AlliedWare™ OS

How To | Configure Dynamic Routing Over An L2TP Tunnel

Introduction

This How To Note shows an example of using a dynamic routing protocol over an L2TP tunnel.

Running dynamic routing protocols over a secure Internet connection can be a complex issue, with the possibility of intermittent connections causing routing problems.

OSPF (or BGP) are more connection-oriented than RIP and therefore are more susceptible to problems caused by intermittent loss of connection between 'neighbours'. A neighbour that may bounce up and down can cause havoc to the correct propagation of OSPF routing information for a network.

The following example scenario is for setting up RIP over an L2TP tunnel. RIP is simpler and has less overhead and control, so it provides a more robust setup as a dynamic routing protocol over an L2TP tunnel.

Which products does it apply to?

This Note applies to the following Allied Telesis routers, running software version 2.6.1 or later:

- AR400 series
- AR700 series

Related How To Notes

You may also find the following How To Notes useful:

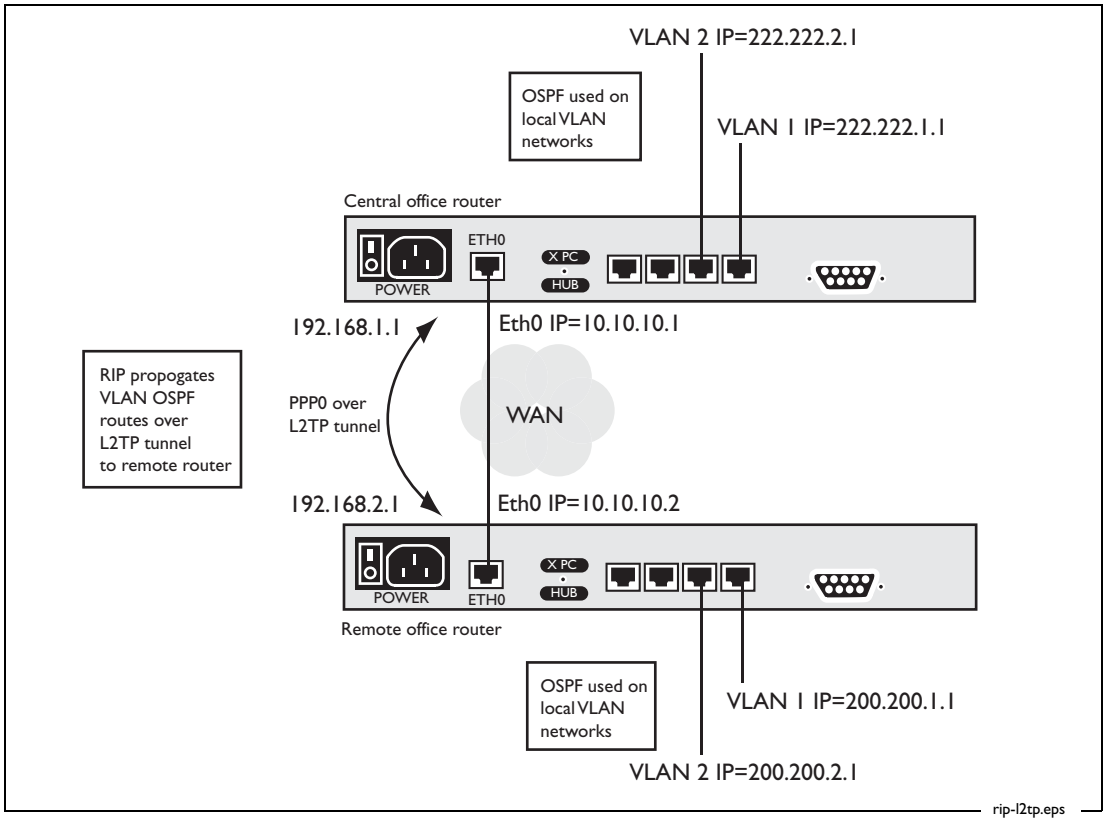
- *How To Configure Remote L2TP Tunnels*
- *How To Configure Allied Telesis and Cisco Routers To Interoperate Over L2TP*

How To Notes are available from www.alliedtelesis.com/resources/literature/howto.aspx.

An example scenario for RIP over L2TP

Our example uses two office sites that are connected via a WAN connection over the Internet using an L2TP tunnel for security.

The setup (shown below) shows the 'Central office' and 'Remote office' routers connected, in this case, back to back via their Ethernet interfaces (this would likely be the remote WAN connection across the Internet, with perhaps static IP assignment from the ISPs).



Network Operation

There is a single static route configured to bring up the L2TP tunnel and a secure point-to-point connection (PPP0) is established over the L2TP tunnel between the 'Central' and 'Remote' office routers. This allows secure communication between the offices across the Internet.

Each local office site is using OSPF as their routing protocol, as it offers some advanced routing features and is scalable and flexible. The 'local' VLAN networks in our example at each office site use OSPF.

RIP is used across the secure Internet connection between offices to provide a more robust network, as discussed previously. So RIP is used on the point-to-point interface (PPP0) over the L2TP tunnel. OSPF is configured to import and export routing information with RIP. This allows RIP to propagate the dynamically learnt OSPF 'local' VLAN network information to the other office router.

Routing Information

The routing table in each router shows locally learnt routes and the routes learnt from the remote router via RIP across the L2TP tunnel. The example output below is from the **show ip route** command on the 'Central office' router.

You can see that the 'local' VLAN networks (222.222.1.0 and 222.222.2.0) have been learnt via OSPF. The 'Remote office' OSPF VLAN networks (200.200.1.0 and 200.200.2.0) have been learnt via RIP. These were exported from OSPF on the 'Remote' router and propagated by RIP over the secure point-to-point connection (PPPO) using the L2TP tunnel.

```
IP Routes
---------------------------------------------------------------------------
Destination      Mask             NextHop           Interface          Age
                 Type     Policy  Protocol        Metrics       Preference
---------------------------------------------------------------------------
10.10.10.0       255.255.255.0    0.0.0.0           eth0             644
                 direct   0       interface         1                  0
10.10.10.0       255.255.255.0    10.10.10.2        eth0             644
                 direct   0       static            1                 60
10.10.10.0       255.255.255.0    192.168.1.2       ppp0             627
                 remote   0       rip               2                100
192.168.1.0      255.255.255.0    0.0.0.0           ppp0             644
                 direct   0       interface         1                  0
200.200.1.0      255.255.255.0    192.168.1.2       ppp0             627
                 remote   0       rip               2                100
200.200.2.0      255.255.255.0    192.168.1.2       ppp0             627
                 remote   0       rip               2                100
222.222.1.0      255.255.255.0    0.0.0.0           vlan1            644
                 direct   0       interface         1                  0
222.222.1.0      255.255.255.0    0.0.0.0           vlan1            641
                 remote   0       ospf-Intra        1                 10
222.222.2.0      255.255.255.0    0.0.0.0           vlan2            644
                 direct   0       interface         1                  0
222.222.2.0      255.255.255.0    0.0.0.0           vlan2            636
                 remote   0       ospf-Intra        1                 10
---------------------------------------------------------------------------
```

Routing Considerations

A routing issue to consider in this set up is the fact that RIP is relatively slow to react to route changes as it only updates, by default, every 30 seconds.

To improve the responsiveness of RIP you can alter the default timers for updating, flushing and so on. You do need to keep in mind that if you lose some packets (quite possible across a lossy Internet connection) some of your routes may flap too much. So the RIP timers need to be adjusted to provide an optimal compromise between responsiveness and robustness.

In this particular example, the various RIP timers are set at half default value.

```
set ip riptimer update=15 invalid=90 holddown=60 flush=150
```

Consideration would need to be given to each specific set up to get an optimal balance when adjusting these timers.

Configurations

Central Office Router

```
set system name=Central_Office
enable l2tp
enable l2tp server=both
add l2tp call="tunnel" rem="tunnel" ip=10.10.10.2 ty=virtual prec=in

create vlan="vlan2" vid=2
add vlan="2" port=3,4

create ppp=0 over=tnl-tunnel
set ppp=0 bap=off username="chap" password="chap"

enable ip
add ip int=eth0 ip=10.10.10.1 mask=255.255.255.0
add ip int=ppp0 ip=192.168.1.1
add ip int=vlan1 ip=222.222.1.1
add ip int=vlan2 ip=222.222.2.1
add ip rou=10.10.10.0 mask=255.255.255.0 int=eth0 next=10.10.10.2
add ip rip int=ppp0 send=rip2 receive=rip2
set ip riptimer update=15 invalid=90 holddown=60 flush=150

set ospf routerid=222.222.1.1 rip=both
add ospf area=backbone stubarea=off summary=send
add ospf range=222.222.1.0 area=backbone mask=255.255.255.0
add ospf range=222.222.2.0 area=backbone mask=255.255.255.0
add ospf interface=vlan1 area=backbone
add ospf interface=vlan2 area=backbone
enable ospf
```

Remote Office Router

```
set system name=Remote_Office

enable l2tp
enable l2tp server=both
add l2tp call="tunnel" rem="tunnel" ip=10.10.10.1 ty=virtual prec=out

create vlan="vlan2" vid=2
add vlan="2" port=3,4

create ppp=0 over=tnl-tunnel
set ppp=0 bap=off username="chap" password="chap"

enable ip
add ip int=ppp0 ip=192.168.1.2
add ip int=eth0 ip=10.10.10.2 mask=255.255.255.0
add ip int=vlan1 ip=200.200.1.1
add ip int=vlan2 ip=200.200.2.1
add ip rou=10.10.10.0 mask=255.255.255.0 int=eth0 next=10.10.10.1
add ip rip int=ppp0 send=rip2 receive=rip2
set ip riptimer update=15 invalid=90 holddown=60 flush=150

set ospf routerid=200.200.1.1 rip=both
add ospf area=backbone stubarea=off summary=send
add ospf range=200.200.1.0 area=backbone mask=255.255.255.0
add ospf range=200.200.2.0 area=backbone mask=255.255.255.0
add ospf interface=vlan1 area=backbone
add ospf interface=vlan2 area=backbone
enable ospf
```

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