配置 Cisco 827 路由器，以实现 NAT 并作为 PPPoE 客户端

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简介

在Cisco IOS软件版本12.1(3)XG， PPP over Ethernet (PPPoE)客户端特性为Cisco 827路由器介绍。此功能允许PPPoE功能被移动到路由器。多台PC可以在Cisco 827后安装。在他们的流量发送给PPPoE会话前，可以加密，过滤，等等。并且，网络地址转换(NAT)能运行。

本文显示配置在Cisco 827路由器的ATM接口(DSL 接口) 上的一个PPPoE客户端。此配置在Cisco 1700路由器可能也使用与非对称数字用户线(ADSL)广域网接口卡。

Cisco 6400节点路由处理器(NRP)的配置也可用在作为带有ATM接口的聚集器的路由器上。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档不限于特定的软件和硬件版本。

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

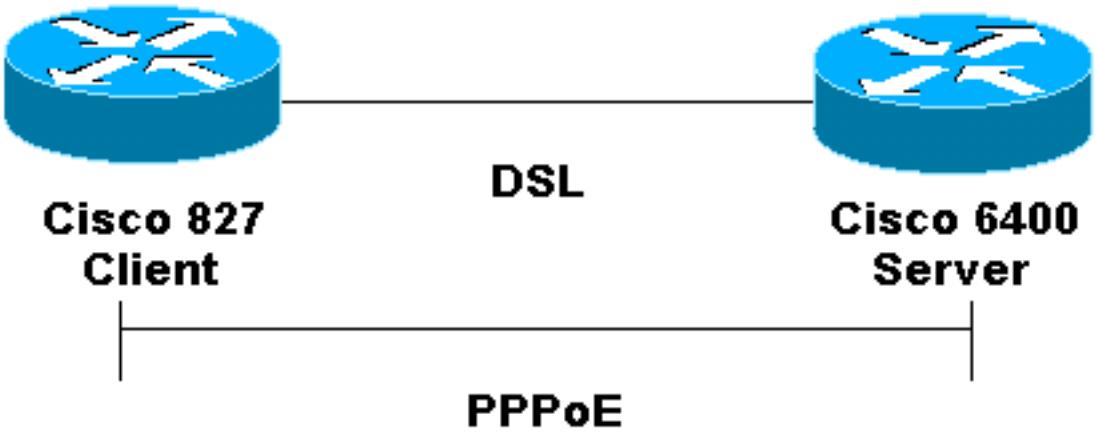
配置

本部分提供用于配置本文档所述功能的信息。

注意： 要查找有关本文档中所使用的命令的详细信息，请使用命令查找工具（仅限注册用户）。

网络图

本文档使用以下网络设置：



配置

本文档使用以下配置：

- Cisco 827路由器
- Cisco 6400 NRP

PPPoE在Cisco 827路由器配置用虚拟专用拨号网络(VPDN)命令。确保您首先配置这些命令。

注意： 关于如何更改最大传输单元(MTU)的大小的信息，参考在PPPoE拨入连通性的故障排除MTU大小。

Cisco 827路由器

```
!
vpdn enable
no vpdn logging!--- This is the default. ! vpdn-group
pppoe request-dialin !--- This is the PPPoE client that
requests to establish a session !--- with the
aggregation unit (6400 NRP). protocol pppoe ! !--- This
is the Internal Ethernet network. ! interface Ethernet0
ip address 10.92.1.182 255.255.255.0 ip nat inside !---
The DSL interface. ! interface ATM0 no ip address no atm
ilmi-keepalive bundle-enable dsl operating-mode auto
```

```
hold-queue 224 in !--- All defaults. !--- PPPoE runs on
top of AAL5SNAP. However, the !--- encap aal5snap
command is not used.

!
interface ATM0.1 point-to-point
 pvc 1/1
  pppoe-client dial-pool-number 1
  !--- pvc 1/1 is an example value that must be changed
!--- in order to match the value used by the ISP. ! !---
The PPPoE client code ties into a dialer interface upon
!--- which a virtual-access interface is cloned. !
interface Dialer1 ip address negotiated ip mtu 1492 !---
Ethernet MTU is 1500 by default -- 1492 + PPPoE headers
= 1500 ip nat outside encapsulation ppp dialer pool 1 !-
-- Ties to ATM interface. ppp authentication chap callin
ppp chap hostname <username> ppp chap password
<password> ! !--- Note: The ISP instructs you about the
!--- type of authentication to use. !--- In order to
change from PPP CHAP to PPP PAP, replace !--- ppp
authentication chap callin !--- ppp chap hostname
<username> !--- ppp chap password <password> !--- with
ppp authentication pap callin !--- ppp pap sent-username
<username> password <password>



 !--- For NAT, overload on the Dialer1 interface !---
and add a default route out since dialer IP address can
change. ip nat inside source list 1 interface Dialer1
overload ip classless ip route 0.0.0.0 0.0.0.0 dialer1
no ip http server ! access-list 1 permit 10.92.1.0
0.0.0.255 !--- For NAT. !
```

Cisco 6400 NRP

```
!
vpdn enable
no vpdn logging!--- This is the default. ! vpdn-group
pppoe request-dialin !--- This is the PPPoE client that
requests to establish a session !--- with the
aggregation unit (6400 NRP). protocol pppoe ! !--- This
is the Internal Ethernet network. ! interface Ethernet0
ip address 10.92.1.182 255.255.255.0 ip nat inside !---
The DSL interface. ! interface ATM0 no ip address no atm
ilmi-keepalive bundle-enable dsl operating-mode auto
hold-queue 224 in !--- All defaults. !--- PPPoE runs on
top of AAL5SNAP. However, the !--- encap aal5snap
command is not used.

!
interface ATM0.1 point-to-point
 pvc 1/1
  pppoe-client dial-pool-number 1
  !--- pvc 1/1 is an example value that must be changed
!--- in order to match the value used by the ISP. ! !---
The PPPoE client code ties into a dialer interface upon
!--- which a virtual-access interface is cloned. !
interface Dialer1 ip address negotiated ip mtu 1492 !---
Ethernet MTU is 1500 by default -- 1492 + PPPoE headers
= 1500 ip nat outside encapsulation ppp dialer pool 1 !-
-- Ties to ATM interface. ppp authentication chap callin
ppp chap hostname <username> ppp chap password
```

```
<password> ! !--- Note: The ISP instructs you about the
!--- type of authentication to use. !--- In order to
change from PPP CHAP to PPP PAP, replace !--- ppp
authentication chap callin !--- ppp chap hostname
<username> !--- ppp chap password <password> !--- with
ppp authentication pap callin !--- ppp pap sent-username
<username> password <password>



 !--- For NAT, overload on the Dialer1 interface !---
and add a default route out since dialer IP address can
change. ip nat inside source list 1 interface Dialer1
overload ip classless ip route 0.0.0.0 0.0.0.0 dialer1
no ip http server ! access-list 1 permit 10.92.1.0
0.0.0.255 !--- For NAT. !
```

验证

当前没有可用于此配置的验证过程。

故障排除

本部分提供的信息可用于对配置进行故障排除。

命令输出解释程序工具（仅限注册用户）支持某些 **show** 命令，使用此工具可以查看对 show 命令输出的分析。

注意： 在发出 **debug** 命令之前，请参阅有关 debug 命令的重要信息。

调试PPPoE客户端

为了调试Cisco 827路由器或Cisco 6400 NRP的PPPoE客户端，您必须考虑协议栈。您能开始在底部排除故障。

- 4. PPP 层
- 3. 以太网层
- 2. ATM 层
- 1. DSL 物理层

1. DSL 物理层

确保线路是上和培训。

```
show interface atm0

ATM0 is up, line protocol is up
  Hardware is PQUICC_SAR (with Alcatel ADSL Module)

show dsl interface atm0
!--- Look for "Showtime" in the first few lines. ATU-R (DS) ATU-C (US) Modem Status: Showtime
(DMTDSL_SHOWTIME)
```

2. ATM 层

如果ATM接口是UP，请使用**debug atm packets命令**发现任何是否自ISP进来。

注意： 您看不到输出数据包用此命令由于方式数据包处理。

您需要发现输出类似于此，与同一个， SAP， CTL，并且显示该流入的ATM信息包的OUI字段是AAL5SNAP。

```
debug atm packet
03:21:32: ATM0(I):
VCD:0x2 VPI:0x1 VCI:0x1 Type:0x0 SAP:AAAA CTL:03 OUI:0080C2
TYPE:0007 Length:0x30
03:21:32: 0000 0050 7359 35B7 0001 96A4 84AC 8864 1100 0001
000E C021 09AB 000C 0235
03:21:32: 279F 0000 0000
03:21:32:
```

3. 以太网层

完整以太网帧在AAL5SNAP数据包。**debug ethernet packet命令**。然而，您需要执行一些VPDN调试为了发现PPPoE帧。

作为参考，实际是PPPoE帧的以太网帧包含二种以太网类型中的一种。

- 0x8863以太网类型= PPPoE控制信息包(处理PPPoE会话)
- 0x8864以太网类型= PPPOE信息包(包含PPP数据包)

一重要提示是有PPPoE的两会话。是VPDN L2TP类型会话和PPP会话的PPPoE会话。所以，为了设立PPPoE，您有一个PPPoE会话建立阶段和一个PPP会话建立阶段。

终端通常介入一个PPP终止阶段和一个PPPoE终止阶段。

PPPoE建立阶段包括PPPoE客户端和服务器(MAC地址)的识别和会话ID的分配。在这完成后，正常PPP建立出现正如其他PPP连接。

为了调试，使用VPDN PPPoE调试帮助您确定PPPoE连接阶段是否是成功的。

```
#debug vpdn pppoe-events

06:17:58: Sending PADI: vc=1/1
!--- A broadcast Ethernet frame (in this case encapsulated in ATM) !--- that requests a PPPoE
server, "Are there any PPPoE servers out there?" 06:18:00: PPPOE: we've got our pado and the
pado timer went off !--- This is a unicast reply from a PPPoE server !--- (very similar to a
DHCP offer). 06:18:00: OUT PADR from PPPoE tunnel !--- This is a unicast reply that accepts the
offer. 06:18:00: IN PADS from PPPoE tunnel !--- This is a confirmation and the establishment
completes.
```

PPP建立在其他PPP开始开始正如。在PPPoE会话建立后，请使用**show vpdn**命令为了得到状态。

```
#show vpdn
%No active L2TP tunnels
%No active L2F tunnels
```

```
PPPoE Tunnel and Session Information Total tunnels 1 sessions 1

PPPoE Tunnel Information

Session count: 1

PPPoE Session Information
SID  RemMAC           LocMAC      Intf  VASt  OIntf   VC
1  0050.7359.35b7  0001.96a4.84ac  Vi1  UP     AT0    1   1
```

使用**show vpdn session all命令**，您能获得信息包计数信息。

```
show vpdn session all
%No active L2TP tunnels
%No active L2F tunnels

PPPoE Session Information Total tunnels 1 sessions 1

session id: 1
local MAC address: 0001.96a4.84ac, remote MAC address: 0050.7359.35b7
virtual access interface: Vi1, outgoing interface: AT0, vc: 1/1
    1656 packets sent, 1655 received, 24516 bytes sent, 24486 received
```

其它调试命令：

- debug vpdn pppoe-data
- debug pppoe-errors
- debug pppoe-packets

PPP 层

建立PPPoE会话之后，PPP调试与其他PPP建立模式相同。

使用同样**debug ppp negotiation**和**debug ppp authentication**指令。以下是示例输出。

注意： 在此示例，主机名是"client1"，并且远程Cisco 6400 NRP的名称是“nrp-b”。

```
show vpdn session all
%No active L2TP tunnels
%No active L2F tunnels

PPPoE Session Information Total tunnels 1 sessions 1

session id: 1
local MAC address: 0001.96a4.84ac, remote MAC address: 0050.7359.35b7
virtual access interface: Vi1, outgoing interface: AT0, vc: 1/1
    1656 packets sent, 1655 received, 24516 bytes sent, 24486 received
```

调试PPPoE服务器

为了调试Cisco 6400 (PPPoE服务器)，请使用用于Cisco 827路由器的同一个自上而上的过程(客户端)。区别在DSL的物理层，这里您需要检查DSL接入复用器(DSLAM)。

- 4. PPP 层
- 3. 以太网层
- 2. ATM 层
- 1. DSL 物理层

1. DSL 物理层

为了检查DSL物理层，您需要发现在DSLAM的DSL统计信息。对于Cisco DSLAMs，请使用**show dsl interface命令**。

2. ATM 层

在Cisco 6400端，您也能使用debug atm packet命令，为一个特定永久虚拟电路(PVC)启用Cisco 6400。

```
debug atm packet interface atm 0/0/0.182 vc 1/82
```

您需要发现输出类似于此，与同一个， SAP， CTL，并且显示该流入的ATM信息包的OUI字段是AAL5SNAP。

```
4d04h: ATM0/0/0.182(I):
VCD:0x3 VPI:0x1 VCI:0x52 Type:0x900 SAP:AAAA CTL:03 OUI:0080C2 TYPE:0007 Length:0x30
4d04h: 0000 0001 96A4 84AC 0050 7359 35B7 8864 1100 0001 000E C021 0A2E 000C 65E3
4d04h: 15E5 0000 0000
```

注意： 您看不到输出数据包用此命令由于方式数据包处理。

3. 以太网层

在Cisco 827路由器使用的相同的VPDN show命令和debug可以在Cisco 6400 NRP上使用，以查看PPPoE的建立。

```
#debug vpdn pppoe-events

4d04h: IN PADI from PPPoE tunnel

4d04h: OUT PADO from PPPoE tunnel

4d04h: IN PADR from PPPoE tunnel

4d04h: PPPoE: Create session
4d04h: PPPoE: VPN session created.

4d04h: OUT PADS from PPPoE tunnel

#show vpdn
%No active L2TP tunnels
%No active L2F tunnels

PPPoE Tunnel and Session Information Total tunnels 1 sessions 1

PPPoE Tunnel Information
```

```
Session count: 1
PPPoE Session Information
SID        RemMAC          LocMAC       Intf    VASt   OIntf    VC
1       0001.96a4.84ac  0050.7359.35b7  Vi4     UP     AT0/0/0 1    82


nrp-b#show vpdn session all
%No active L2TP tunnels
%No active L2F tunnels

PPPoE Session Information Total tunnels 1 sessions 1

session id: 1
local MAC address: 0050.7359.35b7, remote MAC address: 0001.96a4.84ac
virtual access interface: Vi4, outgoing interface: AT0/0/0, vc: 1/82
    30 packets sent, 28 received, 422 bytes sent, 395 received
```

其它调试命令：

- debug vpdn pppoe-data
- debug pppoe-errors
- debug pppoe-packets

4. PPP 层

这是对应于从Cisco 827路由器的更早的调试从Cisco 6400 NRP的PPP debug输出。

```
debug ppp negotiation and debug ppp authentication
4d04h: Vi2 PPP: Treating connection as a dedicated line
4d04h: Vi2 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
4d04h: Vi2 LCP: O CONFREQ [Closed] id 1 len 15
4d04h: Vi2 LCP:    AuthProto CHAP (0x0305C22305)
4d04h: Vi2 LCP:    MagicNumber 0x65F62814 (0x050665F62814)
4d04h: Vi2 LCP: I CONFREQ [REQsent] id 1 len 10
4d04h: Vi2 LCP:    MagicNumber 0x03144FF9 (0x050603144FF9)
4d04h: Vi2 LCP: O CONFACK [REQsent] id 1 len 10
4d04h: Vi2 LCP:    MagicNumber 0x03144FF9 (0x050603144FF9)
4d04h: Vi3 LCP: I ECHOREQ [Open] id 60 len 8 magic 0xA60C0000
4d04h: Vi3 LCP: O ECHOREP [Open] id 60 len 8 magic 0x51A0BEF6
4d04h: Vi2 LCP: TIMEout: State ACKsent
4d04h: Vi2 LCP: O CONFREQ [ACKsent] id 2 len 15
4d04h: Vi2 LCP:    AuthProto CHAP (0x0305C22305)
4d04h: Vi2 LCP:    MagicNumber 0x65F62814 (0x050665F62814)
4d04h: Vi2 LCP: I CONFACK [ACKsent] id 2 len 15
4d04h: Vi2 LCP:    AuthProto CHAP (0x0305C22305)
4d04h: Vi2 LCP:    MagicNumber 0x65F62814 (0x050665F62814)
4d04h: Vi2 LCP: State is Open
4d04h: Vi2 PPP: Phase is AUTHENTICATING, by this end [0 sess, 1 load]
4d04h: Vi2 CHAP: O CHALLENGE id 10 len 26 from "nrp-b"
4d04h: Vi2 CHAP: I RESPONSE id 10 len 28 from "client1"
4d04h: Vi2 PPP: Phase is FORWARDING [0 sess, 1 load]
4d04h: Vi2 PPP: Phase is AUTHENTICATING [0 sess, 1 load]
4d04h: Vi2 CHAP: O SUCCESS id 10 len 4
4d04h: Vi2 PPP: Phase is UP [0 sess, 1 load]
4d04h: Vi2 IPCP: O CONFREQ [Closed] id 1 len 10
4d04h: Vi2 IPCP:    Address 8.8.8.1 (0x030608080801)
4d04h: Vi2 IPCP: I CONFREQ [REQsent] id 1 len 10
```

```
4d04h: Vi2 IPCP:    Address 0.0.0.0 (0x030600000000)
4d04h: Vi2 IPCP: Pool returned 9.9.9.2
4d04h: Vi2 IPCP: O CONFNAK [REQsent] id 1 len 10
4d04h: Vi2 IPCP:    Address 9.9.9.2 (0x030609090902)
4d04h: Vi2 CDPCP: I CONFREQ [Not negotiated] id 1 len 4
4d04h: Vi2 LCP: O PROTREJ [Open] id 3 len 10 protocol CDPCP (0x820701010004)
4d04h: Vi2 IPCP: I CONFACK [REQsent] id 1 len 10
4d04h: Vi2 IPCP:    Address 8.8.8.1 (0x030608080801)
4d04h: Vi2 IPCP: I CONFREQ [ACKrcvd] id 2 len 10
4d04h: Vi2 IPCP:    Address 9.9.9.2 (0x030609090902)
4d04h: Vi2 IPCP: O CONFACK [ACKrcvd] id 2 len 10
4d04h: Vi2 IPCP:    Address 9.9.9.2 (0x030609090902)
4d04h: Vi2 IPCP: State is Open
4d04h: Vi2 IPCP: Install route to 9.9.9.2
4d04h: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access2,
changed state to up
```

相关信息

- Cisco DSL技术支持信息
- 思科800系列路由器产品支持信息
- 技术支持 - Cisco Systems