

Virtual Private Networks

Using Crypto IP Encapsulation

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These slides are available from <http://prolixium.com/vpn/siglinux.ppt>

What is a VPN?

🌐 (from whatis.com)

- A VPN (virtual private network) is a way to use a public telecommunication infrastructure, such as the Internet, to provide remote offices or individual users with secure access to their organization's network.

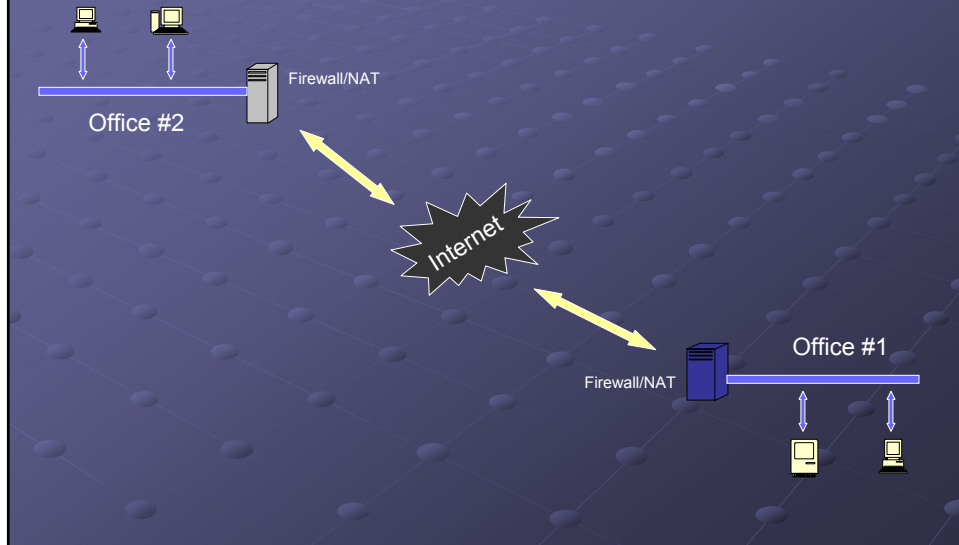
Why do we need a VPN?

- Useful for accessing machines behind firewalls from other networks
- Provides a secure way of extending a network without buying leased lines or connecting via other physical medium
- ...it's cool!

Some Other VPN Implementations

- IPIP
 - For Linux, real old (no IPv6 support, etc)
- GRE
 - Made by Cisco, modern
- IPSec
- PPTP/L2TP
 - PPTP Developed by Microsoft
 - L2TP now an IETF standard, extending/fixing features in PPTP

Example VPN



Why CIPE?

- Free!
 - Distributed under the GNU General Public License
- Encrypted, provides worry-free encapsulation
- Uses UDP, rather than TCP
 - Useful for passing through some firewalls
 - No TCP-in-TCP retransmit issues
 - <http://sites.inka.de/sites/bigred/devel/tcp-tcp.html>

Getting started...

● Download CIPE

- <http://sites.inka.de/sites/bigred/devel/cipe.html>

● Configure and Install

- Needs OpenSSL libraries/headers and Linux kernel source, among other things
- Will build cipcb.o module
- Might complain about a tex error during `make install` (ignore; you just won't get docs)

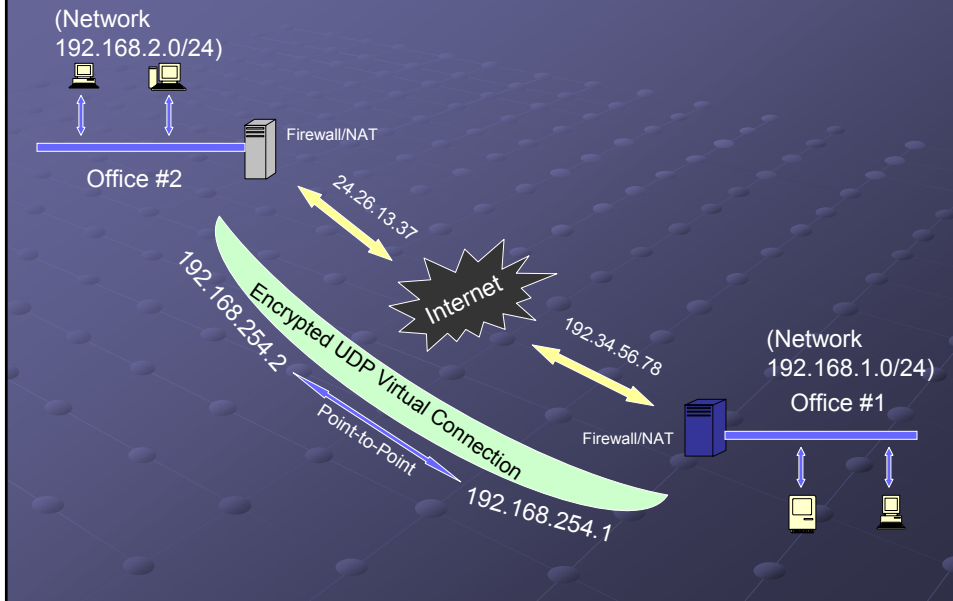
Configuring CIPE

● Install CIPE on hosts that will route packets on the VPN

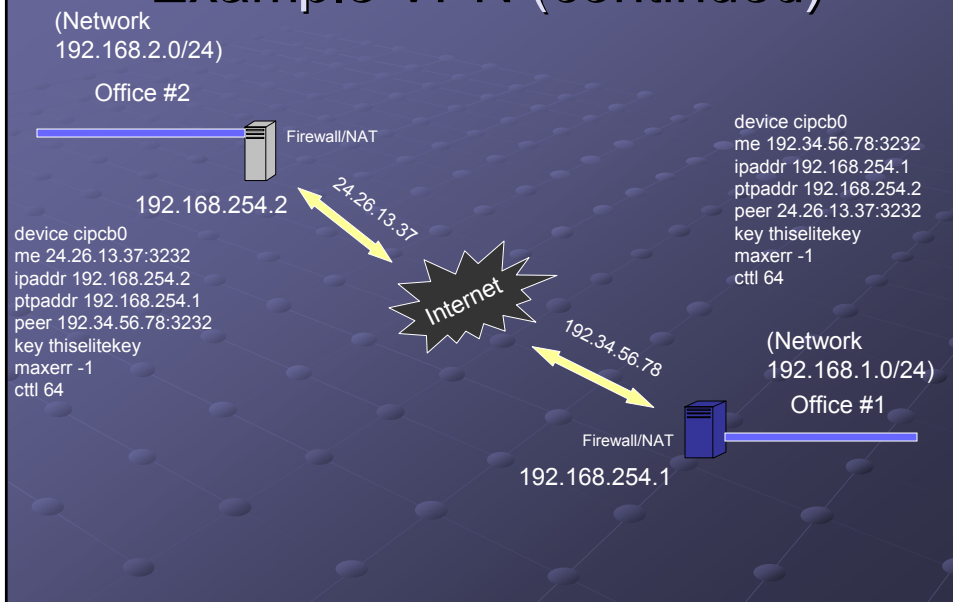
● Configure options files

- Back to our diagram!

Example VPN (continued)



Example VPN (continued)



Example VPN Completed

Office #1 Router

```
cipcb0    Link encap:IPIP Tunnel HWaddr
          inet addr:192.168.254.1 P-t-P:192.168.254.2 Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MTU:1442 Metric:1
          RX packets:144138 errors:0 dropped:0 overruns:0 frame:0
          TX packets:100655 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:175897216 (167.7 MiB) TX bytes:11367036 (10.8 MiB)
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	MSS Window	irtt	Iface
192.168.254.2	0.0.0.0	255.255.255.255	UH	40 0	0	cipcb0
192.168.2.0	192.168.254.2	255.255.255.0	UG	40 0	0	cipcb0
192.168.1.0	0.0.0.0	255.255.255.0	U	40 0	0	eth0
192.34.56.0	0.0.0.0	255.255.255.0	U	40 0	0	eth1
0.0.0.0	192.34.56.254	0.0.0.0	UG	40 0	0	eth1

Example VPN Completed (cont)

Office #2 Router

```
cipcb0    Link encap:IPIP Tunnel HWaddr
          inet addr:192.168.254.2 P-t-P:192.168.254.1 Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MTU:1442 Metric:1
          RX packets:144138 errors:0 dropped:0 overruns:0 frame:0
          TX packets:100655 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:175897216 (167.7 MiB) TX bytes:11367036 (10.8 MiB)
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	MSS Window	irtt	Iface
192.168.254.1	0.0.0.0	255.255.255.255	UH	40 0	0	cipcb0
192.168.1.0	192.168.254.1	255.255.255.0	UG	40 0	0	cipcb0
192.168.2.0	0.0.0.0	255.255.255.0	U	40 0	0	eth0
24.26.13.0	0.0.0.0	255.255.255.0	U	40 0	0	eth1
0.0.0.0	24.26.13.254	0.0.0.0	UG	40 0	0	eth1

Misc. Links

- <http://www.tldp.org/HOWTO/Adv-Routing-HOWTO/>
 - Linux Advanced Routing & Traffic Control HOWTO
- <http://www.seattlewireless.net/index.cgi/IpTunnel>
 - Generic IP Tunnel HOWTO