配置路由器使用ISDN BRI撥打多個站點

目錄

簡介

在某些情況下，您需要配置路由器來撥打多個站點。例如，您可能必須撥打一台路由器以連線到公司網路的一部分，然後撥打Internet服務提供商(ISP)路由器以連線到Internet。

本文提供一個配置示例，其中中央路由器訪問網際網路，而遠端辦公室使用整合多業務數位網路(ISDN)。 遠端辦公室還可以通過中央路由器訪問中央路由器和網際網路。

必要條件

需求

繼續進行此配置之前，請確保：

- 驗證ISDN第1層和第2層是否已啟動。有關詳細資訊，請參閱使用show isdn status命令進行BRI故障排除。
- 從ISP獲取必要資訊，例如驗證方法(可能是Challenge Handshake驗證通訊協定(CHAP)或密碼驗證通訊協定(PAP))、使用者名稱和密碼、撥號器介面的IP位址（除非介面使用交涉位址）。另外，瞭解是否需要使用NAT將多台主機連線到ISP。
- 從遠端路由器獲取有關身份驗證方法、使用者名稱和密碼、撥號號碼和IP地址的資訊。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- 採用Cisco IOS®軟體版本12.1(11)IP plus的Cisco 803路由器。**注意：**如果需要配置NAT，請確保您設定了IP Plus（它在IOS檔名中具有「is」）功能。
- Cisco 2501路由器，是執行Cisco IOS軟體版本12.2(5)的遠端辦公室。

註：不包括ISP路由器的配置。請參閱撥號和存取技術支援頁面以取得一些組態範例。

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。如果您在即時網路中工作，請確保在使用任何命令之前瞭解其潛在影響。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

相關產品

此組態可用於任何具有基本速率介面(BRI)介面的路由器。這包括具有內建BRI介面的路由器，例如Cisco 800（例如，801、802、803、804）和Cisco 1600（例如，1603-R和1604-R）系列路由器。它還包括接受BRI WAN介面卡(WIC)或網路模組（如1600、1700、2600和3600系列）的路由器。有關BRI WIC或網路模組的更多資訊，請參閱WAN介面卡(WIC)/1600、1700、2600和3600系列路由器的平台硬體相容性表。

注意：使用**show version**命令檢查路由器是否具有BRI介面。

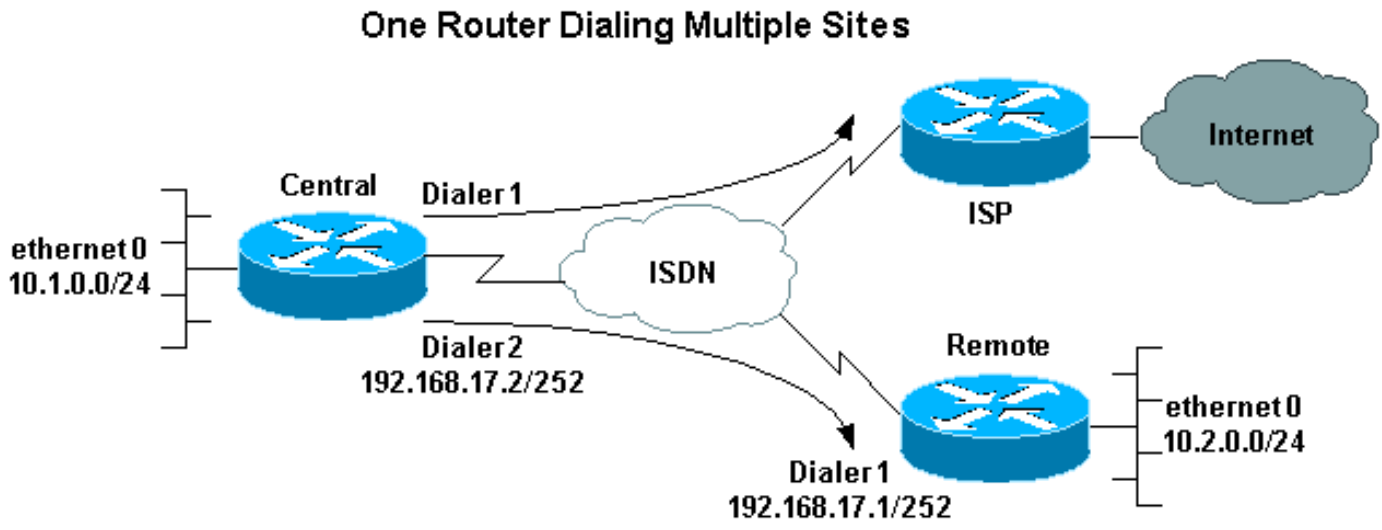
設定

本節提供用於設定本文件中所述功能的資訊。

注意：要查詢有關本文檔中使用的命令的其他資訊，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

在此配置中，中央路由器命名為「central」，遠端公司辦公室命名為「remote」。

在中心位置，撥號器介面1配置為訪問Internet。IP地址由ISP動態分配。NAT用於允許中央LAN、遠端LAN和中央 — 遠端WAN的IP網路通過一個動態分配的IP地址訪問Internet。聯絡您的ISP檢查是否需要NAT。

註：我們已經配置了PAP和CHAP，因為這取決於ISP的配置（但只使用其中一個）。

中央

```
version 12.1
 no parser cache
 service timestamps debug datetime msec
 service timestamps log datetime msec
 !
 hostname central
 !
 username remote password 0 remote
 !--- Username and shared secret password for the router
(remote) !--- (used for CHAP authentication). !---
Shared secret password must be the same on both sides. !
isdn switch-type basic-net3 ! ! interface Ethernet0 ip
address 10.1.0.1 255.255.255.0 ip nat inside !---
Ethernet 0 is an inside NAT interface. !--- All traffic
from this network will be translated. no cdp enable !
interface BRI0 !--- If you have additional BRIs, copy
this BRI 0 configuration to the other BRIs. no ip
address encapsulation ppp dialer pool-member 1 !---
Assign BRI0 as member of dialer pool 1. !--- Dialer pool
1 is specified in interface Dialer 1. dialer pool-member
2 !--- Assign BRI0 as member of dialer pool 2. !---
Dialer pool 2 is specified in interface Dialer 2. isdn
switch-type basic-net3 !--- This depends on the country.
no cdp enable ppp authentication chap pap callin !---
Permit one-way CHAP and PAP authentication. !---
Configure authentication on both the physical and dialer
interface. ! interface Dialer1 !--- Create a dialer
interface for every device to which you need to connect.
description CONNECTION TO INTERNET ip address negotiated
!--- This IP address is obtained from the ISP. If the
ISP permits a static !--- address, configure that
address instead. ip nat outside !--- The Outside NAT
interface. Because this interface only has one IP
address, !--- all traffic from the inside network will
be Port Address Translated (PAT). encapsulation ppp
dialer pool 1 !--- Dialer profile 1. Remember that
interface BRI 0 is a member of this profile. dialer
remote-name ISP dialer idle-timeout 180 dialer string
6122 !--- The number used to dial the ISP. dialer-group
1 !--- Apply interesting traffic definition from dialer-
list 1. no cdp enable ppp authentication chap pap callin
ppp chap hostname XXXXX !--- XXXXX is the username the
ISP expects in order to authenticate this router. !---
For more information, refer to the document on ppp chap
hostname. ppp chap password YYYYY !--- YYYYY is the
password the ISP expects in order to authenticate this
router. ppp pap sent-username XXXXX password YYYYY !---
PAP username and password. !--- This is required only if
the ISP does not support CHAP. ! interface Dialer2
description CONNECTION TO REMOTE OFFICE ip address
192.168.17.2 255.255.255.252 !--- IP address for the
```

```
connection to the remote office. !--- The remote office
BRI interface is in the same subnet. ip nat inside !---
Dialer 2 is an inside NAT interface. !--- With this
configuration, traffic from remote office is translated
!--- before it is sent to the ISP. encapsulation ppp
dialer pool 2 !--- Dialer profile 2. Remember that
interface BRI 0 is a member of this profile. dialer
remote-name remote !--- Specifies the remote router name
(remote). !--- This name must match that used by the
remote router to authenticate itself. !--- Remember that
we configured the router username and password earlier.
dialer idle-timeout 180 dialer string 6121 !--- Number
used to dial the remote office router. dialer-group 1 !-
-- Apply interesting traffic definition from dialer-list
1. no cdp enable ppp authentication chap callin ! ip nat
inside source list 101 interface Dialer1 overload !---
Establishes dynamic source translation (with PAT) for
addresses that are !--- identified by the access list
101. no ip http server ip classless ip route 0.0.0.0
0.0.0.0 Dialer1 !--- Default route. Such traffic will
use dialer 1 to the ISP. ip route 10.2.0.0 255.255.255.0
Dialer2 !--- Route to remote router network. Traffic for
10.2.0.0/24 uses Dialer2. ! access-list 101 permit ip
10.1.0.0 0.0.0.255 any access-list 101 permit ip
10.2.0.0 0.0.0.255 any access-list 101 permit ip
192.168.17.0 0.0.0.3 any !--- Defines an access list
that permits the addresses to be translated. !--- Note
that the Ethernet 0 network, the remote router network
and the !--- BRI network (between this router and the
remote one) will be translated. dialer-list 1 protocol
ip permit !--- Interesting traffic definition. !--- This
definition is applied to both connections. !--- If you
need to define different interesting traffic for each
connection, !--- create two dialer-lists and apply one
to each dialer profile with dialer-group. no cdp run !
line con 0 exec-timeout 3 0 line vty 0 4 exec-timeout 3
0 ! ! end
```

遠端

```
version 12.2
  service timestamps debug datetime msec
  service timestamps log datetime msec
  !
  hostname remote
  !
  username central password 0 remote
!--- Username and shared secret password for the router
(central) !--- (used for CHAP authentication). !---
Shared secret must be the same on both sides. ! isdn
switch-type basic-net3 ! interface Ethernet0 ip address
10.2.0.1 255.255.255.0 !--- Remember that this network
is included in the NAT statements on central. no cdp
enable ! interface BRI0 no ip address encapsulation ppp
dialer pool-member 1 !--- Assign BRI0 as member of
dialer pool 1. !--- Dialer pool 1 is specified in
interface Dialer 1. isdn switch-type basic-net3 no cdp
enable ppp authentication chap ! interface Dialer1 ip
address 192.168.17.1 255.255.255.252 encapsulation ppp
dialer pool 1 !--- Dialer profile 1. Remember that
interface BRI 0 is a member of this profile. dialer
remote-name central !--- Specifies the name of the other
router (central). !--- This name must match that used by
```

```
the remote router to authenticate itself. !--- Remember
that we configured the router username and password
earlier. dialer string 6131 !--- The number used to dial
the central router. dialer-group 1 !--- Apply
interesting traffic definition from dialer-list 1.
pulse-time 0 no cdp enable ppp authentication chap
callin ! ip classless ip route 0.0.0.0 0.0.0.0 Dialer1
!--- Default route. Such traffic will use dialer 1 to
the central router. no ip http server ! dialer-list 1
protocol ip permit !--- All IP traffic is interesting. !
line con 0 exec-timeout 3 0 line aux 0 line vty 0 4
exec-timeout 3 0 ! end
```

驗證

本節提供的資訊可用於確認您的組態是否正常運作。

輸出直譯器工具(僅供註冊客戶使用)支援某些**show**命令，此工具可讓您檢視show命令輸出的分析。

- **show isdn active** — 顯示您用於發出呼叫的ISDN號碼，並指示呼叫是入站還是出站。
- **show caller ip** — 顯示您提供的IP地址的呼叫者資訊摘要。
- **show ip interface dialer 1 | include Internet** — 列出撥號器介面IP資訊和狀態的摘要。
- **show dialer [interface type number]** — 顯示為按需撥號路由(DDR)配置的介面的一般診斷資訊。 如果撥號器正常啟動，系統會顯示以下訊息：
  ```
  Dialer state is data link layer up
  ```
  如果出現物理層啟動，則表示線路協定啟動，但網路控制協定(NCP)未啟動。發起撥號的資料包的源地址和目的地址顯示在撥號原因行中。此**show**命令還會顯示計時器的配置以及連線超時之前的時間。

疑難排解

本節提供的資訊可用於對組態進行疑難排解。

疑難排解指令

輸出直譯器工具(僅供註冊客戶使用)支援某些**show**命令，此工具可讓您檢視show命令輸出的分析。

注意：發出**debug指令之前，請先參閱**有關Debug指令的重要資訊。

- **debug dialer** — 顯示有關撥號器介面上的資料包或事件的調試資訊。
- **debug isdn q931** — 顯示有關本地路由器（使用者端）與網路之間的ISDN網路連線（第3層）的呼叫建立和拆除的資訊。
- **debug ppp negotiation** — 顯示有關點對點協定(PPP)流量以及在PPP元件協商期間交換的資訊，並包含有關鏈路控制協定(LCP)、身份驗證和NCP的資訊。成功的PPP協商將首先開啟LCP狀態，然後進行身份驗證，最後協商NCP。
- **debug ppp authentication** — 使**debug ppp**命令顯示身份驗證協定消息，包括CHAP資料包交換和PAP交換。
- **debug ip peer** — 包含對等體的資訊。

調試輸出

要對配置進行故障排除，請使用以下調試：

```
central#debug isdn q931
ISDN Q931 packets debugging is on

central#debug dialer
Dial on demand events debugging is on

central#debug ppp negotiation
PPP protocol negotiation debugging is on

central#debug ppp authentication
PPP authentication debugging is on

central#debug ip peer
IP peer address activity debugging is on
```

被呼叫的路由器發起對Internet的呼叫：198.133.219.25是Internet上的IP地址。

```
central#ping 198.133.219.25

:.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 40/41/44 ms

*Mar 1 00:06:12.984: BR0 DDR: rotor dialout [priority]
*Mar 1 00:06:12.988: BR0 DDR: Dialing cause ip (s=172.17.243.115,
 d=198.133.219.25)
*Mar 1 00:06:12.988: BR0 DDR: Attempting to dial 6122
*Mar 1 00:06:12.996: ISDN BR0: TX -> SETUP pd = 8 callref = 0x01
 !--- central initiates the call to ISDN number 6122. *Mar 1 00:06:13.000: Bearer Capability i =
0x8890 *Mar 1 00:06:13.008: Channel ID i = 0x83 *Mar 1 00:06:13.008: Called Party Number i =
0x80, '6122', Plan:Unknown, Type:Unknown *Mar 1 00:06:13.088: ISDN BR0: RX <- CALL_PROC pd = 8
callref = 0x81 *Mar 1 00:06:13.092: Channel ID i = 0x89 *Mar 1 00:06:13.244: ISDN BR0: RX <-
CONNECT pd = 8 callref = 0x81 !--- central receives a connect message : the ISDN B channel is
established. *Mar 1 00:06:13.252: ISDN BR0: TX -> CONNECT_ACK pd = 8 callref = 0x01 *Mar 1
00:06:13.260: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up *Mar 1 00:06:13.268: BR0:1:
interface must be fifo queue, force FIFO *Mar 1 00:06:13.272: %DIALER-6-BIND: Interface BR0:1
bound to profile Di1 *Mar 1 00:06:13.280: BR0:1 PPP: Treating connection as a callout *Mar 1
00:06:13.280: BR0:1 PPP: Phase is ESTABLISHING, Active Open *Mar 1 00:06:13.284: BR0:1 PPP: No
remote authentication for call-out *Mar 1 00:06:13.284: BR0:1 LCP: O CONFREQ [Closed] id 1 len
10 *Mar 1 00:06:13.284: BR0:1 LCP: MagicNumber 0x108130DD (0x0506108130DD) *Mar 1 00:06:13.300:
BR0:1 LCP: I CONFREQ [REQsent] id 132 Len 15 *Mar 1 00:06:13.300: BR0:1 LCP: AuthProto CHAP
(0x0305C22305) !--- The ISP wants to use CHAP authentication. *Mar 1 00:06:13.304: BR0:1 LCP:
MagicNumber 0xE4225290 (0x0506E4225290) *Mar 1 00:06:13.304: BR0:1 LCP: O CONFACK [REQsent] id
132 Len 15 *Mar 1 00:06:13.308: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Mar 1 00:06:13.308:
BR0:1 LCP: MagicNumber 0xE4225290 (0x0506E4225290) *Mar 1 00:06:13.308: BR0:1 LCP: I CONFACK
[ACKsent] id 1 Len 10 *Mar 1 00:06:13.312: BR0:1 LCP: MagicNumber 0x108130DD (0x0506108130DD)
*Mar 1 00:06:13.312: BR0:1 LCP: State is Open *Mar 1 00:06:13.320: BR0:1 PPP: Phase is
AUTHENTICATING, by the peer *Mar 1 00:06:13.328: BR0:1 AUTH: Started process 0 pid 22 *Mar 1
00:06:13.328: BR0:1 CHAP: I CHALLENGE id 118 Len 27 from "posets" *Mar 1 00:06:13.332: BR0:1
CHAP: Using alternate hostname XXXXX *Mar 1 00:06:13.332: BR0:1 CHAP: Username posets not found
*Mar 1 00:06:13.336: BR0:1 CHAP: Using default password *Mar 1 00:06:13.336: BR0:1 CHAP: O
RESPONSE id 118 Len 26 from "XXXXX" *Mar 1 00:06:13.360: BR0:1 CHAP: I SUCCESS id 118 Len 4 !---
central receives a CHAP SUCCESS from ISP. *Mar 1 00:06:13.360: BR0:1 PPP: Phase is UP *Mar 1
00:06:13.364: BR0:1 IPCP: O CONFREQ [Not negotiated] id 1 Len 10 *Mar 1 00:06:13.364: BR0:1
IPCP: Address 0.0.0.0 (0x030600000000) *Mar 1 00:06:13.368: BR0:1 IPCP: I CONFREQ [REQsent] id
108 Len 10 *Mar 1 00:06:13.368: BR0:1 IPCP: Address 194.183.201.1 (0x0306C2B7C901) *Mar 1
00:06:13.368: BR0:1: IPPOOL: validate address = 194.183.201.1 *Mar 1 00:06:13.372: BR0:1
set_ip_peer(3): new address 194.183.201.1 *Mar 1 00:06:13.372: BR0:1 IPCP: O CONFACK [REQsent]
id 108 Len 10 *Mar 1 00:06:13.376: BR0:1 IPCP: Address 194.183.201.1 (0x0306C2B7C901) *Mar 1
00:06:13.380: BR0:1 IPCP: I CONFNAK [ACKsent] id 1 Len 10 *Mar 1 00:06:13.380: BR0:1 IPCP:
```

```
Address 194.183.201.3 (0x0306C2B7C903) !--- 194.183.201.3 is assigned by ISP to dialer 1 of
central. *Mar 1 00:06:13.384: BR0:1 IPCP: O CONFREQ [ACKsent] id 2 Len 10 *Mar 1 00:06:13.384:
BR0:1 IPCP: Address 194.183.201.3 (0x0306C2B7C903) *Mar 1 00:06:13.396: BR0:1 IPCP: I CONFACK
[ACKsent] id 2 Len 10 *Mar 1 00:06:13.400: BR0:1 IPCP: Address 194.183.201.3 (0x0306C2B7C903)
*Mar 1 00:06:13.400: BR0:1 IPCP: State is Open *Mar 1 00:06:13.400: Di1 IPCP: Install negotiated
IP interface address 194.183.201.3 *Mar 1 00:06:13.412: BR0:1 DDR: dialer protocol up *Mar 1
00:06:13.416: Di1 IPCP: Install route to 194.183.201.1 *Mar 1 00:06:14.360: %LINEPROTO-5-UPDOWN:
Line protocol on Interface BRI0:1, changed state to up *Mar 1 00:06:19.276: %ISDN-6-CONNECT:
Interface BRI0:1 is now connected to 6122 unknown
```

相關資訊

- 撥號和存取技術支援
- 技術支援與文件 - Cisco Systems