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Configuring FRAS BAN Router with Ethernet–Connected Devices

Document ID: 5314

Introduction

Prerequisites

- Requirements
- Components Used
- Conventions

Configure

- Network Diagram
- Diagram Notes
- Configurations
- Configuration Notes

Verify

Troubleshoot

- Troubleshooting Commands
- FRAS States

Related Information

Introduction

In this sample configuration, a Cisco router configured for Frame Relay Access Support (FRAS) border access node (BAN) is connected to Ethernet end devices. These end devices, in turn, are communicating with a router that is configured as a FRAS Host.

Note: The FRAS Host router can be replaced with a Network Control Program (NCP) with a Frame Relay connection; the configuration of the FRAS BAN router remains the same.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on Cisco IOS® software with the IP PLUS feature set, supporting IBM features.

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 .

Configure

This section provides information to configure the features described in this document.

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

Network Diagram

This document uses this network setup:

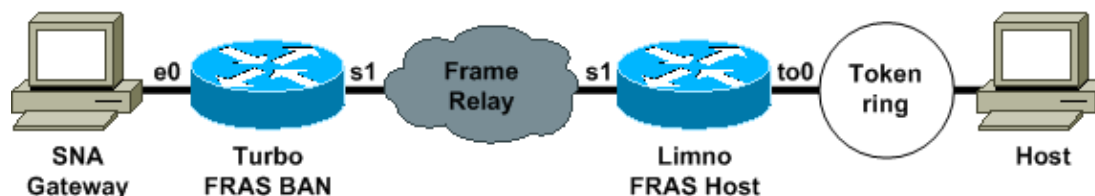


Diagram Notes

The System Network Architecture (SNA) Gateway uses these Media Access Control (MAC) values:

```
smac = 0000.2222.0000 (canonical)
dmac = 0200.2222.0000 (canonical)
lsap = 0x04
dsap = 0x04
```

Note: For easy reference, these are the bitswapped values of those MAC addresses (for more information, use the Bitswapping Tool (registered customers only));

```
smac = 0000.4444.0000 (non-canonical)
dmac = 4000.4444.0000 (non-canonical)
```

The Host uses this MAC value on to0:

```
smac = 4000.3745.0000 (non-canonical)
```

Configurations

This document uses these configurations:

- FRAS BAN Router
- FRAS Host Router

FRAS BAN Router
<pre>turbo# show running-config Building configuration... ! hostname turbo ! source-bridge ring-group 100 source-bridge transparent 100 200 10 1 !</pre>

```

!
interface Ethernet0
mac-address 0000.5555.0000
ip address 5.5.5.1 255.255.255.0
no ip directed-broadcast
bridge-group 1
!
interface Serial1
ip address 2.2.2.1 255.255.255.0
no ip directed-broadcast
encapsulation frame-relay IETF
no keepalive
frame-relay map llc2 20
frame-relay interface-dlci 20
fras ban 300 3 100 4000.4444.0000 dlci 20 bni 4fff.0000.0000
!
bridge 1 protocol ieee
!
end

```

FRAS Host Router

```

limno# show running-config

Building configuration...
!
hostname limno
!
source-bridge ring-group 500
!
interface Serial1
ip address 2.2.2.2 255.255.255.0
no ip directed-broadcast
encapsulation frame-relay IETF
no keepalive
clockrate 4000000
frame-relay map llc2 20
frame-relay interface-dlci 20
!
interface TokenRing0
ip address 4.4.4.2 255.255.255.0
no ip directed-broadcast
ring-speed 16
source-bridge 10 1 500
source-bridge spanning
!
interface Virtual-TokenRing0
no ip address
no ip directed-broadcast
ring-speed 16
source-bridge 400 1 500
source-bridge spanning
fras-host ban Serial1 hmac 4000.3745.0000 bni 4fff.0000.0000
!
end

```

Configuration Notes

The destination MAC (DMAC) of the Ethernet station is the bitswapped MAC value of the MAC configured in the **fras ban** statement on Turbo (4000.4444.0000). In this case, the Ethernet end stations are pointing to 0200.2222.0000.

The FRAS BAN and FRAS Host routers must both have the same Boundary Node Identifier (BNI) MAC addresses. By default, Cisco IOS software uses 4FFF.0000.0000. If you are using a Frame-Relay-attached front-end processor (FEP), instead of a FRAS Host router, then you must get the BNI MAC address and configure it on the FRAS BAN router (if the address is different from the Cisco default value).

The FRAS BAN router configuration contains the **fras ban 300 3 100 4000.4444.0000 dlci 20 bni 4fff.0000.0000** command. This command accepts incoming connections to the BAN MAC address (4000.4444.0000) but only to service access point (SAP) 0x04 so the destination service access point (DSAP) on the end devices must be 0x04. On the Frame Relay side, the router sends data over data-link connection identifier (DLCI) 20 with a DMAC address of 4FFF.0000.0000, which must match the FRAS Host or NCP configuration. Ring number 300 is assigned to the Frame Relay cloud and points to the virtual ring of the router (100) through bridge 3.

The FRAS BAN router is configured for Source Route Translational Bridging (SR/TLB) to accept the incoming Ethernet stations.

The FRAS Host router configuration contains the **fras-host ban Serial1 hmac 4000.3745.0000 bni 4fff.0000.0000** command. This command enables the FRAS Host function for the BAN router to accept incoming BAN frames that arrive at Serial1 with a DMAC of 4FFF.0000.0000. The router sends the Logical Link Control (LLC) frames to the MAC address specified in the host MAC (HMAC) parameter. The HMAC should match the MAC address of the Channel Interface Processor (CIP) adapter or the LAN-attached host.

In this sample configuration, the Frame Relay connection is back-to-back (no Frame Relay switch in the middle). No Local Management Interface (LMI) or keepalives are configured.

Verify

This section provides information to confirm that 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.

You can use these show commands to verify each configuration:

FRAS BAN Router						
turbo# show fras						
Boundary Network Node (BNN):						
Boundary Access Node (BAN):						
DLCI: 20 BNI: 4fff.0000.0000						
Type	Source	Int	LSap	Rsap	Role	State
llc	4000.4444.0000	Bu300	4	4	P	ls_Contacted
fr	0000.4444.0000	Se1	4	4	S	ls_Contacted
turbo# show llc						
LLC2 Connections: total of 2 connections						
Buff Ring300 DTE: 0000.4444.0000 4000.4444.0000 04 04 state NORMAL						
V(S)=1, V(R)=1, Last N(R)=1, Local window=7, Remote Window=127						
akmax=3, n2=10,						
xid-retry timer 0/0 ack timer 0/1000						
p timer 0/1000 idle timer 7680/10000						

```
rej timer 0/3200 busy timer 0/9600
akdelay timer 0/100 txQ count 0/200
RIF: 0890.0C8A.0643.12C0
```

```
Serial1 DTE: 4fff.0000.0000 0000.4444.0000 04 04 state NORMAL
V(S)=1, V(R)=1, Last N(R)=1, Local window=7, Remote Window=127
akmax=3, n2=10,
xid-retry timer 0/0 ack timer 0/1000
p timer 0/1000 idle timer 7010/10000
rej timer 0/3200 busy timer 0/9600
akdelay timer 0/100 txQ count 0/200
```

FRAS Host Router

```
limno# show fras-host
```

```
Number of Active Control Blocks = 1
Number of Available Control Blocks in Pool = 127
```

Port	Dlci	Type	FrRsap	FrLsap	HostSap	FrMac/VMac	HostMac
Sel	20	BAN	04	04	04	0000.4444.0000	4000.3745.0000

```
limno# show fras-host dlci 20
```

```
Number of Active Control Blocks = 1
Number of Available Control Blocks in Pool = 127
```

Port	Dlci	Type	FrRsap	FrLsap	HostSap	FrMac/VMac	HostMac
Sel	20	BAN	04	04	04	0000.4444.0000	4000.3745.0000

```
limno# show fras-host detail
```

```
Number of Active Control Blocks = 1
Number of Available Control Blocks in Pool = 127
```

```
Port = Sel, Dlci = 20, Type = BAN, FrRsap = 04, FrLsap = 04, HostSap = 04
Host Mac = 4000.3745.0000, Rif = 0810.1901.1F41.00A0, Bni = 4fff.0000.0000
Frames Fwd to Host = 211, Last Rcvd From Frad = 7 sec
Fr Mac = 0000.4444.0000, Rif = NONE
Frames Fwd to Frad = 213, Last Rcvd from Host = 7 sec
```

```
limno# show fras-host serial 1
```

```
Number of Active Control Blocks = 1
Number of Available Control Blocks in Pool = 127
```

Port	Dlci	Type	FrRsap	FrLsap	HostSap	FrMac/VMac	HostMac
Sel	20	BAN	04	04	04	0000.4444.0000	4000.3745.0000

```
limno# show llc
```

```
No LLC2 connections
```

Troubleshoot

This section provides information to troubleshoot your configuration.

Troubleshooting Commands

It is recommended that you configure the same Network Time Protocol (NTP) source on both routers, to synchronize their clocks so that it easier to match **debug** command output.

Note: Before you issue **debug** commands, refer to Important Information on Debug Commands.

You can turn on these debugs on the FRAS BAN router:

- **debug fras error** Displays information about FRAS protocol errors.
- **debug fras state** Displays information about link–state changes for the FRAS data–link control. Refer to FRAS States Defined for definitions of these states.
- **debug fras message** Displays general information about FRAS messages.

You can turn on these debugs on the FRAS Host router:

- **debug fras–host packet** Shows which LLC2 session frames the FRAS Host is handling.



Caution: Use this command with great care. If many LLC2 sessions are active and passing data, this command might generate large amounts of output to the console and impact performance.

- **debug fras–host error** Enables the FRAS Host to send error messages to the console.
- **debug fras–host activation** Displays the LLC2 session activation and deactivation frames that the FRAS Host is handling, such as exchange identification (XID), Set Asynchronous Balanced Mode Extended (SABME), disconnect (DISC), and unnumbered acknowledgment (UA).



Caution: Use this command with great care. If many LLC2 sessions are being activated or deactivated at any time, this command might generate large amounts of output to the console and impact performance.

FRAS States

For definitions of FRAS states, refer to FRAS States Defined.

Related Information

- [Technology Support](#)
- [Product Support](#)
- [Technical Support & Documentation – Cisco Systems](#)

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Updated: Sep 14, 2005

Document ID: 5314
