Configuring SMDS

The Switched Multimegabit Data Service (SMDS) is a WAN service offered by a variety of service providers. This chapter describes the configuration tasks for the SMDS packet-switched software.

For further general information about SMDS, see the chapter "Wide-Area Networking Overview" at the beginning of this book.

For a complete description of the commands mentioned in this chapter, refer to the chapter "SMDS Commands" in the Cisco IOS Wide-Area Networking Command Reference. To locate documentation of other commands that appear in this chapter, use the command reference master index or search online.

To identify the hardware platform or software image information associated with a feature, use the Feature Navigator on Cisco.com to search for information about the feature or refer to the software release notes for a specific release. For more information, see the section "Identifying Supported Platforms" in the chapter "Using Cisco IOS Software."

SMDS Hardware Requirements

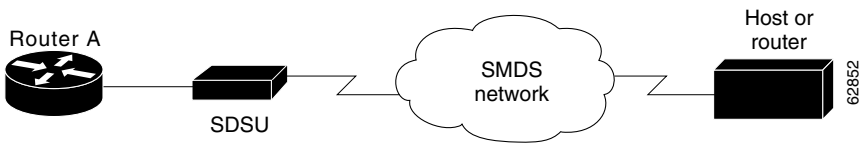
You need the following hardware, equipment, and special software to configure SMDS:

- CSC-MCI or CSC-SCI serial interface controller card, or a HSSI interface on chassis-based systems, or the serial port on a router

  To operate on CSC-SCI or CSC-MCI cards, SMDS requires that the appropriate microcode version be installed. Version numbers are 1.2 (or later) for CSC-SCI and 1.7 (or later) for CSC-MCI.
- EIA/TIA-449 or V.35 applique
- SMDS data service unit (SDSU) device

Figure 37 illustrates the connections among the components.

Figure 37 Typical SMDS Configuration



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Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

SMDS Addresses

All addresses for SMDS service are assigned by the service provider and can be assigned to individuals and groups.

You must enter addresses in the Cisco SMDS configuration software using an E prefix for multicast addresses and a C prefix for unicast addresses.

Cisco IOS software expects the addresses to be entered in E.164 format, which is 64 bits (15-digit addressing). The first 4 bits are the address type, and the remaining 60 bits are the address. If the first 4 bits are 1100 (0xC), the address is a unicast SMDS address, which is the address of an individual SMDS host. If the first 4 bits are 1110 (0xE), the address is a multicast SMDS address, which is used to broadcast a packet to multiple end points. The 60 bits of the address are in binary-coded decimal (BCD) format. Each 4 bits of the address field presents a single telephone number digit, allowing for up to 15 digits. At a minimum, you must specify at least 11 digits (44 bits). Unused bits at the end of this field are filled with ones.

Note The **arp smds** command supports 48-bit addresses only (C or E followed by 11 digits). The addresses must be entered in dotted notation—for example, C141.5556.1414.

An example of a 15-digit E.164 address follows:

```
C14155561313FFFF
```

Note Older versions of Cisco IOS software supported 48-bit SMDS addresses. If, when using the current version of the software, you write the configuration to NVRAM, the full 64-bit SMDS address is written. Older versions of the software will no longer be able to read the new SMDS configuration from NVRAM. However, the current version of the software can read previous versions of the configuration in NVRAM.

The addresses can be entered with periods in a manner similar to Ethernet-style notation, or simply as a string of digits.

The following is an example of an individual address entered in Ethernet-style notation:

```
C141.5555.1212.FFFF
```

The following is an example of a group address:

```
E180.0999.9999.FFFF
```

SMDS Configuration Task List

Before you can begin the configuration tasks, you must have already obtained your SMDS addresses from your service provider. You need the following two types of addresses:

- The group address for broadcasts
- The SMDS hardware (individual) address for each router that interfaces directly into the SMDS network (that is, customer premises equipment)

You must perform basic steps to enable SMDS. In addition, you can customize SMDS for your particular network needs and monitor SMDS connections. Perform the tasks in the following sections:

- Enabling SMDS on the Interface

- Customizing Your SMDS Network
- Monitoring the SMDS Connection

See the section "SMDS Configuration Examples," at the end of this chapter, for ideas of how to configure SMDS on your network.

Enabling SMDS on the Interface

Perform the tasks in the following sections to enable SMDS:

- Setting SMDS Encapsulation
- Specifying the SMDS Address
- Establishing Address Mapping
- Mapping a Multicast Address to an SMDS Address
- Enabling ARP
- Enabling Broadcast ARP Messages
- Enabling Dynamic Address Mapping for IPX over SMDS

Setting SMDS Encapsulation

To set SMDS encapsulation at the interface level, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# encapsulation smds`	Enables SMDS on the interface.

For examples of enabling SMDS encapsulation, see the "SMDS Configuration Examples" section later in this chapter.

Specifying the SMDS Address

To specify the SMDS individual address for a particular interface, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds address smds-address`	Enters an individual address provided by the SMDS service provider.

For examples of specifying the SMDS address, see the examples in the section "SMDS Configuration Examples" later in this chapter.

Establishing Address Mapping

Routing tables are configured dynamically when DECnet, extended AppleTalk, IP, IPX, and ISO CLNS routing are configured. However, you can configure static mapping for these protocols, if needed. For other protocols, you must configure a static map between an individual SMDS address and a higher-level protocol address.

To establish address mapping, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds static-map` *protocol protocol-address smds-address* `[broadcast]`	Defines static entries for those routers that are SMDS remote peers.

The supported protocols and the keywords to enable them are as follows:

- AppleTalk—**appletalk**
- Banyan VINES—**vines**
- DECnet—**decnet**
- IP—**ip**
- ISO CLNS—**clns**
- Novell IPX—**ipx**
- XNS—**xns**

For examples of establishing address mapping, see the "SMDS Configuration Examples" section later in this chapter.

Mapping a Multicast Address to an SMDS Address

You can map an SMDS group address to a broadcast or multicast address used by a higher-level protocol. If you do so, you need not specify the **broadcast** keyword in the **smds static-map** command, and the Cisco IOS software need not replicate each broadcast address.

To map an SMDS group address to a multicast address, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds multicast` *protocol smds-address*	Maps an SMDS group address to a multicast address used by a higher-level protocol.

The protocols supported and the keywords to enable them are as follows. Note that bridging is not a protocol, but the **bridge** keyword is valid for providing a map to a multicast address.

- AppleTalk—**appletalk**
- AppleTalk ARP address—**aarp**
- Banyan VINES—**vines**
- Bridging—**bridge**
- DECnet—**decnet**

- DECnet multicast address for all Level 1 routers—**decnet_router-L1**
- DECnet multicast address for all Level 2 routers—**decnet_router-L2**
- DECnet multicast address for all end systems—**decnet_node**
- IP—**ip**
- ISO CLNS—**clns**
- Multicast address for all CLNS intermediate systems—**clns_is**
- Multicast address for all CLNS end systems—**clns_es**
- Novell IPX—**ipx**
- XNS—**xns**

For examples of mapping to a multicast address, see the "SMDS Configuration Examples" later in this chapter.

Enabling ARP

When you enable the Address Resolution Protocol (ARP), you can choose to enable either a dynamic ARP cache or one built statically. To enable ARP, use one of the following commands in the specified configuration mode:

Command	Purpose
`Router(config-if)# smds enable-arp`	Enables ARP and dynamic address resolution (interface).
`Router(config)# arp` *ip-address smds-address* `smds`	Enables ARP with a static entry for the remote router (global).

An SMDS network can be thought of in much the same way as an X.25 cloud. The premises equipment (in this case Cisco routers) represents the edge of the cloud. The service provider enables communication across the cloud. However, proper configuration is needed for communication to occur. This configuration will differ from one protocol family to another.

One major difference between protocol families is dynamic versus static routing among the routers (called *remote peers*) on the periphery of the cloud. For IP, routing across the SMDS cloud is fully dynamic. No action on the user's part is needed to map higher-level protocol addresses to SMDS addresses. Both IP and ARP can be configured and a dynamic ARP routing table enabled.

Note The **arp smds** command requires 12-digit dotted-notation SMDS addresses—for example, C141.5678.9012.

See the section "Configuring Specific Protocols," later in this chapter, for more information about configuring higher-level protocols.

Enabling Broadcast ARP Messages

When an ARP server is present in the network, you can enable broadcast ARP messages that are sent to all ARP SMDS addresses or to all IP SMDS multicast addresses when ARP addresses are not present.

To enable broadcast ARP messages, use the following commands in interface configuration mode:

	Command	Purpose
Step 1	`Router(config-if)# smds enable-arp`	Enables ARP and dynamic address resolution.
Step 2	`Router(config-if)# smds multicast arp` *smds-address* [*ip-address mask*]	Enables broadcast ARP messages.

For an example of how to enable broadcast ARP messages, see the section "Typical Multiprotocol Configuration Example" later in this chapter.

Enabling Dynamic Address Mapping for IPX over SMDS

To enable dynamic address mapping for IPX on an SMDS interface, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds glean ipx` [*timeout-value*] [**broadcast**]	Enables dynamic address mapping for IPX.

For an example of how to enable dynamic address mapping for IPX over SMDS, see the section "IPX Dynamic Address Mapping Example" later in this chapter.

Customizing Your SMDS Network

Perform the tasks in the following sections to customize your SMDS network:

- Configuring Specific Protocols
- Enabling Transparent Bridging over SMDS
- Configuring SMDS Subinterfaces for Multiple Logical IP Subnetworks
- Reenabling Data Exchange Interface Version 3.2 with Heartbeat Support
- Configuring Pseudobroadcasting
- Enabling Fast Switching

Configuring Specific Protocols

Some protocol families are dynamically routed. For IP and CLNS, routing is fully dynamic, and no action on your part is needed to map higher-level protocol addresses to SMDS addresses. But for the other supported protocols, you must make a static entry for each router to communicate with all other peer routers. The static entries need to be made only for those routers that are SMDS remote peers. Nothing additional needs to be done to assure communication with other nodes behind the peer routers.

For an example of how to configure specific protocols, see the section "Typical Multiprotocol Configuration Example" later in this chapter.

Table 8 lists protocol families and the multicasts that are needed.

Table 8 Protocol Families and Types of Multicasts Needed

Protocol Family	Multicasts Needed
IP	IP
DECnet	DECNET, DECNET_NODE, DECNET_ROUTER-L1, DECNET_ROUTER-L2
CLNS	CLNS, CLNS_ES,CLNS_IS
Novell IPX	IPX
XNS	XNS
AppleTalk	APPLETALK, AARP
Banyan VINES	VINES

Configuring ARP and IP

For both IP and ARP, the multicast address must be configured and ARP must be enabled. ARP multicast is required only for ARP servers; the IP multicast is used for ARP and routing updates.

Configuring DECnet

Static maps must be configured for DECnet. In addition, a separate **smds multicast** command is needed for DECNET, DECNET_NODE, DECNET_ROUTER-L1, and DECNET_ROUTER-L2.

Configuring CLNS

Multicasts must be configured for CLNS_ES and CLNS_IS. No static maps are necessary. End system hello (ESH), intermediate system hello (ISH), and router hello packets are sent to the multicast address, and neighbor entries are created automatically.

Configuring IPX

For Novell IPX, the multicast address must be configured. A static map entry can be made for each remote peer, or you can use the **smds glean** command to dynamically map addresses. Static map entries override any dynamic map entries.

Routing Information Protocol (RIP) routing packets, Service Advertisement Protocol (SAP) packets, NetBIOS Name Lookups, directed broadcasts, and traffic to the helper addresses (if that helper address is a broadcast address) are sent to the SMDS IPX multicast address.

Configuring XNS

For XNS, the multicast address must be configured, and a static map entry must be made for each remote peer. Only RIP, directed broadcasts, and helper traffic are sent to the XNS multicast address.

Configuring AppleTalk

The SMDS cloud must be treated by all AppleTalk routers connected to it as either extended or nonextended. The network types cannot be mixed on the same SMDS cloud. Instead, all AppleTalk routers on an SMDS cloud must agree about the network type: extended or nonextended.

If any router in the SMDS cloud uses Cisco IOS Release 10.3(3) (or earlier), use a nonextended AppleTalk configuration for the SMDS cloud. To use nonextended AppleTalk, use the **appletalk address** command and configure static maps.

If all routers in the SMDS cloud use Cisco IOS Release 10.3(4) (or later), you can use extended AppleTalk to support dynamic AARP for SMDS addresses. To use extended AppleTalk, use the **appletalk cable-range** command.

For information on the **appletalk address** and **appletalk cable-range** commands, refer to the *Cisco IOS AppleTalk and Novell IPX Command Reference*.

For an example of how to configure AppleTalk, see the section "AppleTalk Configuration Examples" later in this chapter.

Configuring Banyan VINES

For Banyan VINES, the multicast address must be configured. Also note that VINES works only with static maps.

Enabling Transparent Bridging over SMDS

You can enable transparent bridging for SMDS encapsulated serial and HSSI interfaces. Cisco's implementation of IEEE 802.6i transparent bridging for SMDS supports 802.3, 802.5, and FDDI frame formats. The router can accept frames with or without frame check sequence (FCS).

Fast-switched transparent bridging is the default and is not configurable. If a packet cannot be fast switched, it will be process switched.

To enable transparent bridging, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	`Router(config)# interface type number`	Specifies a serial or HSSI interface.
Step 2	`Router(config-if)# encapsulation smds`	Configures SMDS encapsulation on the serial interface.
Step 3	`Router(config-if)# bridge-group bridge-group`	Associates the interface with a bridge group.
Step 4	`Router(config-if)# smds multicast bridge smds-address`	Configures bridging across SMDS.

For more information about bridge groups and the **bridge-group** command, see the "Configuring Transparent Bridging" chapter in the *Cisco IOS Bridging and IBM Networking Configuration Guide*.

Configuring SMDS Subinterfaces for Multiple Logical IP Subnetworks

Multiple logical IP subnetworks are supported as defined by RFC 1209. This RFC explains routing IP over an SMDS cloud where each connection is considered a host on one specific private network, and describes cases where traffic must transit from network to network.

This solution allows a single SMDS interface to be treated as multiple logical IP subnetworks and to support routing of packets from one network to the next without using intervening routers. When multiple logical IP subnetworks are enabled, the router performs routing between the subnetworks using IP addresses on an SMDS interface. Each supported subnetwork has an IP address, a unicast SMDS E.164 address, and a multicast SMDS E.164 address configured on the SMDS interface. Broadcast packets are duplicated and transmitted to all IP networks on the specified SMDS interface and use the associated multicast SMDS address for the network.

Only routers that require knowledge of multiple IP networks need to be configured with multipoint subinterfaces that correspond to different networks.

To configure the Cisco IOS software to have multipoint subinterfaces for multiple logical IP subnetworks, use the following commands beginning in global configuration mode:

	Command	Purpose

Step 1	`Router(config)# interface serial` *interface.subinterface* `multipoint`
	
	`Router(config)# interface serial` *slot/port.subinterface* `multipoint`
	(for Cisco 7000 series routers[1])
		Defines a logical subinterface for each IP network.

Step 2	`Router(config-if)# ip address` *ip-address mask*	Configures the subinterface as an IP network.
Step 3	`Router(config-if)# smds address` *smds-address*	Assigns unicast SMDS E.164 address to the subinterface.
Step 4	`Router(config-if)# smds multicast` *protocol smds-address*	Assigns multicast SMDS E.164 address for each protocol supported on the subinterface.
Step 5	`Router(config-if)# smds enable-arp`	Enables ARP on the subinterface, if required by the protocol.

1. Beginning in Cisco IOS Release 11.3, all commands supported on the Cisco 7500 series are also supported on the Cisco 7000 series.

For an example of how to configure multiple logical IP subnetworks, see the "Multiple Logical IP Subnetworks over SMDS Example" section later in this chapter.

Reenabling Data Exchange Interface Version 3.2 with Heartbeat Support

By default, SMDS provides the Data Exchange Interface (DXI) Version 3.2 *heartbeat* process as specified in the SIG-TS-001/1991 standard. The DXI mechanism encapsulates SMDS packets in a DXI frame before they are transmitted. The heartbeat mechanism automatically generates a heartbeat poll frame every 10 seconds. The Interim Local Management Interface (ILMI) is not supported. See the *Cisco IOS Wide-Area Networking Command Reference* for more information about DXI 3.2.

Note If you are running serial lines back-to-back, disable keepalive on SMDS interfaces. Otherwise, DXI declares the link down.

If you find you must reenable the DXI heartbeat, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds dxi`	Enables DXI 3.2.

Configuring Pseudobroadcasting

Some hosts do not support multicast E.164 addresses. This is a problem in IP where frequent broadcast packets are sent because routing updates are generally broadcast. IP and ARP depend on the use of multicast addresses to determine a route to a destination IP address. A mechanism was needed to artificially support the use of broadcast where multicast E.164 addresses do not exist; the result is *pseudobroadcasting*. If a multicast address is not available to a destination, pseudobroadcasting can be enabled to broadcast packets to those destinations using a unicast address.

To configure pseudobroadcasting, use the following command in interface configuration mode:

Command	Purpose
`Router(config-if)# smds static-map` *protocol protocol-address smds-address* `broadcast`	Configures pseudobroadcasting.

For an example of how to configure pseudobroadcasting, see the section "Pseudobroadcasting Example" later in this chapter.

Enabling Fast Switching

SMDS fast switching of IP, IPX, and AppleTalk packets provides faster packet transfer on serial links with speeds above 56 kbps. Use fast switching if you use high-speed, packet-switched, datagram-based WAN technologies such as Frame Relay offered by service providers.

By default, SMDS fast switching is enabled.

To re-enable fast switching, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	`Router(config)# interface` *type number*	Defines and enters interface configuration mode.
Step 2	`Router(config-if)# encapsulation smds`	Sets SMDS encapsulation.
Step 3	`Router(config-if)# ip route-cache`	Enables the interface for IP fast switching.
Step 4	`Router(config-if)# ipx route-cache`	Enables the interface for IPX fast switching.
Step 5	`Router(config-if)# appletalk route-cache`	Enables the interface for AppleTalk fast switching.

Monitoring the SMDS Connection

To monitor the SMDS connection, use one or more of the following commands in EXEC mode:

Command	Purpose
Router# **show arp**	Monitors ARP activity.
Router# **show smds addresses**	Displays the individual addresses and the interface with which they are associated.
Router# **show smds map**	Displays all SMDS addresses that are mapped to higher-level protocol addresses.
Router# **show smds traffic**	Displays packet traffic activity.

SMDS Configuration Examples

The following section provides typical configuration file examples you can use as models for your network configurations:

- Typical Multiprotocol Configuration Example
- Remote Peer on the Same Network Example
- IPX Dynamic Address Mapping Example
- AppleTalk Configuration Examples
- Multiple Logical IP Subnetworks over SMDS Example
- Pseudobroadcasting Example

Typical Multiprotocol Configuration Example

The following example is a typical interface configured for IP, DECnet, ISO CLNS, Novell IPX, XNS, and AppleTalk. DECnet needs to be configured globally and at the interface level.

```
interface serial 4
 ip address 1.1.1.2 255.0.0.0
 decnet cost 4
 appletalk address 92.1
 appletalk zone smds
 clns router igrp FOO
 ipx net 1a
 xns net 17
 encapsulation SMDS
! SMDS configuration follows
 smds address c120.1580.4721
 smds static-map APPLETALK 92.2 c120.1580.4592
 smds static-map APPLETALK 92.3 c120.1580.4593
 smds static-map APPLETALK 92.4 c120.1580.4594
 smds static-map NOVELL 1a.0c00.0102.23ca c120.1580.4792
 smds static-map XNS 17.0c00.0102.23ca c120.1580.4792
 smds static-map NOVELL 1a.0c00.0102.23dd c120.1580.4728
 smds static-map XNS 17.0c00.0102.23aa c120.1580.4727
 smds multicast NOVELL e180.0999.9999
 smds multicast XNS e180.0999.9999
 smds multicast ARP e180.0999.9999
 smds multicast IP e180.0999.9999
 smds multicast APPLETALK e180.0999.9999
 smds multicast AARP e180.0999.9999
 smds multicast CLNS_IS e180.0999.9990
```

```
 smds multicast CLNS_ES e180.0999.9990
 smds multicast DECNET_ROUTER e180.0999.9992
 smds multicast DECNET_NODE e180.0999.9992
 smds multicast DECNET e180.0999.9992
 smds enable-arp
```

Remote Peer on the Same Network Example

The following example illustrates a remote peer on the same SMDS network. DECnet needs to be configured globally and at the interface level.

```
interface serial 0
 ip address 1.1.1.1 255.0.0.0
 decnet cost 4
 appletalk address 92.2
 appletalk zone smds
 clns router igrp FOO
 ipx net 1a
 xns net 17
 encapsulation SMDS
! SMDS configuration follows
 smds address c120.1580.4792
 smds static-map APPLETALK 92.1 c120.1580.4721
 smds static-map APPLETALK 92.3 c120.1580.4593
 smds static-map APPLETALK 92.4 c120.1580.4594
 smds static-map NOVELL 1a.0c00.0102.23cb c120.1580.4721
 smds static-map XNS 17.0c00.0102.23cb c120.1580.4721
 smds static-map NOVELL 1a.0c00.0102.23dd c120.1580.4728
 smds static-map XNS 17.0c00.0102.23aa c120.1580.4727
 smds multicast NOVELL e180.0999.9999
 smds multicast XNS e180.0999.9999
 smds multicast IP e180.0999.9999
 smds multicast APPLETALK e180.0999.9999
 smds multicast AARP e180.0999.9999
 smds multicast CLNS_IS e180.0999.9990
 smds multicast CLNS_ES e180.0999.9990
 smds multicast DECNET_ROUTER e180.0999.9992
 smds multicast DECNET_NODE e180.0999.9992
 smds multicast DECNET e180.0999.9992
 smds enable-arp
```

IPX Dynamic Address Mapping Example

The following example enables dynamic address mapping for IPX on interface serial 0 and sets the time to live (TTL) to 14 minutes.

```
interface serial 0
 encapsulation smds
 smds address c141.5797.1313
 smds multicast ipx e180.0999.9999
 smds glean ipx 14
```

AppleTalk Configuration Examples

The following two sections provide basic examples of configuration for an extended AppleTalk network and for a nonextended AppleTalk network. For more information on AppleTalk commands, refer to the *Cisco IOS AppleTalk and Novell IPX Command Reference.*

Extended AppleTalk Network Example

If all AppleTalk routers on the SMDS cloud are running Cisco IOS Release 10.3(4) or later releases, you can use an AppleTalk extended network. To do so, use the **appletalk cable-range** interface command.

When SMDS is configured for an extended AppleTalk network, SMDS static maps are not required and not used. Dynamic AARP is supported on the multicast channel.

```
interface Serial0
 ip address 192.168.200.1 255.255.255.0
 encapsulation smds
 appletalk cable-range 10-10
 appletalk zone SMDS
 smds address c151.0988.1923
 smds static-map ip 192.168.200.2 c151.0988.8770
 smds multicast APPLETALK e151.0988.2232
 smds multicast AARP e151.0988.2232
 smds multicast IP e151.0988.2232
 smds multicast ARP e151.0988.2232
 smds enable-arp
```

Nonextended Appletalk Network Example

The following example configures SMDS for a nonextended AppleTalk network. When SMDS is configured for a nonextended AppleTalk network, SMDS static maps are required and the **appletalk address** command is used. Dynamic AppleTalk Address Resolution Protocol (AARP) is not supported on the multicast channel.

```
interface Serial0
 ip address 192.168.200.1 255.255.255.0
 encapsulation smds
 appletalk address 10.1
 appletalk zone SMDS
 smds address c151.0988.1923
 smds static-map ip 192.168.200.2 c151.0988.8770
 smds static-map appletalk 10.2 c151.0988.8770
 smds multicast APPLETALK e151.0988.2232
 smds multicast IP e151.0988.2232
 smds multicast ARP e151.0988.2232
 smds enable-arp
```

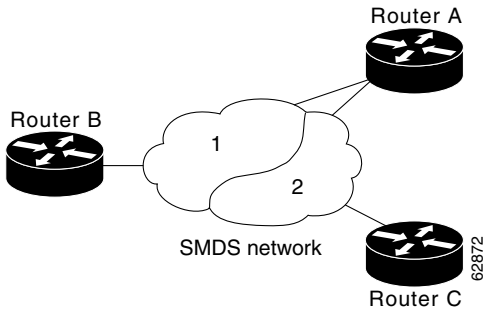
Multiple Logical IP Subnetworks over SMDS Example

In the following example, routers A, B, and C are connected to an SMDS cloud by means of two logical subnetworks labeled 1 and 2, as shown in Figure 38.

Router A recognizes two IP networks and can communicate with Routers B and C directly. Router B can communicate with router A directly, and with router C through router A. Router C can communicate with router A directly and with router B through router A.

Notice that a packet destined to router B from router C must make two hops on the cloud through the same interface on router A. Notice also that this configuration is nonstandard. This issue was considered when the multiple logical IP subnetworks proposal was made, and was deemed not to be critical.

Figure 38 Multiple Logical IP Subnetworks Configuration



The following example shows all routers as Cisco 7200 routers, but they can be other platforms.

Configuration for Router A

```
interface serial 2/0
 encapsulation smds
!
interface serial 2/0.1 multipoint
 smds addr c111.3333.3333
 ip address 2.2.2.1 255.0.0.0
 smds multicast ip e122.2222.2222
 smds enable-arp
 smds multicast ARP e122.2222.2222
```

Configuration for Router B

```
interface serial 4/0
 encapsulation smds
 smds address c111.2222.2222
 ip address 1.1.1.3 255.0.0.0
 smds multicast ip e180.0999.9999
 smds enable-arp
```

Configuration for Router C

```
interface serial 1/0
 encapsulation smds
 smds address c111.4444.4444
 ip address 2.2.2.2 255.0.0.0
 smds multicast ip e122.2222.2222
 smds enable-arp
```

Pseudobroadcasting Example

In the following example, an ARP broadcast from router A is sent to multicast address E180.0999.9999.FFFF to router B and to unicast address C120.1234.5678.FFFF to router C. The reply from router C uses the unicast address C120.1111.2222.FFFF for the return reply if it is the target of the ARP request. IGRP broadcast updates follow the same rules.

Configuration for Router A

```
interface s 0
 encapsulation smds
 smds address c120.1111.2222
 ip address 172.20.1.30 255.255.255.0
 smds multicast ip e180.0999.9999
```

```
 smds static-map ip 172.20.1.10 c120.1234.5678 broadcast
 smds enable-arp
```

Configuration for Router B

```
interface s 4
 smds address c120.9999.8888
 ip address 172.20.1.20
 smds multicast ip e180.0999.9999
 smds enable-arp
```

Configuration for Router C

```
interface serial 2
 smds address c120.1234.5678
 ip address 172.20.1.10
 smds static-map ip 172.20.1.30 c120.1111.2222 broadcast
 smds enable-arp
```
