保持ARP表可用於DHCP IP編址的提示

目標

本文介紹如何設定交換機的地址解析協定(ARP)表,以便從ARP表中頻繁清除過期的介質訪問 控制(MAC)地址。此外,本文還將說明如何手動清除ARP表。這些選項是針對<u>CSCvn</u>36700錯 誤<u>的解決方案。</u>

簡介

ARP在IP路由中執行所需的功能。ARP從其已知IP地址查詢主機的MAC地址,也稱為硬體地 址。ARP維護一個快取(表),其中MAC地址對映到IP地址。ARP是運行IP的所有思科裝置 的一部分。

某些Cisco Small Business交換器可以在第3層執行,並能實作動態主機設定通訊協定 (DHCP)伺服器支援。DHCP通常用於自動為裝置分配IP地址。將交換機配置為具有適當 DHCP池的DHCP伺服器時,通常無需干預即可將IP地址分配給客戶端。

分配IP地址時,還會給它一個DHCP租用時間。如果在到期之前續訂租約,則通常會在裝置上 保留相同的IP地址,並且會為其指定新的租用時間。當裝置始終連線到網路時,通常會發生這 種情況。

如果裝置已關閉、在網路之間移動或網路已重新啟動,該IP地址保留可能過期。這些過期地址 通常會保留一段時間,並與分配的MAC地址匹配。此地址保留在DHCP伺服器資料庫中作為保 留位置,這樣,如果客戶端再次加入網路,可以為其分配以前擁有的IP地址。這非常方便,但 如果有許多裝置加入和離開網路,則過期清單可能會很快變長。

每次連線新裝置時,都需要為其分配IP地址。如果運行的網路中存在大量過期IP地址,並且清 除速度不夠快,則DHCP池會耗盡IP地址,並且沒有任何地址可供新客戶機使用。有幾個可避 免此潛在問題的方法。

選項1:配置交換機,以便更頻繁地清除ARP表

選項2:手動清除ARP清單

請開啟以首先在交換機的圖形使用者介面(GUI)中驗證您的設定。

適用裝置

SF200

SG200

SF300

SG300

SG350X

SG500X

SG500XG

SG550

SG550X

SG550XG

軟體版本

適用於所有版本

驗證GUI上的設定

步驟1.輸入Username和Password以登入思科交換器。按一下「Log In」。預設情況下,使用 者名稱和密碼為*cisco*,但由於您正在現有網路中工作,因此您應擁有自己的使用者名稱和密 碼。改為輸入這些憑據。

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

步驟2.導覽至IP Configuration > DHCP Server > Properties,然後驗證*DHCP Server Status*是 否為Enabled。



步驟3.導覽至IP Configuration > DHCP Server > Network Pools。在*Network Pool Table*下 ,驗證包括租用地址*數量在內的詳細資訊*。

cisco SG300-28	28-Po	rt Gigabi	it Manage	d Switch			cisco Language:
Spanning Tree MAC Address Tables Multicast	Netw	ork Pools					
IP Configuration		Pool Name	Network Mask	Address Pool Start	Address Pool End	Lease Duration	Number of Leased Addresses
 IPv4 Management and Inter 		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		dd	Edit	Delete Detail	S		

附註:在本例中, Number of Leased Addresses顯示為零,因為沒有連線的客戶端。

步驟4.導航到IP Configuration > DHCP Server > Address Binding,檢視過期的客戶端詳細資 訊。預設情況下,DHCP租用時間配置為一天。一旦DHCP客戶端的租用時間已到期,並且客 戶端已斷開與網路的連線,交換機將在一段時間內將該條目保留為*Expired*狀態。

de de							
SG300-28PF	28	-Port Gia	abit PoE+	Managed Switch			
		102 168 05 12	Client Identifier	01 94 bf 2d f1 81 65	2018-Oct-19 00:00:-29324	Dynamic	Expired
Getting Started		102 169 05 12	Client Identifier	01.14.20 Eo.9f.42.0o	2010-Oct-10-00:00:-20024	Dynamic	Expired
Status and Statistics		192.100.95.15	Client Identifier	01.14.20.56.01.42.06	2010-001-20 00.0034234	Dynamic	Expired
Administration		192.108.95.14	Client Identifier	01.4C.57.CB.56.15.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
 Smartport 		192.168.95.16	Client Identifier	01.f0.db.e2.65.d4.60	2018-Oct-20 10:41:30	Dynamic	Expired
 VLAN Management 		192.168.95.17	Client Identifier	01.b4.f7.a1.c0.c2.20	2018-Oct-21 00:00:-45672	Dynamic	Expired
 Spanning Tree 		192.168.95.18	Client Identifier	01.fc.d8.48.d9.2a.7e	2018-Oct-21 00:00:-36500	Dynamic	Expired
 MAC Address Tables 		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		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		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:-25207	Dynamic	Expired
IPv6 Management and Interface		Delete	Cashe raonalion	01.00.02.00.00.02	2010 00121 00.00. 20201	Cynamio	Capiton
 Domain Name System 		Delete					
Source of the contraction of the							

步驟5.導覽至Status and Statistics > TCAM Utilization,然後驗證*IPv4和非IP的最大TCAM條 目數*。三重內容可定址儲存器(TCAM)是交換機中的記憶體,用於構建和查詢MAC地址表。預 設情況下,最大ARP表大小為128個條目。當交換器處於第3層模式時,ARP逾時也會預設設 定為60000秒。當ARP表達到其最大容量時,交換機將停止獲取新的MAC地址,直到清除非活 動(過期)MAC地址為止。

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 Ro In Use	uting Maximum	Non-IP I In Use	Rules Maximum			
802.1x EAP	128	7	128	0	338			
ACL TCAM Utilization 2 RMON View Log	Routing Resource Managem	ent						

選項1:配置交換機,以便更頻繁地清除ARP表

清除ARP表將允許新的DHCP客戶端從DHCP池獲取IP地址。為此,可以將ARP超時設定從預 設的60,000秒縮短到300秒。這樣會定期更頻繁地清除ARP表中的過期MAC地址。

步驟1.導覽至IP Configuration > ARP,以確認預設的ARP Entry Age Out是否設定為 60000,以及Normal Age Out選項是否已啟用。

sG300-28 28-Port Gigabit Managed Switch						
Getting Started						
 Status and Statistics 						
 Administration 	ARP Entry Age Out: 60000 sec (Range: 1 - 40000000, Default: 60000)					
 Port Management 						
 Smartport 	Clear ARP Table Entries: All					
 VLAN Management 	Static					
 Spanning Tree 	Normal Age Out					
MAC Address Tables	Apply Cancel					
Multicast						
✓ IP Configuration 1						
 IPv4 Management and Inter 	ARP Table					
IPv4 Interface	Filter: Interface equals to VLAN 1 V Go Clear Filter					
ARP 2	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 DHCP Snooping/Relay	Add Edit Delete					

步驟2.將ARP條目老化時間值編輯為300秒,在預設情況下保留Normal Age Out單選按鈕。按 一下「Apply」。

cisco SG300-28 28-Port Gigabit Managed Switch						
Getting Started	ARP 1					
Administration Port Management	C ARP Entry Age Out: 300 sec (Range: 1 - 40000000, Default: 60000)					
Smartport VLAN Management	Clear ARP Table Entries: All Dynamic Static					
 Spanning Tree MAC Address Tables 	3 Normal Age Out 2					
Multicast IP Configuration	Apply Cancel					
 IPv4 Management and Inter IPv4 Interface IPv4 Poutes 	ARP Table Filter: Interface equals to VLAN 1 • Go Clear Filter					
ARP ARP Proxy	Interface IP Address MAC Address Status VLAN 1 192.168.1.90 e8:6a:64:65:18:8a Dynamic					
UDP Relay/IP Helper DHCP Snooping/Relay DHCP Server	Add Edit Delete					

步驟3.選擇**複製/儲存配置**,將運行配置儲存到啟動配置。這可確保交換機重新啟動或重新啟動後配置將保持不變。

cisco SG300-28 2	28-Port Gigabit Managed Switch
Getting Started Status and Statistics Administration Port Management Capacitant	ARP Success. To permanently save the configuration, go to the Copy/Save Configuration page or click the Save icon.
Smartport VLAN Management Spanning Tree MAC Address Tables Multicast IP Configuration	• ARP Entry Age Out: 300 sec (Range: 1 - 40000000, Default: 60000) Clear ARP Table Entries: All Dynamic Static Normal Age Out Normal Age Out
 IPv4 Management and Inter IPv4 Interface IPv4 Routes ARP ARP Proxy UDP Relay/IP Helper DHCP Snooping/Relay DHCP Server Properties Network Pools 	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 Delete

步驟4. *在Source File Name*下,驗證**Running configuration**已選中。在*Destination File Name*下,驗證**Startup configuration**已選中。按一下「**Apply**」。



步驟5.系統會顯示此快顯視窗。按一下「OK」,在交換器上應用新設定。





選項2:手動清除ARP清單

第二種方法是手動清除清單,以便為其他使用者端取得IP位址騰出空間。此操作不會設定將來的ARP清除,因為它是手動操作。必要時可重複此過程。

步驟1.導覽至IP Configuration > ARP。在*清除ARP表條目*下,選擇要從系統中清除的ARP條 目的型別。

All — 立即刪除所有靜態和動態地址。

Dynamic — 立即刪除所有動態地址。

Static — 立即刪除所有靜態地址。

正常超時 — 根據配置的ARP條目超時時間刪除動態地址。

附註:在此示例中,選擇了All。

按一下「Apply」。ARP全域性設定會臨時寫入運行配置檔案中。

SG300-28 28-Port Gigabit Managed Switch						
Getting Started	ARP					
 Status and Statistics 						
 Administration 	Ö ARP Entry Age Out: 300 sec (Range: 1 - 40000000, Default: 60000)					
 Port Management 						
 Smartport 	Clear ARP Table Entries: All					
 VLAN Management 	Static 3					
 Spanning Tree 	Normal Age Out					
 MAC Address Tables 						
Multicast	Apply Cancel					
IP Configuration	4					
 IPv4 Management and Inter 	ARP Table					
IPv4 Interface	Filter: Interface equals to VLAN 1 V Go Clear Filter					
ARP 2	Interface IP Address MAC Address Status					

步驟2.若要永久儲存組態,請按一下「Copy/Save Configuration」或閃爍的「Save」圖示。

sg300-28 28-Port Gigabit Managed Switch						
 Status and Statistics Administration 	ARP					
 Port Management Smartport 	Success. To permanently save the configuration, go to the Copy/Save Configuration page or click the Save icon.					
VLAN ManagementSpanning Tree	ARP Entry Age Out: 300 sec (Range: 1 - 40000000, Default: 60000)					
MAC Address Tables Multicast IP Configuration	Clear ARP Table Entries: All Dynamic Static					
 IPv4 Management and Inter IPv4 Interface IPv4 Routes ARP ARP Proxy 	Apply Cancel ARP Table					

步驟3.系統會將您重新導向至*複製/儲存組態*頁面。驗證是否已選擇「Source File Name(源 檔名)」作為「Running configuration(運行配置)」,以及「Destination File Name(目標檔



步驟4.系統會顯示此快顯視窗。按一下「OK」,在交換器上應用新設定。

Not secure | 192.168.1.254/csfad2fe8e/kubrick/confirm...



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



結論

現在,您已完成將ARP表設定為更頻繁地清除或手動清除ARP清單。

檢視與本文相關的影片……

按一下此處檢視思科的其他技術對話