successful.

SecOff > enable isakmp

Info (1082057): ISAKMP has been enabled.

SecOff > enable firewall

Info (1077257): 05-Feb-2010 13:40:22

Firewall enabled.

Info (1077003): Operation successful.

SecOff > enable firewall notify=mail to=<administrator-email-address>

Info (1077003): Operation successful.

SecOff > create firewall policy="fw"

Info (1077003): Operation successful.

SecOff > create firewall policy="fw" dy=dynamic

Info (1077003): Operation successful.

SecOff > add firewall policy="fw" dy=dynamic us=ANY

Info (1077003): Operation successful.

SecOff > enable firewall policy="fw" icmp_f=all

Info (1077003): Operation successful.

SecOff > add firewall policy="fw" int=vlan100 type=private

Info (1077003): Operation successful.

SecOff > add firewall policy="fw" int=dyn-dynamic type=private

Info (1077003): Operation successful.

SecOff > add firewall policy="fw" int=eth0 type=public

Info (1077003): Operation successful.

SecOff > add firewall poli="fw" nat=enhanced int=vlan100 gblin=eth0

Info (1077003): Operation successful

SecOff > add firewall poli="fw" nat=enhanced int=dyn-dynamic gblin=eth0

Info (1077003): Operation successful.

SecOff > add firewall poli="fw" ru=1 ac=allo int=eth0 prot=udp po=500 ip=172.28.40.41 gblip=172.28.40.41 gblp=500

Info (1077003): Operation successful.

SecOff > add firewall poli="fw" ru=2 ac=non int=eth0 prot=ALL ip=172.174.1.0-172.174.1.254 enc=ips

Info (1077003): Operation successful.

SecOff > add firewall poli="fw" ru=3 ac=non int=vlan100 prot=ALL ip=172.174.1.0-172.174.1.254

Info (1077003): Operation successful.

SecOff > set firewall poli="fw" ru=3 rem=192.0.0.0-192.255.255.254

Info (1077003): Operation successful.

SecOff >.

Command file

This is the sequence of command lines shown above without expected results. Cut and paste to use in your environment.

```
create isakmp pol="windows_isakmp" pe=any mod=aggressive key=1 xau=server
set isakmp pol=windows_isakmp gro=2
set isakmp pol=windows_isakmp sendi=true
set isakmp pol=windows_isakmp localid=172.28.40.41 remotei=example@a.com
create ipsec sas=1 key=isakmp prot=esp enc=des hasha=sha
create ipsec bund=0 key=isakmp string=1
create ipsec pol="peer" int=eth0 ac=ipsec key=isakmp bund=0 peer=ANY
isa=windows_isakmp
set ipsec pol="peer" lad=172.174.1.0 lma=255.255.255.0
set ipsec pol="peer" usepfsk=TRUE gro=2
create ipsec pol="internet" int=eth0 ac=permit
create ipsec pol="isakmp" int=eth0 ac=permit
set ipsec pol="isakmp" lp=500
enable ipsec
enable isakmp
enable firewall
enable firewall notify=mail to=<administrator-email-address>
create firewall policy="fw"
create firewall policy="fw" dy=dynamic
add firewall policy="fw" dy=dynamic us=ANY
enable firewall policy="fw" icmp_f=all
add firewall policy="fw" int=vlan100 type=private
add firewall policy="fw" int=dyn-dynamic type=private
add firewall policy="fw" int=eth0 type=public
add firewall poli="fw" nat=enhanced int=vlan100 gblin=eth0
add firewall poli="fw" nat=enhanced int=dyn-dynamic gblin=eth0
add firewall poli="fw" ru=1 ac=allo int=eth0 prot=udp po=500
ip=172.28.40.41 gblip=172.28.40.41 gblp=500
add firewall poli="fw" ru=2 ac=non int=eth0 prot=ALL ip=172.174.1.0-
172.174.1.254 enc=ips
add firewall poli="fw" ru=3 ac=non int=vlan100 prot=ALL ip=172.174.1.0-
172.174.1.254
set firewall poli="fw" ru=3 rem=192.0.0.0-192.255.255.254
.
```

2.3 Configuring X-Auth

SecOff > add radius server=172.174.1.100 secret=secret

Info (1077003): Operation successful.

SecOff > enable portauth=8021x

Info (1077003): Operation successful.

Command file

This is the sequence of command lines shown above without expected results. Cut and paste to use in your environment.

```
add radius server=172.174.1.100 secret=secret
enable portauth=8021x
```

2.4 Save Configuration

SecOff > create conf=vpn.cfg

Info (1034003): Operation successful.

SecOff > set conf=vpn.cfg

Warning: Config file MUST add a user with SECURITY OFFICER privilege

Do you wish to proceed with setting config?(y/n) y

Info (1049003): Operation successful.

Command file

This is the sequence of command lines shown above without expected results. Cut and paste to use in your environment.

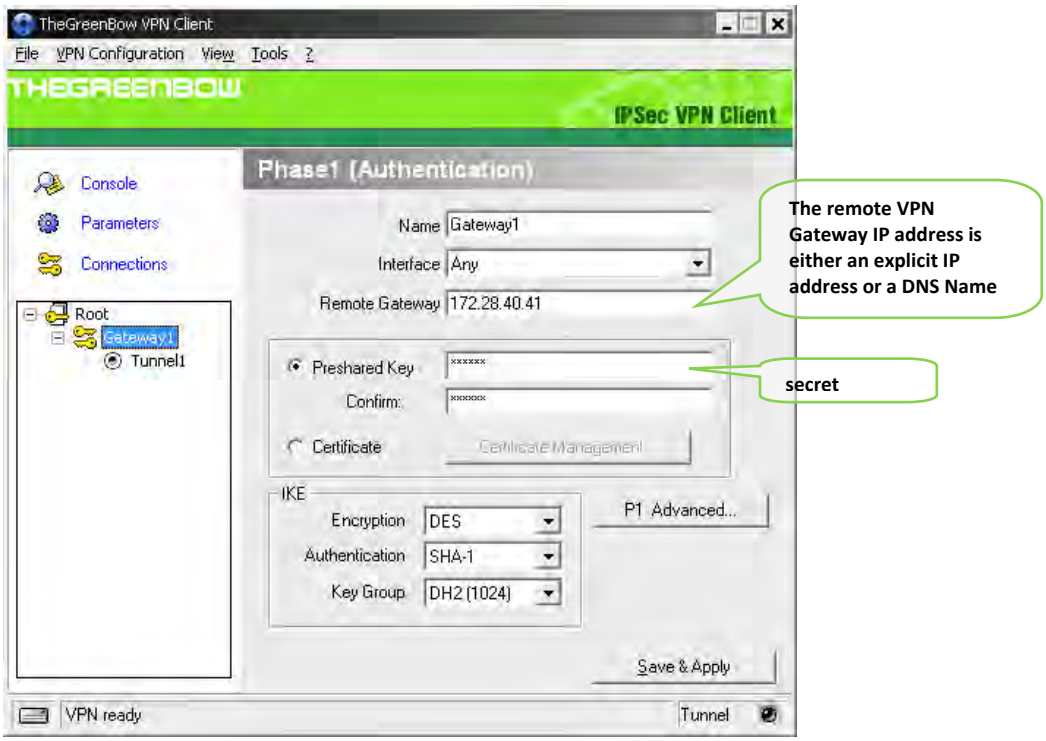
```
create conf=vpn.cfg
set conf=vpn.cfg
y
```

3 TheGreenBow IPSec VPN Client configuration

This section describes the required configuration to connect to an AlliedTelesis AT-AR700 Series VPN router via VPN connections.

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

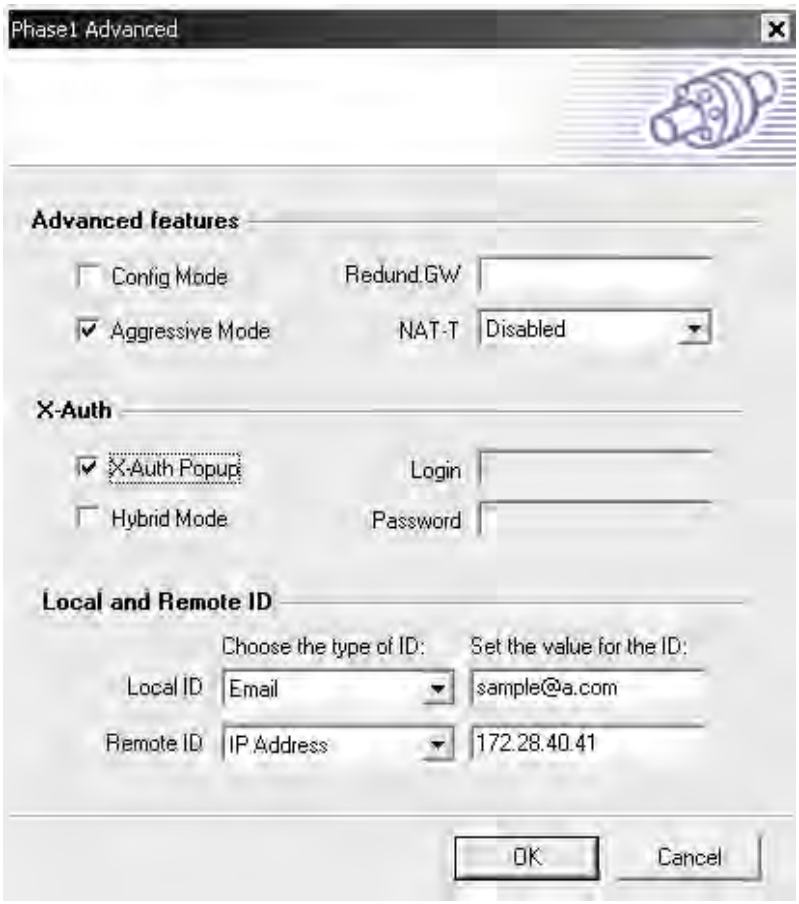
3.1 VPN Client Phase 1 (IKE) Configuration



Phase 1 configuration

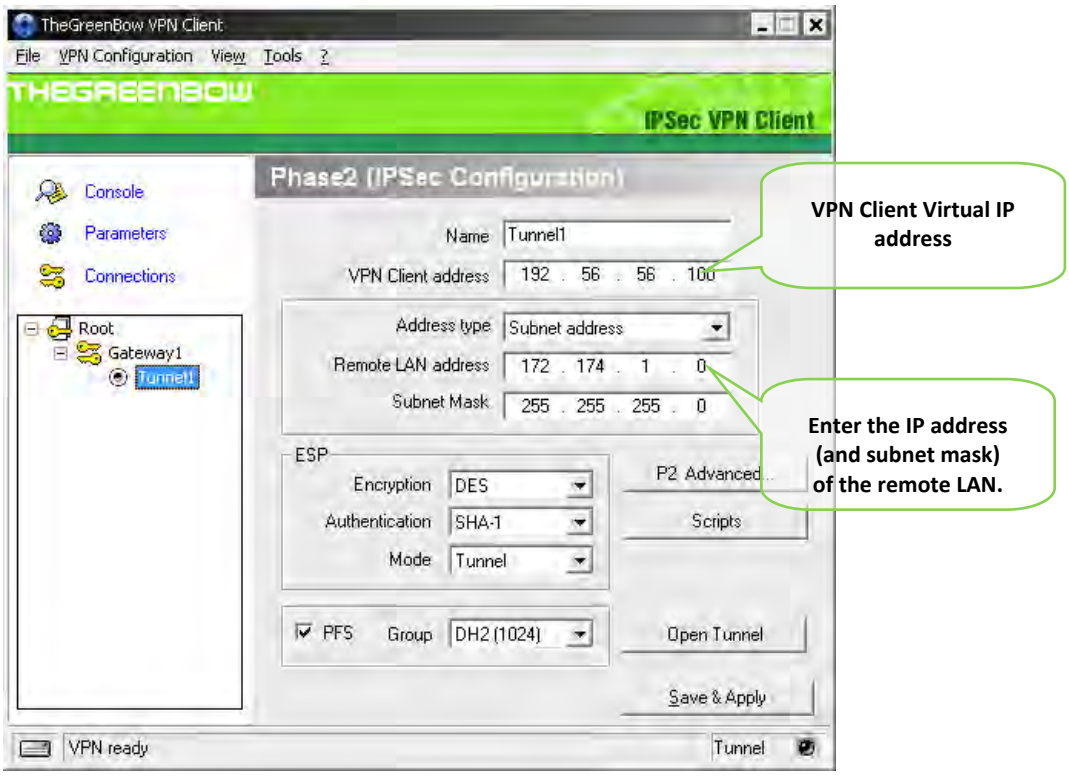
You may use either Preshared key, Certificates, USB Tokens, OTP Token (One Time Password) or X-Auth combined with RADIUS Server for User Authentication with the AlliedTelesis AT-AR700 Series router. This configuration is one example of what can be accomplished in term of User Authentication. You may want to refer to either the AlliedTelesis AT-AR700 Series router user guide or TheGreenBow IPSec VPN Client software User Guide for more details on User Authentication options.

3.2 VPN Client Phase 1 (P1 Advanced) Configuration



P1 Advanced Configuration

3.3 VPN Client Phase 2 (IPSec) Configuration



Phase 2 Configuration

3.4 Open IPSec VPN tunnels

Once both AlliedTelesis AT-AR700 Series 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. 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 after entering Login & Password. (e.g. ping, IE browser)

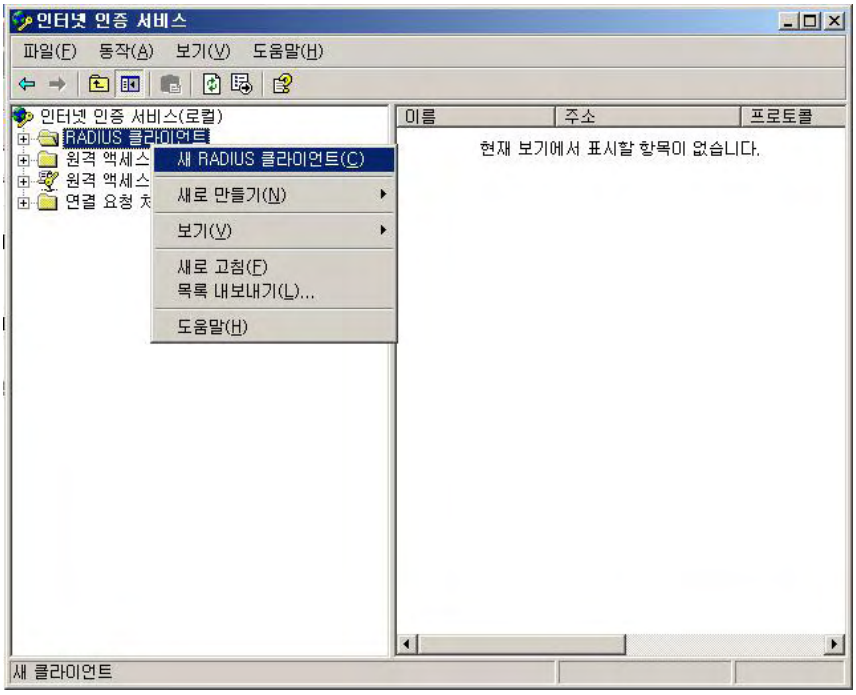
3. Select "Connections" to see opened VPN Tunnels

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 an AlliedTelesis AT-AR700 Series VPN router.

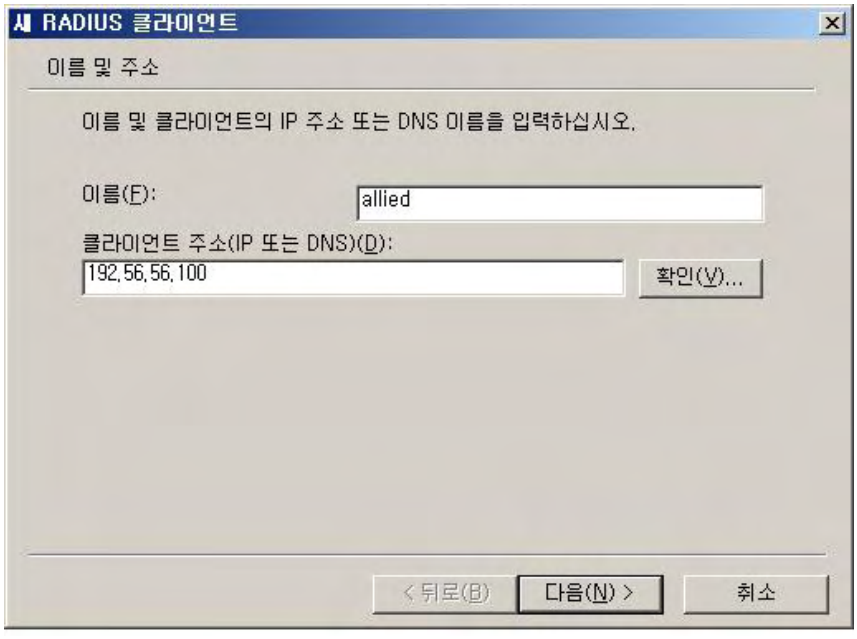
```
20090630 104525 Default (SA Gateway2-P1) SEND phase 1 Main Mode  [SA] [VID] [VID] [VID] [VID] [VID]
20090630 104525 Default (SA Gateway2-P1) RECV phase 1 Main Mode  [SA] [VID] [VID]
20090630 104526 Default (SA Gateway2-P1) SEND phase 1 Main Mode  [KEY_EXCH] [NONCE] [NAT_D] [NAT_D]
20090630 104526 Default (SA Gateway2-P1) RECV phase 1 Main Mode  [KEY_EXCH] [NONCE] [NAT_D] [NAT_D]
20090630 104526 Default (SA Gateway2-P1) SEND phase 1 Main Mode  [HASH] [ID] [NOTIFY]
20090630 104526 Default (SA Gateway2-P1) RECV phase 1 Main Mode  [HASH] [ID]
20090630 104526 Default phase 1 done: initiator id 192.168.205.151, responder id mygateway.dyndns.org
20090630 104526 Default (SA Gateway2-Tunnel3-P2) SEND phase 2 Quick Mode  [HASH] [SA] [KEY_EXCH] [NONCE] [ID] [ID]
20090630 104527 Default (SA Gateway2-Tunnel3-P2) RECV phase 2 Quick Mode  [HASH] [SA] [KEY_EXCH] [NONCE] [ID] [ID]
20090630 104527 Default (SA Gateway2-Tunnel3-P2) SEND phase 2 Quick Mode  [HASH]
20090630 104555 Default (SA Gateway2-P1) SEND Informational  [HASH] [NOTIFY] type DPD_R_U_THERE
20090630 104555 Default (SA Gateway2-P1) RECV Informational  [HASH] [NOTIFY] type DPD_R_U_THERE_ACK
```

4 Setup Radius Server (Windows 2003 Server)

4.1 Add New Radius Client

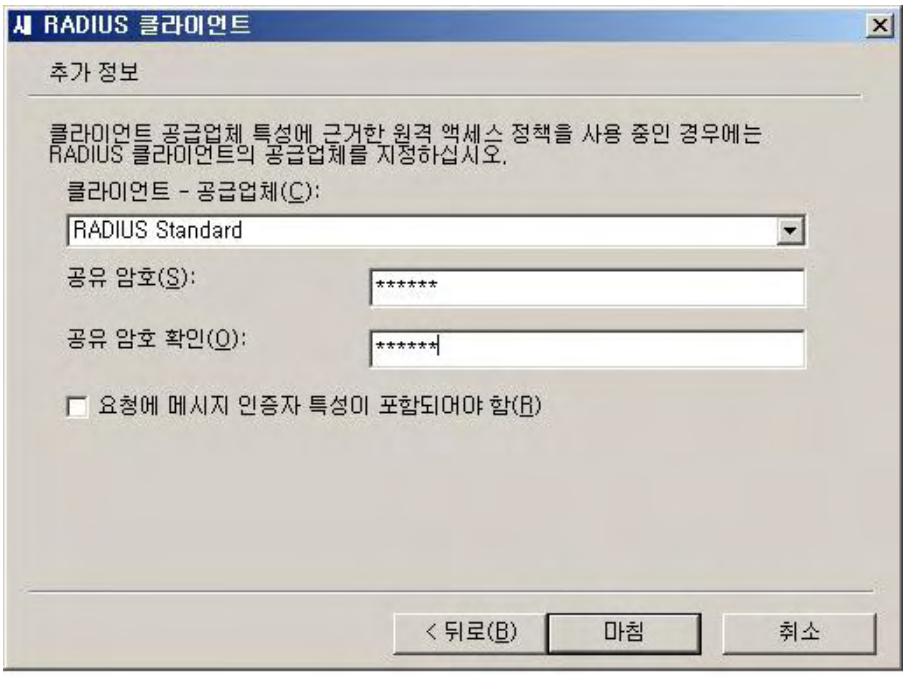


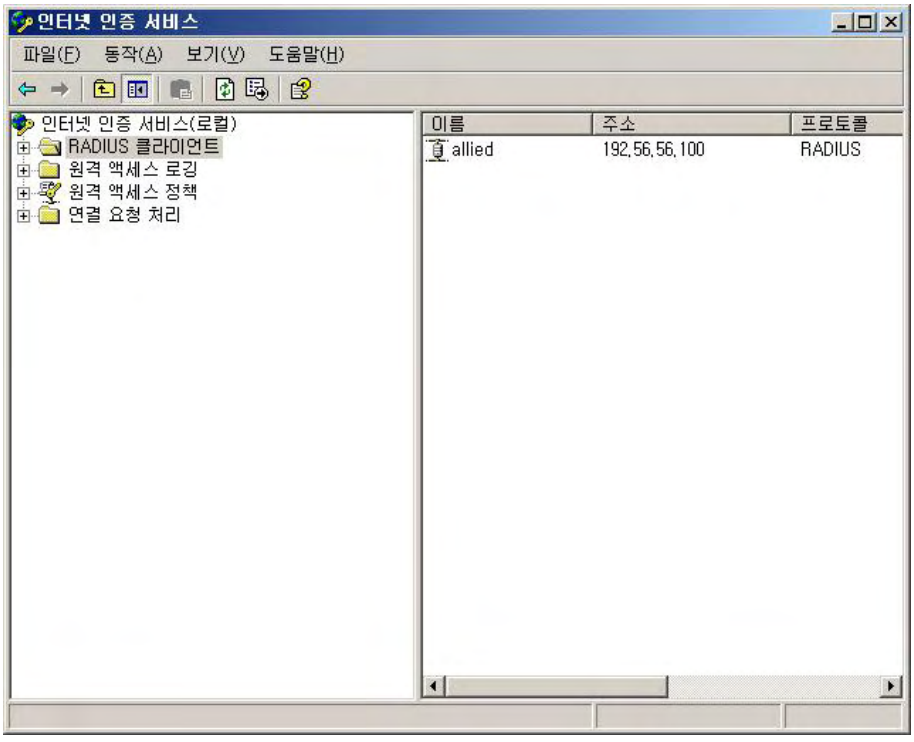
Add Radius Client



Configure Radius Client

4.2 Set the Secret Key



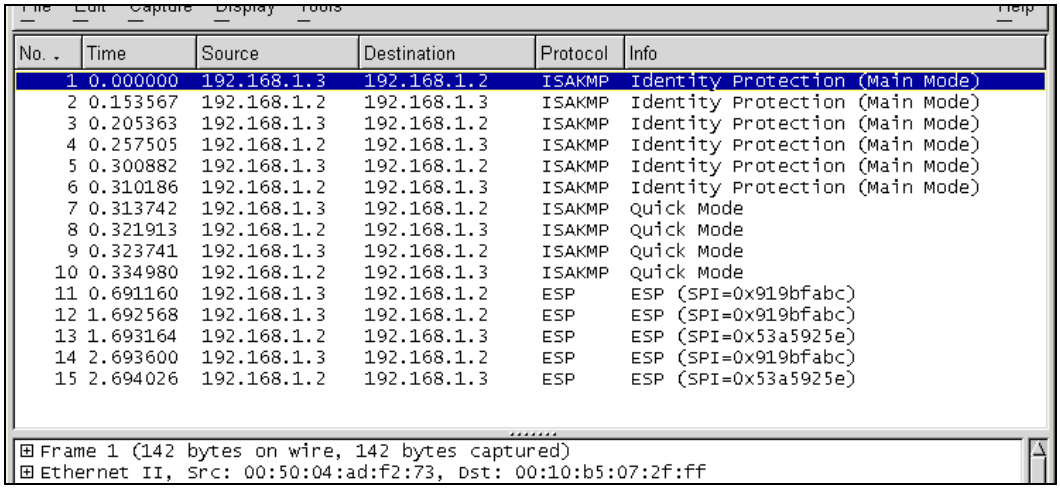


5 Tools in case of trouble

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.

5.1 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 http://www.wireshark.org. It can be used to follow protocol exchange between two devices. For installation and use details, read its specific documentation (http://www.wireshark.org/docs/).



6 VPN IPSec Troubleshooting

6.1 « 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 Default 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.

6.2 « 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.

6.3 « 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 Default 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.

6.4 « 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 Main 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.

6.5 « 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
```

6.6 « 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).

6.7 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).

6.8 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 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 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 Wireshark (http://www.wireshark.org) on one of your target computer. You can check that your pings arrive inside the LAN.

7 Contacts

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

Technical support by email at support@thegreenbow.com

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