

# Windows 시스템에서 Cisco 라우터로 PPPoE 세션 설정

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## 소개

이 문서에서는 Windows 시스템(PPPoE 클라이언트 역할)과 PPPoE 서버 역할을 하는 Cisco 라우터 간에 PPPoE(Point-to-Point connection over Ethernet)를 구성하는 절차에 대해 설명합니다.

## 사전 요구 사항

### 요구 사항

엔드 투 엔드 레이어 1 연결에 대한 지식이 있으면 UP(User Priority)를 사용하는 것이 좋습니다.

### 사용되는 구성 요소

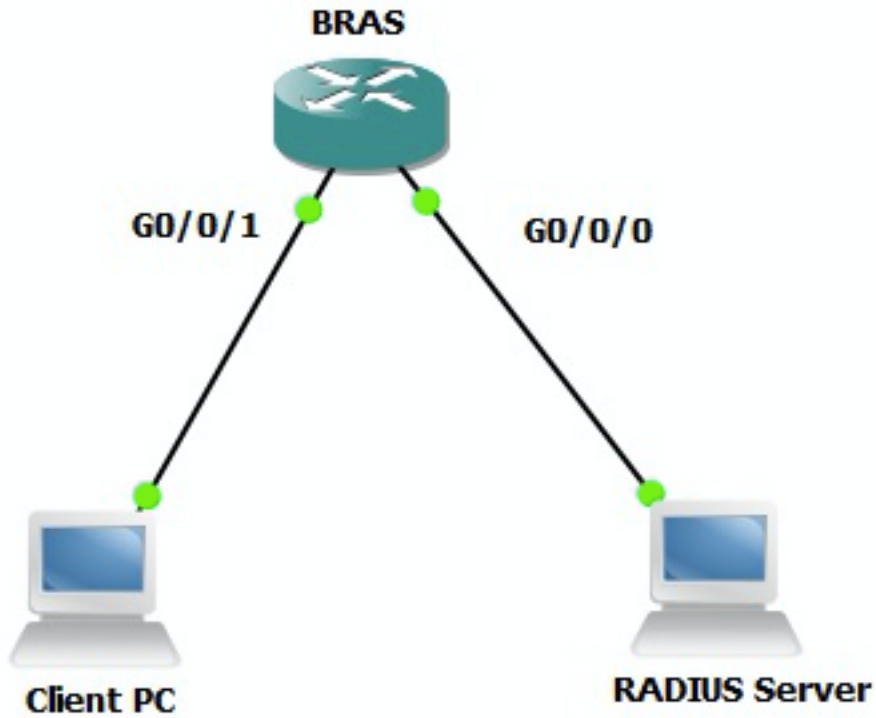
이 문서는 특정 소프트웨어 및 하드웨어 버전으로 한정되지 않습니다.

이 문서의 정보는 특정 랩 환경의 디바이스를 토대로 작성되었습니다. 이 문서에 사용된 모든 디바이스는 초기화된(기본) 컨피그레이션으로 시작되었습니다. 현재 네트워크가 작동 중인 경우, 모든 명령어의 잠재적인 영향을 미리 숙지하시기 바랍니다.

## 구성

### 네트워크 다이어그램

이 문서에서는 이미지에 표시된 네트워크 설정을 사용합니다.



## 구성

### BRAS 구성

```

aaa new-model
! Enabling AAA on router
!
aaa authentication ppp PPPOE-METD group PPPOE-RADIUS
! Defining AAA method list for PPP Authentication
aaa authorization network PPPOE-AUTHOR-METD group PPPOE-RADIUS
! Defining AAA method list for PPP Authorization
aaa accounting network PPPOE-ACCT-METD start-stop group PPPOE-RADIUS
! Defining AAA method list for PPP Accounting
!
aaa group server radius PPPOE-RADIUS
! Defining AAA Server Group named PPPOE-RADIUS
server-private 10.106.39.253 key cisco
ip radius source-interface GigabitEthernet0/0/0
!
bba-group pppoe BBA-TEST
virtual-template 10
!

```

```
interface GigabitEthernet0/0/1.47
encapsulation dot1Q 1 native
pppoe enable group BBA-TEST
end

!

interface Virtual-Template10
ip unnumbered Loopback10
peer default ip address pool local

! Calling three named AAA Method lists configured above under this Virtual Template
ppp authentication pap chap PPPOE-METD
ppp authorization PPPOE-AUTHOR-METD
ppp accounting PPPOE-ACCT-METD
end

!

ip local pool local 192.168.1.2 192.168.1.10

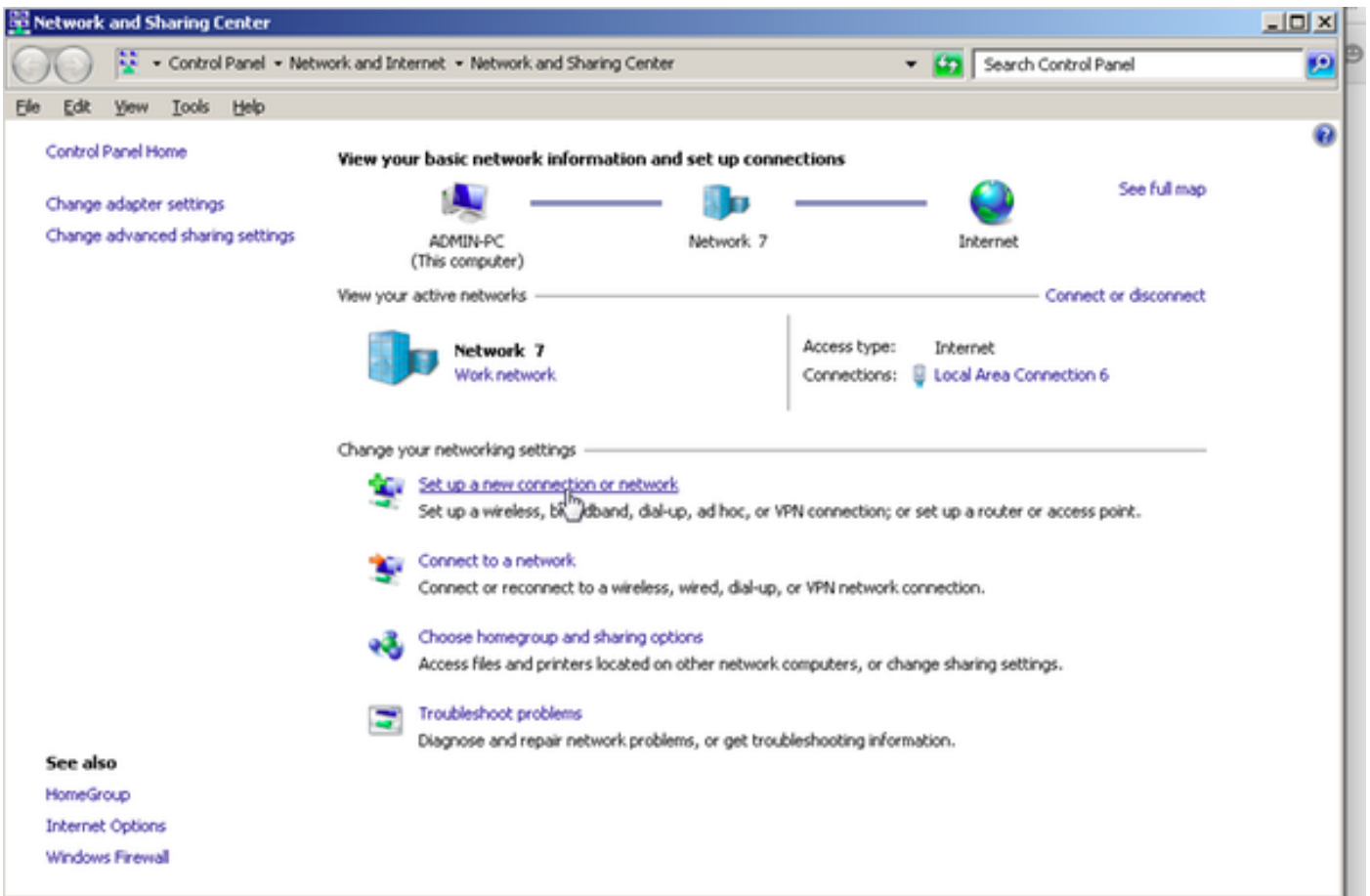
!

interface Loopback10
ip address 192.168.1.1 255.255.255.255
end
```

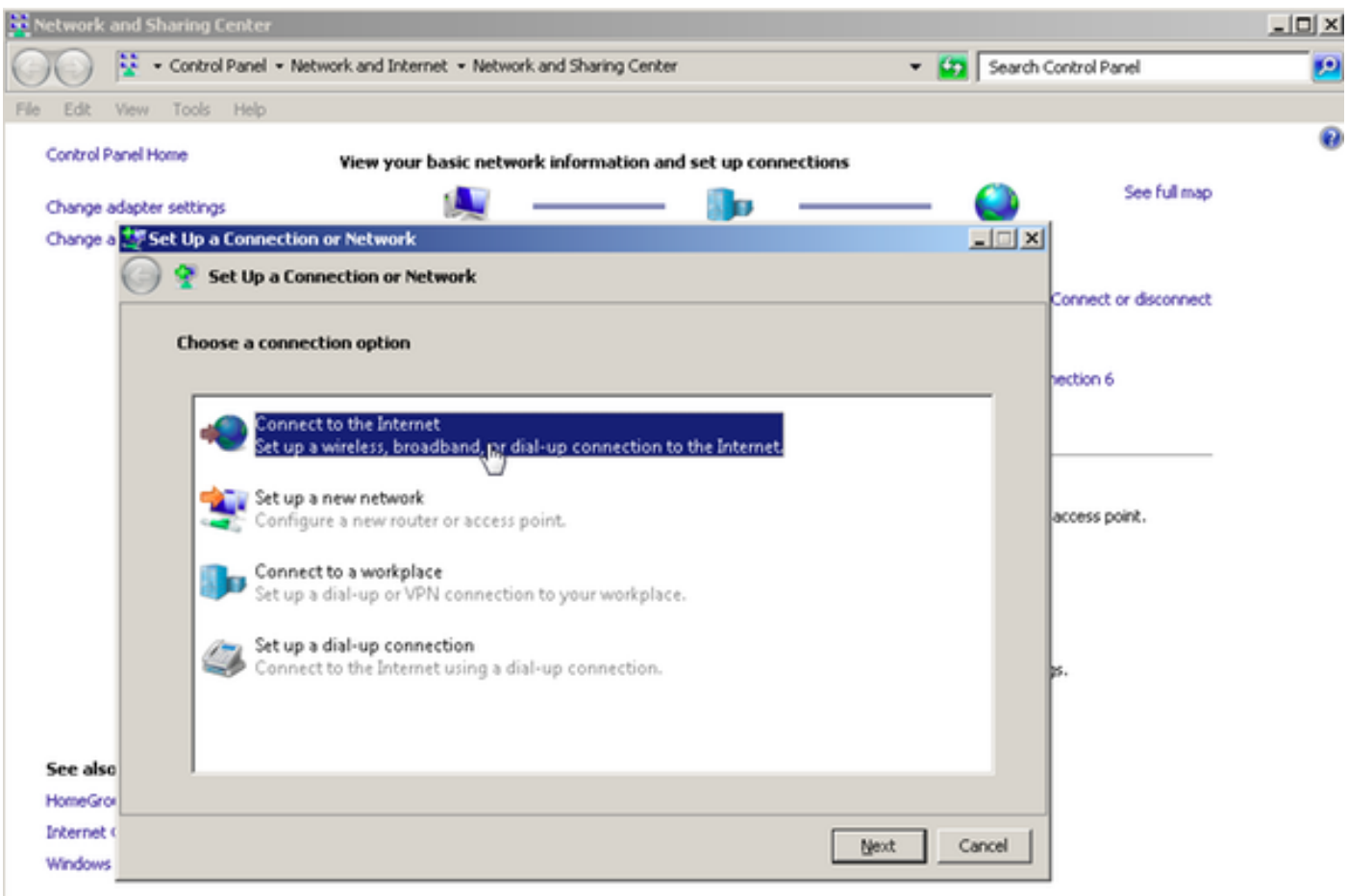
## Windows 컴퓨터 구성 및 설정

PPPoE 클라이언트 역할을 하는 Windows 시스템에서 PPPoE 세션을 시작하려면 다음 단계를 완료하십시오.

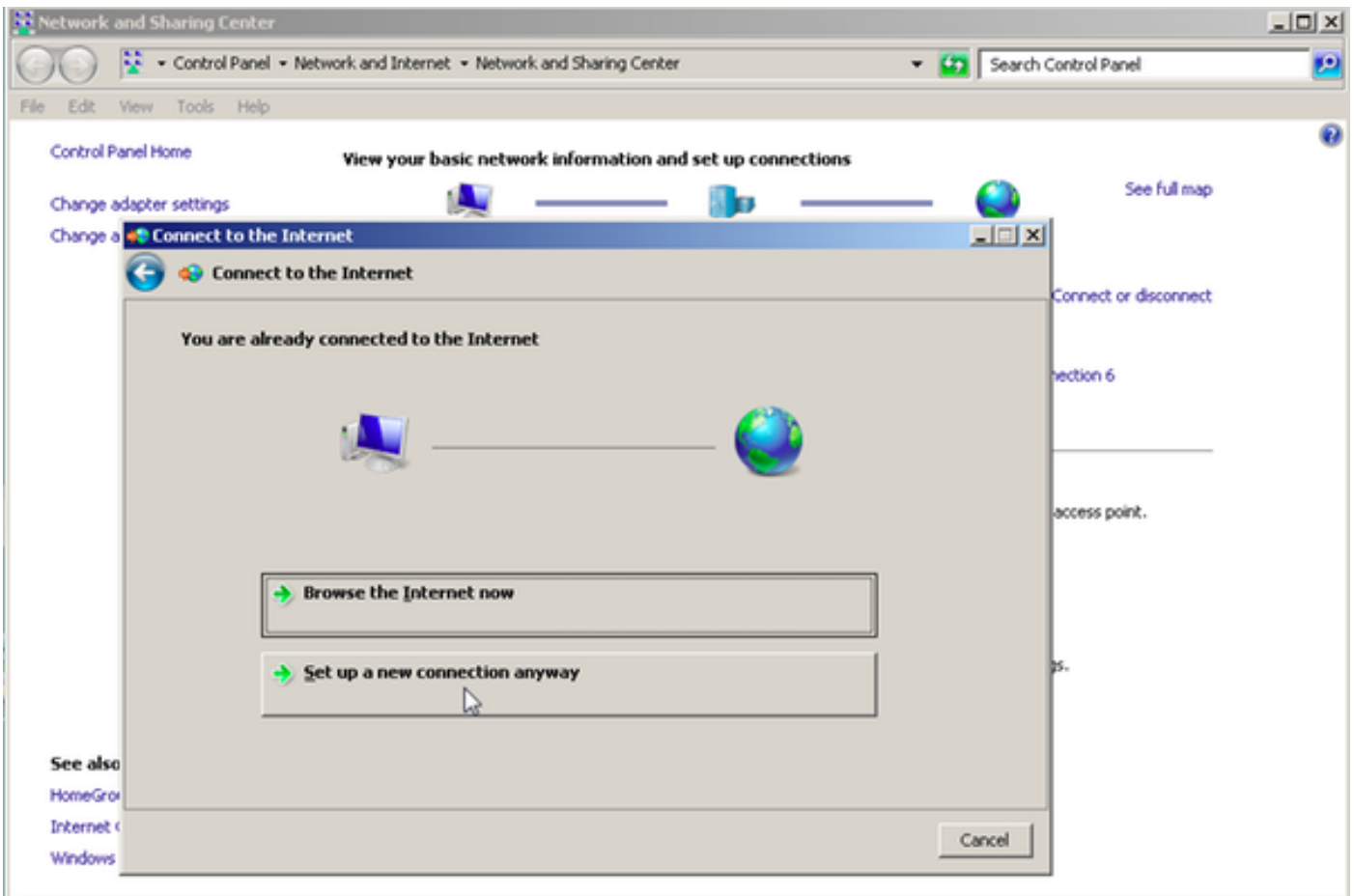
1단계. **네트워크 및 공유 센터**를 열고 이미지에 표시된 대로 **새 연결** 또는 **네트워크 설정**을 클릭합니다.



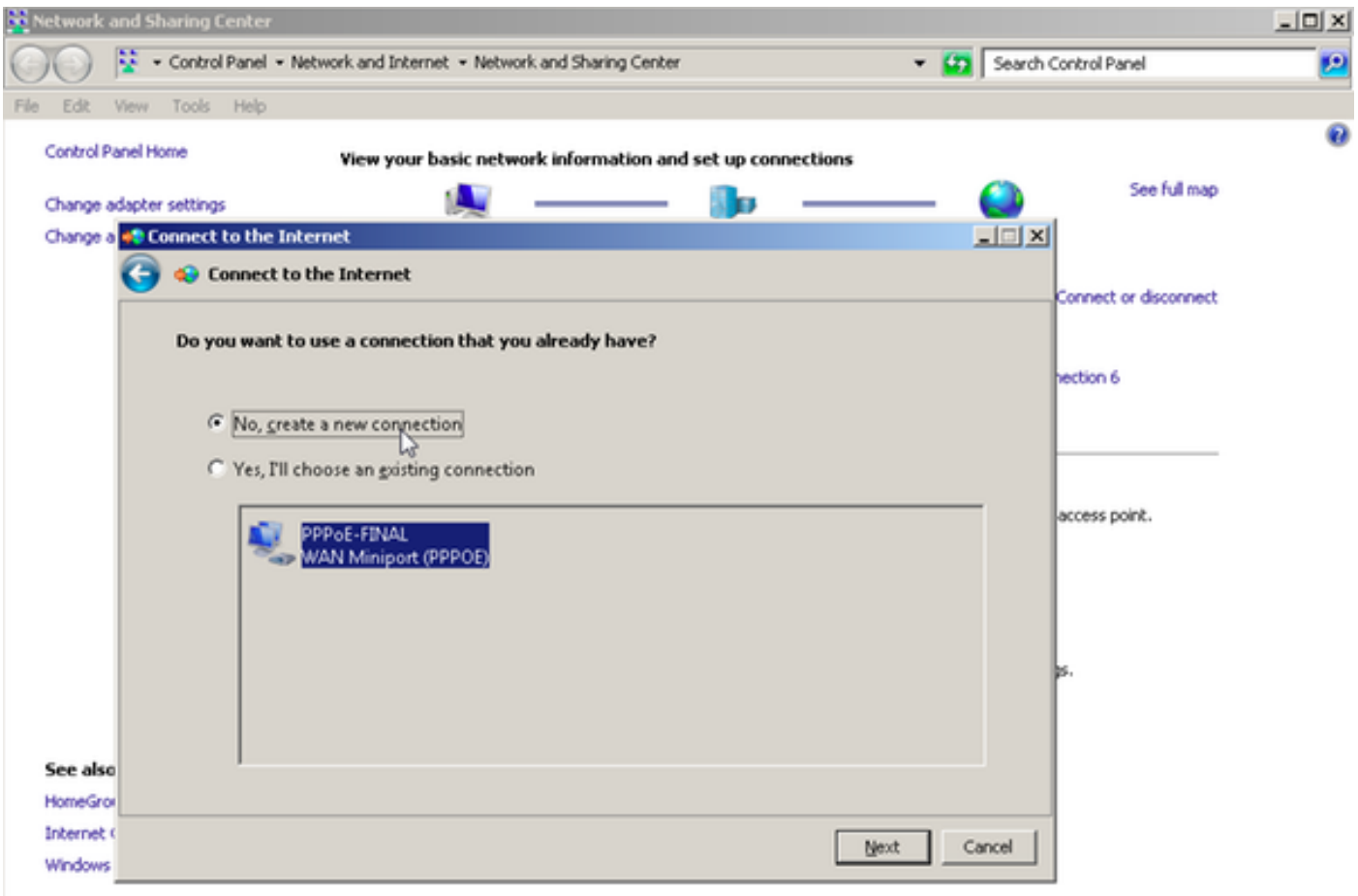
2단계. 이미지에 표시된 대로 인터넷에 연결을 선택하고 다음을 클릭합니다.



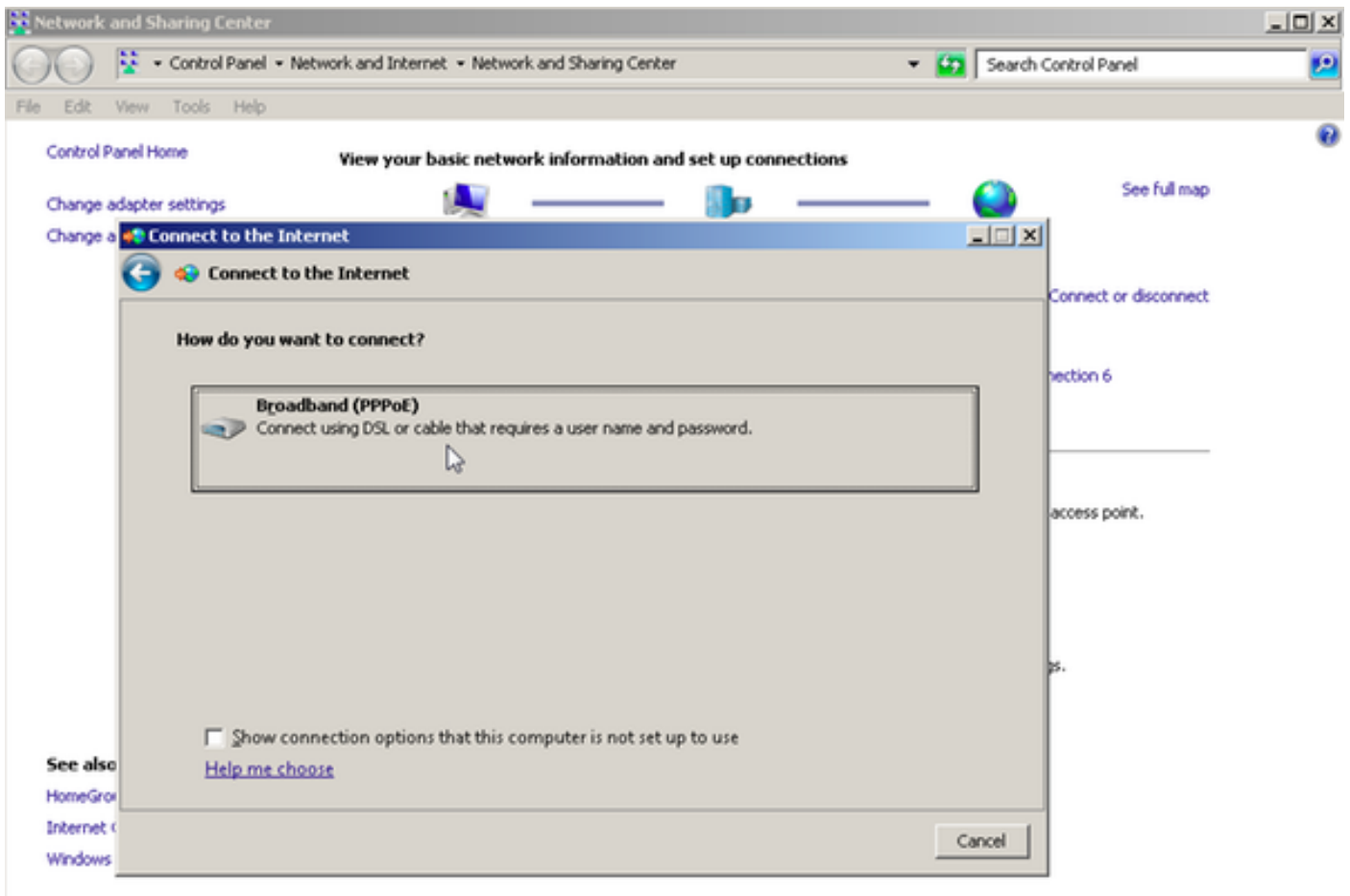
3단계. 이미지에 표시된 대로 새 연결 설정을 선택합니다.



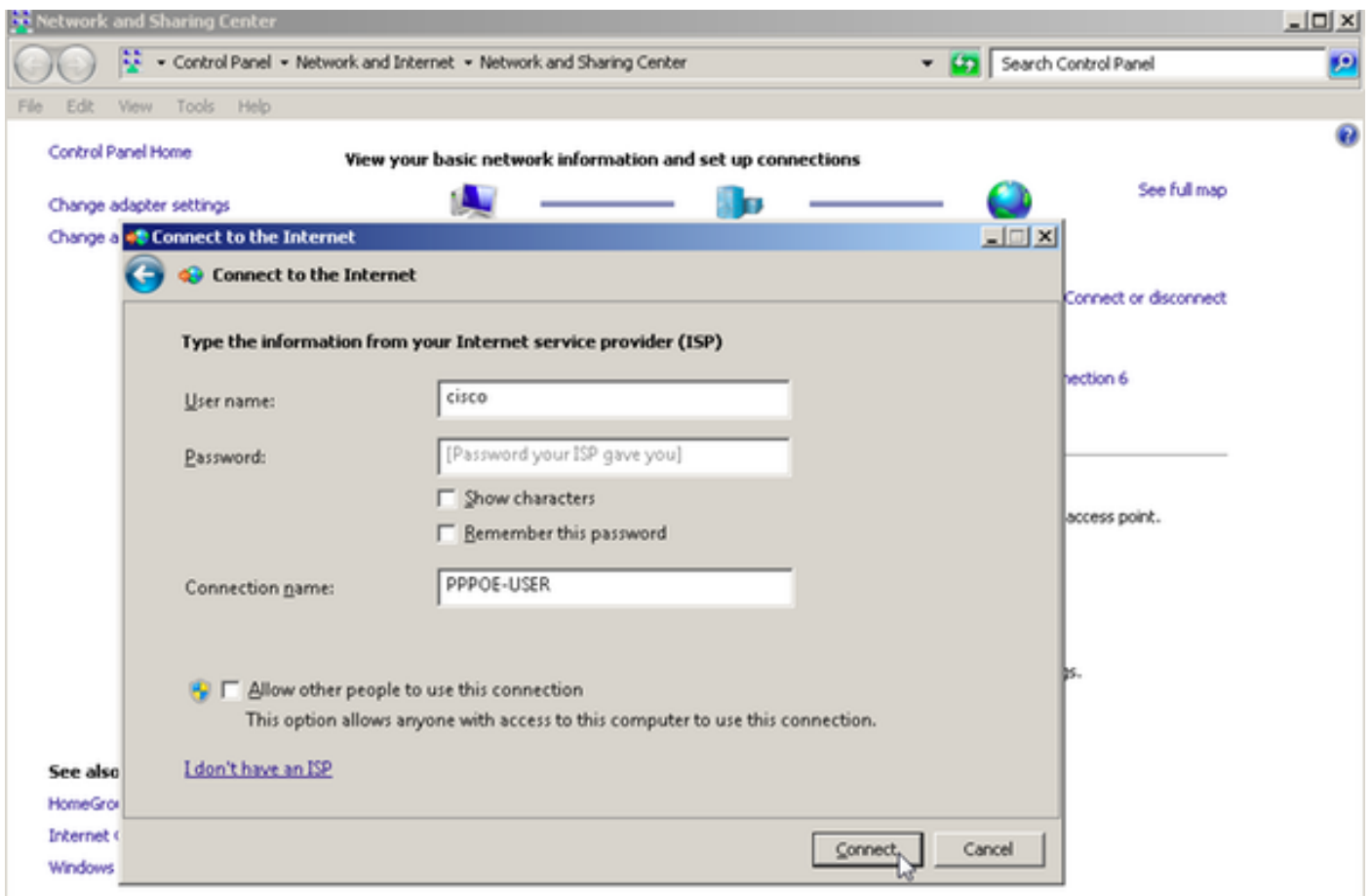
4단계. 이미지에 표시된 대로 No(아니요)를 선택하고 새 연결을 생성합니다.



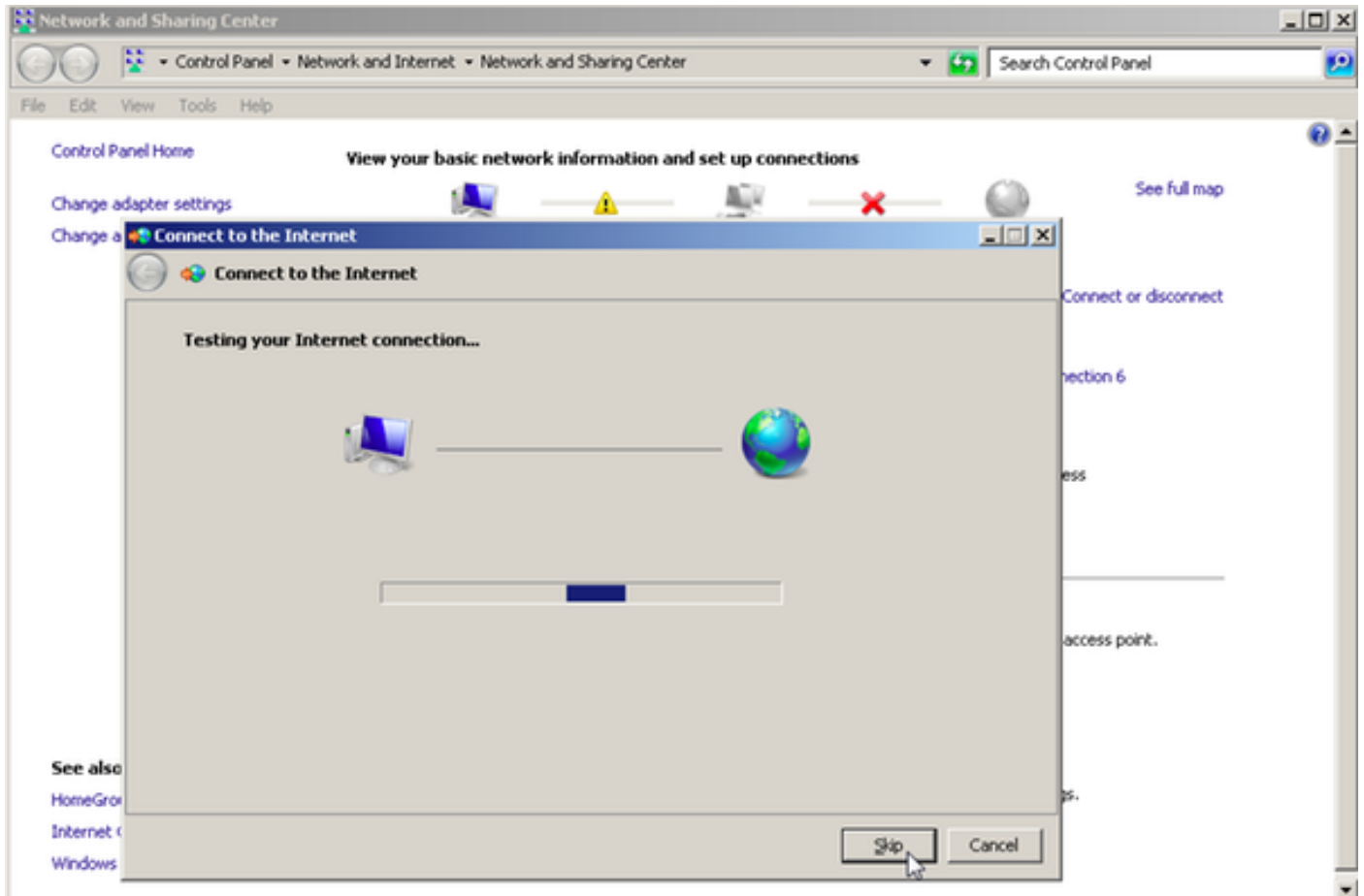
5단계. 이미지에 표시된 대로 광대역(PPPoE)을 클릭합니다.



6단계. 이미지에 표시된 대로 사용자 이름, 비밀번호 및 연결 이름을 입력하고 클릭합니다. 연결합니다.



이렇게 하면 서버에 대한 PPPoE 세션이 시작됩니다. 이미지에 표시된 대로 확인 섹션을 확인합니다



## 다음을 확인합니다.

1단계. 네트워크 탭을 다시 열고 네트워크(이 예에서는 PPPOE-USER라는 이름)를 선택하고 상태를 확인합니다. 다음 이미지에 표시된 대로 사용자 이름과 암호를 입력한 후 연결을 클릭하여 세션을 시작합니다.

Network and Sharing Center

Control Panel > Network and Internet > Network and Sharing Center

File Edit View Tools Help

Control Panel Home

Change adapter settings  
Change advanced sharing settings

**View your basic network information and set up connections**

ADMIN-PC (This computer) — Network 7 — Internet [See full map](#)

View your active networks [Connect or disconnect](#)

**Network 7**  
Work network

Access type: Internet  
Connections: Local Area Connection 6

Change your networking settings

- Set up a new connection or network  
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.
- Connect to a network  
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.
- Choose homegroup and sharing options  
Access files and printers located on other network computers, or change sharing options.
- Troubleshoot problems  
Diagnose and repair network problems, or get troubleshooting information.

**See also**

- HomeGroup
- Internet Options
- Windows Firewall

Currently connected to: **Network 7** Internet access

Dial-up and VPN

PPPOE-USER [Connect](#)

PPPoE-FINAL

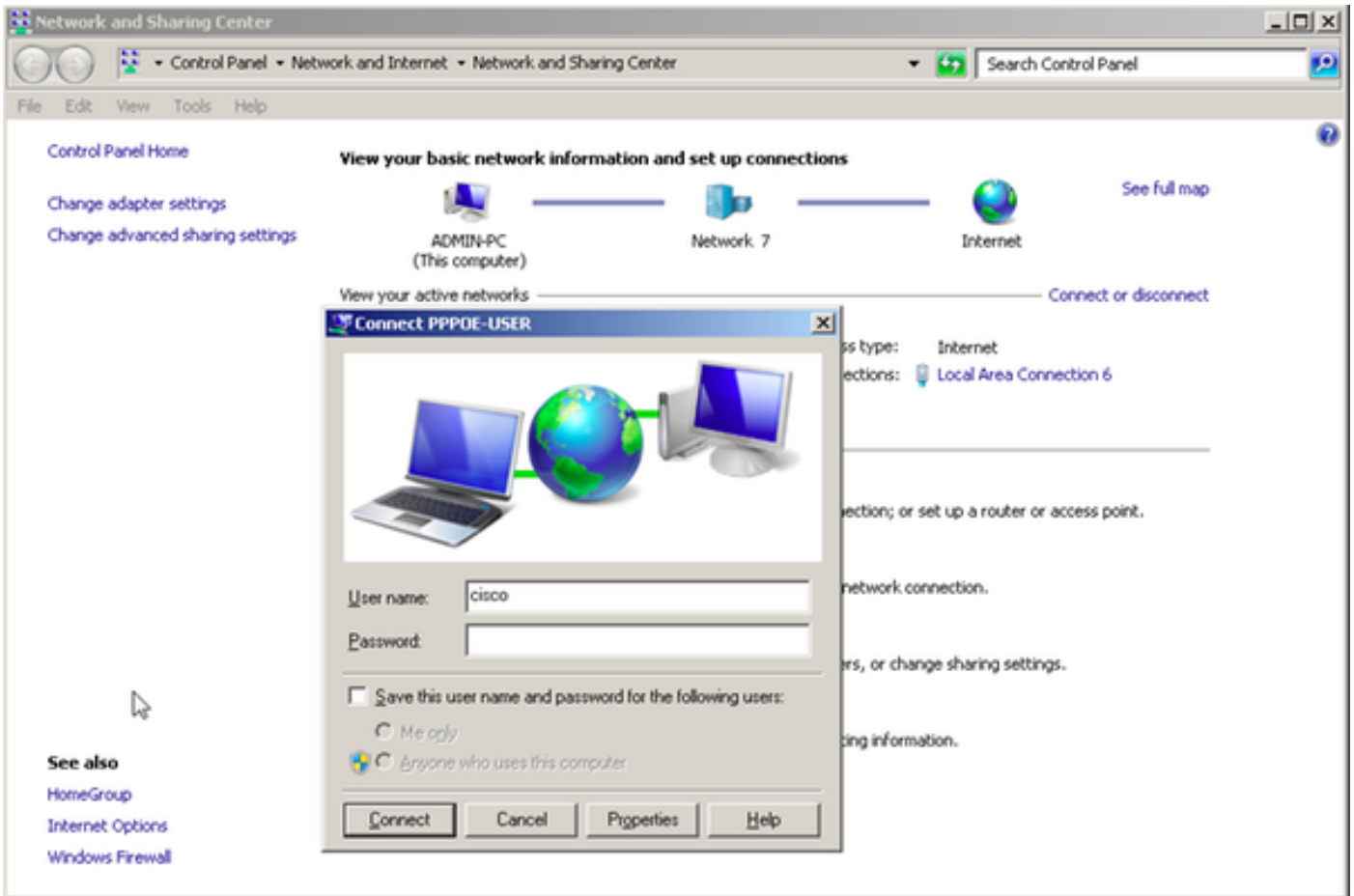
PPP-1

pppoe

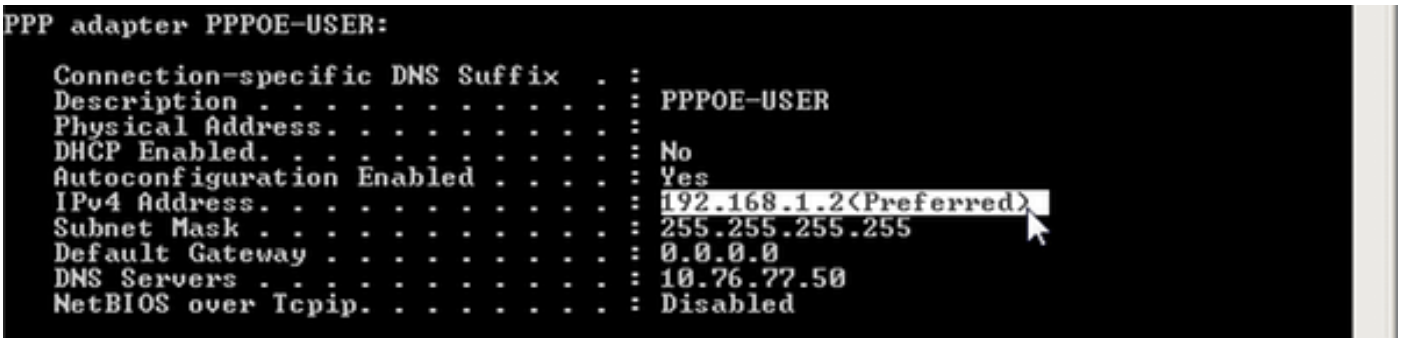
(non  
10.76  
\\10.1  
tftp

Open Network and Sharing Center





2단계. 명령 프롬프트를 열고 `ipconfig /all` 명령을 실행하여 협상된 IP 주소를 확인합니다(이미지에 표시됨).



3단계. PPPoE 세션 설정을 확인하려면 디버그 pppoe 이벤트, 디버그 pppoe 오류 및 `debug ppp 협상`을 활성화합니다. 또한 디버그 radius를 활성화하여 Radius 서버와 교환된 메시지를 확인할 수도 있습니다.

```
BRAS#show debugging
```

```

PPP:
PPP protocol negotiation debugging is on
PPPoE:
PPPoE protocol events debugging is on
PPPoE protocol errors debugging is on
  
```

```
Radius protocol debugging is on
```

Radius packet protocol debugging is on

Debug snippet:

BRAS#

\*Sep 19 18:44:14.531: PPPoE 0: I PADI R:0050.56ad.7206 L:ffff.ffff.ffff Gi0/0/1.47

! Receiving PPPoE Active Discovery Initiation (PADI) broadcast packet from Windows Machine (MAC 0050.56ad.7206) on Router interface Gi0/0/1.47

\*Sep 19 18:44:14.531: Service tag: NULL Tag

\*Sep 19 18:44:14.531: PPPoE 0: O PADO, R:d867.d99f.6601 L:0050.56ad.7206 Gi0/0/1.47

! Sending PPPoE Active Discovery Offer (PADO) unicast packet from Router interface Gi0/0/1.47 (MAC d867.d99f.6601 ) to Windows Machine (MAC 0050.56ad.7206)

\*Sep 19 18:44:14.531: Service tag: NULL Tag

\*Sep 19 18:44:14.533: PPPoE 0: I PADR R:0050.56ad.7206 L:d867.d99f.6601 Gi0/0/1.47

! Receiving PPPoE Active Discovery Request (PADR) unicast packet from Windows Machine (MAC 0050.56ad.7206) on Router interface Gi0/0/1.47

\*Sep 19 18:44:14.533: Service tag: NULL Tag

\*Sep 19 18:44:14.533: PPPoE : encap string prepared

\*Sep 19 18:44:14.533: [76]PPPoE 63: Access IE handle allocated

\*Sep 19 18:44:14.533: [76]PPPoE 63: AAA get retrieved attrs

\*Sep 19 18:44:14.533: [76]PPPoE 63: AAA get nas port details

\*Sep 19 18:44:14.533: [76]PPPoE 63: Error adjusting nas port format did

\*Sep 19 18:44:14.533: [76]PPPoE 63: AAA get dynamic attrs

\*Sep 19 18:44:14.533: [76]PPPoE 63: AAA unique ID 88 allocated

\*Sep 19 18:44:14.533: [76]PPPoE 63: No AAA accounting method list

\*Sep 19 18:44:14.534: [76]PPPoE 63: Service request sent to SSS

\*Sep 19 18:44:14.534: [76]PPPoE 63: Created, Service: None R:d867.d99f.6601 L:0050.56ad.7206 Gi0/0/1.47

\*Sep 19 18:44:14.534: [76]PPPoE 63: State NAS\_PORT\_POLICY\_INQUIRY Event SSS MORE KEYS

\*Sep 19 18:44:14.534: PPP: Alloc Context [7FE79EC0D8C8]

\*Sep 19 18:44:14.534: ppp76 PPP: Phase is ESTABLISHING

\*Sep 19 18:44:14.534: [76]PPPoE 63: data path set to PPP

\*Sep 19 18:44:14.534: [76]PPPoE 63: Segment (SSS class): PROVISION

! We can also enable 'debug sss events' and 'debug sss error' to debug this stage

\*Sep 19 18:44:14.534: [76]PPPoE 63: State PROVISION\_PPP Event SSM PROVISIONED

\*Sep 19 18:44:14.534: [76]PPPoE 63: O PADS R:0050.56ad.7206 L:d867.d99f.6601 Gi0/0/1.47

! Sending PPPoE Active Discovery Session Confirmation (PADS) unicast packets from Router interface Gi0/0/1.47 (MAC d867.d99f.6601 ) to Windows Machine (MAC 0050.56ad.7206)

\*Sep 19 18:44:14.534: [76]PPPoE 63: Unable to Add ANCP Line attributes to the PPPoE Authen attributes

! Access Node Control Protocol (ANCP) is configured between the Digital Subscriber Line Access Concentrator (DSLAM) and Broadband Remote Access Server (BRAS), which is used to aggregate traffic from multiple subscribers and deliver information for any application independently. More information related to ANCP could be found here. It is expected for the IOS to print this message even if ANCP is not enabled.

\*Sep 19 18:44:14.534: ppp76 PPP: Using vpn set call direction  
\*Sep 19 18:44:14.534: ppp76 PPP: Treating connection as a callin  
\*Sep 19 18:44:14.534: ppp76 PPP: Session handle[8800004C] Session id[76]  
\*Sep 19 18:44:14.534: ppp76 LCP: Event[OPEN] State[Initial to Starting]  
\*Sep 19 18:44:14.534: ppp76 PPP LCP: Enter passive mode, state[Stopped]  
\*Sep 19 18:44:14.539: ppp76 LCP: I CONFREQ [Stopped] id 0 len 21  
\*Sep 19 18:44:14.539: ppp76 LCP: MRU 1480 (0x010405C8)  
\*Sep 19 18:44:14.539: ppp76 LCP: MagicNumber 0x61EB5A46 (0x050661EB5A46)  
\*Sep 19 18:44:14.539: ppp76 LCP: PFC (0x0702)  
\*Sep 19 18:44:14.539: ppp76 LCP: ACFC (0x0802)  
\*Sep 19 18:44:14.539: ppp76 LCP: Callback 6 (0x0D0306)  
\*Sep 19 18:44:14.539: ppp76 LCP: O CONFREQ [Stopped] id 1 len 18  
\*Sep 19 18:44:14.539: ppp76 LCP: MRU 1492 (0x010405D4)  
\*Sep 19 18:44:14.539: ppp76 LCP: AuthProto PAP (0x0304C023)  
\*Sep 19 18:44:14.539: ppp76 LCP: MagicNumber 0x7B063BEA (0x05067B063BEA)  
\*Sep 19 18:44:14.539: ppp76 LCP: O CONFREQ [Stopped] id 0 len 7  
\*Sep 19 18:44:14.539: ppp76 LCP: Callback 6 (0x0D0306)  
\*Sep 19 18:44:14.539: ppp76 LCP: Event[Receive ConfReq-] State[Stopped to REQsent]  
\*Sep 19 18:44:14.540: ppp76 LCP: I CONFACK [REQsent] id 1 len 18  
\*Sep 19 18:44:14.540: ppp76 LCP: MRU 1492 (0x010405D4)  
\*Sep 19 18:44:14.540: ppp76 LCP: AuthProto PAP (0x0304C023)  
\*Sep 19 18:44:14.540: ppp76 LCP: MagicNumber 0x7B063BEA (0x05067B063BEA)  
\*Sep 19 18:44:14.540: ppp76 LCP: Event[Receive ConfAck] State[REQsent to ACKrcvd]  
\*Sep 19 18:44:14.540: ppp76 LCP: I CONFREQ [ACKrcvd] id 1 len 18  
\*Sep 19 18:44:14.540: ppp76 LCP: MRU 1480 (0x010405C8)  
\*Sep 19 18:44:14.540: ppp76 LCP: MagicNumber 0x61EB5A46 (0x050661EB5A46)  
\*Sep 19 18:44:14.540: ppp76 LCP: PFC (0x0702)  
\*Sep 19 18:44:14.540: ppp76 LCP: ACFC (0x0802)  
\*Sep 19 18:44:14.540: ppp76 LCP: O CONFACK [ACKrcvd] id 1 len 18  
\*Sep 19 18:44:14.540: ppp76 LCP: MRU 1480 (0x010405C8)  
\*Sep 19 18:44:14.540: ppp76 LCP: MagicNumber 0x61EB5A46 (0x050661EB5A46)  
\*Sep 19 18:44:14.540: ppp76 LCP: PFC (0x0702)  
\*Sep 19 18:44:14.540: ppp76 LCP: ACFC (0x0802)  
\*Sep 19 18:44:14.540: ppp76 LCP: Event[Receive ConfReq+] State[ACKrcvd to Open]  
\*Sep 19 18:44:14.541: ppp76 LCP: I IDENTIFY [Open] id 2 len 18 magic 0x61EB5A46MSRASV5.20  
\*Sep 19 18:44:14.541: ppp76 LCP: I IDENTIFY [Open] id 3 len 24 magic 0x61EB5A46MSRAS-0-ADMIN-PC  
\*Sep 19 18:44:14.541: ppp76 LCP: I IDENTIFY [Open] id 4 len 24 magic 0x61EB5A46sPPY.X`I?Z5SWE}}  
\*Sep 19 18:44:14.541: ppp76 PPP: Queue PAP code[1] id[78]  
\*Sep 19 18:44:14.563: ppp76 PPP: Phase is AUTHENTICATING, by this end  
\*Sep 19 18:44:14.564: ppp76 PAP: Redirect packet to ppp76  
\*Sep 19 18:44:14.564: ppp76 PAP: I AUTH-REQ id 78 len 11 from "cisco"

! Incoming Authentication Request from Windows Machine using User name "cisco"

\*Sep 19 18:44:14.564: ppp76 PAP: Authenticating peer cisco  
\*Sep 19 18:44:14.564: ppp76 PPP: Phase is FORWARDING, Attempting Forward

\*Sep 19 18:44:14.564: ppp76 LCP: State is Open  
\*Sep 19 18:44:14.564: ppp76 PPP: Phase is AUTHENTICATING, Unauthenticated User  
\*Sep 19 18:44:14.564: RADIUS/ENCODE(00000088):Orig. component type = PPPoE  
\*Sep 19 18:44:14.564: RADIUS: DSL line rate attributes successfully added  
\*Sep 19 18:44:14.564: RADIUS/ENCODE: Skip encoding 0 length AAA Cisco vsa password  
\*Sep 19 18:44:14.564: RADIUS(00000088): Config NAS IP: 10.106.39.212  
\*Sep 19 18:44:14.564: RADIUS(00000088): Config NAS IPv6: ::  
\*Sep 19 18:44:14.564: RADIUS/ENCODE: No idb found! Framed IP Addr might not be included  
\*Sep 19 18:44:14.564: RADIUS/ENCODE(00000088): acct\_session\_id: 125  
\*Sep 19 18:44:14.564: RADIUS(00000088): Config NAS IP: 10.106.39.212  
\*Sep 19 18:44:14.564: RADIUS(00000088): sending  
\*Sep 19 18:44:14.564: RADIUS(00000088): Send Access-Request to 10.106.39.253:1645 id 1645/106, len 147

! Sending an Access-Request to Radius Server at 10.106.39.253 on port 1645.

\*Sep 19 18:44:14.564: RADIUS: authenticator C1 5B AA 62 1D E1 31 6C - 16 A5 CE 92 D6 9C 12 E7  
\*Sep 19 18:44:14.564: RADIUS: Framed-Protocol [7] 6 PPP [1]  
\*Sep 19 18:44:14.564: RADIUS: User-Name [1] 7 "cisco"  
\*Sep 19 18:44:14.564: RADIUS: User-Password [2] 18 \*  
\*Sep 19 18:44:14.564: RADIUS: NAS-Port-Type [61] 6 Virtual [5]  
\*Sep 19 18:44:14.564: RADIUS: NAS-Port [5] 6 0  
\*Sep 19 18:44:14.564: RADIUS: NAS-Port-Id [87] 9 "0/0/1/1"  
\*Sep 19 18:44:14.564: RADIUS: Vendor, Cisco [26] 41  
\*Sep 19 18:44:14.564: RADIUS: Cisco AVpair [1] 35 "client-mac-address=0050.56ad.7206"  
\*Sep 19 18:44:14.564: RADIUS: Service-Type [6] 6 Framed [2]  
\*Sep 19 18:44:14.564: RADIUS: NAS-IP-Address [4] 6 10.106.39.212  
\*Sep 19 18:44:14.564: RADIUS: Acct-Session-Id [44] 10 "0000007D"  
\*Sep 19 18:44:14.564: RADIUS: Nas-Identifier [32] 12 "BRAS"  
\*Sep 19 18:44:14.564: RADIUS(00000088): Sending a IPv4 Radius Packet  
\*Sep 19 18:44:14.564: RADIUS(00000088): Started 5 sec timeout  
\*Sep 19 18:44:14.566: RADIUS: Received from id 1645/106 10.106.39.253:1645, Access-Accept, len 52

! Receiving an Access-Accept from Radius Server

\*Sep 19 18:44:14.566: RADIUS: authenticator C0 0D 6C 33 F1 A3 04 27 - F0 C2 76 F5 54 FD E2 42  
\*Sep 19 18:44:14.566: RADIUS: Class [25] 32  
\*Sep 19 18:44:14.566: RADIUS: 4A 83 05 60 00 00 01 37 00 01 0A 6A 27 FD 01 D2 12 2E 98 D0 4F B0  
00 00 00 00 00 00 14 [ J`7j'.O]  
\*Sep 19 18:44:14.566: RADIUS(00000088): Received from id 1645/106  
\*Sep 19 18:44:14.566: ppp76 PPP: Phase is FORWARDING, Attempting Forward  
\*Sep 19 18:44:14.568: [76]PPPoE 63: State LCP\_NEGOTIATION Event SSS CONNECT LOCAL  
\*Sep 19 18:44:14.568: [76]PPPoE 63: Segment (SSS class): UPDATED  
\*Sep 19 18:44:14.568: [76]PPPoE 63: Segment (SSS class): BOUND  
\*Sep 19 18:44:14.568: [76]PPPoE 63: data path set to Virtual Access  
\*Sep 19 18:44:14.569: [76]PPPoE 63: State LCP\_NEGOTIATION Event SSM UPDATED  
\*Sep 19 18:44:14.569: Vi2.1 PPP: Phase is AUTHENTICATING, Authenticated User  
\*Sep 19 18:44:14.569: Vi2.1 PAP: 0 AUTH-ACK id 78 len 5  
\*Sep 19 18:44:14.569: Vi2.1 PPP: Reducing MTU to peer's MRU  
\*Sep 19 18:44:14.569: [76]PPPoE 63: AAA get dynamic attrs  
\*Sep 19 18:44:14.569: Vi2.1 PPP: Phase is UP  
\*Sep 19 18:44:14.569: Vi2.1 IPCP: Protocol configured, start CP. state[Initial]  
\*Sep 19 18:44:14.569: Vi2.1 IPCP: Event[OPEN] State[Initial to Starting]  
\*Sep 19 18:44:14.569: Vi2.1 IPCP: 0 CONFREQ [Starting] id 1 len 10  
\*Sep 19 18:44:14.569: Vi2.1 IPCP: Address 192.168.1.1 (0x0306C0A80101)  
\*Sep 19 18:44:14.569: Vi2.1 IPCP: Event[UP] State[Starting to REQsent]  
\*Sep 19 18:44:14.569: [76]PPPoE 63: State PTA\_BINDING Event STATIC BIND RESPONSE

```
*Sep 19 18:44:14.569: [76]PPPoE 63: Connected PTA
<snip>
*Sep 19 18:44:14.572: Vi2.1 IPCP: Event[Receive ConfReq+] State[ACKrcvd to Open]
*Sep 19 18:44:14.595: Vi2.1 IPCP: State is Open
*Sep 19 18:44:14.595: PPPoE : ipfib_encapstr prepared
*Sep 19 18:44:14.596: Vi2.1 Added to neighbor route AVL tree: topoid 0, address 192.168.1.2
*Sep 19 18:44:14.596: Vi2.1 IPCP: Install route to 192.168.1.2
```

```
! Installing route to PPPoE client
```

```
BRAS#sh pppoe sess
```

```
  1 session  in LOCALLY_TERMINATED (PTA) State
  1 session  total
```

Uniq ID	PPPoE SID	RemMAC LocMAC	Port	VT	VA VA-st	State Type
76	63	0050.56ad. d867.d99f.6601	Gi0/0/1.47	10	Vi2.1 UP	PTA

```
BRAS#
```

```
BRAS#sh caller ip
```

```
Line User IP Address Local Number Remote Number <->
```

```
Vi2.1 cisco 192.168.1.2 - - in
```

```
BRAS# ping 192.168.1.2
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
```

```
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

## 문제 해결

현재 이 컨피그레이션에 사용할 수 있는 특정 문제 해결 정보가 없습니다. 그러나 관련 디버그의 도움을 받아 PPP 및 PPPoE와 관련된 표준 문제 해결 기술을 적용할 수 있습니다.

## 관련 정보

- [기술 지원 및 문서 - Cisco Systems](#)