# Multiple Routed Protocols Over ATM PVCs Using VC Multiplexing

**Document ID: 10499**

## Contents

## Introduction

This document illustrates a sample configuration between two routers and an Asynchronous Transfer Mode (ATM) switch, using multiple routed protocols over permanent virtual circuits (PVCs). The configuration uses VC multiplexing, and the protocols used are IP and Internetwork Packet Exchange (IPX).

**Note:** This document focuses on PVC configurations on Cisco routers running Cisco IOS® Software. For PVC configuration examples on Cisco WAN switches, please click here.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

To implement this configuration, you need these software and hardware versions:

- Cisco IOS Software Release 10.3 or later. (Commands were enhanced in 11.3T, and the enhanced commands are used in the configurations immediately following the network diagram. Configurations using the earlier commands are provided at the end of this document.)
- Two Cisco routers
- An ATM switch

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 Cisco Technical Tips Conventions.

# Routed RFC 1483

When using PVCs, a user has two ways of carrying multiple protocols over ATM.

- **virtual circuit (VC) based multiplexing** The user defines one PVC per protocol. This uses more VCs than LLC encapsulation, but reduces overhead, because a header is not necessary.
- **Logical Link Control (LLC) Encapsulation** The user multiplexes multiple protocols over a single ATM VC. The protocol of a carried protocol data unit (PDU) is identified by prefixing the PDU with an LLC header. Refer to the sample configuration of Multiple Routed Protocols over ATM PVCs Using LLC Encapsulation.
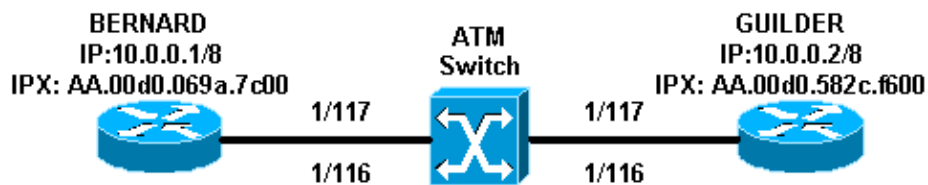
# Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

## Network Diagram

This document uses this network setup:



- In the example, 1/116 is switched to 1/116 by the ATM switch and 1/117 is switched to 1/117.
- Instead of using a static mapping with the IP or IPX remote address as shown in the configurations, Inverse Address Resolution Protocol (InARP) can be used on the PVCs configured on the multipoint subinterface using the commands:

```
protocol ip inarp broadcast
protocol ipx inarp broadcast
```

InARP does the mapping automatically.
- If you use point−to−point subinterfaces, you will have to assign one PVC (and thus one protocol) per point−to−point subinterface, and mapping is not necessary. This is the easiest and recommended way to implement routed RFC 1483.

## Configurations

This document uses these configurations:

- Bernard
- Guilder

**Bernard**

```
interface ATM2/0/0.116 multipoint
 ip address 10.0.0.1 255.0.0.0
 no ip directed-broadcast
 pvc ip 1/116
  protocol ip 10.0.0.2 broadcast
  encapsulation aal5mux ip
 !
 pvc ipx 1/117
  protocol ipx AA.00d0.582c.f600 broadcast
  encapsulation aal5mux ipx
 !
 ipx network AA
```

**Guilder**

```
interface ATM1/0.1 multipoint
 ip address 10.0.0.2 255.0.0.0
 no ip directed-broadcast
 pvc ip 1/116
  protocol ip 10.0.0.1 broadcast
  encapsulation aal5mux ip
 !
 pvc ipx 1/117
  protocol ipx AA.00d0.069a.7c00 broadcast
  encapsulation aal5mux ipx
 !
 ipx network AA
```

## Commands Used

- **pvc** *[name] vpi/vci* Create an ATM PVC on a main interface or subinterface.
- **encapsulation** *aal5snap|aal5mux* Configure the ATM adaptation layer (AAL) and encapsulation type for an ATM PVC, SVC, or VC class. Use one of the **aal5mux** encapsulation options to dedicate the specified PVC to a single protocol (called VC multiplexing); use the **aal5snap** encapsulation option to multiplex two or more protocols over the same PVC (called LLC multiplexing).
- **protocol** *protocol* **[broadcast]** Use the protocol command to configure a static map for an ATM PVC, SVC, or VC class and enable InARP or InARP broadcasts on an ATM PVC by either configuring InARP directly on the PVC or in a VC class. The keyword **broadcast** indicates that this map entry is used when the corresponding protocol sends broadcast packets to the interface.

## Earlier Cisco IOS Releases – Configurations

With Cisco IOS Software Releases earlier than 11.3T, the configurations would look like the following:

**Bernard**

```
interface ATM2/0/0.116 multipoint
 ip address 10.0.0.1 255.0.0.0
 no ip directed-broadcast
 atm pvc 6 1 116 aal5mux ip
 atm pvc 7 1 117 aal5mux novell
 map-group ip-ipx
 ipx network AA
!
map-list ip-ipx
 ip 10.0.0.2 atm-vc 6 broadcast
 ipx AA.00d0.582c.f600 atm-vc 7 broadcast
```

| Guilder |
|---|

```
interface ATM1/0.1 multipoint
 ip address 10.0.0.2 255.0.0.0
 no ip directed-broadcast
 map-group ip-ipx
 atm pvc 6 1 116 aal5mux ip
 atm pvc 7 1 117 aal5mux novell
 ipx network AA
!
map-list ip-ipx
 ipx AA.00d0.069a.7c00 atm-vc 7 broadcast
 ip 10.0.0.1 atm-vc 6 broadcast
```

## Earlier Cisco IOS Releases – Commands Used

These command are valid for Cisco IOS Software Releases earlier than 11.3T:

- **atm pvc** *vcd vpi vci aal−encap [[midlow midhigh] [peak average [burst]]]* **[inarp [minutes]]** Create a permanent virtual circuit (PVC) on an ATM interface and, optionally, generate Operation, Administration, and Maintenance (OAM) F5 loopback cells or enable Inverse ATM ARP.
- **map−group** *name* Associate an ATM map list to an interface or subinterface for either a PVC or SVC.
- **map−list** *name* Define an ATM map statement for either a PVC or SVC.
- *protocol protocol−address* **atm−vc** *vcd* **[broadcast]** Define an ATM map statement for a PVC. Must be used with the **map−list** *name* command.

**Note:** It is always recommended to use the newer syntax.

# Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show atm pvc** *[vpi/vci]* (for Cisco IOS Software Releases 11.3T and later) Display all ATM PVCs and traffic information, including the ATM VPI and VCI numbers.
- **show atm pvc interface atm** *[interface number]* Display all ATM PVCs and traffic information, including the interface number or subinterface number of the PVC. Displays all PVCs on the specified interface or subinterface.
- **show atm map** Display the list of all configured ATM static maps to remote hosts on an ATM network.
- **show atm traffic** Display current, global ATM traffic information to and from all ATM networks connected to the router.
- **show atm int atm** *slot/port* Display ATM−specific information about an ATM interface.

# Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

# Related Information

- **Multiple Routed Protocols Over ATM PVCs Using LLC Encapsulation**

- **ATM Technology Support Pages**
- **ATM Command Reference**
- **RFC 1483** ⬏
- **Technical Support – Cisco Systems**

---

---

Updated: Jun 05, 2005                                    Document ID: 10499