

含XOT Keepalive的X25 Over TCP/IP

目錄

[簡介](#)

[必要條件](#)

[需求](#)

[採用元件](#)

[慣例](#)

[設定](#)

[網路圖表](#)

[組態](#)

[驗證](#)

[疑難排解](#)

[疑難排解指令](#)

[相關資訊](#)

簡介

透過TCP傳輸的X.25(XOT)使您能夠透過TCP/IP網路傳送X.25封包，而不是連結存取程式平衡(LAPB)連結。XOT還允許您通過IP網路傳輸X.25流量。

Cisco IOS®軟體在X.25鏈路和TCP連線之間交換X.25資料包。每個虛電路目標地址都可以對映到單獨的IP地址。XOT keepalive可用於檢測底層TCP。TCP確實能夠通過檢查確認序列號來檢測連線。如果沒有收到任何確認封包，它會保留取消封包並繼續嘗試重新傳輸，直到最終放棄並中斷TCP連線。但是，此過程花費的時間太長。

本檔案將說明如何在TCP連線中斷的情況下使用XOT keepalive功能、加以偵測並更快動作。

必要條件

需求

本文件沒有特定需求。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Cisco IOS軟體版本9.21或更新版本，包含任何功能集
- 任何Cisco IOS軟體版本9.21或更高版本的Cisco路由器都支援此功能
- Cisco IOS軟體版本12.2(13)T13和12.2(27)

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設

) 的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

慣例

如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

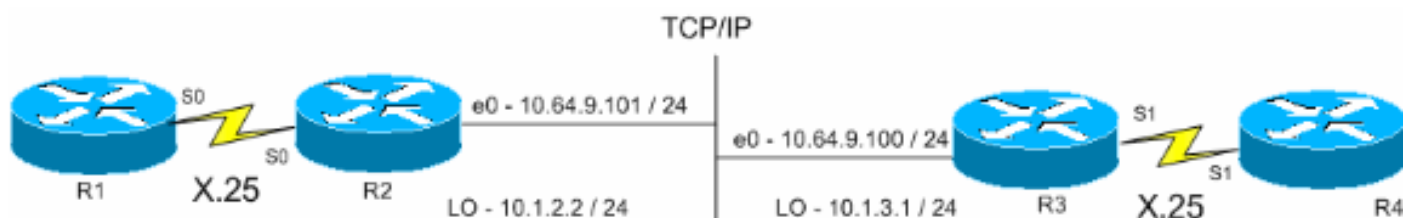
設定

本節提供用於設定本文中所述功能的資訊。

註：使用[Command Lookup Tool](#)(僅限註冊客戶)查詢有關本文檔中使用的命令的更多資訊。

網路圖表

本檔案會使用以下網路設定：



組態

本檔案會使用以下設定：

- [R1 \(思科2500路由器 \)](#)
- [R2 \(Cisco 2500路由器 \)](#)
- [R3 \(思科2600路由器 \)](#)
- [R4 \(思科2600路由器 \)](#)

R1 (思科2500路由器)

```
Current configuration:
!
version 12.2
service timestamps debug datetime msec
service timestamps log uptime
!
hostname R1
!
x25 routing
!--- The X.25 local switching. ! interface Serial0 no ip
address no ip directed-broadcast encapsulation x25 no ip
mroute-cache x25 address 45678 x25 win 5 !--- For
testing purposes, the X.25 flow control !--- is set to
something other than !--- the default value. In this
configuration, !--- win 5 and wout 5, and ips and ops
256 are used. x25 wout 5 x25 ips 256 x25 ops 256 x25
idle 1 ! line con 0 transport input none line aux 0 line
vty 0 4 password cisco login ! end
```

R2 (Cisco 2500路由器)

```

Current configuration
!
version 12.2
service pad to-xot
!--- Enable this command in order to make a packet
assembler/disassembler (PAD) !--- over XOT through the
router locally. It is useful for troubleshooting XOT
problems. service timestamps debug datetime msec service
timestamps log uptime ! hostname R2 ! x25 routing !---
Enables X.25 switching. ! ! ! interface Loopback0 ip
address 10.1.2.2 255.255.255.0 ! interface Ethernet0 ip
address 10.64.9.101 255.255.255.0 no ip route-cache no
ip mroute-cache ! interface Serial0 no ip address
encapsulation x25 dce no ip mroute-cache x25 win 5 x25
wout 5 x25 ips 256 x25 ops 256 !--- Set these flow
control parameters since the interface you have
connected to !--- also has these parameters set. If not
matched, you can reset the link !--- while there are
larger packets that go over. x25 idle 1 clockrate 64000
! router rip network 10.0.0.0 ! x25 route ^12 xot
10.64.9.100 xot-keepalive-period 10 xot-keepalive-tries
3 xot-source Loopback0 x25 route ^4 interface Serial0
xot-keepalive-period 10 xot-keepalive-tries 3 !--- By
default, xot-keepalives is always enabled, uses the
default keepalive !--- period of 60 seconds, and retries
four times. Use the !--- loopback as the XOT source to
enhance the TCP connection reliability. !--- If you have
two interfaces configured for X.25 and one of the !---
interfaces goes down, one interface remains up so that
the TCP !--- connection is not interrupted. In order to
achieve this redundancy !--- connection, the XOT uses
the loopback interface since the !--- source and the TCP
connection do not fail. !--- If you want to have
redundant interfaces in your router, the !--- X.25 route
command is configured as - X.25 route ^12 xot
10.64.9.100 10.64.9.200 !--- where 10.64.9.100 and
10.64.9.200 are the remote destination IP addresses.

!
line con 0
line aux 0
line vty 0 4
login
!
end

```

R3 (思科2600路由器)

```

Current configuration : 1427 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log uptime
!
hostname R3
!
!
x25 routing
!
!
interface Loopback0
ip address 10.1.3.1 255.255.255.0

```

```

!
interface Serial1
bandwidth 384
no ip address
encapsulation x25
no ip route-cache
no ip mroute-cache
x25 win 7
x25 wout 7
x25 ips 1024
x25 ops 1024
x25 idle 1
service-module t1 clock source internal
service-module t1 timeslots 1-6
!
interface Ethernet1/0
ip address 10.64.9.100 255.255.255.0
no ip route-cache
no ip mroute-cache
half-duplex
!
router rip
network 10.0.0.0
!
!
x25 route ^12 interface Serial1 xot-keepalive-period
 10 xot-keepalive-tries 3
x25 route ^4 xot 10.64.9.101 xot-keepalive-period
 10 xot-keepalive-tries 3 xot-source Loopback0

!
line con 0
exec-timeout 0 0
line aux 0
line vty 0 4
login
!
end

```

R4 (思科2600路由器)

```

Current configuration
!
!
!
version 12.2
service timestamps debug datetime msec
service timestamps log uptime
no service password-encryption
!
hostname R4
!
!
interface Ethernet0/0
 ip address 10.64.9.88 255.255.255.0
 half-duplex
!
interface Serial1
 bandwidth 384
 no ip address
 encapsulation x25 dce
 x25 address 123456
 x25 win 7

```

```
x25 wout 7
x25 ips 1024
x25 ops 1024
!--- These parameters are set for testing purposes. x25
idle 1 service-module t1 timeslots 1-6 ! line con 0 line
aux 0 line vty 0 4 password cisco login ! end
```

驗證

使用本節內容，確認您的組態是否正常運作。

[輸出直譯器工具](#)(僅供已註冊客戶使用)(OIT)支援某些show命令。使用OIT檢視show命令輸出的分析

。

- **show x25 pad** — 顯示有關當前開放連線的資訊，包括封包傳輸、X.3引數設定和虛擬電路的目前狀態。
- **show x25 xot** — 顯示與給定條件匹配的所有XOT虛電路的資訊。
- **show tcp** — 顯示TCP連線的狀態。
- **pad** — 使用此命令登入到PAD。

此輸出顯示了從R1到R4進行PAD呼叫時顯示的調試輸出：

```
R1#pad 123456
```

```
User Access Verification
```

```
Password:
```

```
lwd: Serial0: X.25 O R1 Call (15) 8 lci 1024
lwd: From (5): 45678 To (6): 123456
lwd: Facilities: (0)
lwd: Call User Data (4): 0x01000000 (pad)
lwd: Serial0: X.25 I R1 Call Confirm (5) 8 lci 1024
lwd: From (0): To (0):
lwd: Facilities: (0)
R4>
```

此呼叫通過R2。此輸出是使用**debug x25 event**和**debug ip tcp driver**命令捕獲的。

```
R2#
*Mar 9 07:02:39.982: Serial0: X.25 I R1 Call (15) 8 lci 1024
*Mar 9 07:02:39.986: From (5): 45678 To (6): 123456
*Mar 9 07:02:39.990: Facilities: (0)
*Mar 9 07:02:39.990: Call User Data (4): 0x01000000 (pad)
*Mar 9 07:02:40.006: TCPDRV404EF4: Active async open 10.1.2.2:0
--> 10.64.9.100 :1998 OK, lport 11020
*Mar 9 07:02:40.034: TCPDRV404EF4: disable tcp timeouts
*Mar 9 07:02:40.034: TCPDRV404EF4: enable tcp timeouts
*Mar 9 07:02:40.038: TCPDRV404EF4: keepalive interval set to 10000 ms
!--- The keepalives parameters. *Mar 9 07:02:40.038: TCPDRV404EF4: keepalive attempts set to 3
*Mar 9 07:02:40.042: TCPDRV404EF4: keepalives turned on *Mar 9 07:02:40.046:
[10.64.9.100,1998/10.1.2.2,11020]: XOT O P2 Call (21) 8 lc i 1 *Mar 9 07:02:40.050: From (5):
45678 To (6): 123456 *Mar 9 07:02:40.054: Facilities: (6) *Mar 9 07:02:40.054: Packet sizes: 256
256 *Mar 9 07:02:40.058: Window sizes: 5 5 *Mar 9 07:02:40.058: Call User Data (4): 0x01000000
(pad) *Mar 9 07:02:40.182: [10.64.9.100,1998/10.1.2.2,11020]: XOT I P2 Call Confirm (11) 8 lci 1
*Mar 9 07:02:40.182: From (0): To (0): *Mar 9 07:02:40.186: Facilities: (6) *Mar 9 07:02:40.186:
Packet sizes: 256 256 *Mar 9 07:02:40.190: Window sizes: 5 5 *Mar 9 07:02:40.194: Serial0: X.25
O R1 Call Confirm (5) 8 lci 1024 *Mar 9 07:02:40.194: From (0): To (0): *Mar 9 07:02:40.198:
```

Facilities: (0)

R3通過XOT接收來自R2的呼叫，然後將其傳遞到R4。此輸出是使用debug x25 event和debug ip tcp driver命令捕獲的。

```
R3#
*Mar 9 07:00:41.338: TCPDRV27693C: Passive open 10.64.9.100:1998 <-- 10.1.2.2:1 1020
*Mar 9 07:00:41.342: TCPDRV27693C: disable tcp timeouts
*Mar 9 07:00:41.342: TCPDRV27693C: enable tcp timeouts
*Mar 9 07:00:41.370: [10.1.2.2,11020/10.64.9.100,1998]: XOT I P/Inactive Call (21) 8 lci 1
*Mar 9 07:00:41.370: From (5): 45678 To (6): 123456
*Mar 9 07:00:41.374: Facilities: (6)
*Mar 9 07:00:41.378: Packet sizes: 256 256
*Mar 9 07:00:41.378: Window sizes: 5 5
*Mar 9 07:00:41.382: Call User Data (4): 0x01000000 (pad)
*Mar 9 07:00:41.394: TCPDRV27693C: keepalive interval set to 10000 ms
*Mar 9 07:00:41.394: TCPDRV27693C: keepalive attempts set to 3
*Mar 9 07:00:41.398: TCPDRV27693C: keepalives turned on
*Mar 9 07:00:41.402: Serial1: X.25 O R1 Call (21) 8 lci 1024
*Mar 9 07:00:41.402: From (5): 45678 To (6): 123456
*Mar 9 07:00:41.406: Facilities: (6)
*Mar 9 07:00:41.410: Packet sizes: 256 256
*Mar 9 07:00:41.410: Window sizes: 5 5
*Mar 9 07:00:41.414: Call User Data (4): 0x01000000 (pad)
*Mar 9 07:00:41.454: Serial1: X.25 I R1 Call Confirm (5) 8 lci 1024
*Mar 9 07:00:41.454: From (0): To (0):
*Mar 9 07:00:41.458: Facilities: (0)
*Mar 9 07:00:41.462: [10.1.2.2,11020/10.64.9.100,1998]: XOT O P3 Call Confirm (11) 8 lci 1
*Mar 9 07:00:41.462: From (0): To (0):
```

R4收到該呼叫並將其連線到vty埠：

```
R4#
*Mar 9 06:57:16.598: Serial1: X.25 I R1 Call (21) 8 lci 1024
*Mar 9 06:57:16.602: From (5): 45678 To (6): 123456
*Mar 9 06:57:16.606: Facilities: (6)
*Mar 9 06:57:16.606: Packet sizes: 256 256
*Mar 9 06:57:16.610: Window sizes: 5 5
*Mar 9 06:57:16.610: Call User Data (4): 0x01000000 (pad)
*Mar 9 06:57:16.622: Serial1: X.25 O R1 Call Confirm (5) 8 lci 1024
*Mar 9 06:57:16.626: From (0): To (0):
*Mar 9 06:57:16.626: Facilities: (0)
```

R4#show x25 vc

```
SVC 1024, State: D1, Interface: Serial1
Started 00:02:15, last input 00:02:12, output 00:02:12
```

```
Line: 2 vty 0 Location: Host: 45678
45678 connected to 123456 PAD <--> X25
```

```
Window size input: 5, output: 5
Packet size input: 256, output: 256
PS: 4 PR: 0 ACK: 0 Remote PR: 4 RCNT: 0 RNR: no
P/D state timeouts: 0 timer (secs): 0
data bytes 47/60 packets 4/8 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

R2#show tcp

```
Stand-alone TCP connection to host 10.64.9.100
Connection state is ESTAB, I/O status: 1, unread input bytes: 0
Local host: 10.1.2.2, Local port: 11020
Foreign host: 10.64.9.100, Foreign port: 1998
```

Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)

TCP driver queue size 0, flow controlled FALSE

Event Timers (current time is 0x2AB893F0):

Timer Starts Wakeups Next

Retrans 11 0 0x0

TimeWait 0 0 0x0

AckHold 10 0 0x0

SendWnd 0 0 0x0

KeepAlive 50 0 0x2AB8A290

!--- Sends keepalive packets and increments. GiveUp 0 0 0x0 PmtuAger 0 0 0x0 DeadWait 0 0 0x0
iss: 1072933807 snduna: 1072933977 sndnxt: 1072933977 sndwnd: 8023 irs: 1206945087 rcvnxt:
1206945244 rcvwnd: 8036 delrcvwnd: 156 SRTT: 231 ms, RTTO: 769 ms, RTV: 538 ms, KRTT: 0 ms
minRTT: 8 ms, maxRTT: 300 ms, ACK hold: 200 ms Flags: higher precedence, retransmission timeout,
keepalive running

!--- The keepalive status. Datagrams (max data segment is 536 bytes): Rcvd: 40 (out of order:
0), with data: 10, total data bytes: 156 Sent: 41 (retransmit: 0, fastretransmit: 0), with data:
10, total data bytes: 16 9

如需詳細資訊，請參閱[X.25 Route命令XOT Keepalive選項](#)。

疑難排解

使用本節內容，對組態進行疑難排解。

疑難排解指令

[輸出直譯器工具](#)(僅供已註冊客戶使用)(OIT)支援某些show命令。使用OIT檢視show命令輸出的分析。

附註：使用 debug 指令之前，請先參閱[有關 Debug 指令的重要資訊](#)。

- **debug x25 events** — 顯示除資料和資源記錄資料包之外的所有X.25流量的資訊。
- **debug ip tcp driver** — 顯示有關TCP驅動程式事件的資訊。

如果R2和R3之間的連線斷開，TCP連線將在保持連線期間後斷開。然後，show tcp命令的輸出在R2和R3路由器中都是空的。

當R2和R3的XOT介面關閉時，您可以觀察此調試輸出：

R2#**debug x25 events**

```
*Mar 10 05:36:24.685: [10.64.9.100,1998/10.1.2.2,11037]: XOT cx closed
*Mar 10 05:36:24.689: Serial0: X.25 O R1 Clear (5) 8 lci 1024
*Mar 10 05:36:24.693: Cause 9, Diag 0 (Out of order/No additional information)
*Mar 10 05:36:24.709: Serial0: X.25 I R1 Clear Confirm (3) 8 lci 1024
```

R2#**debug ip tcp driver**

```
*Mar 10 05:41:08.800: TCPDRV205B44: 10.1.2.2:11038 --> 10.64.9.100:1998 DoClose
(Cookie 402718) tcp close
```

R3#**debug x25 events**

```
*Mar 10 05:34:27.241: [10.1.2.2,11037/10.64.9.100,1998]: XOT cx closed
*Mar 10 05:34:27.245: Serial1: X.25 O R1 Clear (5) 8 lci 1024
*Mar 10 05:34:27.245: Cause 0, Diag 0 (DTE originated/No additional information)
```

*Mar 10 05:34:27.261: Serial1: X.25 I R1 Clear Confirm (3) 8 lci 1024

R3#**debug ip tcp driver**

*Mar 10 05:39:11.321: TCPDRV354BB8: 10.64.9.100:1998 --> 10.1.2.2:11038 DoClose
(Cookie 354B5C) tcp close

相關資訊

- [X.25和LAPB命令](#)
- [X.25通訊協定技術支援](#)
- [技術支援與文件 - Cisco Systems](#)