

DHCP 题

1、DHCP 报文是通过 UDP 还是 TCP 发送：

UDP

bootp					
No.	Time	Source	Destination	Protocol	Length Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344 DHCP Discover - Transaction ID 0x69f72ec9
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351 DHCP Offer - Transaction ID 0x69f72ec9
Frame 307: 344 bytes on wire (2752 bits), 344 bytes captured (2752 bits) on interface \Device\NPF_{93338A83-F569-446...}					
Ethernet II, Src: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c), Dst: Broadcast (ff:ff:ff:ff:ff:ff)					
Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255					
User Datagram Protocol, Src Port: 68, Dst Port: 67					
Source Port: 68					
Destination Port: 67					
Length: 310					
Checksum: 0x9d07 [unverified]					
[Checksum Status: Unverified]					
[Stream index: 52]					
[Timestamps]					
UDP payload (302 bytes)					
Dynamic Host Configuration Protocol (Discover)					

2、绘制一个定时数据报，说明客户端和服务器之间的第一个 Discover/Offer/Request/ACK DHCP 交换的序列。

对于每个数据包，表明源端口号和目的端口号。

端口号是否与实验中给出的示例相同？



实际的 DHCP	源端口	目的端口
Discover	0.0.0.0:68	255.255.255.255:67
Offer	192.168.43.1:67	192.168.43.221:68
Request	0.0.0.0:68	255.255.255.255:67
ACK	192.168.43.1:67	192.168.43.221:68

与给出的示例不相同

实际 DHCP：

bootp					
No.	Time	Source	Destination	Protocol	Length Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344 DHCP Discover
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351 DHCP Offer
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370 DHCP Request
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371 DHCP ACK

示例：

No.	Time	Source	Destination	Protocol	Length Info
2	7.587185	0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover - 1
4	8.632950	192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer - 1
5	8.633123	0.0.0.0	255.255.255.255	DHCP	342 DHCP Request - 1
6	8.635133	192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK - 1

3、主机的链路层地址：

IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c)

No.	Time	Source	Destination	Protocol	Length	Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - T
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351	DHCP Offer - T
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - T
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - T
1162	522.583...	192.168.43.221	192.168.43.1	DHCP	358	DHCP Request - T
1164	522.685...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - T

> Frame 309: 370 bytes on wire (2960 bits), 370 bytes captured (2960 bits) on interface \Dev

▼ Ethernet II, Src: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

> Destination: Broadcast (ff:ff:ff:ff:ff:ff)

> Source: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c)

type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

> User Datagram Protocol, Src Port: 68, Dst Port: 67

> Dynamic Host Configuration Protocol (Request)

4、DHCP discover 报文和 DHCP request 报文的区别是什么：

区别在 **Option: (53) DHCP Message Type**

▼ Option: (53) DHCP Message Type (Discover)

Length: 1

DHCP: Discover (1)

▼ Option: (53) DHCP Message Type (Request)

Length: 1

DHCP: Request (3)

5、前四个 DHCP 报文中的 Transaction-ID 值是多少？

第二组 (Request/ACK) 的 Transaction-ID 值是多少？

使用 Transaction-ID 的目的是什么？

前四个: **0x69f72ec9**

第二组: **0x1b7e7953**

使用 Transaction-ID 的目的是为了区分不同组的 DHCP 数据

Time	Source	Destination	Protocol	Length	Info	Transaction ID
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344 DHCP Discover	0x69f72ec9
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351 DHCP Offer	0x69f72ec9
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370 DHCP Request	0x69f72ec9
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371 DHCP ACK	0x69f72ec9
1162	522.583...	192.168.43.221	192.168.43.1	DHCP	358 DHCP Request	0x1b7e7953
1164	522.685...	192.168.43.1	192.168.43.221	DHCP	371 DHCP ACK	0x1b7e7953

6、如果 IP 地址在四个消息交换结束时才设置，那四个消息交换的 IP 数据报使用什么值？

客户端和服务端都使用 **255.255.255.255**

Time	Source	Destination	Protocol	Length	Info
2	7.587185	0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover - T
4	8.632950	192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer - T
5	8.633123	0.0.0.0	255.255.255.255	DHCP	342 DHCP Request - T
6	8.635133	192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK - T

7、DHCP 服务端的 IP 地址是多少？

192.168.43.1

310 256.923...	192.168.43.1	192.168.43.221	DHCP	371 DHCP ACK	- Transaction ID 0x69f72ec9
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8、在 Offer 消息中，DHCP 提供给主机的 IP 地址是多少？

表明哪个 DHCP 报文中包含了所提供的 DHCP 地址。

192.168.43.221

在 Offer 消息中可以看到 DHCP 提供的地址

bootp

No.	Time	Source	Destination	Protocol	Length	Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Trans
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351	DHCP Offer - Trans
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Trans
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - Trans

Seconds elapsed: 0

- > Bootp flags: 0x0000 (Unicast)
- Client IP address: 0.0.0.0
- Your (client) IP address: 192.168.43.221
- Next server IP address: 192.168.43.1
- Relay agent IP address: 0.0.0.0
- Client MAC address: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c)
- Client hardware address padding: 00000000000000000000
- Server host name not given
- Boot file name not given
- Magic cookie: DHCP
- ✓ Option: (53) DHCP Message Type (Offer)
 - Length: 1
 - DHCP: Offer (2)
- ✓ Option: (54) DHCP Server Identifier (192.168.43.1)

9、在示例中，主机和 DHCP 服务端之间没有中继代理。跟踪中哪些值表示没有中继代理？

你的实验中有中继代理吗？

如果有，代理的 IP 地址是什么？

当 Relay agent IP address 是 0.0.0.0 时，表示没有中继代理。

我的实验中没有

bootp

No.	Time	Source	Destination	Protocol	Length	Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351	DHCP Offer - Transaction
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - Transaction

> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

> User Datagram Protocol, Src Port: 68, Dst Port: 67

✓ Dynamic Host Configuration Protocol (Discover)

- Message type: Boot Request (1)
- Hardware type: Ethernet (0x01)
- Hardware address length: 6
- Hops: 0
- Transaction ID: 0x69f72ec9
- Seconds elapsed: 0
- > Bootp flags: 0x0000 (Unicast)
- Client IP address: 0.0.0.0
- Your (client) IP address: 0.0.0.0
- Next server IP address: 0.0.0.0
- Relay agent IP address: 0.0.0.0
- Client MAC address: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c)
- Client hardware address padding: 00000000000000000000
- Server host name not given
- Boot file name not given

10、DHCP Offer 报文中路由器行和子网掩码行的用途：

路由器行表明客户端的默认网关是什么

掩码行是为了告诉客户端应当使用的掩码值

No.	Time	Source	Destination	Protocol	Length	Info
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351	DHCP Offer - Transaction ID
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - Transaction ID

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 192.168.43.221
Next server IP address: 192.168.43.1
Relay agent IP address: 0.0.0.0
Client MAC address: IntelCor_a6:e1:7c (60:f2:62:a6:e1:7c)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP

> Option: (53) DHCP Message Type (ACK)
> Option: (54) DHCP Server Identifier (192.168.43.1)
> Option: (51) IP Address Lease Time
> Option: (58) Renewal Time Value
> Option: (59) Rebinding Time Value
> Option: (1) Subnet Mask (255.255.255.0)
> Option: (28) Broadcast Address (192.168.43.255)
> Option: (3) Router
> Option: (6) Domain Name Server
> Option: (81) Client Fully Qualified Domain Name
> Option: (43) Vendor-Specific Information

11、示例文件中，DHCP 服务端向客户端提供了一个特定的 IP 地址。在客户端对第一个服务端发送 Offer 报文的回应中，客户端是否接收这个 IP 地址？

在客户端的 Response 中，客户端的请求地址在哪？

是

请求地址为 192.168.1.101

No.	Time	Source	Destination	Protocol	Length	Info
2	7.587185	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transa
4	8.632950	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transa
5	8.633123	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transa
6	8.635133	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transa
36	20.134178	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transa
37	20.135930	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transa
41	25.073867	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transa

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP

> Option: (53) DHCP Message Type (Request)
> Option: (61) Client identifier
✓ > Option: (50) Requested IP Address (192.168.1.101)
Length: 4
Requested IP Address: 192.168.1.101
> Option: (54) DHCP Server Identifier (192.168.1.1)
> Option: (12) Host Name
> Option: (60) Vendor class identifier
> Option: (55) Parameter Request List
> Option: (255) End

12、租赁时间的目的？

实验的租期？

目的：IP 地址是有限的，对于没有使用的 IP 地址，DHCP 服务器需要进行回收，以免出现 IP 地址不够用的情况。

租赁时间：1 小时

```
Magic cookie: DHCP
> Option: (53) DHCP Message Type (ACK)
> Option: (54) DHCP Server Identifier (192.168.43.1)
< Option: (51) IP Address Lease Time
  Length: 4
  IP Address Lease Time: (3600s) 1 hour
> Option: (58) Renewal Time Value
> Option: (59) Rebinding Time Value
< Option: (41) Subnet Mask (255.255.255.0)
```

13、DHCP release 的目的？

DHCP 服务端是否发出确认客户端的 DHCP 请求？

如果客户端的 DHCP release 消息丢失会怎样？

目的：释放租用的 IP 地址

没有发出确认客户端的请求

如果丢失：回收 IP 地址

14、清除 bootp filter。DHCP 报文交换期间是否收到 ARP 报文？

如果是，解释目的。

有

目的：检查 IP 地址是否冲突

Wireshark DHCP.pcapng

文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(V) 无线(W) 工具(T) 帮助(H)

应用显示过滤器: <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
302	254.734...	fe80::e585:9513:9e2...	fe80::4a3f:e9ff:fec...	ICMPv6	86	Neighbor Advertisement fe80::e585:9513:9e28:ac17 (sol, ovr) is at 60:f2:62:a6:e1:
303	255.889...	2408:8410:6030:d7a4...	2408:8410:6030:d7a4...	ICMPv6	86	Neighbor Solicitation for 2408:8410:6030:d7a4::bf from 60:f2:62:a6:e1:7c
304	255.957...	2408:8410:6030:d7a4...	2408:8410:6030:d7a4...	ICMPv6	78	Neighbor Advertisement 2408:8410:6030:d7a4::bf (rtr, sol)
305	256.597...	2408:8410:6030:d7a4...	2408:8410:6030:d7a4...	DNS	116	Standard query 0xa2df AAAA disc801.prod.do.dsp.mp.microsoft.com
306	256.645...	2408:8410:6030:d7a4...	2408:8410:6030:d7a4...	DNS	326	Standard query response 0xa2df AAAA disc801.prod.do.dsp.mp.microsoft.com CNAME di
307	256.898...	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x69f72ec9
308	256.909...	192.168.43.1	192.168.43.221	DHCP	351	DHCP Offer - Transaction ID 0x69f72ec9
309	256.910...	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0x69f72ec9
310	256.923...	192.168.43.1	192.168.43.221	DHCP	371	DHCP ACK - Transaction ID 0x69f72ec9
311	256.939...	fe80::e585:9513:9e2...	ff02::16	ICMPv6	90	Multicast Listener Report Message v2
312	256.939...	192.168.43.221	224.0.0.22	IGMPv3	54	Membership Report / Leave group 224.0.0.252
313	256.966...	IntelCor_a6:e1:7c	Broadcast	ARP	42	Who has 192.168.43.1? Tell 192.168.43.221
314	256.969...	Huawei1Te_c7:a3:55	IntelCor_a6:e1:7c	ARP	42	192.168.43.1 is at 48:3f:e9:c7:a3:55
315	257.008...	192.168.43.221	224.0.0.22	IGMPv3	54	Membership Report / Leave group 239.255.255.250
316	257.011...	192.168.43.221	224.0.0.22	IGMPv3	54	Membership Report / Join group 239.255.255.250 for any sources
317	257.025...	192.168.43.221	192.168.43.255	NBNS	110	Registration NB LAPTOP-CDUGBACH<20>
318	257.025...	192.168.43.221	192.168.43.255	NBNS	110	Registration NB WORKGROUP<00>
319	257.025...	192.168.43.221	192.168.43.255	NBNS	110	Registration NB LAPTOP-CDUGBACH<00>
320	257.047...	fe80::e585:9513:9e2...	ff02::c	UDP	1248	62417 → 3702 Len=1186
321	257.047...	192.168.43.221	239.255.255.250	UDP	1123	62416 → 3702 Len=1081