# 保持ARP表可用于DHCP IP编址的提示

#### 目标

本文介绍如何设置交换机的地址解析协议(ARP)表,以频繁地从ARP表中清除过期的介质访问 控制(MAC)地址。此外,本文还说明如何手动清除ARP表。这些选项是Bug CSCvn36700的<u>解</u> <u>决方案。</u>

#### 简介

ARP在IP路由中执行所需功能。ARP从其已知IP地址中查找主机的MAC地址(也称为硬件地 址)。ARP维护一个缓存(表),其中MAC地址映射到IP地址。ARP是运行IP的所有思科设 备的一部分。

某些思科S系列交换机可以在第3层运行,并能够实施动态主机配置协议(DHCP)服务器支持。 DHCP通常用于自动为设备分配IP地址。当交换机配置为具有适当DHCP池的DHCP服务器时 ,通常不需要干预来为客户端分配IP地址。

分配IP地址时,也会给出DHCP租用时间。如果租约在到期前续约,则设备上通常会保留相同的IP地址,并且会给出新的租用时间。当设备始终连接到网络时,通常会发生这种情况。

如果设备关闭、在网络之间移动或网络重新启动,则该IP地址保留可能会过期。这些过期的地 址通常会保留一段时间,与分配的MAC地址匹配。这将保留在DHCP服务器数据库中作为保持 位置,这样,如果客户端再次加入网络,就可以为其分配以前拥有的相同IP地址。这可以很方 便,但是如果有大量设备加入和离开网络,过期列表可能会很快变长。

每次连接新设备时,都需要为其分配IP地址。如果您运行的网络中有许多过期的IP地址尚未足 够快地清除,则DHCP池会耗尽IP地址,而且不会向新客户端分配任何地址。避免此潜在问题 有几种选择。

选项1:配置交换机以更频繁地清除ARP表

选项2:手动清除ARP列表

请阅读,首先在交换机的图形用户界面(GUI)中验证您的设置。

#### 适用设备

SF200

SG200

SF300

SG300

SG350X

SG500X

SG500XG

SG550

SG550X

SG550XG

### 软件版本

适用于所有版本

#### 验证GUI上的设置

步骤1.输入用户名和密码以登录**Cisco**交**换机**。单击Log In。默认情况下,用户名和密码*为 cisco*,但由于您在现有网络上工作,因此您应该拥有自己的用户名和密码。改为输入这些凭 据。

uluilu cisco	Switch	Username:	
		Password:	2
		Language: English 🔻	
		3 Log In	Secure Browsing (HTTPS)

步骤2.导航至IP Configuration > DHCP Server > Properties并验证DHCP服务器状态是否已启 用。



步骤3.导航至IP Configuration > DHCP Server > Network Pools。在"*网络池表"*下,验证详细 信息,*包括租用地址数*。

cisco SG300-28	28-P	ort Gigab	it Manage	d Switch			cisco Language:
Spanning Tree     MAC Address Tables     Multicast	Ne	twork Pools	•				
IP Configuration		Pool Name	Network Mask	Address Pool Start	Address Pool End	Lease Duration	Number of Leased Addresses
<ul> <li>IPv4 Management and Inter</li> </ul>		MyDHCPpool	255.255.255.0	192.168.1.10	192.168.1.253	1d 0h 0m	0
IPv4 Interface IPv4 Routes ARP ARP Proxy UDP Relay/IP Helper DHCP Server Properties Network Pools Static Hosts DHCP Options Address Binding IPv6 Management and Intel Domain Name System		Add DHCP Server Opt	Edit	Delete Detail	S		

**注意:**在本例中,租*用地址数*显示*为零,*因为没有连接客户端。

步骤4.导航至IP Configuration > DHCP Server > Address Binding,查看过期的客户端详细信 息。默认情况下,DHCP租用时间配置为一天。一旦DHCP客户端的租用时间已过,并且客户 端与网络断开连接,交换机仍会将该条目保留为"已过期"状态一段时间。

SG300-28PF	28	-Port Gia	abit PoE+	Managed Switch			
CIBCO		102 169 05 12	Client Identifier	01 04 bf 2d f1 91 65	2019-Oct-10.00:00:-20224	Dynamic	Expired
Getting Started		192.100.95.12	Client Identifier	01.34.01.20.11.01.03	2018-Oct-19 00:00:-25324	Dynamic	Expired
Status and Statistics		192.108.95.13	Client Identifier	01.14.20.56.81.42.06	2018-001-20 00.0034234	Dynamic	Expired
Administration		192.108.95.14	Client Identifier	01.4C.57.Ca.5e.15.D0	2018-Oct-21 00:00:-27963	Dynamic	Expired
Port Management		192.168.95.15	Client Identifier	01.a0.56.f3.e3.b0.06	2018-Oct-20 00:00:-34099	Dynamic	Expired
<ul> <li>Smartport</li> </ul>		192.168.95.16	Client Identifier	01.f0.db.e2.65.d4.60	2018-Oct-20 10:41:30	Dynamic	Expired
<ul> <li>VLAN Management</li> </ul>		192.168.95.17	Client Identifier	01.b4.f7.a1.c0.c2.20	2018-Oct-21 00:00:-45672	Dynamic	Expired
<ul> <li>Spanning Tree</li> </ul>		192.168.95.18	Client Identifier	01.fc.d8.48.d9.2a.7e	2018-Oct-21 00:00:-36500	Dynamic	Expired
<ul> <li>MAC Address Tables</li> </ul>		192.168.95.19	Client Identifier	01.54.33.cb.67.1f.69	2018-Oct-20 00:00:-45676	Dynamic	Expired
Multicast		192.168.95.20	Client Identifier	01.64.5a.04.b0.83.a6	2018-Oct-20 10:04:11	Dynamic	Expired
IP Configuration		192.168.95.21	Client Identifier	01.80.ed.2c.9f.95.0b	2018-Oct-19 09:38:24	Dynamic	Expired
·		192.168.95.22	Client Identifier	01.4c.57.ca.46.76.1a	2018-Oct-20 00:00:-29323	Dynamic	Expired
IPv4 Management and Interface IPv4 Interface		192.168.95.23	Client Identifier	01.c4.b3.01.d4.aa.dd	2018-Oct-19 09:42:03	Dynamic	Expired
IPv4 Routes		192.168.95.24	Client Identifier	01.3c.2e.f9.24.ef.7d	2018-Oct-21 00:00:-30419	Dynamic	Expired
ARP		192.168.95.25	Client Identifier	01.a0.56.f3.cd.7f.4e	2018-Oct-19 10:15:07	Dynamic	Expired
ARP Proxy		192.168.95.26	Client Identifier	01.a0.4e.a7.0c.f6.06	2018-Oct-20 00:00:-47162	Dynamic	Expired
DP Relay/IP Helper		192.168.95.27	Client Identifier	01.30.35.ad.bf.37.76	2018-Oct-20 00:00:-46586	Dynamic	Expired
DHCP Server		192.168.95.28	Client Identifier	01.0c.d7.46.26.bb.0b	2018-Oct-21 00:00:-26690	Dynamic	Expired
Properties		192.168.95.29	Client Identifier	01.14.56.8e.6b.00.85	2018-Oct-21 00:00:-31124	Dynamic	Expired
Network Pools		192.168.95.30	Client Identifier	01.24.18.1d.31.a5.6e	2018-Oct-20 00:00:-31676	Dynamic	Expired
Excluded Addresses		192.168.95.31	Client Identifier	01.a0.99.9b.45.33.61	2018-Oct-21 00:00:-25319	Dynamic	Expired
Static Hosts DHCP Options		192.168.95.32	Client Identifier	01.f0.d7.aa.7f.af.a0	2018-Oct-21 00:00:-44698	Dynamic	Expired
Address Binding		192.168.95.33	Client Identifier	01.7c.04.d0.2b.1f.0a	2018-Oct-21 00:00:-24125	Dynamic	Expired
,		192,168,95,34	Client Identifier	01.3c.f8.62.d9.0a.62	2018-Oct-21 00:00:-25297	Dynamic	Expired
IPv6 Management and Interface		Delete					
Domain Name System		Jelete					
© 2010-2014 Cisco Systems Inc. All	Righte	Received					
2 2010-2014 Cisco Systems, inc. An Nynis Keselved.							

步骤5.导航至"状**态和统计信息">"TCAM利用率"**,并验*证"IPv4和非IP的最大TCAM条目数*"。三 态内容可寻址存储器(TCAM)是构建和查找MAC地址表的交换机中的内存。默认情况下,最大 ARP表大小为128个条目。当交换机处于第3层模式时,ARP超时也默认设置为60000秒。当 ARP表达到其最大容量时,交换机将停止学习新的MAC地址,直到清除非活动(过期)的 MAC地址。

SG300-28 28-Port Gigabit Managed Switch						
Getting Started Status and Statistics 1 System Summary	TCAM Utilization					
Interface Etherlike	Maximum TCAM Entries for IPv4 and Non-IP       IPv4 Routing       Non-IP Rules         IPv4 and Non-IP       In Use       Maximum       In Use	num				
802.1x EAP	128 7 128 0	338				
ACL TCAM Utilization 2 RMON View Log	Routing Resource Management					

### 选项 1: 配置交换机以更频繁地清除ARP表

清除ARP表将允许新DHCP客户端从DHCP池获取IP地址。为此,可以将ARP超时设置从默认的60,000秒减少到300秒。这将定期更频繁地从ARP表中清除过期的MAC地址。

步骤1.导航至**IP Configuration > ARP**,以验证默*认ARP条目老化*期已配置为60000,*并启用 Normal Age Out*选项。

cisco SG300-28 2	8-Port Gigabit Managed Switch				
Getting Started	ARP				
<ul> <li>Status and Statistics</li> </ul>					
Administration	ARP Entry Age Out: 60000 sec (Range: 1 - 40000000, Default: 60000)				
<ul> <li>Port Management</li> </ul>					
<ul> <li>Smartport</li> </ul>	Clear ARP Table Entries: All				
<ul> <li>VLAN Management</li> </ul>	Static				
<ul> <li>Spanning Tree</li> </ul>	Normal Age Out				
MAC Address Tables					
Multicast	Apply Cancel				
IP Configuration					
<ul> <li>IPv4 Management and Inter</li> </ul>	ARP Table				
IPv4 Interface	Filter: Interface equals to VLAN 1 V Go Clear Filter				
ARP 2	Interface IP Address MAC Address Status				
ARP Proxy	ULAN 1 192.168.1.90 e8:6a:64:65:18:8a Dynamic				
UDP Relay/IP Helper <ul> <li>DHCP Snooping/Relay</li> </ul>	Add Edit Delete				

步骤2.将ARP条目**老化期限值**编辑**为300秒**,默认情况下保**持"正常老化期限**"单选按钮处于选 中状态。单击 Apply。

cisco SG300-28 2	28-Port Gigabit Managed Switch				
Getting Started	ARP				
<ul> <li>Status and Statistics</li> </ul>					
<ul> <li>Administration</li> </ul>	ARP Entry Age Out: 300 sec (Range: 1 - 40000000 Default: 60000)				
<ul> <li>Port Management</li> </ul>					
<ul> <li>Smartport</li> </ul>	Clear ARP Table Entries: O All				
<ul> <li>VLAN Management</li> </ul>	Static				
<ul> <li>Spanning Tree</li> </ul>	Normal Age Out 2				
MAC Address Tables					
<ul> <li>Multicast</li> </ul>	Apply Cancel				
✓ IP Configuration					
<ul> <li>IPv4 Management and Inter</li> </ul>	ARP Table				
IPv4 Interface	Filter:     Interface equals to     VLAN 1     Go     Clear Filter				
ARP	Interface IP Address MAC Address Status				
ARP Proxy	VLAN 1 192.168.1.90 e8:6a:64:65:18:8a Dynamic				
UDP Relay/IP Helper	Add Edit Delete				
DHCP Server					

步骤3.选择"复**制/保存配置**"将运行配置保存到启动配置。这可确保在交换机重新启动或重新启动后配置将保持不变。

sG300-28 2	28-Port Gigabit Managed Switch
Getting Started    Status and Statistics  Administration  Port Management  Smartport	ARP Success. To permanently save the configuration, go to the Copy/Save Configuration page or click the Save icon.
VLAN Management     Spanning Tree     MAC Address Tables     Multicast     IP Configuration	ARP Entry Age Out:     S00     sec (Range: 1 - 40000000, Default: 60000)     Clear ARP Table Entries:     All     Dynamic     Static     Normal Age Out
<ul> <li>IPv4 Management and Inter IPv4 Interface</li> <li>IPv4 Routes</li> <li>ARP</li> <li>ARP Proxy</li> <li>UDP Relay/IP Helper</li> <li>DHCP Snooping/Relay</li> <li>DHCP Server</li> <li>Properties</li> <li>Network Pools</li> </ul>	Apply       Cancel         ARP Table       Filter:       Interface equals to VLAN 1 V Go Clear Filter         Interface       IP Address       MAC Address       Status         VLAN 1       192.168.1.90       e8:6a:64:65:18:8a       Dynamic         Add       Edit       Delete

步骤4.在"*源文件名"下*,验**证是否选**中"运行配置"。在目标*文件名下*,验证是**否选中**启动配置 。单击 Apply。



步骤5.此弹出窗口将出现。单击OK以在交换机上应用新设置。



### 选项 2:手动清除ARP列表

第二个选项是手动清除列表,为其他客户端获取IP地址腾出空间。此操作不会设置将来的 ARP清除,因为它是手动操作。如有必要,可以重复此过程。

步骤1.导航至**IP Configuration > ARP**。在*Clear ARP Table Entries*下,选择要从系统中清除的 ARP条目的类型。

全部 — 立即删除所有静态地址和动态地址。

动态 — 立即删除所有动态地址。

静态 — 立即删除所有静态地址。

正常老化超时 — 根据配置的ARP条目老化超时时间删除动态地址。

**注意:**在本例中,选**择"**全部"。

单击 Apply。ARP全局设置会临时写入运行配置文件。

sG300-28 2	8-Port Gigabit Managed Switch				
Getting Started	ARP				
<ul> <li>Status and Statistics</li> </ul>					
<ul> <li>Administration</li> </ul>	ARP Entry Age Out: 300 sec (Range: 1 - 40000000, Default: 60000)				
<ul> <li>Port Management</li> </ul>					
<ul> <li>Smartport</li> </ul>	Clear ARP Table Entries:  All				
<ul> <li>VLAN Management</li> </ul>	Static				
<ul> <li>Spanning Tree</li> </ul>	Normal Age Out				
MAC Address Tables					
Multicast	Apply Cancel				
IP Configuration	4				
<ul> <li>IPv4 Management and Inter</li> </ul>	ARP Table				
IPv4 Interface	Filter: Interface equals to VLAN 1 V Go Clear Filter				
IPv4 Routes	Interface IP Address MAC Address Status				

步骤2.要永久保存配置,请单击"复制/保存配置"或闪烁的"保存"图标。

cisco SG300-28 2	8-Port Gigabit Managed Switch
<ul> <li>Status and Statistics</li> </ul>	ARP
Administration	
<ul> <li>Port Management</li> </ul>	Success To permanently save the configuration, go to the Conv/Save Configuration page or click the Save icc
<ul> <li>Smartport</li> </ul>	
<ul> <li>VLAN Management</li> </ul>	
<ul> <li>Spanning Tree</li> </ul>	C ARP Entry Age Out:         300         sec (Range: 1 - 40000000, Default: 60000)
MAC Address Tables	Clear ARP Table Entries: 🔵 All
<ul> <li>Multicast</li> </ul>	O Dynamic
✓ IP Configuration	Static     Normal Age Out
<ul> <li>IPv4 Management and Inter IPv4 Interface</li> <li>IPv4 Routes</li> <li>ARP</li> <li>ARP Proxy</li> </ul>	Apply Cancel ARP Table

步骤3.您将重定向到"复制/保存配置"页。验证"Source File Name(源文件名)"是否选**定为"** Running configuration(**运行配置)**",*"Destination File Name(目标文件*名)"是否选定为"Startup



步骤4.此弹出窗口将出现。单击OK以在交换机上应用新设置。





Please note: navigation to other screens while copy operation is in progress will abort the process.



## 结论

您现在已完成设置ARP表以更频繁地清除或手动清除ARP列表。



<u>单击此处查看思科提供的其他技术讲座</u>