

# Configure PPPoE over BDI on ASR1k Series Routers

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## Introduction

This document describes how to configure Point-to-Point Protocol over Ethernet (PPPoE) Server with the Bridge Domain Interface (BDI) and vlan-range.

## Prerequisites

### Requirements

Cisco recommends that you have knowledge of these topics:

- End-to-End Layer 1 connectivity is fine
- Basics of PPP and PPPoE are well understood

### Components Used

The information in this document is based on these software and hardware versions:

- HOST-1 - CISCO887G
- HOST-2 - CISCO887
- SWITCH - WS-C3560-24TS-S
- PPPoE SERVER - ASR1001-X

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Configure

**Note:** Use the [Command Lookup Tool](#) ([registered](#) customers only) in order to obtain more information on the commands used in this section.

## HOST-1

```
!  
interface FastEthernet0  
  switchport access vlan 100  
  no ip address  
end  
  
!  
  
interface Vlan100  
  no ip address  
  pppoe enable group global  
  pppoe-client dial-pool-number 1  
end  
  
!  
  
interface Dialer1  
  ip address negotiated  
  encapsulation ppp  
  dialer pool 1  
  ppp chap hostname dsl  
  ppp chap password 0 dsl  
end
```

## HOST-2

```
!  
  
interface FastEthernet0  
  switchport access vlan 200  
  no ip address  
end  
  
!  
  
!  
interface Vlan200  
  no ip address  
  pppoe enable group global  
  pppoe-client dial-pool-number 1  
end  
  
!  
  
!  
interface Dialer1  
  ip address negotiated  
  encapsulation ppp  
  dialer pool 1  
  ppp chap hostname dsl  
  ppp chap password 0 dsl  
end
```

## SWITCH

```
SWITCH#sh cdp neighbors
```

```
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,  
D - Remote, C - CVTA, M - Two-port Mac Relay
```

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
SERVER	Gig 0/1	130	R I	ASR1001-X	Gig 0/0/0
HOST-1	Fas 0/2	141	R B S I	887G	Fas 0
HOST-2	Fas 0/1	167	R B S I	887	Fas 0

```
!  
interface FastEthernet0/2  
  switchport access vlan 100  
end
```

```
!  
interface FastEthernet0/1  
  switchport access vlan 200  
end
```

```
!  
!  
interface GigabitEthernet0/1  
  switchport trunk encapsulation dot1q  
  switchport trunk allowed vlan 100,200  
  switchport mode trunk  
end
```

```
!  
PPPoE SERVER
```

```
!  
username dsl password 0 dsl  
  
!  
bba-group pppoe global  
  virtual-template 1  
!  
interface GigabitEthernet0/0/0  
  no ip address  
  negotiation auto  
  cdp enable  
  service instance 100 ethernet  
    encapsulation dot1q 100 etype pppoe-all  
    rewrite ingress tag pop 1 symmetric  
    bridge-domain 100  
!  
  service instance 200 ethernet  
    encapsulation dot1q 200 etype pppoe-all  
    rewrite ingress tag pop 1 symmetric  
    bridge-domain 200  
!  
!  
interface Virtual-Templat1  
  ip unnumbered Loopback0  
  peer default ip address pool POOL  
  ppp authentication chap
```

```

!
interface BDI100
  no ip address
  pppoe enable group global
!
interface BDI200
  no ip address
  pppoe enable group global
!
interface Loopback0
  ip address 192.168.10.1 255.255.255.255
end

!
ip local pool POOL 192.168.1.1 192.168.1.100

```

Alternativley, you can configure 'vlan-range' as shown:

```

!
interface GigabitEthernet0/0/0
  no ip address
  negotiation auto
  service instance 100 ethernet
  encapsulation default
  bridge-domain 1
!
end

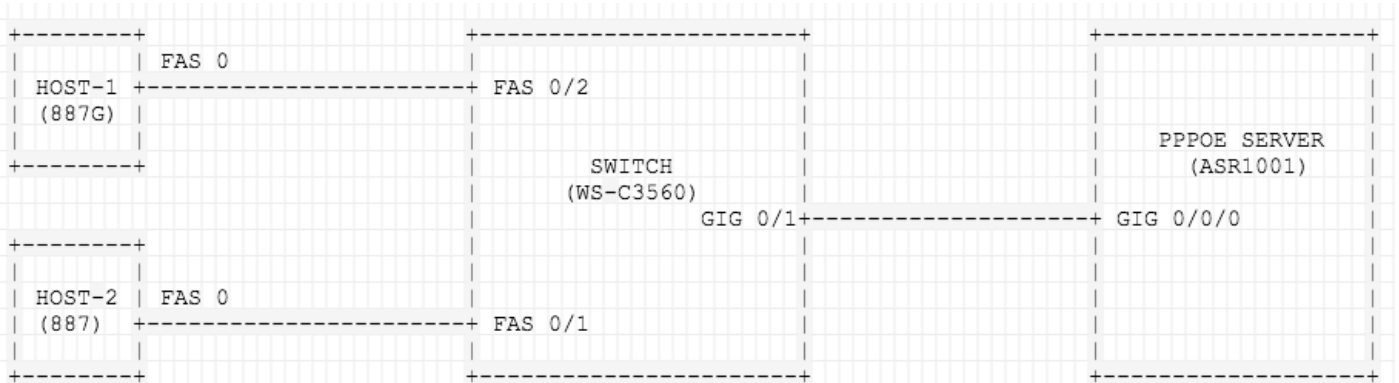
```

```

!
interface BDI1
  no ip address
  vlan-range dot1q 1 4094
  pppoe enable group global
!
end

```

## Network Diagram



## Verify

Use this section in order to confirm that your configuration works properly.

### On HOST-1

```
HOST-1#show pppoe session
1 client session
```

Uniq ID	PPPoE SID	RemMAC LocMAC	Port	VT	VA VA-st Vi2	State Type
N/A	5	00a2.eee6.663f c471.fe93.d112	Vl100	Di1	UP	UP

```
HOST-1#show ip interface brief | exclude un
```

Interface	IP-Address	OK?	Method	Status	Protocol
Dialer1	192.168.1.4	YES	IPCP	up	up

```
HOST-1#show caller ip
```

Line	User	IP Address	Local Number	Remote Number	<->
Vi2	SERVER	192.168.10.1	-	<unknown phone	in

```
HOST-1#ping 192.168.10.1
```

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

```
Sending 5, 100-byte ICMP Echos to 192.168.10.1, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
```

```
HOST-1#show ppp interface virtual-Access 2
```

```
PPP Serial Context Info
```

```
-----
```

```
Interface       : Vi2
PPP Serial Handle: 0x1F000003
PPP Handle      : 0xB2000003
SSS Handle      : 0x80000004
AAA ID          : 24
Access IE       : 0xA7000003
SHDB Handle     : 0x0
State           : Up
Last State      : Binding
Last Event      : LocalTerm
```

```
PPP Session Info
```

```
-----
```

```
Interface       : Vi2
PPP ID          : 0xB2000003
Phase           : UP
Stage           : Local Termination
Peer Name       : SERVER
Peer Address    : 192.168.10.1
Control Protocols: LCP[Open] IPCP[Open] CDPCP[Stopped]
Session ID      : 3
AAA Unique ID   : 24
SSS Manager ID  : 0x80000004
SIP ID         : 0x1F000003
PPP_IN_USE     : 0x11
```

```
Vi2 LCP: [Open]
```

```
Our Negotiated Options
```

```
Vi2 LCP: MagicNumber 0x7735647E (0x05067735647E)
```

```
Peer's Negotiated Options
```

```
Vi2 LCP: MRU 1500 (0x010405DC)
```

```
Vi2 LCP: AuthProto CHAP (0x0305C22305)
```

Vi2 LCP: MagicNumber 0xA7A011AC (0x0506A7A011AC)

Vi2 IPCP: [Open]

Our Negotiated Options

Vi2 IPCP: Address 192.168.1.5 (0x0306C0A80105)

Peer's Negotiated Options

Vi2 IPCP: Address 192.168.10.1 (0x0306C0A80A01)

## On HOST-2

HOST-2#show ip interface brief | exclude un

Interface	IP-Address	OK?	Method	Status	Protocol
Dialer1	192.168.1.6	YES	IPCP	up	up

HOST-2#show caller ip

Line	User	IP Address	Local Number	Remote Number	<->
Vi2	SERVER	192.168.10.1	-	<unknown phone	in

HOST-2#ping 192.168.10.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.10.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms

HOST-2#show ppp interface virtual-Access 2

PPP Serial Context Info

-----  
Interface : Vi2  
PPP Serial Handle: 0x7B00000A  
PPP Handle : 0xA000000A  
SSS Handle : 0x4C00000B  
AAA ID : 68  
Access IE : 0x1D00000A  
SHDB Handle : 0x0  
State : Up  
Last State : Binding  
Last Event : LocalTerm

PPP Session Info

-----  
Interface : Vi2  
PPP ID : 0xA000000A  
Phase : UP  
Stage : Local Termination  
Peer Name : SERVER  
Peer Address : 192.168.10.1  
Control Protocols: LCP[Open] IPCP[Open] CDPCP[Stopped]  
Session ID : 10  
AAA Unique ID : 68  
SSS Manager ID : 0x4C00000B  
SIP ID : 0x7B00000A  
PPP\_IN\_USE : 0x11

Vi2 LCP: [Open]

Our Negotiated Options

Vi2 LCP: MagicNumber 0x421AC8AB (0x0506421AC8AB)

Peer's Negotiated Options

Vi2 LCP: MRU 1500 (0x010405DC)

```
Vi2 LCP: AuthProto CHAP (0x0305C22305)
Vi2 LCP: MagicNumber 0xA7A0942C (0x0506A7A0942C)
```

```
Vi2 IPCP: [Open]
Our Negotiated Options
Vi2 IPCP: Address 192.168.1.6 (0x0306C0A80106)
Peer's Negotiated Options
Vi2 IPCP: Address 192.168.10.1 (0x0306C0A80A01)
```

## On SWITCH

```
SWITCH#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/4, Fa0/5, Fa0/6, Fa0/7 Fa0/8, Fa0/9, Fa0/10, Fa0/11 Fa0/12, Fa0/13, Fa0/14, Fa0/15 Fa0/16, Fa0/17, Fa0/18, Fa0/19 Fa0/20, Fa0/21, Fa0/22, Fa0/23 Fa0/24, Gi0/2
11 VLAN0011	active	
12 VLAN0012	active	
13 VLAN0013	active	
100 VLAN0100	active	Fa0/2
200 VLAN0200	active	Fa0/1

```
SWITCH#Show interface trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Gi0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Gi0/1	100,200

Port	Vlans allowed and active in management domain
Gi0/1	100,200

Port	Vlans in spanning tree forwarding state and not pruned
Gi0/1	100,200

## On PPPoE SERVER

```
SERVER#show pppoe session
2 sessions in LOCALLY_TERMINATED (PTA) State
2 sessions total
```

Uniq ID	PPPoE SID	RemMAC LocMAC	Port	VT	VA VA-st	State Type
5	5	c471.fe93.d112 00a2.eee6.663f	BD100	1	Vi2.2 UP	PTA
6	6	e8b7.4886.b8ea 00a2.eee6.663f	BD200	1	Vi2.1 UP	PTA

```
SERVER#show caller ip
```

Line	User	IP Address	Local Number	Remote Number	<->
Vi2.1	ds1	192.168.1.6	-	-	in
Vi2.2	ds1	192.168.1.5	-	-	in

```
SERVER#show ip local pool POOL
Pool          Begin          End            Free  In use
POOL          192.168.1.1   192.168.1.100 98     2
Available addresses:
 192.168.1.7
 192.168.1.8
 192.168.1.9
```

.....  
.....

When you use '**vlan-range**', notice change in 'Port':

```
SERVER#show pppoe session
 2 sessions in LOCALLY_TERMINATED (PTA) State
 2 sessions total
```

Uniq ID	PPPoE SID	RemMAC LocMAC	Port	VT	VA VA-st	State Type
7	7	c471.fe93.d112 00a2.eee6.663f	BD1 VLAN: 100	1	Vi2.1 UP	PTA
8	8	e8b7.4886.b8ea 00a2.eee6.663f	BD1 VLAN: 200	1	Vi2.2 UP	PTA

```
SERVER#show caller ip
Line      User      IP Address      Local Number      Remote Number      <->
Vi2.1    dsl       192.168.1.7    -                  -                  in
Vi2.2    dsl       192.168.1.8    -                  -                  in
```

## Troubleshoot

This section provides information you can use in order to troubleshoot your configuration.

These debugs will be helpful to troubleshoot PPP/PPPoE.

- debug pppoe events
- debug pppoe errors
- debug ppp negotiation

## Related Information

- [PPPoE over BDI on CISCO CSR 1000V](#)
- [Enhancement Bug - PPPoE Termination on BDI and vlan-range on ASR1k](#)
- [Technical Support & Documentation - Cisco Systems](#)