

# IPsec VPN Guide

## *Opengear to Opengear*

This is a guide on how to create an IPsec VPN tunnel between two Opengear devices. In the first example both Opengear devices are on the same network. In the second example one of the Opengear devices is connected to the Internet via 3G. Both examples use RSA authentication.

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Background on how IPsec works:

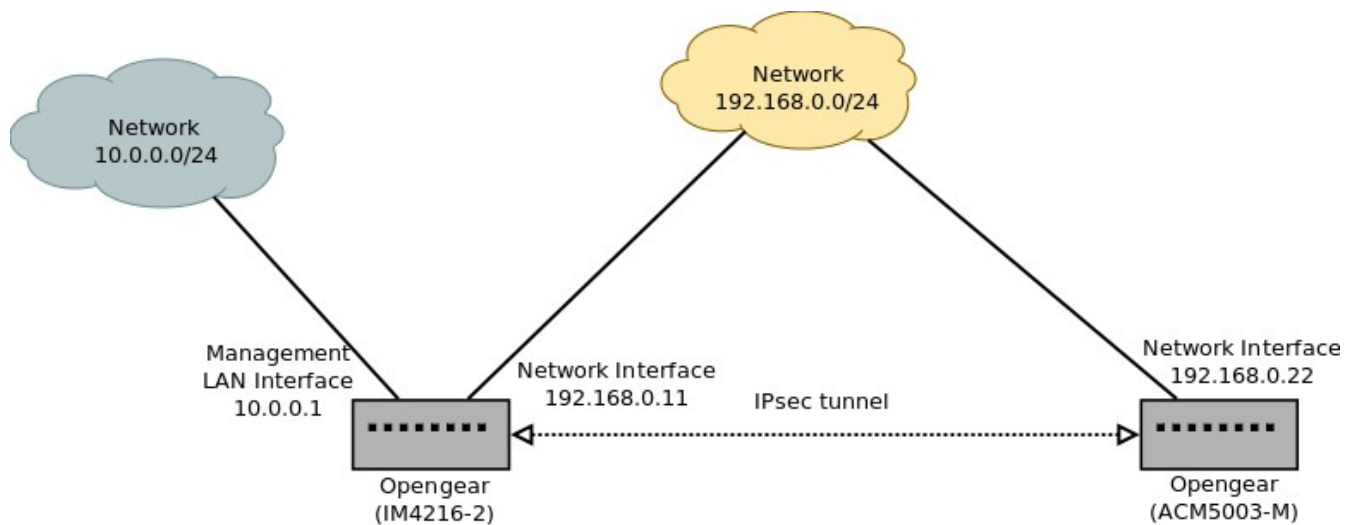
<http://www.ciscopress.com/articles/article.asp?p=24833&seqNum=6>

Scenario: using two Opengear devices to create an IPsec VPN between two secure networks over an insecure network (such as the Internet). A workstation on either network would be able to securely manage any network host on the VPN.

## 1. Opendgear to Opendgear on Same Network

1. Opendgear device: IM4216-2  
Network Interface: 192.168.0.11  
Management LAN Interface: 10.0.0.1
2. Opendgear device: ACM5003-M  
Network Interface: 192.168.0.22

This example creates an IPsec VPN tunnel between two subnets on a local network. The IM4216-2 is acting as a gateway for the 10.0.0.0/24 network and is connecting to a single host – ACM5003-M. Both Opendgear devices are on the 192.168.0.0/24 network.



In web UI for both devices: **Serial & Network** → **IPsec VPN**, click **Add**

Enter the following:

Field	IM4216-2	ACM5003-M
Tunnel Name	im_to_acm	acm_to_im
Initiate Tunnel	No	Yes
Authentication Method	RSA	RSA
Left Public Key	[generate keys]	[generate keys]
Right Public Key	Copy and paste from 'Left Public Key' of ACM5003	Copy and paste from 'Left Public Key' of IM4216
Authentication Protocol	ESP	ESP
Aggressive Mode	Leave unchecked	Leave unchecked
IKE Proposal	Negotiable	Negotiable
Perfect Forward Secrecy	Check	Check
Left ID	im4216@opengear.com	acm5003@opengear.com
Right ID	acm5003@opengear.com	im4216@opengear.com
Left Address	<i>leave blank</i>	<i>leave blank</i>
Right Address	<i>leave blank</i>	192.168.0.11
Left Subnet	10.0.0.0/24	192.168.0.22/32
Right Subnet	192.168.0.22/32	10.0.0.0/24

"IPsec SA established tunnel mode" should be visible in the Syslog:

```
<84>Dec 3 19:50:25 pluto[6210]: "im_to_acm/1x1"[1] 192.168.250.4 #2:  
STATE_QUICK_R2: IPsec SA established tunnel mode {ESP=>0xd36f30de  
<0x1698a1bd xfrm=AES_128-HMAC_SHA1 NATOA=none NATD=none DPD=none}
```

## IM4216-2 IPsec VPN Configuration

Edit IPsec Tunnel	
<b>Tunnel Name</b>	<b>im_to_acm</b> A descriptive name for the IPsec tunnel
<b>Initiate Tunnel</b>	<input type="checkbox"/> Initiate the tunnel connection from this end
<b>Security</b>	
<b>Authentication Method</b>	<input checked="" type="radio"/> RSA digital signatures <input type="radio"/> Shared secret (PSK) Authenticate using RSA digital signatures or a shared secret (PSK)
<b>Left Public Key</b>	<input type="text" value="0sAQN6M6SIpsomcNBRK9iryKzfrTYTtTCy4IRR7SAspT+QXUyVsPFL5nb4ke/qkiyhIUq"/> Generated RSA public key of this end of the tunnel
<b>Right Public Key</b>	<input type="text" value="0sAQOrJX1vjDb/HZ7cphnzmVLKcXM89i37SE2ExpBVx1jlsjWKO40rtE4kakLXgWwlq"/> RSA public key of the other end of the tunnel
<b>Authentication Protocol</b>	<input checked="" type="radio"/> ESP <input type="radio"/> AH Authenticate as part of ESP encryption or separately using the AH protocol
<b>Aggressive Mode</b>	<input type="checkbox"/> Use IKE aggressive mode to establish the tunnel, leave unchecked to use IKE main mode
<b>IKE Proposal (Phase 1)</b>	<input type="text" value="Negotiable"/> Algorithm to establish the tunnel, must be specified when using aggressive mode, in the format <i>cipt</i>
<b>Perfect Forward Secrecy</b>	<input checked="" type="checkbox"/> Require perfect forward secrecy of keys
<b>Left ID</b>	<input type="text" value="@im4216"/> The identifier for this end of the tunnel, should include a fully qualified domain name preceded by @
<b>Right ID</b>	<input type="text" value="@acm5003"/> The identifier for the other end of the tunnel, should include a fully qualified domain name preceded
<b>Left Address</b>	<input type="text"/> The public IP or DNS address of this end of the tunnel, leave blank to use the interface of the default
<b>Right Address</b>	<input type="text"/> The public IP or DNS address of the other end of the tunnel, leave blank if it is dynamic
<b>Networking</b>	
<b>Left Subnet</b>	<input type="text" value="10.0.0/24"/> The private subnet or comma-separated list of subnets behind this end of the tunnel in CIDR notation only
<b>Right Subnet</b>	<input type="text" value="192.168.0.22/32"/> The private subnet or comma-separated list of subnets behind the other end of the tunnel in CIDR n

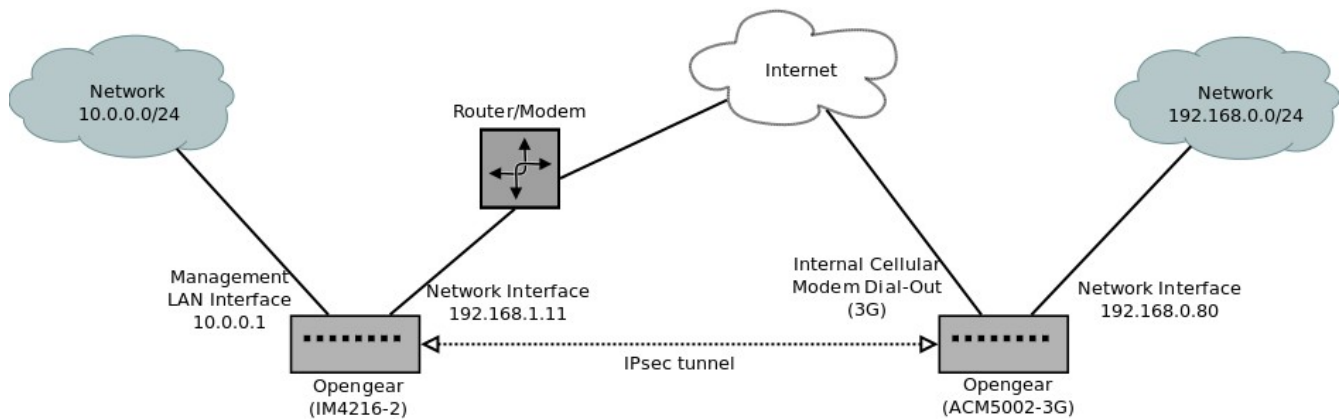
## ACM5003-M IPsec VPN Configuration

Edit IPsec Tunnel	
<b>Tunnel Name</b>	<b>acm_to_im</b> A descriptive name for the IPsec tunnel
<b>Initiate Tunnel</b>	<input checked="" type="checkbox"/> Initiate the tunnel connection from this end
<b>Security</b>	
<b>Authentication Method</b>	<input checked="" type="radio"/> RSA digital signatures <input type="radio"/> Shared secret (PSK) Authenticate using RSA digital signatures or a shared secret (PSK)
<b>Left Public Key</b>	<input type="text" value="0sAQOrJX1vjDb/HZ7cphnzmVLKcXM89i37SE2ExpBVx1jlsjWKO40rtE4kakLXgWw1q"/> Generated RSA public key of this end of the tunnel
<b>Right Public Key</b>	<input type="text" value="0sAQN6M6SIpsomcNBRK9iryKzfrTYTITCy4IRR7SAspT+QXUyVsPFL5nb4ke/qkiyhIUq"/> RSA public key of the other end of the tunnel
<b>Authentication Protocol</b>	<input checked="" type="radio"/> ESP <input type="radio"/> AH Authenticate as part of ESP encryption or separately using the AH protocol
<b>Aggressive Mode</b>	<input type="checkbox"/> Use IKE aggressive mode to establish the tunnel, leave unchecked to use IKE main mode
<b>IKE Proposal (Phase 1)</b>	<input type="text" value="Negotiable"/> Algorithm to establish the tunnel, must be specified when using aggressive mode, in the format <i>crypt</i>
<b>Perfect Forward Secrecy</b>	<input checked="" type="checkbox"/> Require perfect forward secrecy of keys
<b>Left ID</b>	<input type="text" value="@acm5003"/> The identifier for this end of the tunnel, should include a fully qualified domain name preceded by @
<b>Right ID</b>	<input type="text" value="@im4216"/> The identifier for the other end of the tunnel, should include a fully qualified domain name preceded
<b>Left Address</b>	<input type="text"/> The public IP or DNS address of this end of the tunnel, leave blank to use the interface of the default
<b>Right Address</b>	<input type="text" value="192.168.0.11"/> The public IP or DNS address of the other end of the tunnel, leave blank if it is dynamic
<b>Networking</b>	
<b>Left Subnet</b>	<input type="text" value="192.168.0.22/32"/> The private subnet or comma-separated list of subnets behind this end of the tunnel in CIDR notation only
<b>Right Subnet</b>	<input type="text" value="10.0.0.0/24"/> The private subnet or comma-separated list of subnets behind the other end of the tunnel in CIDR notation only

## 2. Opengear to Opengear via Internet (3G and ADSL2+)

1. Opengear device: IM4216-2  
Network Interface: 192.168.1.11  
Management LAN Interface: 10.0.0.1
2. Opengear device: ACM5002-3G  
Internal Cellular Modem: opengeartest.dyndns.org  
Network Interface: 192.168.0.80

This example creates an IPsec VPN tunnel between two subnets via the Internet. The IM4216-2 is acting as a VPN gateway for the 10.0.0.0/24 network and the ACM5002-3G is acting as a VPN gateway for the 192.168.0.0/24 network.



In web UI for both devices: **Serial & Network** → **IPsec VPN**, click **Add**

Enter the following:

Field	IM4216-2	ACM5002-3G
Tunnel Name	im_to_acm	acm_to_im
Initiate Tunnel	Yes	No
Authentication Method	RSA	RSA
Left Public Key	[generate keys]	[generate keys]
Right Public Key	Copy and paste from 'Left Public Key' of ACM5003	Copy and paste from 'Left Public Key' of IM4216
Authentication Protocol	ESP	ESP
Aggressive Mode	Leave unchecked	Leave unchecked
IKE Proposal	Negotiable	Negotiable
Perfect Forward Secrecy	Check	Check
Left ID	@im4216	@acm5002
Right ID	@acm5002	@im4216
Left Address	<i>leave blank</i>	<i>leave blank</i>
Right Address	opengear-test.dyndns.org	<i>leave blank</i>
Left Subnet	10.0.0.0/24	192.168.0.0/24
Right Subnet	192.168.0.0/24	10.0.0.0/24

"IPsec SA established tunnel mode" should be visible in the Syslog:

```
<84>Apr 4 19:47:22 pluto[2458]: "im_to_acm" #4: STATE_QUICK_R2: IPsec SA established tunnel mode {ESP=>0x1222ddf<0x9c361881 xfrm=AES_128-HMAC_SHA1 NATOA=none NATD=none DPD=none}
```

## IM4216-2 IPsec VPN Configuration

Edit IPsec Tunnel	
<b>Tunnel Name</b>	<b>im_to_acm</b> A descriptive name for the IPsec tunnel
<b>Initiate Tunnel</b>	<input checked="" type="checkbox"/> Initiate the tunnel connection from this end
<b>Security</b>	
<b>Authentication Method</b>	<input checked="" type="radio"/> RSA digital signatures <input type="radio"/> Shared secret (PSK) Authenticate using RSA digital signatures or a shared secret (PSK)
<b>Left Public Key</b>	<input type="text" value="0sAQN6M6SIpsomcNBRK9iryKzfrTYTtTCy4IRR7SAspT+QXUyVsPFL5nb4ke/qkiyhIUq"/> Generated RSA public key of this end of the tunnel
<b>Right Public Key</b>	<input type="text" value="0sAQOrJX1vjDb/HZ7cphnzmVLKcXM89i37SE2ExpBVx1jlsjWKO40rtE4kakLXgWwIq"/> RSA public key of the other end of the tunnel
<b>Authentication Protocol</b>	<input checked="" type="radio"/> ESP <input type="radio"/> AH Authenticate as part of ESP encryption or separately using the AH protocol
<b>Aggressive Mode</b>	<input type="checkbox"/> Use IKE aggressive mode to establish the tunnel, leave unchecked to use IKE main mode
<b>IKE Proposal (Phase 1)</b>	<input type="text" value="Negotiable"/> Algorithm to establish the tunnel, must be specified when using aggressive mode, in the format <i>cipt</i>
<b>Perfect Forward Secrecy</b>	<input checked="" type="checkbox"/> Require perfect forward secrecy of keys
<b>Left ID</b>	<input type="text" value="@im4216"/> The identifier for this end of the tunnel, should include a fully qualified domain name preceded by @
<b>Right ID</b>	<input type="text" value="@acm5003"/> The identifier for the other end of the tunnel, should include a fully qualified domain name preceded
<b>Left Address</b>	<input type="text"/> The public IP or DNS address of this end of the tunnel, leave blank to use the interface of the default
<b>Right Address</b>	<input type="text" value="opengearstest.dyndns.org"/> The public IP or DNS address of the other end of the tunnel, leave blank if it is dynamic
<b>Networking</b>	
<b>Left Subnet</b>	<input type="text" value="10.0.0/24"/> The private subnet or comma-separated list of subnets behind this end of the tunnel in CIDR notation only
<b>Right Subnet</b>	<input type="text" value="192.168.0/24"/> The private subnet or comma-separated list of subnets behind the other end of the tunnel in CIDR notation only

# ACM5002-3G IPsec VPN Configuration

Edit IPsec Tunnel	
<b>Tunnel Name</b>	<b>acm_to_im</b> A descriptive name for the IPsec tunnel
<b>Initiate Tunnel</b>	<input type="checkbox"/> Initiate the tunnel connection from this end
<b>Security</b>	
<b>Authentication Method</b>	<input checked="" type="radio"/> RSA digital signatures <input type="radio"/> Shared secret (PSK) Authenticate using RSA digital signatures or a shared secret (PSK)
<b>Left Public Key</b>	<input type="text" value="0sAQOrJX1vjDb/HZ7cphnzmVLKcXM89i37SE2ExpBVx1jIsjWKO40rtE4kakLXgWwlq"/> Generated RSA public key of this end of the tunnel
<b>Right Public Key</b>	<input type="text" value="0sAQN6M6SIpsomcNBRK9iryKzfrTYTtCy4IRR7SAspT+QXUyVsPFI5nb4ke/qkiyhIUq"/> RSA public key of the other end of the tunnel
<b>Authentication Protocol</b>	<input checked="" type="radio"/> ESP <input type="radio"/> AH Authenticate as part of ESP encryption or separately using the AH protocol
<b>Aggressive Mode</b>	<input type="checkbox"/> Use IKE aggressive mode to establish the tunnel, leave unchecked to use IKE main mode
<b>IKE Proposal (Phase 1)</b>	<input type="text" value="Negotiable"/> Algorithm to establish the tunnel, must be specified when using aggressive mode, in the format <i>ciph</i>
<b>Perfect Forward Secrecy</b>	<input checked="" type="checkbox"/> Require perfect forward secrecy of keys
<b>Left ID</b>	<input type="text" value="@acm5003"/> The identifier for this end of the tunnel, should include a fully qualified domain name preceded by @
<b>Right ID</b>	<input type="text" value="@im4216"/> The identifier for the other end of the tunnel, should include a fully qualified domain name preceded
<b>Left Address</b>	<input type="text"/> The public IP or DNS address of this end of the tunnel, leave blank to use the interface of the default
<b>Right Address</b>	<input type="text"/> The public IP or DNS address of the other end of the tunnel, leave blank if it is dynamic
<b>Networking</b>	
<b>Left Subnet</b>	<input type="text" value="192.168.0.0/24"/> The private subnet or comma-separated list of subnets behind this end of the tunnel in CIDR notation only
<b>Right Subnet</b>	<input type="text" value="10.0.0.0/24"/> The private subnet or comma-separated list of subnets behind the other end of the tunnel in CIDR notation only

### 3. Example Using Dynamic DNS

Dynamic DNS	
<b>Dynamic DNS</b>	<input type="text" value="dyndns"/> Update a DNS server when IP address is changed.
<b>DDNS server</b>	<input type="text"/> The DDNS server to push updates to. The format is server address:port <i>This is used by gnudip only</i>
<b>DDNS Hostname</b>	<input type="text" value="opengear.test.dyndns.org"/> The fully qualified DNS hostname assigned to this interface.
<b>DDNS Username</b>	<input type="text" value="opengear.test"/> The username for the account to manage this interface.
<b>DDNS Password</b>	<input type="password" value="....."/> The password for the account to manage this interface.
<b>Confirm DDNS Password</b>	<input type="password" value="....."/> Re-enter the password for confirmation.
<b>Maximum interval between updates</b>	<input type="text"/> Maximum interval between updates in days. DDNS update will be sent even if the address has not changed. <i>Defaults to 25.</i>
<b>Minimum interval between checks</b>	<input type="text"/> Minimum interval between checks for changed addresses, in seconds. Updates will still be sent if the address has changed. <i>Defaults to 1800.</i>
<b>Maximum attempts per update</b>	<input type="text"/> Number of times to attempt an update before giving up. <i>Defaults to 3.</i>
<input type="button" value="Apply"/>	

#### 4. Notes on Opengear IPsec VPN Configuration

- Only on: ACM500x, IM42xx, IMG4xxx and KCS
- Establishes a VPN connection between console servers at remote sites and a VPN gateway (e.g.: CISCO router) on central office network. Remote console server can be accessed with CMS6000 on central network.
- Uses Openswan to configure a VPN allowing multiple access to console servers
- In **Authentication Protocol** select the authentication protocol to be used. Either authenticate as part of *ESP* (Encapsulating Security Payload) encryption or separately using the *AH* (Authentication Header) protocol.
- Enter a **Left ID** and **Right ID**. This is the identifier that the Local host/gateway and remote host/gateway use for IPsec negotiation and authentication. Each ID must include an '@' and can include a fully qualified domain name preceded by '@' ( e.g. *left@example.com* )
- Enter the public IP or DNS address of this Opengear VPN gateway (or if not an ACM5004G enter the address of the gateway device connecting it to the Internet) as the **Left Address**. You can leave this blank to use the interface of the default route
- In **Right Address** enter the public IP or DNS address of the remote end of the tunnel (only if the remote end has a static or dyndns address). Otherwise leave this blank
- If the Opengear VPN gateway is serving as a VPN gateway to a local subnet (e.g. the *console server* has a Management LAN configured) enter the private subnet details in **Left Subnet**.
- Use the CIDR notation (where the IP address number is followed by a slash and the number of 'one' bits in the binary notation of the netmask). For example 192.168.0.0/24 indicates an IP address where the first 24 bits are used as the network address. This is the same as 255.255.255.0. If the VPN access is only to the console server itself and to its attached serial console devices then leave **Left Subnet** blank
- If there is a VPN gateway at the remote end, enter the private subnet details in **Right Subnet**. Again use the CIDR notation and leave blank if there is only a remote host
- Select **Initiate Tunnel** if the tunnel connection is to be initiated from the Left console server end. This can only be initiated from the VPN gateway (Left) if the remote end was configured with a static (or dyndns) IP address