# Troubleshooting Encapsulation Failures with the debug atm errors Command

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## Introduction

When you enable the **debug atm errors** command, encapsulation error messages are sometimes displayed. This document explains what these error messages mean.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

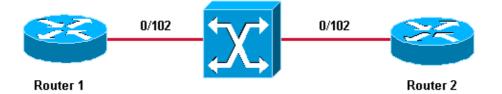This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

### Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

## Network Diagram

This document is based on this network setup:

**Router 1**     0/102        0/102     **Router 2**

## Notes

- 0/102 is the virtual path identifier/virtual channel identifier (VPI/VCI) value assigned on both ends of the permanent virtual connection (PVC) between Router 1 and Router 2.
- For the sake of clarity, 0/102 is switched to 0/102 by the ATM switch.
- These PVCs have been created on a multipoint subinterface.

# Configurations

This document uses these PVC configurations:

- Router 1
- Router 2

| Router 1 |
|---|

```
interface ATM6/0.102 multipoint
 ip address 11.1.1.1 255.255.255.0
 no ip directed-broadcast
 pvc 0/102
  protocol ip 11.1.1.2
  encapsulation aal5snap
```

| Router 2 |
|---|

```
interface ATM2/0.102 multipoint
 ip address 11.1.1.2 255.255.255.0
 no ip directed-broadcast
 pvc 0/102
  protocol ip 11.1.1.1
  encapsulation aal5snap
```

# Unicast Mapping Problem

In this example, a ping to 11.1.1.23 is attempted from Router 2 while the **debug atm error** command is turned on:

```
Router1# ping 11.1.1.23

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.1.1.23, timeout is 2 seconds:
   *Jul 12 05:01:26.161: ATM(ATM6/0): Encapsulation error1, link=7, host=B010117.
   *Jul 12 05:01:28.161: ATM(ATM6/0): Encapsulation error1, link=7, host=B010117.
   *Jul 12 05:01:30.161: ATM(ATM6/0): Encapsulation error1, link=7, host=B010117.
   *Jul 12 05:01:32.161: ATM(ATM6/0): Encapsulation error1, link=7, host=B010117.
   *Jul 12 05:01:34.161: ATM(ATM6/0): Encapsulation error1, link=7, host=B010117.
   Success rate is 0 percent (0/5)
```

You can see from this output that the ping fails and the encapsulation error message is recorded. The hexadecimal value B010117 is converted to decimal in this manner:

| Hexadecimal Value | Decimal Value |
|---|---|
| B | 11 |
| 01 | 1 |
| 01 | 1 |
| 17 | 23 |

The hexadecimal value displayed is equivalent to 11.1.1.23, which is the address to which the ping is sent.

## Why Does It Fail?

The interface ATM 2/0.102 is configured as a point–to–multipoint interface. Before it can reach a device on the other side of a PVC on this interface, mapping must exist between the IP address and the PVC. This mapping can be obtained using the **inarp** command or by statically configuring it, as shown in this document.

In this example, there is no mapping between 11.1.1.23 and a PVC:

```
Router2# show atm map

Map list ATM2/0.102pvc4 : PERMANENT
ip 11.1.1.1 maps to VC 4, VPI 0, VCI 102, ATM2/0.102
```

The only mapping that exists is between 11.1.1.1 and the PVC 0/102. Since there is no mapping for 11.1.1.23, the router can not send the packet and it therefore records an encapsulation failure.

## Solution

Whenever you see such an error message, decode the hexadecimal value and check why the mapping is not configured for that particular unicast IP address.

# Broadcast or Multicast Mapping Problem

In this example, this routing configuration is added to both routers:

```
router eigrp 1
 network 11.0.0.0
!
router rip
 network 11.0.0.0
```

When you issue the **debug atm error** command, this message is displayed:

```
!--- This timestamped line of output appears on one line:

.Jul 12 14:21:09.408: ATM(ATM2/0.102)
        Send:Error in encapsulation, No VC for address 0xFFFFFFFF
```

This message indicates that the router is not able to send a broadcast on the PVC.

## Why Does It Fail?

If you look closely at this configuration, you can see that the broadcast keyword under the PVC configuration is missing. Similar to the previous unicast problem, you must specify this keyword before you

can send a broadcast on the PVC. In this case, the broadcast is generated by the Routing Information Protocol (RIP).

This message is also sometimes displayed:

```
!--- Each of these timestamped lines of output appear on one line:

*Jul 12 06:09:50.945: ATM(ATM2/0.102)
        Send: Error in encapsulation, No VC for address 0xE000000A
*Jul 12 06:09:51.625: ATM(ATM2/0.102)
        Send: Error in encapsulation, No VC for address 0xE0000009

!--- E000000A corresponds to 224.0.0.10.
!--- E0000009 corresponds to 224.0.0.9.
```

Both of these addresses are being used by the Enhanced Interior Gateway Routing Protocol (EIGRP) configured on the routers. Again, these packets can not be sent because the `broadcast` keyword is missing under the PVC configuration.

Whenever you see those messages, they are probably due to a routing protocol not being able to send updates or hello packets across the PVC. They can also be caused by other types of multicast traffic, such as IP/TV.

## Solution

In order to allow broadcast and multicast messaging on the PVC, the configuration should be similar to this example, which is done on Router 2:

```
interface ATM2/0.102 multipoint
   ip address 11.1.1.2 255.255.255.0
   no ip directed-broadcast
   pvc 0/102
    protocol ip 11.1.1.1 broadcast
    encapsulation aal5snap
```

# Related Information

- **ATM (Asynchronous Transfer Mode) Support Pages**
- **Tools and Utilities – Cisco Systems**
- **Technical Support – Cisco Systems**