

IP電話註銷故障排除 — 案例研究

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簡介

本檔案介紹可用於對組態進行疑難排解的資訊。

除了網路層級TCP保持連線機制之外，Cisco IP電話還使用應用層級保持連線機制。適用於精簡型通話控制通訊協定(SCCP)和作業階段啟始通訊協定(SIP)裝置的保持連線機制可確保裝置持續使用通話控制進行註冊。它們還旨在通過呼叫控制重建裝置連線。

必要條件

需求

本文件沒有特定需求。

採用元件

本文件所述內容不限於特定軟體和硬體版本。

SCCP保持連線和故障切換機制

SCCP使用TCP協定進行傳輸，並使用埠2000和2443（對於安全埠）連線到Call Manager。SCCP電話應在註冊到Cisco Unified Communications Manager(CUCM)之前建立TCP連線。之後，將在埠2000上進行TCP 3次握手，以建立通訊通道。電話通過向CUCM傳送SYN（同步）來發起此連線，CUCM使用SYN、ACK（確認）進行響應。電話反過來會使用ACK進行響應，然後建立TCP連線。

Keep-alive

有兩種保持連線的方法：應用層級(SKINNY keep-alive)和網路層級(TCP keep-alive)

容錯移轉

在理想情況下，SCCP電話保持建立到主CUCM和第一個備份CUCM的TCP連線。SCCP電話將保持連線傳送到已建立TCP連線的所有CUCM。然後，主伺服器響應SCCP保持連線。主伺服器的時間間隔為30秒，備份伺服器的時間間隔為60秒。

主CUCM使用SCCP keepalive ACK進行響應，確認SCCP和TCP連線。備份CUCM僅向電話傳送的保持連線傳送TCP ACK。當電話由於Call Manager服務不可用或主CUCM的TCP連線本身不可用而未能備份CUCM時，它使用兩種機制來檢測主CM故障，並且它們是正常和延遲的。

正常故障轉移

此方法使用一種演算法計算CUCM確認先前的keep-alive所用的平均時間。

例如，如果CUCM響應過去10000 keep-alive所用的平均時間為X秒，則電話將等待X秒，然後才會檢測到CUCM故障。然後，它將嘗試註冊到備份CUCM。

延遲故障轉移

在此機制中，電話會等待3個保持連線間隔來檢測主CUCM的故障。

缺點

資料包傳輸時間波動的網路，延遲故障轉移有助於避免不必要的註銷。

傳輸時間波動示例（注意ping響應的時間延遲）：

```
64 bytes from 10.106.97.150: icmp_seq=1 ttl=63 time=0.100 ms
64 bytes from 10.106.97.150: icmp_seq=2 ttl=63 time=200 ms
64 bytes from 10.106.97.150: icmp_seq=3 ttl=63 time=0.180 ms
64 bytes from 10.106.97.150: icmp_seq=4 ttl=63 time=0.678 ms
```

```
64 bytes from 10.106.97.150: icmp_seq=5 ttl=63 time=590 ms
64 bytes from 10.106.97.150: icmp_seq=6 ttl=63 time=0.100 ms
64 bytes from 10.106.97.150: icmp_seq=7 ttl=63 time=345 ms
64 bytes from 10.106.97.150: icmp_seq=8 ttl=63 time=456 ms
64 bytes from 10.106.97.150: icmp_seq=9 ttl=63 time=0.345 ms
```

優勢

此機制可用於延遲敏感網路中。

SIP保持連線

根據CUCM中的設定，SIP電話註冊到CUCM並每120秒傳送一次保持連線。當電話向主CUCM傳送初始註冊時，會將**Expires**計時器設定為3600秒（在電話上應用的SIP配置檔案中預設設定）。CUCM根據服務引數中設定的值將計時器修改為120秒，從而傳送ACK。

因此，電話每120秒傳送一次keep-alive（實際為115秒，即120減去SIP配置檔案中配置的增量值，預設值為5秒）。在這種情況下，電話每115秒傳送一次keep-alive。

SIP電話將Register消息交換到**Expires**欄位設定為0的備份CUCM。

至主要

```
REGISTER sip:10.106.114.161 SIP/2.0

Via: SIP/2.0/TCP 10.106.114.185:53006;branch=z9hG4bKd451a4fa

From: <sip:5678@10.106.114.161>;tag=0024142ddf242c6644b6e5d2-f01c795a

To: <sip:5678@10.106.114.161>

Call-ID: 0024142d-df24000a-44da4e09-0de51424@10.106.114.185

Max-Forwards: 70

Date: Wed, 15 Jul 2015 12:42:56 GMT

CSeq: 11435 REGISTER

User-Agent: Cisco-CP7975G/9.3.1

Contact: <sip:9e9e1ffb-0206-4ea1-6d77-ba04a72017f7@10.106.114.185:53006;transport=tcp>;+sip.instance="<urn:uuid:00000000-0000-0000-0000-0024142ddf24>;+u.sip!devicename.ccm.cisco.com="SEP0024142DDF24";+u.sip!model.ccm.cisco.com="437"

Supported: replaces,join,sdp-anat,norefersub,resource-priority,extended-refer,X-cisco-callinfo,X-cisco-serviceuri,X-cisco-escapecodes,X-cisco-service-control,X-cisco-srtp-fallback,X-cisco-monrec,X-cisco-config,X-cisco-sis-6.0.0,X-cisco-xsi-8.5.1

Content-Length: 0

Expires: 3600
```

SIP/2.0 100 Trying

Via: SIP/2.0/TCP 10.106.114.185:53006;branch=z9hG4bKd451a4fa

From: <sip:5678@10.106.114.161>;tag=0024142ddf242c6644b6e5d2-f01c795a

To: <sip:5678@10.106.114.161>

Date: Wed, 15 Jul 2015 12:42:59 GMT

Call-ID: 0024142d-df24000a-44da4e09-0de51424@10.106.114.185

CSeq: 11435 REGISTER

Content-Length: 0

SIP/2.0 200 OK

Via: SIP/2.0/TCP 10.106.114.185:53006;branch=z9hG4bKd451a4fa

From: <sip:5678@10.106.114.161>;tag=0024142ddf242c6644b6e5d2-f01c795a

To: <sip:5678@10.106.114.161>;tag=1708299782

Date: Wed, 15 Jul 2015 12:42:59 GMT

Call-ID: 0024142d-df24000a-44da4e09-0de51424@10.106.114.185

CSeq: 11435 REGISTER

Expires: 120

Contact: <sip:9e9e1ffb-0206-4ea1-6d77-

ba04a72017f7@10.106.114.185:53006;transport=tcp>;+sip.instance="<urn:uuid:00000000-0000-0000-0000-

0024142ddf24>;+u.sip!devicename.ccm.cisco.com="SEP0024142DDF24";+u.sip!model.ccm.cisco.com="437"

Supported: X-cisco-srtp-fallback,X-cisco-sis-6.0.0

Content-Length: 0

至次要

REGISTER sip:10.60.1.12:5060;transport=tcp SIP/2.0

Via: SIP/2.0/TCP 10.60.63.21:3784;rport;branch=z9hG4bKPjdcJ819aZtTctmvr0VBheV6p0uL8aC.pG

Max-Forwards: 70

From: <sip:6836@10.60.1.12>;tag=5oI-ew53.DGjTDu5LB9orkdDpZlccNbv

To: <sip:6836@10.60.1.12>

Call-ID: HxTK.m6BH9qxjstVwexTbhVnUxNeuxle

CSeq: 18800 REGISTER

Expires: 0

Contact: <sip:e2b0f175-feae-d664-befa-b7cd0837fcc6@10.60.63.21:5060;transport=TCP>;+sip.instance="<urn:uuid:00000000-0000-0000-0000-e0d1730aclb1>" ;+u.sip!devicename.ccm.cisco.com="SEPE0D1730AC1B1" ;+u.sip!model.ccm.cisco.com="592" ;expires=0;cisco-keep-alive

Content-Length: 0

需要日誌

要確定電話取消註冊的原因，請收集概述的資訊：

- Event Viewer Application and System Logs (事件檢視器應用程式和系統日誌) — 為電話註銷提供警報/錯誤代碼，並使用該代碼進行故障排除。
- 同時從電話和CUCM (主和備份) 捕獲資料包 — 有助於從網路的角度隔離問題。
- Cisco Call Manager跟蹤。

相關連結

[從CUCM收集資料包捕獲](#)

[從IP電話收集捕獲](#)

[收集CUCM跟蹤](#)

分析日誌和資料包捕獲

- 事件檢視器應用程式日誌將列印EndPointUnregistered消息以及相關的原因代碼。

Example: 31 uc-ucm-01 local7 3 : 41679: uc-ucm-01.pcce.local Jul 02 2015 06:22:31 UTC : %UC_CALLMANAGER-3-EndPointUnregistered: % [DeviceName=SEPE0D1730A8137] [IPAddress=10.60.98.210] [Protocol=SIP] [DeviceType=592] [Description=Phone] [Reason=13] [IPAddrAttributes=0] [LastSignalReceived=SIPStationDPrimaryLineTimeout] [AppID=Cisco CallManager] [ClusterID=StandAloneCluster] [NodeID=uc-ucm-01]: An endpoint has unregistered EndPointUnregistration的原因代碼可在[系統錯誤消息文檔](#)中找到。

讀取Wireshark日誌

收集兩端的Captures時，驗證電話傳送的keepalive是否實際到達CUCM。

TCP封包的序號有助於在監聽器擷取中輕鬆追蹤電話和CUCM之間的TCP流量。

從電話擷取

No.	Time	Source	Destination	Protocol	Sequence Number	Acknowledgement Number	Info
200	18:14:40.051014	10.106.114.185	10.106.114.161	SIP	2991996997	1953874543	Request: REGISTER sip:10.106.114.161 (0 bindings)
201	18:14:49.053199	10.106.114.161	10.106.114.185	SIP	1953873581	2991996997	Status: 100 Trying (0 bindings)
202	18:14:49.053909	10.106.114.161	10.106.114.185	SIP	1953873906	2991996997	Status: 200 OK (1 bindings)
203	18:14:49.065591	10.106.114.185	10.106.114.161	TCP	2991996997	1953874543	53006 > sip [ACK] Seq=2991996997 Ack=1953874543 Win=8192 Len=0
484	18:16:44.077219	10.106.114.185	10.106.114.161	SIP	2991996997	1953874543	Request: REGISTER sip:10.106.114.161 (0 bindings)
485	18:16:44.079859	10.106.114.161	10.106.114.185	SIP	1953874543	2991997887	Status: 100 Trying (0 bindings)
486	18:16:44.079869	10.106.114.161	10.106.114.185	SIP	1953874868	2991997887	Status: 200 OK (1 bindings)
487	18:16:44.091359	10.106.114.185	10.106.114.161	TCP	2991997887	1953875505	53006 > sip [ACK] Seq=2991997887 Ack=1953875505 Win=8192 Len=0

電話傳送序列號為2991996107的資料包，請驗證此資料包是否到達CUCM。

從CUCM捕獲

No.	Time	Source	Destination	Protocol	Sequence number	Acknowledgement number	Info
1	18:12:59.366272	10.106.114.185	10.106.114.161	SIP	2991995217	1953872619	Request: REGISTER sip:10.106.114.161
2	18:12:59.366286	10.106.114.161	10.106.114.185	SIP	1953872619	2991996107	Status: 100 Trying (0 bindings)
3	18:12:59.366858	10.106.114.161	10.106.114.185	SIP	1953872944	2991996107	Status: 200 OK (1 bindings)
4	18:12:59.378246	10.106.114.185	10.106.114.161	TCP	2991996107	1953873581	53006 > sip [ACK] seq=2991996107 Ack=1953873581 win=8192 Len=0
5	18:14:54.368343	10.106.114.185	10.106.114.161	SIP	2991996107	1953873581	Request: REGISTER sip:10.106.114.161
6	18:14:54.369997	10.106.114.161	10.106.114.185	SIP	1953873581	2991996997	Status: 100 Trying (0 bindings)
7	18:14:54.370751	10.106.114.161	10.106.114.185	SIP	1953873906	2991996997	Status: 200 OK (1 bindings)
8	18:14:54.382545	10.106.114.185	10.106.114.161	TCP	2991996997	1953874543	53006 > sip [ACK] seq=2991996997 Ack=1953874543 win=8192 Len=0
9	18:16:49.400028	10.106.114.185	10.106.114.161	SIP	2991996997	1953874543	Request: REGISTER sip:10.106.114.161
10	18:16:49.401468	10.106.114.161	10.106.114.185	SIP	1953874543	2991997887	Status: 100 Trying (0 bindings)
11	18:16:49.401833	10.106.114.161	10.106.114.185	SIP	1953874868	2991997887	Status: 200 OK (1 bindings)
12	18:16:49.414139	10.106.114.185	10.106.114.161	TCP	2991997887	1953875505	53006 > sip [ACK] seq=2991997887 Ack=1953875505 win=8192 Len=0

在電話監聽器捕獲中看到的序列號應在CUCM捕獲中看到。

案例研究1.2

問題描述

SCCP電話定期重新啟動。

疑難排解

事件檢視器應用程式日誌表明電話由於丟失keep alive (錯誤代碼為13) 而一直重新啟動。

Event Viewer Message.

從IP電話和CUCM收集資料包捕獲。 在此案例中，從IP電話傳送的最後一個保持連線未到達CUCM。

Image.

由於以下原因，Keep-alive被丟棄：

當電話傳送ARP以獲取CUCM的MAC地址時，響應來自具有ASA mac-address的ARP代理。顯然，第一個回應不是來自CUCM。但是，由於電話首先收到該幀，因此它會將該幀連同另一台裝置的MAC地址傳送給交換機。

這通常在ASA上啟用ARP代理時發生。

Filter: eth.addr == 58:0a:20:fb:07:1f

No.	Time	Source	Destination	Protocol	Sequence number	Acknowledgement number	Info
26544	18:07:36.474587000	58:0a:20:fb:07:1f	10.10.10.202	LLDP_Multicast			Chassis Id = 10.10.10.130 Port Id = 580A20FB071F:P2 TTL = 180 System Name = SEP580A2
26769	18:07:04.408906000	10.10.10.130	10.10.10.202	SKINNY	204530782	2085624343	KeepAlive
26770	18:07:04.408907000	10.10.10.202	10.10.10.130	SKINNY	2085624343	204530794	KeepAliveAck
26771	18:07:04.408919000	10.10.10.130	10.10.10.202	TCP	204530794	2085624355	35602 > cisco-sccp [ACK] Seq=204530794 Ack=2085624355 Win=611 Len=0 TSV=76674527 TSE
27625	18:07:29.501257000	58:0a:20:fb:07:1f	10.10.10.130	LLDP_Multicast			Chassis Id = 10.10.10.130 Port Id = 580A20FB071F:P1 TTL = 180 System Name = SEP580A2
27784	18:07:34.418935000	58:0a:20:fb:07:1f	Broadcast	ARP			who has 10.10.10.202? Tell 10.10.10.130
27785	18:07:34.419757000	f4:0f:1b:1e:26:a9	58:0a:20:fb:07:1f	ARP			10.10.10.202 is at f4:0f:1b:1e:26:a9
27786	18:07:34.419774000	vmware_90:10:cf	58:0a:20:fb:07:1f	ARP			10.10.10.202 is at 00:0c:29:90:10:cf
27787	18:07:34.419774000	10.10.10.130	10.10.10.202	SKINNY	204530794	2085624355	KeepAlive
27788	18:07:34.618965000	10.10.10.130	10.10.10.202	SKINNY	204530794	2085624355	[TCP Retransmission] KeepAlive
27802	18:07:35.038931000	10.10.10.130	10.10.10.202	SKINNY	204530794	2085624355	[TCP Retransmission] KeepAlive
27842	18:07:35.878875000	10.10.10.130	10.10.10.202	SKINNY	204530794	2085624355	[TCP Retransmission] KeepAlive
27879	18:07:36.821433000	10.10.10.130	10.10.10.202	TCP	1638850975	35602	35602 > cisco-sccp [SYN] Seq=1638850975 Win=5840 Len=0 MSS=1460 SACK_PERM=1 TSV=7667
27880	18:07:36.822237000	10.10.10.202	10.10.10.130	TCP	3958510895	3154496376	[TCP ACKed lost segment] cisco-sccp > 35602 [SYN, ACK] Seq=3958510895 Ack=3154496376
27881	18:07:36.822249000	10.10.10.130	10.10.10.202	TCP	3154496376	35602	35602 > cisco-sccp [RST] Seq=3154496376 Win=0 Len=0
27910	18:07:37.600142000	58:0a:20:fb:07:1f	10.10.10.202	CDP_VTP/OTF/PAGP/UDCP			Device ID: SEP580A20FB071F Port ID: Port 1
27918	18:07:37.8926352000	10.10.10.130	10.10.10.130	TCP	3958510895	3154496376	cisco-sccp > 35602 [SYN, ACK] Seq=3958510895 Ack=3154496376 Win=14600 Len=0 MSS=1460
27919	18:07:37.927119000	10.10.10.130	10.10.10.202	TCP	3154496376	35602	35602 > cisco-sccp [RST] Seq=3154496376 Win=0 Len=0
27985	18:07:39.818859000	10.10.10.130	10.10.10.202	TCP	1638850975	35602	35602 > cisco-sccp [SYN] Seq=1638850975 Win=5840 Len=0 MSS=1460 SACK_PERM=1 TSV=7667
27986	18:07:39.819690000	10.10.10.202	10.10.10.130	TCP	3958510896	3154496376	[TCP Dup ACK 27918#1] cisco-sccp > 35602 [ACK] Seq=3958510896 Ack=3154496376 Win=1460

Frame 27787: 78 bytes on wire (624 bits), 78 bytes captured (624 bits) on interface 0/20

Ethernet II, Src: 58:0a:20:fb:07:1f (58:0a:20:fb:07:1f), Dst: f4:0f:1b:1e:26:a9 (f4:0f:1b:1e:26:a9)

Destination: f4:0f:1b:1e:26:a9 (F4:0F:1B:1E:26:A9)

Address: f4:0f:1b:1e:26:a9 (F4:0F:1B:1E:26:A9)

- ...0 = IG bit: Individual address (unicast)
- ...10 = LG bit: Globally unique address (factory default)

Source: 58:0a:20:fb:07:1f (58:0a:20:fb:07:1f)

Address: 58:0a:20:fb:07:1f (58:0a:20:fb:07:1f)

- ...0 = IG bit: Individual address (unicast)
- ...10 = LG bit: Globally unique address (factory default)

Type: IP (0x0800)

Internet Protocol, Src: 10.10.10.130 (10.10.10.130), Dst: 10.10.10.202 (10.10.10.202)

Transmission Control Protocol, Src Port: 35601 (35601), Dst Port: cisco-sccp (2000), Seq: 204530794, Ack: 2085624355, Len: 12

Source port: 35601 (35601)

Destination port: cisco-sccp (2000)

[Stream index: 152]

Sequence number: 204530794

[Next sequence number: 204530806]

Acknowledgement number: 2085624355

Header length: 32 bytes

IP Len: 0x18 (new ACK)

```

0000 f4 0f 1b 1e 26 a9 58 0a 20 fb 07 1f 08 00 45 60  ....&.X. ....E
0010 00 40 8b ef 00 00 04 06 c5 09 0a 0a 82 0a 08 00  ..&.....&.....E
0020 0a ca 8b 11 07 0d 0c 30 e4 6a 7c 50 1a 23 80 18  .....0..j]P.#.
0030 02 63 b0 43 00 00 01 01 08 0a 04 92 01 98 34 3e  .C.C.....4>
0040 2c 4b 04 00 00 00 16 00 00 00 00 00 00 00 00 00  .,K.....

```

解析

禁用ASA上的ARP代理以解決問題。

案例研究2.

問題描述

Cisco IP電話型號8961電話每16分鐘重置一次，然後註冊到輔助CUCM。2分鐘後，電話回到Primary CUCM，此週期繼續。

疑難排解

從電話和CUCM跟蹤收集資料包捕獲。取消註冊的原因是IP電話未收到SIP keep-alive。

分析

SIP電話註冊到CUCM，並根據CUCM中的設定每120秒傳送一次保持連線。

當電話傳送初始註冊時，它將到期計時器設定為3600秒（在電話上應用的SIP配置檔案中預設設定）。CUCM根據服務引數中設定的值將計時器修改為120秒，以確認這一點。

電話每120秒傳送一次Keepalive（keep-alive間隔為115秒，即120減去SIP配置檔案中配置的增量值，預設值為5秒）。在這種情況下，電話每115秒傳送一次keepalive。

在此問題情境中，電話在115秒傳送第一個keepalive，但它在網路中被捨棄。這會導致電話在0.01秒（100毫秒）內重新傳輸keepalive。它從CUCM獲取REGISTER請求的響應。

現在，電話在115秒傳送第二個keepalive資料包，然後該資料包在網路中丟棄。現在，電話將其REGISTER重試間隔增加到0.02秒（200毫秒）。

每當電話在115之後傳送keepalive資料包時，都會在網路中丟棄，從而導致電話重新傳輸資料包。此外，電話還會以指數級增加其重試間隔。在少數幾次keep-alive後，電話重試次數增加到14秒。

電話在14秒後重新傳輸，並從CUCM獲得ACK。

下次電話傳送keep-alive時，它將丟失，然後電話在28秒後重新傳輸REGISTER請求。CUCM不能等待28秒，它只等待15秒（在115秒之後），然後傳送取消註冊訊號。

保持連線時間和RTO總計可達16分鐘幾秒。

由於CUCM發出註銷訊號，16分鐘後，電話註冊到輔助CUCM，2分鐘後，電話註冊回主，繼續操作。

1930	22:56:11.7299388	10.147.230.189	178.215.139.22	SIP	9722	4203 Request: REGISTER sip:178.215.139.22
1931	22:56:11.7437220	10.147.230.189	178.215.139.22	SIP	9723	4203 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
1934	22:56:17.471894	178.215.139.22	10.147.230.189	TCP	4563	7623 sip > 50708 [ACK] Seq=4563 Ack=7623 win=22559 Len=0
1935	22:56:17.473022	178.215.139.22	10.147.230.189	SIP	4563	7623 Status: 100 Trying (0 bindings)
1936	22:56:17.473815	178.215.139.22	10.147.230.189	SIP	4900	7623 status: 200 OK (1 bindings)
1938	22:56:17.507164	10.147.230.189	178.215.139.22	TCP	7623	5548 50708 > sip [ACK] Seq=7623 Ack=5548 win=17940 Len=0
3318	22:58:12.474709	10.147.230.189	178.215.139.22	SIP	7623	5548 Request: REGISTER sip:178.215.139.22
3323	22:58:12.892520	10.147.230.189	178.215.139.22	SIP	7623	5548 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
3324	22:58:12.907067	178.215.139.22	10.147.230.189	TCP	5548	8524 sip > 50708 [ACK] Seq=5548 Ack=8524 win=25319 Len=0
3325	22:58:12.908564	178.215.139.22	10.147.230.189	SIP	3548	8524 status: 100 Trying (0 bindings)
3326	22:58:12.908910	10.147.230.189	178.215.139.22	TCP	8524	5885 50708 > sip [ACK] Seq=8524 Ack=5885 win=17940 Len=0
3327	22:58:12.909452	178.215.139.22	10.147.230.189	SIP	5885	8524 status: 200 OK (1 bindings)
3328	22:58:12.909808	10.147.230.189	178.215.139.22	TCP	8524	6534 50708 > sip [ACK] Seq=8524 Ack=6534 win=17940 Len=0
4711	23:00:07.909779	10.147.230.189	178.215.139.22	SIP	8524	6534 Request: REGISTER sip:178.215.139.22
4722	23:00:08.747602	10.147.230.189	178.215.139.22	SIP	8524	6534 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
4723	23:00:08.762120	178.215.139.22	10.147.230.189	TCP	6534	9425 sip > 50708 [ACK] Seq=6534 Ack=9425 win=27030 Len=0
4724	23:00:08.763291	178.215.139.22	10.147.230.189	SIP	6534	9425 Status: 100 Trying (0 bindings)
4725	23:00:08.763658	10.147.230.189	178.215.139.22	TCP	9425	6871 50708 > sip [ACK] Seq=9425 Ack=6871 win=17940 Len=0
4726	23:00:08.764030	178.215.139.22	10.147.230.189	SIP	6871	9425 status: 200 OK (1 bindings)
4727	23:00:08.764032	10.147.230.189	178.215.139.22	TCP	9425	7519 50708 > sip [ACK] Seq=9425 Ack=7519 win=17940 Len=0
6117	23:02:03.764972	10.147.230.189	178.215.139.22	SIP	9425	7519 Request: REGISTER sip:178.215.139.22
6137	23:02:05.442842	10.147.230.189	178.215.139.22	SIP	9425	7519 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
6138	23:02:05.457251	178.215.139.22	10.147.230.189	TCP	7519	10326 sip > 50708 [ACK] Seq=7519 Ack=10326 win=28832 Len=0
6139	23:02:05.458324	178.215.139.22	10.147.230.189	SIP	7519	10326 status: 100 Trying (0 bindings)
6140	23:02:05.458692	10.147.230.189	178.215.139.22	TCP	10326	7856 50708 > sip [ACK] Seq=10326 Ack=7856 win=17940 Len=0
6141	23:02:05.459023	178.215.139.22	10.147.230.189	SIP	7856	10326 status: 200 OK (1 bindings)
6142	23:02:05.459397	10.147.230.189	178.215.139.22	TCP	10326	8505 50708 > sip [ACK] Seq=10326 Ack=8505 win=17940 Len=0
7520	23:04:00.460122	10.147.230.189	178.215.139.22	SIP	10326	8505 Request: REGISTER sip:178.215.139.22
7519	23:04:03.837337	10.147.230.189	178.215.139.22	SIP	10326	8505 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
7560	23:04:03.832323	178.215.139.22	10.147.230.189	TCP	8505	11227 sip > 50708 [ACK] Seq=8505 Ack=11227 win=50634 Len=0
7561	23:04:03.834245	178.215.139.22	10.147.230.189	SIP	8505	11227 status: 100 Trying (0 bindings)
7562	23:04:03.834726	178.215.139.22	10.147.230.189	SIP	8842	11227 status: 200 OK (1 bindings)
7563	23:04:03.834728	10.147.230.189	178.215.139.22	TCP	11227	8842 50708 > sip [ACK] Seq=11227 Ack=8842 win=17940 Len=0
7564	23:04:03.835387	10.147.230.189	178.215.139.22	TCP	11227	9489 50708 > sip [ACK] Seq=11227 Ack=9489 win=17940 Len=0
8947	23:05:58.836796	10.147.230.189	178.215.139.22	SIP	11227	9489 Request: REGISTER sip:178.215.139.22
9036	23:06:05.567236	10.147.230.189	178.215.139.22	SIP	11227	9489 [TCP Retransmission] Request: REGISTER sip:178.215.139.22
9030	23:06:05.567350	178.215.139.22	10.147.230.189	TCP	9489	12128 sip > 50708 [ACK] Seq=9489 Ack=12128 win=32436 Len=0
9031	23:06:05.568414	178.215.139.22	10.147.230.189	SIP	9489	12128 status: 100 Trying (0 bindings)
9032	23:06:05.568832	10.147.230.189	178.215.139.22	TCP	12128	9826 50708 > sip [ACK] Seq=12128 Ack=9826 win=17940 Len=0
9033	23:06:05.569233	178.215.139.22	10.147.230.189	SIP	9826	12128 status: 200 OK (1 bindings)

保持連線丟棄的原因

當交換機埠配置了埠安全時，埠老化配置了非活動計時器。計時器已設定為一分鐘，比SIP keep-alive計時器小。這導致交換機埠每分鐘刷新一次電話MAC。由於SIP keep-alive間隔是每2分鐘一次，因此資料包一直被丟棄。