

# 在接入服务器上使用 Cisco IOS DHCP 服务器

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## 简介

本文提供一配置示例为使用Cisco IOS DHCP服务器在接入服务器。

## 先决条件

### 要求

本文档没有任何特定的要求。

### 使用的组件

本文档中的信息基于以下软件和硬件版本：

- 在Cisco 5300路由器的Cisco IOS软件版本12.1(9)。Cisco IOS DHCP服务功能在Cisco IOS软件版本12.0(1)T介绍。是否请使用[软件顾问](#)检查您的当前IOS版本和平台支持IOS DHCP服务功能。**注意：**您需要Cisco IOS软件版本12.0(2)T或以后为了用在Cisco 1700系列路由器上。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

### 规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

## 背景信息

有传送的IP地址几不同的机制给接入服务器的拨入客户端。用于向客户端分配 IP 地址的部分可能选项包括：

- 从接入服务器上的 IP 池分配地址。
- 使用外部动态主机控制协议 (DHCP) 服务器。
- 使用RADIUS或TACACS。

本文着重如何以接入服务器分配IP地址和其他DHCP变量使用Cisco IOS服务器功能对拨入客户端。这避免使用一个外部DHCP服务器，并且，反而，使用从Cisco IOS的内置的DHCP服务器功能。您可以通过 DHCP 自动将可重复使用的 IP 地址分配给 DHCP 客户端。

Cisco IOS DHCP服务功能是分配并且管理从特定地址池的IP地址在路由器内给DHCP客户端的全双工DHCP服务器实施。如果Cisco IOS DHCP服务器不能满足从其自己的数据库的DHCP请求，能转发请求到网络管理员定义的一个或更多第二DHCP服务器。

要得知更多Cisco IOS DHCP功能，限制和支持的平台，请参考[Cisco IOS DHCP服务器文档](#)。这时，称作是有用的哪些参数可以通过对PPP客户端。

**注意：** 我们无法使用屏蔽对PPP客户端的子网。这归结于与请求注释(RFC)的一个限制。对此的原因是，当PPP协商与PPP客户端时，以下参数通过PPP和IP Control Protocol (IPCP)协商：

- IP 地址。
- 主要的和附属域名系统(DNS)地址。
- 主要的和辅NetBIOS名字服务(NBNS)地址。
- TCP/IP报头压缩。

通过的子网掩码功能对PPP客户端不作为协议的部分PPP (RFC 1548)或IPCP的(RFC 1332)。因为这些字段通过PPP，协商**async-bootp**命令例如**async-bootp dns-server**和**async-bootp nbns-server**给PPP客户端传递信息。**async-bootp subnet-mask**不是通过PPP通过的参数。

延长的Bootstrap协议(BOOTP)请求的**async-bootp**全局配置命令**enable (event)**支持，如对RFC 1084定义，当您配置串行线路互联网协议(SLIP)的路由器。当运行拨号网络时的Windows 95或NT PC拨号到您的路由器，执行PPP、不是BOOTP或者SLIP。这意味着那没有办法就此而言通过子网掩码对Windows 95或NT PPP拨号客户端或者网关。当您有从接入服务器动态地获得其IP地址的一个Windows拨入客户端时，您能看到子网掩码设置为255.0.0.0。因为这是点对点连接，子网掩码不是重要，因为拨入客户端为接入服务器所知作为单个主机路由(255.255.255.255网络屏蔽)。接入服务器有其中每一个的一个主机路由已连接拨入客户端。

关于PPP协商的信息，检查以下RFC：

- RFC 1332
- RFC 2484
- RFC 1877

您能访问从所有公共RFC信息库的这些RFC。

## 配置

本部分提供有关如何配置本文档所述功能的信息。

注意：要查找本文档所用命令的其他信息，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：

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#### 焦糖

```
caramel#show running-config Building configuration...
Current configuration : 3030 bytes !! Last
configuration change at 14:02:23 CEST Thu Aug 23 2001 !
NVRAM config last updated at 12:25:26 CEST Thu Aug 23
2001 ! version 12.1 service timestamps debug datetime
msec service timestamps log datetime msec no service
password-encryption ! hostname caramel ! boot system
flash: aaa new-model AAA authentication login default
local AAA authentication ppp default local AAA
authorization network default local enable password ww !
username ww password 0 ww username vpdn password 0 vpdn
username async password 0 async username test password 0
test spe 2/0 2/9 firmware location flash:mica-modem-
pw.2.7.3.0.bin !! resource-pool disable !!! ! clock
timezone CET 2 clock summer-time CEST recurring last Sun
Mar 2:00 last Sun Oct 3:00 modem country mica belgium ip
subnet-zero ip host rund 172.17.247.195 ip domain-name
nba.cisco.com ip name-server 10.200.20.134 no ip dhcp
conflict logging ip dhcp excluded-address 10.10.10.1 ip
dhcp excluded-address 10.10.10.253 ip dhcp excluded-
address 10.10.10.254 ip dhcp excluded-address
10.10.10.252 ! ip dhcp pool 0 network 10.10.10.0
255.255.255.0 dns-server 10.10.10.254 default-router
10.10.10.1 domain-name CISCO.COM netbios-name-server
10.10.10.253 10.10.10.252 ! ip address-pool dhcp-proxy-
client ip dhcp-server 10.10.10.1 isdn switch-type
primary-net5 mta receive maximum-recipients 0 !
controller E1 0 clock source line primary pri-group
timeslots 1-31 ! controller E1 1 clock source line
secondary 1 ! controller E1 2 clock source line
secondary 2 ! controller E1 3 clock source line
secondary 3 ! ! ! ! interface Loopback0 ip address
10.10.10.1 255.255.255.0 ! interface Ethernet0 ip
address 10.200.20.7 255.255.255.0 no cdp enable !
interface Serial0 no ip address shutdown ! interface
Serial1 no ip address shutdown no fair-queue clockrate
2015232 no cdp enable ! interface Serial2 no ip address
shutdown no fair-queue clockrate 2015232 no cdp enable !
interface Serial3 no ip address shutdown no fair-queue
clockrate 2015232 no cdp enable ! interface Serial0:15
no ip address encapsulation ppp dialer rotary-group 1
isdn switch-type primary-net5 isdn incoming-voice modem
no peer default ip address no cdp enable ppp
authentication chap !! interface Serial1:15 no ip
address encapsulation ppp dialer rotary-group 1 isdn
switch-type primary-net5 isdn incoming-voice modem no
peer default ip address no cdp enable ppp authentication
```

```

chap !! interface Serial2:15 no ip address
encapsulation ppp dialer rotary-group 1 isdn switch-type
primary-net5 isdn incoming-voice modem no peer default
ip address no cdp enable ppp authentication chap !!
interface Serial3:15 no ip address encapsulation ppp
dialer rotary-group 1 isdn switch-type primary-net5 isdn
incoming-voice modem no peer default ip address no cdp
enable ppp authentication chap ! interface FastEthernet0
no ip address shutdown duplex auto speed auto no cdp
enable ! interface Group-Async0 ip unnumbered Loopback0
encapsulation ppp no ip route-cache no ip mroute-cache
async mode interactive peer default ip address dhcp ppp
authentication chap group-range 1 60 ! interface Dialer1
ip unnumbered Loopback0 encapsulation ppp no ip route-
cache no ip mroute-cache dialer-group 1 peer default ip
address dhcp no cdp enable ppp authentication chap ! ip
classless ip route 0.0.0.0 0.0.0.0 10.200.20.1 no ip
http server !!! line con 0 exec-timeout 0 0 line 1 120
no exec modem InOut autoselect ppp line aux 0 line vty 0
4 exec-timeout 0 0 password ww transport input telnet !
ntp clock-period 17179736 ntp server 10.200.20.134 end

```

## 验证

本部分所提供的信息可用于确认您的配置是否正常工作。

[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。

- **show caller ip** —显示您提供的IP地址的一个主叫信息汇总。
- **show ip dhcp server statistics** —显示DHCP服务器统计信息。
- **show ip dhcp binding** —显示在DHCP服务器的地址绑定。
- **show users** —显示控制台端口是否是活跃的，并且列出有源主机的IP地址或IP别名的所有活动的Telnet会话。
- **ping** —检查设备是否操作，并且，如果网络连接是完整的。

这些命令输出如下所示：

```

caramel#
Aug 23 11:05:25.553: %LINK-3-UPDOWN: Interface Serial0:12, changed state to up
Aug 23 11:05:25.553: Se0:12 PPP: Treating connection as a callin
Aug 23 11:05:25.553: Se0:12 PPP: Phase is ESTABLISHING, Passive Open
Aug 23 11:05:25.553: Se0:12 LCP: State is Listen
Aug 23 11:05:25.681: Se0:12 LCP: I CONFREQ [Listen] id 1 len 17
Aug 23 11:05:25.681: Se0:12 LCP:   MagicNumber 0x003EDA4F (0x0506003EDA4F)
Aug 23 11:05:25.681: Se0:12 LCP:   PFC (0x0702)
Aug 23 11:05:25.681: Se0:12 LCP:   ACFC (0x0802)
Aug 23 11:05:25.681: Se0:12 LCP:   Callback 6 (0x0D0306)
Aug 23 11:05:25.681: Se0:12 LCP: O CONFREQ [Listen] id 1 len 15
Aug 23 11:05:25.681: Se0:12 LCP:   AuthProto CHAP (0x0305C22305)
Aug 23 11:05:25.681: Se0:12 LCP:   MagicNumber 0x14AAE40E (0x050614AAE40E)
Aug 23 11:05:25.681: Se0:12 LCP: O CONFREQ [Listen] id 1 len 7
Aug 23 11:05:25.681: Se0:12 LCP:   Callback 6 (0x0D0306)
Aug 23 11:05:25.705: Se0:12 LCP: I CONFACK [REQsent] id 1 len 15
Aug 23 11:05:25.705: Se0:12 LCP:   AuthProto CHAP (0x0305C22305)
Aug 23 11:05:25.705: Se0:12 LCP:   MagicNumber 0x14AAE40E (0x050614AAE40E)
Aug 23 11:05:25.709: Se0:12 LCP: I CONFREQ [ACKrcvd] id 2 len 14
Aug 23 11:05:25.709: Se0:12 LCP:   MagicNumber 0x003EDA4F (0x0506003EDA4F)
Aug 23 11:05:25.709: Se0:12 LCP:   PFC (0x0702)

```

Aug 23 11:05:25.709: Se0:12 LCP: ACFC (0x0802)  
Aug 23 11:05:25.709: Se0:12 LCP: O CONFACK [ACKrcvd] id 2 len 14  
Aug 23 11:05:25.709: Se0:12 LCP: MagicNumber 0x003EDA4F (0x0506003EDA4F)  
Aug 23 11:05:25.709: Se0:12 LCP: PFC (0x0702)  
Aug 23 11:05:25.709: Se0:12 LCP: ACFC (0x0802)  
Aug 23 11:05:25.709: Se0:12 LCP: State is Open  
Aug 23 11:05:25.709: Se0:12 PPP: Phase is AUTHENTICATING, by this end  
Aug 23 11:05:25.709: Se0:12 CHAP: O CHALLENGE id 1 len 28 from "caramel"  
Aug 23 11:05:25.733: Se0:12 CHAP: I RESPONSE id 1 len 25 from "test"  
Aug 23 11:05:25.733: Se0:12 PPP: Phase is FORWARDING  
Aug 23 11:05:25.733: Se0:12 PPP: Phase is AUTHENTICATING  
Aug 23 11:05:25.737: Se0:12 CHAP: O SUCCESS id 1 len 4  
Aug 23 11:05:25.737: Se0:12 PPP: Phase is UP  
Aug 23 11:05:25.737: Se0:12 IPCP: O CONFREQ [Not negotiated] id 1 len 10  
Aug 23 11:05:25.737: Se0:12 IPCP: Address 10.10.10.1 (0x03060A0A0A01)  
Aug 23 11:05:25.753: Se0:12 IPCP: I CONFREQ [REQsent] id 1 len 34  
Aug 23 11:05:25.753: Se0:12 IPCP: Address 0.0.0.0 (0x030600000000)  
Aug 23 11:05:25.753: Se0:12 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)  
Aug 23 11:05:25.753: Se0:12 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000)  
Aug 23 11:05:25.753: Se0:12 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000)  
Aug 23 11:05:25.757: Se0:12 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000)  
Aug 23 11:05:25.757: Se0:12 AAA/AUTHOR/IPCP: Start.  
Her address 0.0.0.0, we want 0.0.0.0  
Aug 23 11:05:25.757: Se0:12 AAA/AUTHOR/IPCP: Done.  
Her address 0.0.0.0, we want 0.0.0.0  
Aug 23 11:05:25.757: Se0:12: Pools to search :  
Aug 23 11:05:25.757: DHCPD: DHCPDISCOVER received from client 0074.6573.74  
through relay 10.10.10.1.  
Aug 23 11:05:26.737: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:12,  
changed state to up  
Aug 23 11:05:27.756: DHCPD: assigned IP address 10.10.10.9 to client 0074.6573.74.  
Aug 23 11:05:27.756: DHCPD: Sending DHCP OFFER to client 0074.6573.74 (10.10.10.9).  
Aug 23 11:05:27.756: DHCPD: child pool: 10.10.10.0 / 255.255.255.0 (0)  
Aug 23 11:05:27.756: DHCPD: pool 0 has no parent.  
Aug 23 11:05:27.756: DHCPD: child pool: 10.10.10.0 / 255.255.255.0 (0)  
Aug 23 11:05:27.756: DHCPD: pool 0 has no parent.  
Aug 23 11:05:27.756: DHCPD: unicasting BOOTREPLY for client 0010.7be6.4498  
to relay 10.10.10.1.  
Aug 23 11:05:27.756: DHCPD: DHCPREQUEST received from client 0074.6573.74.  
Aug 23 11:05:27.756: DHCPD: Sending DHCPACK to client 0074.6573.74 (10.10.10.9).  
Aug 23 11:05:27.756: DHCPD: child pool: 10.10.10.0 / 255.255.255.0 (0)  
Aug 23 11:05:27.756: DHCPD: pool 0 has no parent.  
Aug 23 11:05:27.756: DHCPD: child pool: 10.10.10.0 / 255.255.255.0 (0)  
Aug 23 11:05:27.756: DHCPD: pool 0 has no parent.  
Aug 23 11:05:27.760: DHCPD: unicasting BOOTREPLY for client 0010.7be6.4498  
to relay 10.10.10.1.  
Aug 23 11:05:27.804: Se0:12: Default pool returned address = 10.10.10.9  
Aug 23 11:05:27.804: Se0:12 IPCP: Pool returned 10.10.10.9  
Aug 23 11:05:27.804: Se0:12 IPCP: O CONFREQ [REQsent] id 1 len 10  
Aug 23 11:05:27.804: Se0:12 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000)  
Aug 23 11:05:27.804: Se0:12 IPCP: I CONFACK [REQsent] id 1 len 10  
Aug 23 11:05:27.804: Se0:12 IPCP: Address 10.10.10.1 (0x03060A0A0A01)  
Aug 23 11:05:27.804: Se0:12 IPCP: TIMEOUT: State ACKrcvd  
Aug 23 11:05:27.804: Se0:12 IPCP: O CONFREQ [ACKrcvd] id 2 len 10  
Aug 23 11:05:27.804: Se0:12 IPCP: Address 10.10.10.1 (0x03060A0A0A01)  
Aug 23 11:05:27.820: Se0:12 IPCP: I CONFREQ [REQsent] id 2 len 28  
Aug 23 11:05:27.820: Se0:12 IPCP: Address 0.0.0.0 (0x030600000000)  
Aug 23 11:05:27.820: Se0:12 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)  
Aug 23 11:05:27.820: Se0:12 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000)  
Aug 23 11:05:27.820: Se0:12 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000)  
Aug 23 11:05:27.820: Se0:12 AAA/AUTHOR/IPCP: Start.  
Her address 0.0.0.0, we want 10.10.10.9  
Aug 23 11:05:27.820: Se0:12 AAA/AUTHOR/IPCP: Done.  
Her address 0.0.0.0, we want 10.10.10.9

```

Aug 23 11:05:27.824: Se0:12 IPCP: O CONFNAK [REQsent] id 2 len 28
Aug 23 11:05:27.824: Se0:12 IPCP:   Address 10.10.10.9 (0x03060A0A0A09)
Aug 23 11:05:27.824: Se0:12 IPCP:   PrimaryDNS 10.10.10.254 (0x81060A0A0AFE)
Aug 23 11:05:27.824: Se0:12 IPCP:   PrimaryWINS 10.10.10.253(0x82060A0A0AFD)
Aug 23 11:05:27.824: Se0:12 IPCP:   SecondaryWINS 10.10.10.252(0x84060A0A0AFC)
Aug 23 11:05:27.824: Se0:12 IPCP: I CONFACK [REQsent] id 2 len 10
Aug 23 11:05:27.824: Se0:12 IPCP:   Address 10.10.10.1 (0x03060A0A0A01)
Aug 23 11:05:27.844: Se0:12 IPCP: I CONFREQ [ACKrcvd] id 3 len 28
Aug 23 11:05:27.844: Se0:12 IPCP:   Address 10.10.10.9 (0x03060A0A0A09)
Aug 23 11:05:27.844: Se0:12 IPCP:   PrimaryDNS 10.10.10.254(0x81060A0A0AFE)
Aug 23 11:05:27.844: Se0:12 IPCP:   PrimaryWINS 10.10.10.253(0x82060A0A0AFD)
Aug 23 11:05:27.844: Se0:12 IPCP:   SecondaryWINS 10.10.10.252(0x84060A0A0AFC)
Aug 23 11:05:27.844: Se0:12 AAA/AUTHOR/IPCP: Start.
Her address 10.10.10.9, we want 10.10.10.9
Aug 23 11:05:27.848: Se0:12 AAA/AUTHOR/IPCP: Reject 10.10.10.9, using 10.10.10.9
Aug 23 11:05:27.848: Se0:12 AAA/AUTHOR/IPCP: Done.
Her address 10.10.10.9, we want 10.10.10.9
Aug 23 11:05:27.848: Se0:12 IPCP: O CONFACK [ACKrcvd] id 3 len 28
Aug 23 11:05:27.848: Se0:12 IPCP:   Address 10.10.10.9(0x03060A0A0A09)
Aug 23 11:05:27.848: Se0:12 IPCP:   PrimaryDNS 10.10.10.254(0x81060A0A0AFE)
Aug 23 11:05:27.848: Se0:12 IPCP:   PrimaryWINS 10.10.10.253(0x82060A0A0AFD)
Aug 23 11:05:27.848: Se0:12 IPCP:   SecondaryWINS 10.10.10.252(0x84060A0A0AFC)
Aug 23 11:05:27.848: Se0:12 IPCP: State is Open
Aug 23 11:05:27.848: Di1 IPCP: Install route to 10.10.10.9
Aug 23 11:05:31.552: %ISDN-6-CONNECT: Interface Serial0:12 is now connected
to 6133 test
Aug 23 11:05:38.688: DHCPD: DHCPINFORM received from
client 00e0.1e57.6af0(10.200.20.12)

caramel#show ip dhcp binding IP address Hardware address Lease expiration Type 10.10.10.9
0074.6573.74 Aug 24 2001 02:05 PM Automatic caramel# caramel#show ip dhcp server statistics
Memory usage 13975 Address pools 1 Database agents 0 Automatic bindings 1 Manual bindings 0
Expired bindings 0 Malformed messages 2 Message Received BOOTREQUEST 9 DHCPDISCOVER 9
DHCPREQUEST 8 DHCPDECLINE 0 DHCPRELEASE 18 DHCPINFORM 5 Message Sent BOOTREPLY 0 DHCPPOFFER 8
DHCPACK 8 DHCPNAK 0 caramel#show caller ip Line User IP Address Local Number Remote Number <->
Se0:12 test 10.10.10.9 211 6133 in caramel#show user Line User Host(s) Idle Location * 0 con 0
idle 00:00:00 Interface User Mode Idle Peer Address Se0:12 test Sync PPP 00:00:27 PPP:
10.10.10.9 caramel#ping 10.10.10.9 Type escape sequence to abort. Sending 5, 100-byte ICMP Echos
to 10.10.10.9, timeout is 2 seconds: !!!!! Success rate is 100 percent (5/5), round-trip
min/avg/max = 52/56/60 ms caramel# !--- User disconnects now. caramel# Aug 23 11:06:11.332:
DHCPD: checking for expired leases. Aug 23 11:07:25.552: %ISDN-6-DISCONNECT: Interface
Serial0:12 disconnected from 6133 test, call lasted 120 seconds Aug 23 11:07:25.588: %LINK-3-
UPDOWN: Interface Serial0:12, changed state to down Aug 23 11:07:25.592: Se0:12 IPCP: State is
Closed Aug 23 11:07:25.592: Se0:12 set_ip_peer(0): new address Aug 23 11:07:25.592:
ip_free_pool: Se0:12: address = 10.10.10.9 (1)0.0.0.0 Aug 23 11:07:25.592: Se0:12 PPP: Phase is
TERMINATING Aug 23 11:07:25.592: Se0:12 LCP: State is Closed Aug 23 11:07:25.592: Se0:12 PPP:
Phase is DOWN Aug 23 11:07:25.592: Di1 IPCP: Remove route to 10.10.10.9 Aug 23 11:07:26.588:
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:12, changed state to down Aug 23
11:07:30.592: DHCPD: DHCPRELEASE message received from client 0074.6573.74 (10.10.10.9). Aug 23
11:07:30.592: DHCPD: returned 10.10.10.9 to address pool 0. Aug 23 11:07:31.592: DHCPD:
DHCPRELEASE message received from client 0074.6573.74 (10.10.10.9). Aug 23 11:07:32.592: DHCPD:
DHCPRELEASE message received from client 0074.6573.74 (10.10.10.9). Aug 23 11:08:11.332: DHCPD:
checking for expired leases.

```

如果正确地实现IOS DHCP服务器功能，您能查看在拨入客户端的IP配置、Windows IP配置程序(winipcfg)或适当命令检查已接收DHCP参数。我们能从DHCP服务器获得以下参数通过使用在我们使用测验的Windows 98 PC的winipcfg：

```

ip address      10.10.10.9
mask            255.0.0.0
default gateway 10.10.10.10
dhcp server     -
primary wins    10.10.010.253
secondary wins  10.10.10.252

```

lease obtained -  
lease expires -

## [故障排除](#)

本部分提供的信息可用于对配置进行故障排除。

### [故障排除命令](#)

**注意：** 在发出 `debug` 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- `debug ppp协商`—导致`debug ppp`命令显示在PPP启动期间传送的PPP数据包，PPP选项协商。
- 当池组定义时，`debug ip peer`—包含更多输出。
- `debug ip dhcp server linkage`—显示数据库链接信息。
- `debug ip dhcp server events`—报告服务器事件，类似地址分配和数据库更新。
- `debug ip dhcp server packets`—解码DHCP接收和发射。

## [相关信息](#)

- [Cisco IOS DHCP 服务器](#)
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