將Cisco 1700/2600/3600 ADSL WIC配置為使用NAT的PPPoE客戶端

目錄

簡介

Cisco 1700、2600和3600系列路由器支援非對稱數位使用者線路(ADSL)WAN介面卡(WIC)。 所有三個平台的配置基本相同。但是，在硬體和Cisco IOS®軟體版本中，每個版本都需要有所不同。在本文檔中，Cisco 1700、2600和3600稱為「Cisco ADSL WIC」。

必要條件

需求

本文件沒有特定需求。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Cisco 6400 UAC-NRP IOS軟體版本12.1(3)DC1
- Cisco 6400 UAC-NSP IOS軟體版本12.1(3)DB
- Cisco 6130 DSLAM-NI2 IOS軟體版本12.1(5)DA

要在Cisco 2600/3600上支援ADSL WIC，需要以下硬體：

2600	3600
機箱WIC插槽	NM-1FE1R2W
NM-2W	NM-1FE2W
	NM-2FE2W
	NM-2W

重要事項：對於Cisco 3600，此硬體不支援ADSL WIC:

- NM-1E1R2W
- NM-1E2W
- NM-2E2W

要支援ADSL WIC，至少需要以下Cisco IOS軟體版本：

- Cisco 2600/3600上的Cisco IOS軟體版本12.1(5)YB（僅限Plus版本）
- Cisco 1700上的Cisco IOS軟體版本IOS 12.1(3)XP或更高版本（僅限於Plus版本或ADSL功能集）。ADSL功能集在映像名稱中由「y7」標識。例如，c1700-**sy7**-mz.121-3.XP.bin。
- 下載Cisco 1700的映像時，請確保選擇映像名稱1700。請勿下載1720或1750映像。這些功能不支援ADSL WIC。

若要支援乙太網路上的點對點通訊協定(PPPoE)，您必須設定ADSL+PLUS功能。僅ADSL功能集不支援Cisco 1700上的PPPoE。

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

背景資訊

在Cisco IOS軟體版本12.1(3)XG中，為Cisco ADSL WIC引入了PPPoE使用者端功能。此功能允許將PPPoE功能移動到路由器。Cisco ADSL WIC後面可以安裝多台PC。在流量傳送到PPPoE會話之前，可以對其進行加密、過濾等。此外，還可以運行網路地址轉換(NAT)。

本檔案介紹在Cisco ADSL WIC的非同步傳輸模式(ATM)介面（DSL介面）上設定的PPPoE使用者端。

Cisco 6400節點路由處理器(NRP)上的配置也可用於另一個用作聚合器的路由器和ATM介面。

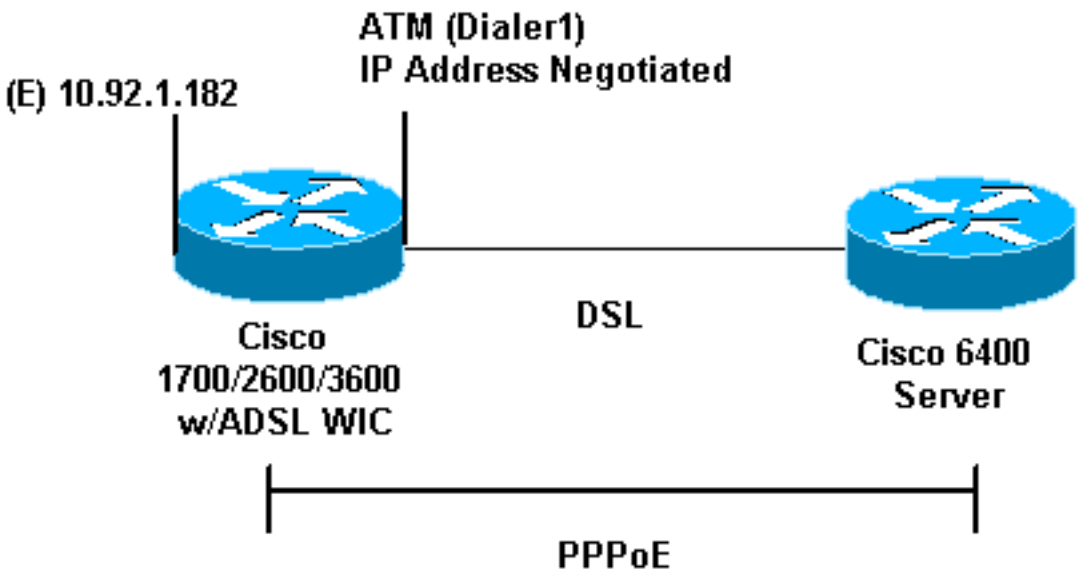
設定

本節提供設定本檔案中所述功能的資訊。

注意：要查詢有關本文檔中命令的其他資訊，請使用命令查詢工具(僅限註冊客戶)。

網路圖表

本檔案會使用以下網路設定：



組態

在Cisco ADSL WIC上使用虛擬專用撥號網路(VPDN)命令配置PPPoE。請確保先配置這些命令。

注意：有關如何更改最大傳輸單元(MTU)大小的資訊，請參閱排除PPPoE撥入連線中的MTU大小故障。

本檔案會使用以下設定：

- Cisco ADSL WIC
- Cisco 6400

Cisco ADSL WIC

```
!
vpdn enable
no vpdn logging
!
vpdn-group pppoe
  request-dialin
!--- You are the PPPoE client that asks to establish a
session !--- with the aggregation unit (6400 NRP). These
VPDN commands !--- are not needed with Cisco IOS
Software Release 12.2(13)T !--- or later. protocol pppoe
! !--- Internal Ethernet network. ! interface
FastEthernet0 ip address 10.92.1.182 255.255.255.0 ip
nat inside !--- 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 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 default = 1500 (1492 + PPPoE headers = 1500) ip nat
outside encapsulation ppp dialer pool 1 !--- Ties to the
ATM interface. ppp authentication chap callin ppp chap
hostname <username> ppp chap password <password> ! !---
The ISP instructs you about the type of authentication
!--- to use. !--- To change from PPP Challenge Handshake
Authentication !--- Protocol (CHAP) to PPP Password
Authentication Protocol !--- (PAP), replace these three
lines: !--- ppp authentication chap callin !--- ppp chap
hostname



          !--- ppp chap password



          !--- with these two lines: !--- ppp
authentication pap callin !--- ppp pap sent-username



          !--- For NAT, overload on the Dialer1
interface and add a !--- default route out, because the
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

```
Cisco 6400 ***
local ppp user
!--- You can also use aaa.

username <username> password <password>
 !--- Begin with the VPDN commands. Notice that you bind
the !--- PPPoE here to a virtual-template, instead of on
the ATM !--- interface. You can not (at this time) use
more than one !--- virtual-template (or VPDN group) for
PPPoE beginning with !--- the VPDN commands. vpdn enable
no vpdn logging ! vpdn-group pppoe accept-dialin !---
PPPoE server mode. protocol pppoe virtual-template 1 ! !
interface ATM0/0/0 no ip address no atm ilmi-keepalive
hold-queue 500 in !--- The binding to the virtual-
template interface is !--- configured in the VPDN group.
! interface ATM0/0/0.182 point-to-point pvc 1/82
encapsulation aal5snap !--- This needs the command on
the server side. protocol pppoe ! ! !--- Virtual-
template is used instead of dialer interface. !
interface Virtual-Template1 ip unnumbered Loopback10 ip
mtu 1492 peer default ip address pool ippool ppp
authentication chap ! ! interface Loopback10 ip address
8.8.8.1 255.255.255.0 ! ip local pool ippool 9.9.9.1
```

9.9.9.5

驗證

目前沒有適用於此組態的驗證程序。

疑難排解

使用本節內容，對組態進行疑難排解。

輸出直譯器工具(僅供已註冊客戶使用)(OIT)支援某些**show**命令。使用OIT檢視**show**命令輸出的分析。

附註：使用 **debug** 指令之前，請先參閱有關 Debug 指令的重要資訊。

調試PPPoE客戶端

要在Cisco ADSL WIC或Cisco 6400上調試PPPoE客戶端，必須考慮協定棧。您可以從底部開始排除故障。

1. DSL物理層：確保線路已接通並經過培訓。

```
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層：如果ATM介面已啟動，請發出**debug atm packet**指令，看看是否有訊息來自ISP。**注意：**由於處理資料包的方式，使用此命令看不到傳出資料包。您需要看到類似如下所示的輸出，以及顯示傳入ATM資料包為AAL5SNAP的相同型別、SAP、CTL和OUI欄位：

```
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. 乙太網層：完整的乙太網幀在AAL5SNAP資料包中。沒有debug Ethernet packet命令。但是，您需要執行一些VPDN偵錯(Cisco IOS軟體版本12.2(13)T或更新版本的PPPoE偵錯)才能看到PPPoE訊框。例如，作為PPPoE幀的乙太網幀包含以下兩個Ethertype之一：0x8863 Ethertype = PPPoE控制資料包（處理PPPoE會話）0x8864 Ethertype = PPPoE資料包（包含PPP資料包）一個重要的注意事項是PPPoE中有兩個作業階段。PPPoE會話（即VPDN L2TP型別會話）和PPP會話。要建立PPPoE，需要一個PPPoE會話建立階段和一個PPP會話建立階段。終端通常包括PPP終止階段和PPPoE終止階段。PPPoE建立階段識別PPPoE客戶端和伺服器（MAC地址）並分配會話ID。完成後，正常的PPP建立與任何其它PPP連線一樣進行。要調試，請使用VPDN PPPoE調試(Cisco IOS軟體版本12.2(13)T或更高版本的PPPoE調試)來確定PPPoE連線階段是否成功。

```
#debug vpdn pppoe-events (debug pppoe events)
06:17:58: Sending PADI: vc=1/1
```

```
!--- A broadcast Ethernet frame (in this case encapsulated in ATM) !--- 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
completes the establishment.
```

PPP建立開始於任何其他PPP啟動。建立PPPoE作業階段後，發出**show vpdn**指令(適用於Cisco IOS軟體版本12.2(13)T或更新版本的**show pppe session**)以取得狀態。

```
# show vpdn (show pppoe session)
%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      11
```

通過**show vpdn session all**(**show pppoe session all**)命令獲取資料包計數資訊。

```
show vpdn session all (show pppoe 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
```

其他debug指令：**debug vpdn pppoe-data**(**debug pppoe data**)**debug vpdn pppoe-errors**(**debug pppoe errors**)**debug vpdn pppoe-packets**(**debug pppoe packets**)

4. PPP層：建立PPPoE會話後，PPP調試對於任何其他PPP建立都是相同的。使用相同的**debug ppp negotiation**和**debug ppp authentication**命令。這是輸出示例。**注意**：在此示例中，主機名為「client1」。 遠端Cisco 6400的名稱為「nrp-b」。

```
06:36:03: Vi1 PPP: Treating connection as a callout
06:36:03: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
06:36:03: Vi1 PPP: No remote authentication for call-out
06:36:03: Vi1 LCP: O CONFREQ [Closed] id 1 len 10
06:36:03: Vi1 LCP:    MagicNumber 0x03013D43 (0x050603013D43)
06:36:03: Vi1 LCP: I CONFACK [REQsent] id 1 len 10
06:36:03: Vi1 LCP:    MagicNumber 0x03013D43 (0x050603013D43)
06:36:05: Vi1 LCP: I CONFREQ [ACKrcvd] id 2 len 15
06:36:05: Vi1 LCP:    AuthProto CHAP (0x0305C22305)
06:36:05: Vi1 LCP:    MagicNumber 0x65E315E5 (0x050665E315E5)
06:36:05: Vi1 LCP: O CONFACK [ACKrcvd] id 2 len 15
06:36:05: Vi1 LCP:    AuthProto CHAP (0x0305C22305)
06:36:05: Vi1 LCP:    MagicNumber 0x65E315E5 (0x050665E315E5)
06:36:05: Vi1 LCP: State is Open
06:36:05: Vi1 PPP: Phase is AUTHENTICATING, by the peer [0 sess, 1 load]
06:36:05: Vi1 CHAP: I CHALLENGE id 9 len 26 from "nrp-b"
06:36:05: Vi1 CHAP: Using alternate hostname client1
06:36:05: Vi1 CHAP: Username nrp-b not found
06:36:05: Vi1 CHAP: Using default password
06:36:05: Vi1 CHAP: O RESPONSE id 9 len 28 from "client1"
```

```
06:36:05: Vi1 CHAP: I SUCCESS id 9 len 4
06:36:05: Vi1 PPP: Phase is FORWARDING [0 sess, 1 load]
06:36:05: Vi1 PPP: Phase is AUTHENTICATING [0 sess, 1 load]
06:36:05: Vi1 PPP: Phase is UP [0 sess, 1 load]
06:36:05: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
06:36:05: Vi1 IPCP:    Address 0.0.0.0 (0x030600000000)
06:36:05: Vi1 CDPCP: O CONFREQ [Closed] id 1 len 4
06:36:05: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10
06:36:05: Vi1 IPCP:    Address 8.8.8.1 (0x030608080801)
06:36:05: Vi1 IPCP:    Address 8.8.8.1 (0x030608080801)
06:36:05: Vi1 IPCP:    Address 9.9.9.2 (0x030609090902)
06:36:05: Vi1 IPCP: O CONFREQ [ACKsent] id 2 len 10
06:36:05: Vi1 IPCP:    Address 9.9.9.2 (0x030609090902)
06:36:05: Vi1 LCP: I PROTREJ [Open] id 3 len 10 protocol CDPCP (0x820701010004)
06:36:05: Vi1 CDPCP: State is Closed
06:36:05: Vi1 IPCP: I CONFACK [ACKsent] id 2 len 10
06:36:05: Vi1 IPCP:    Address 9.9.9.2 (0x030609090902)
06:36:05: Vi1 IPCP: State is Open
06:36:05: Di1 IPCP: Install negotiated IP interface address 9.9.9.2
06:36:05: Di1 IPCP: Install route to 8.8.8.1
06:36:06: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Virtual-Access1, changed state to up
```

調試PPPoE伺服器

要調試Cisco 6400（PPPoE伺服器），請使用與Cisco ADSL WIC（客戶端）相同的自下而上過程。 不同之處在於DSL物理層，您需要檢查DSLAM。

1. DSL物理層：要檢查DSL物理層，您需要檢視DSLAM上的DSL統計資訊。對於Cisco DSLAM，發出**show dsl interface**命令。
2. ATM層：在Cisco 6400端，您還可以發出**debug atm packet**命令。為特定PVC啟用Cisco 6400。

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

   您需要看到類似如下所示的輸出，以及顯示傳入ATM資料包為AAL5SNAP的相同型別、SAP、CTL和OUI欄位：

   ```
   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：由於處理資料包的方式，使用此命令看不到傳出資料包。
3. 乙太網層：在Cisco ADSL WIC上使用的相同VPDN **show**命令和調試可以在Cisco 6400上用於檢視PPPoE的建立。

   ```
   # debug vpdn pppoe-events (debug 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

# show vpdn session all

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
```

其他debug指令：debug vpdn pppoe-data(debug pppoe data)debug vpdn pppoe-errors(debug pppoe errors)debug vpdn pppoe-packets(debug pppoe packets)

4. PPP層：以下是Cisco 6400的PPP調試輸出，與Cisco ADSL WIC的早期調試相對應：

```
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
```

相關資訊

- 長距離乙太網路(LRE)和數位使用者線路(xDSL)技術支援
- LRE和xDSL產品支援
- 技術支援與文件 - Cisco Systems