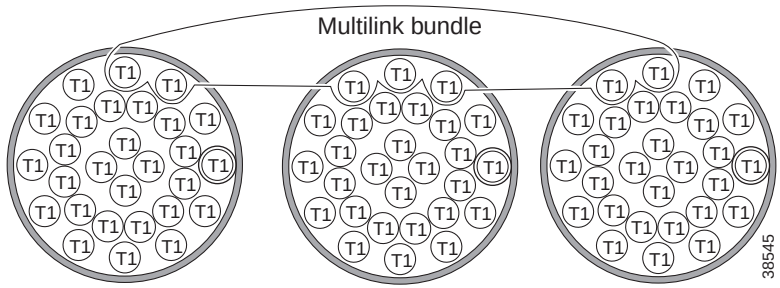
Configuring Multilink Point-to-Point Connections

Use the Cisco 10000 series ESR Multilink Point-to-Point Protocol (MLP) feature to bundle T1 interfaces into logical groups. This chapter provides the procedure for creating MLP bundles. For information on unsupported MLP commands, see the online *Cisco 10000 Series ESR Troubleshooting Guide.*

Figure 16-1 illustrates a multilink bundle consisting of T1 interfaces from three T3 interfaces.

Figure 16-1 Multilink Bundle Consisting of T1s from Multiple T3s

You can combine up to ten T1s to create a Multilink bundle.
The bundle can include T1 channels assigned to different T3s.



Tip You can use MLP to create a degree of redundancy by configuring a multilink bundle made up of T1 lines from more than one line card. If one line card stops operating, the part of the bundle on other line cards continues to operate.

Creating a New Multilink Group

This section explains how to create a new multilink group in which multiple T1 interfaces can be bundled. You can create up to 512 multilink groups on each Cisco 10000 series ESR.

Step 1 To create a new multilink group, enter the **interface multilink** command. In the following example, the multilink group is assigned the number 8, but it can be any number from 1 to 2147483647.

```
Router(config)# interface multilink 8
Router(config-if)#
```

Note You also use the **interface multilink** *number* command to enter interface configuration mode for an already existing multilink group.

Step 2 Use the **ppp chap hostname** command to assign a name that is used when you add T1 interfaces to the group. For example:

```
Router(config-if)# ppp chap hostname cambridge
```

Step 3 To create an IP address for the multilink group, use the **ip address** command. For example:

```
Router(config-if)# ip address 172.27.48.209 255.255.0.0
```

Step 4 Add any other configuration subcommands required for the enabling of routing protocols and adjust the interface characteristics.

Step 5 Exit out of interface configuration mode.

```
Router(config-if)# exit
Router(config)#
```

After creating the multilink group, you can assign T1 interfaces to it.

Note Multilink fragmentation is not supported on the Cisco 10000 series ESR. You must disable fragmentation on the remote end of the connection.

Adding T1 Lines to a Multilink Group

This section tells you how to add T1 interfaces to a multilink group. A multilink group consisting of multiple T1 interfaces is referred to as a multilink bundle.

You should assign only full T1 interfaces to a multilink group. You cannot assign more than ten T1 interfaces to a multilink group.

Step 1 Enter interface configuration mode for one of your T1 interfaces. The following example shows the command for entering a T1 interface on a CT3 line card:

```
Router(config)# interface serial 3/0/0/1:0
```

Step 2 If you have not already done so, specify the interface encapsulation as PPP.

```
Router(config-if)# encapsulation ppp
```

Step 3 Enter the **ppp multilink** command to enable this interface to support MLP.

```
Router(config-if)# ppp multilink
```

Step 4 Assign this interface to the multilink group. In this example, the interface is assigned to multilink group 8.

```
Router(config-if)# multilink-group 8
```

Step 5 Specify the PPP CHAP hostname. The hostname should be the same as the one assigned when you created the multilink group in the "Creating a New Multilink Group" section on page 16-2.

```
Router(config-if)# ppp chap hostname cambridge
```

Step 6 Exit out of interface configuration mode.

```
Router(config-if)# exit
Router(config)#
```

If the interface you added to the multilink bundle contains information such as an IP address, routing protocol, or access list, the router ignores that information. If you remove the interface from the multilink bundle, that information becomes active again.

To add more T1 interfaces to an already created multilink bundle, repeat Step 1 through Step 6.

Tip To move a T1 line to a different MLP bundle, follow the above procedure. Be sure to change the multilink-group number in Step 4 and the hostname value in Step 5.

Removing an Interface from a Multilink Bundle

To remove an interface from a multilink bundle, use the procedure described in this section.

Step 1 Enter interface configuration mode for the T1 interfaces you want to remove from a multilink bundle. For example:

```
Router(config)# interface serial 3/0/0/1:0
```

Step 2 Remove the interface from the multilink group.

```
Router(config-if)# no multilink-group
```

Step 3 Disable multilink for the interface.

```
Router(config-if)# no ppp multilink
```

Step 4 Remove the PPP authentication.

```
Router(config-if)# no ppp chap hostname
```

Step 5 Exit out of interface configuration mode.

```
Router(config-if)# exit
Router(config)#
```

After you remove PPP authentication, the interface is completely removed from the multilink bundle.

Show Commands

This section lists show commands you can use to obtain information about multilink bundles.

show interfaces multilink

Use the **show interfaces multilink** command to obtain statistics on a multilink bundle.

Example:

```
Router# show interfaces multilink 8
Multilink8 is up, line protocol is up
  Hardware is multilink group interface
  Internet address is 100.1.1.1/24
  MTU 1500 bytes, BW 15360 Kbit, DLY 100000 usec, rely 255/255, load
1/255
  Encapsulation PPP, crc 16, loopback not set
  Keepalive not set
  DTR is pulsed for 2 seconds on reset
  LCP Open, multilink Open
  Open:IPCP
  Last input 15:24:43, output never, output hang never
  Last clearing of "show interface" counters 15:27:59
  Queueing strategy:fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     36 packets input, 665 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     31 packets output, 774 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

show ppp multilink

Use the **show ppp multilink** command to obtain information about all existing multilink bundles and their member links.

Example:

```
Router# show ppp multilink
Multilink8, bundle name is group1
  Bundle is Distributed
  0 lost fragments, 0 reordered, 0 unassigned, sequence 0x0/0x9
rcvd/sent
  8 discarded, 4 lost received, 1/255 load
  Member links:10 active, 0 inactive (max 10, min not set)
    Serial3/0/0/1:0
    Serial3/0/0/2:0
    Serial3/0/0/3:0
    Serial3/0/0/4:0
    ...
```

show interfaces multilink stat

Use the **show interfaces multilink** *group-number* **stat** command to review traffic statistics for a multilink bundle.

Example:

```
Router# show interfaces multilink 8 stat
Multilink 8
          Switching path    Pkts In   Chars In   Pkts Out  Chars Out
               Processor         36        665         31        774
            Route cache           0          0          0          0
                  Total         36        665         31        774
```