CISCO

November 2007

Configuring BFS In-Band Transport Using an Ethernet Network with System Release 2.7/3.7/4.2

Overview

Introduction

This document provides detailed configuration information for distributing Broadcast File System (BFS) data inband (IB) using an MPEG processor and system release (SR) 2.7/3.7/4.2.

Purpose

MPEG processors are quickly becoming a popular choice for systems that deploy switched digital video (SDV) and ad insertion. Operators might also want to use an MPEG processor to distribute BFS IB using their Gigabit Ethernet (GbE) networks, allowing them to remove their ASI distribution networks.

Though the examples in this document use the Cisco Digital Content Manager (DCM) 9900 as the MPEG processor, the configurations in this document allow your BFS to work with most any brand of MPEG processor.

Scope

This document describes two configurations. The first configuration uses a single DCM to receive the ASI output from the DNCS, transport the BFS IB over a GbE transport network, and terminate the sessions on a GQAM using its GbE interface.

The second configuration uses one DCM to receive the ASI output from the DNCS, transport the BFS IB over a GbE transport network, and then uses another remote DCM to convert the GbE stream to an ASI stream for the BFS QAM.

Note: It is beyond the scope of this document to provide detailed procedures for setting up the network components and the DCM components of this configuration. Please refer to the appropriate documentation for those procedures.

Audience

This document was written for headend technicians. Cisco field service engineers and Cisco Service engineers may also find the information in this document helpful.

Related Publications

You may find the following publications useful as resources when you implement the procedures in this document. *DCM User's Guide* (part number 4003867)

- *Digital Content Manager (DCM) Model D9900 Configuration Guide* (part number 4011746)

- *Distributed Broadcast File System Configuration Guide For System Releases 2.7, 3.7, and 4.2* (part number 4017541)

- *Ensuring Proper GQAM Operation and Provisioning of the GbE Port* (part number 4017870)

- *Gigabit QAM Modulator Model D9479 Hardware Installation and Operation Guide* (part number 745431)

- *Provisioning the Gigabit Ethernet Port on the Gigabit QAM Modulator* (part number 4002333)

Document Version

This is the second release of this document.

Configuration Using a Single DCM

This configuration uses a single DCM to receive the ASI output from the DNCS, transport the BFS IB over a GbE transport network, and terminate the sessions on a GQAM using its GbE interface.

This configuration uses a dummy QAM for the automatically provisioned BFS sessions and requires that continuous feed (CF) sessions be provisioned on the GQAM.

Note: It is beyond the scope of this document to provide detailed procedures for setting up the network components and the DCM components of this configuration. Please refer to the appropriate documentation for those procedures.

Configuration Considerations

There are several options and recommendations to consider when you configure the BFS for multicast transport.

■ **Multicast or unicast?**

We recommend that you use multicast, since each remote headend distributes the same BFS IB content to the set-tops.

■ **Multi-Program Transport Stream (MPTS) or Single-Program Transport Stream (SPTS)?**

You can configure the DCM to transmit the BFS IB sources in a single MPTS or each source as a SPTS. Typically, we recommend SPTS because of the following advantages:

■ **Redundancy** - If you have redundant BFS IB sources, then each source should be an SPTS so the GQAM can choose an alternate DCM if an individual BFS source fails. If you use MPTS, the GQAM must switch to the alternate DCM for all BFS sources, even if only one BFS source fails.

■ **Troubleshooting** - Using SPTS makes BFS IB troubleshooting easier since each BFS source has its own multicast IP address.

Example: A GbE MPEG analyzer can provide important information regarding the BFS IB source (such as the data rate), using the multicast IP address as a filter without requiring deeper MPEG2 packet inspection.

The disadvantage to using SPTS is that each BFS source must have a unique IP address. Typically, the number of BFS IB sources is limited (usually less than 40), so this might not be an issue for most operators.

If you use MPTS, the DCM uses the same IP address for all of the BFS sources.

■ **Source-specific multicast (SSM) or anycast?**

Using SSM is only required if you want the GQAM to include the Source IP address in the IGMP message. Cisco recommends using SSM to simplify the multicast routing configuration, to ensure the multicast received by the GQAM is from a "qualified" video source, and to facilitate use of a redundant BFS source. Otherwise, you can use anycast (for example, IGMPv2/PIM-SM). If you want to use SSM for BFS IB multicast, you must configure the BFS sources with the same IP address range configured on the routers. We recommend that you use the standard IANA IP address range 232/8.

Tip: If you are using SPTS, you can easily identify the BFS source by matching the last octet of the IANA IP address to the program number.

If you use SSM, the BFS source IP address is required when you set up the GQAM multicast session.

■ **Transrating?**

Transrating is not required, since the DNCS transmits BFS using ASI at a constant rate, and the set-tops require that the DCM not change the data. In the DCM, the BFS programs on the ASI input are "dragged" directly to the GbE output port and assigned a data rate that matches the DNCS settings (plus a small overhead to avoid continuity issues).

■ **Bootloader recommendations?**

You should use the same frequency for all QAM carriers that carry BFS.

Configuring a Single DCM for BFS Multicast

Before you begin the configuration on the DNCS, you must configure the DCM using the following steps.

Note: Refer to the *Digital Content Manager (DCM) Model D9900 Configuration Guide* (part number 4011746) for specific procedures related to these steps.

1 Assign the BFS sources from the programs listed under the DCM ASI input to a GbE port.

2 Are you using SPTS or MPTS?

 ■ **If you are using SPTS**, set the multicast IP address for each BFS source.

 ■ **If you are using MPTS**, assign one IP address to the transport stream (TS) that carries all the BFS IB sources.

3 Set the data rate for each output program. This data rate should match the setting in the BFS Administration Source Configuration window with the addition of a small amount of overhead (0.1 Mbps for each source).

Configuring the BFS Using a Single DCM

To begin the process, you must create a source definition for each BFS source with a unique session ID.

Note: A source definition is required for each remote QAM that carries BFS IB.

1   On the DNCS Administrative console, click the **DNCS** tab.

2   Click the **System Provisioning** tab.

3   Click **Source**. The Source List window opens.

4   Click the Source ID column twice to sort the source IDs from the lowest to the highest number.

5   Click to highlight the row of the source name and source ID for which you want to build an additional session.

6   Click **File > Source Definitions**. The Source Definition List window opens listing the available source definitions with their session IDs for the source you selected.

7   Click **File > New Digital**. The Set Up Digital Source Definition window opens.
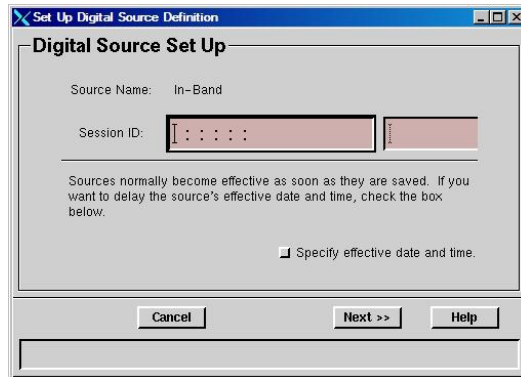
8   For **Session ID**, type a unique session ID number in the first box and the source ID number in the second box.

   Example: The session ID for the In-Band source shown on the Source Definition List window is **00:00:00:00:00:00 2**. Therefore, the next unique session ID for the In-Band source will be **00:00:00:00:00:01 2** as shown in the following illustration.
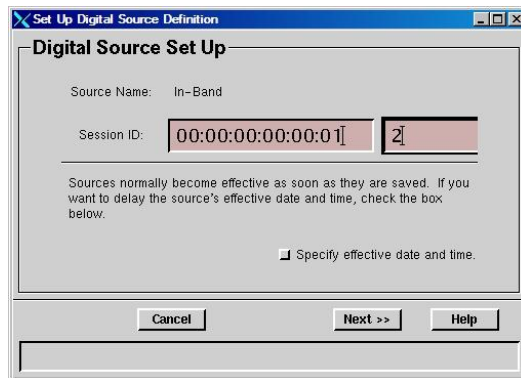
9   Click **Next**. The Define Session dialog box opens.

10 Select the **Multicast through a GQAM option** and click **Next**. The Multicast Digital Session Setup window opens.

11 Configure the following fields on the Multicast Digital Session Setup window:

- **Bandwidth** - Enter the maximum amount of bandwidth (in Mbps) that the system should allow for this service. This setting must match the data rate set in the DNCS (**Application Interface Modules tab > BFS Admin > Hosts tab > dncsatm (double-click) > Bandwidth**).

- **QAM Name** - Select the name of the GQAM that will multicast this source from the list.

- **Output Carrier** - Select the same carrier for all BFS sessions from the list.

- **Program Number** - Type the BFS source number being fed into the transport stream. This number must match the program number of the MPEG source defined in the DNCS (**Application Interface Modules tab > BFS Admin > Hosts tab > dncsatm (double-click) > PAT Configuration > Program Number**).

  Note: The Program Number is required for MPTS. If you are using SPTS, only the bootloader BFS source must have the Program Number.

- **Source Address 1** - Enter the GbE IP address of the DCM.

- **Source Address 2** - If you use redundant sources, enter the first backup IP address. Otherwise, leave blank.

- **Source Address 3** - If you use redundant sources, enter the second backup IP address. Otherwise, leave blank.

- **Input Destination Multicast IP Address** - Enter the destination multicast IP address.

  Notes:

  – For SPTS, each BFS IB source must have a distinct IP address.

  – For MTPS, the same IP address is used, and the program number differentiates the sessions.

- **UDP Port** - Leave blank.

12 Click **Save**. The system saves the multicast session in the DNCS database and starts the session you built for it. The Multicast Digital Session Definition window updates to include the new session information.

Configuring the Network for Multicast BFS Transport

Once you have set up the DCM and the DNCS for multicast BFS transport, you must set up your network to make sure that the multicast streams are available to the GQAM GbE interface. Typically, you would configure multicast routing in your network to achieve this. Some general steps to configure the network for multicast routing are listed below.

1 Configure IP multicast routing on each router in the network.

2 Enable a multicast routing protocol on the router interfaces to the DCM and the GQAM.

3 Make sure that routes exist from the DCM GbE interface to the GQAM GbE interface subnet. If you are not using SSM, make sure that routes from the Rendezvous Point to the GQAM GbE subnet interface also exist.

4 Enable IGMP on the router interface to the GQAM.

   Important: If you are using SSM, you must use IGMPv3.

Configuration Using a Remote DCM

The DNCS currently does not support assigning a GQAM as the BFS QAM when using the GbE interface of the GQAM. Therefore, to remotely locate the BFS QAM from the DNCS, you must use two DCMs. This configuration uses one DCM to receive the ASI output from the DNCS, transport the BFS IB over a GbE transport network, and then uses another remote DCM to convert the GbE stream to an ASI stream for the BFS QAM.

The configuration described in this section uses only one BFS QAM, and therefore does not require continuous feed (CF) sessions. You will need to use CF sessions for each additional QAM that you provision with BFS sessions. Specific instructions for configuring CF sessions to multiple ASI QAMs carrying BFS are available in the *DNCS Online Help for SR 2.7/3.7/4.2.*

Cisco recommends that you use the same frequency for all QAMs carrying BFS to limit image download issues.

Note: It is beyond the scope of this document to provide detailed procedures for setting up the network components and the DCM components of this configuration. Please refer to the appropriate documentation for those procedures.

Configuration Considerations

The configuration considerations are very similar to the single DCM/remote GQAM *Configuration Considerations* (on page 3). Only the differences between the two configurations are listed below.

- **Multicast or unicast?**

  This configuration example is for remotely locating the BFS QAM from the DNCS; therefore, only one QAM carrying BFS is used. In the case of this example, we recommend unicast transport.

- **Source-specific multicast (SSM) or anycast?**

  If you are using unicast transport, this selection is not applicable.

- **Bootloader recommendations?**

  This section is not applicable, since only one QAM will carry BFS.

Configuring the Headend DCM for BFS Unicast

Important: This DCM configuration is used only if you are using unicast to deliver the BFS sources from the headend DCM to the remote DCM.

Note: Refer to the *Digital Content Manager (DCM) Model D9900 Configuration Guide* (part number 4011746) for specific procedures related to these steps.

1 The headend DCM must have a route from its GbE interface (used to output BFS sources) to the remote DCM GbE interface (used as the input for BFS sources).

2 The destination IP for each BFS source must be the remote DCM GbE interface.

- **If you are using SPTS**, set the destination IP address for each BFS source.

- **If you are using MPTS**, assign the destination IP address to the transport stream (TS) that carries all the BFS IB sources.

3 If you are using SPTS, each source must have a unique UDP port.

4 Assign a data rate that matches the data rate in the DNCS (**Application Interface Modules tab > BFS Admin > Hosts tab > dncsatm (double-click) > Bandwidth**) plus a slight amount of overhead (0.1 Mbps).

Configuring the Network for Multicast BFS Unicast

Update the routing configuration of all applicable routing elements in the network so that the packets from the headend DCM are routed to the remote DCM GbE interface.

Configuring the Remote DCM for Unicast BFS Transport

Use the following steps to configure the remote DCM for unicast BFS transport.

Note: Refer to the *Digital Content Manager (DCM) Model D9900 Configuration Guide* (part number 4011746) for specific procedures related to these steps.

Important:

1   If the DCMs are configured properly, each BFS source will be listed under the input GbE port pair.

2   Once all BFS sources are present on the GbE input, drag each source to a TSID under an ASI port designated for output.

3   Update the ASI output TSID to match the TSID used by the DNCS HMUX ASI card.

   Note: You can verify the TSID on the DNCS HMUX card by using the following steps:

   a   On the DNCS Administrative Console, click the **Application Interface Modules** tab.

   b   Click **BFS Admin**. The DNCS BFS Administration window opens.

   c   On the **Hosts** tab, click **dncsatm**.

   d   The output TSID is listed in the **RF Output TSID for BFS Port** field.

BFS IB Session Configuration

The DNCS will automatically set up the BFS IB sessions to the BFS QAM. Therefore, you do not need to create other source definitions as you would in the single DCM/remote GQAM configuration explained earlier. You can identify the BFS QAM in the DNCS by matching its input ASI TSID with the DNCS HMUX TSID on the Connectivity tab (**Network Element Provisioning tab > QAM > QAM List window > (double-click a GQAM) > Set Up QAM window > Connectivity tab**).

For Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

[month] 2012   Printed in USA   Part Number   4014666 Rev B