



AAL 2 Trunking Application

This chapter provides a general description of an application in which a VISM equipped Cisco MGX 8850 provides AAL2 trunking between a customer's TDM network and a Voice Gateway over a packet network. This is an application of VISM operating in AAL2 Trunking mode.

Application Description

Figure 6-1 and Figure 6-2 show high level views of voice traffic being conveyed over an AAL 2 trunk in a packet network.

This application requires that the VISM be in AAL2 Trunking mode.

Figure 6-1 shows the trunk with a VISM equipped MGX 8850 at one end of a trunk (at the telephone company's central office) and a Cisco 3810 Multiservice Access Concentrator and a Cisco MGX 8220 edge concentrator at the other end of the trunk (customer's premises).

Figure 6-2 shows a trunk with a VISM equipped MGX 8850 at both ends of the trunk.

In both cases, the trunk is an AAL2 non-switched ATM PVC that carries both the voice payload in a transparent fashion. The voice traffic is delivered to, or received from, the central office switch over short haul T1 lines. VISM supports up to 64 such AAL 2 PVCs.

If CAS signaling is used, the signaling is transported across the trunk as AAL 2 type 3 cells.

If CCS signaling is used, the CCS signaling is delivered across the ATM network as AAL 5 cells over separate PVCs. VISM supports up to 8 (one for each T1/E1 line) such AAL 5 PVCs.

Other data services (such as Frame Relay) can also be accommodated by configuring the Cisco 3810's, the MGX 8220, or MGX 8850 with the appropriate service modules and using separate PVCs into the packet network. The packet network routes these other data services as required.

Figure 6-1 AAL2 Trunking - One End

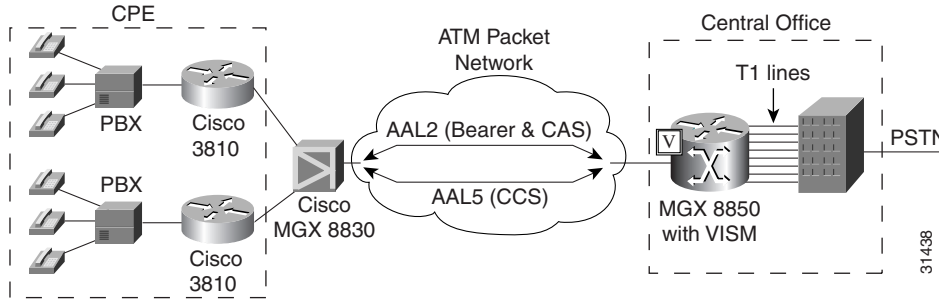
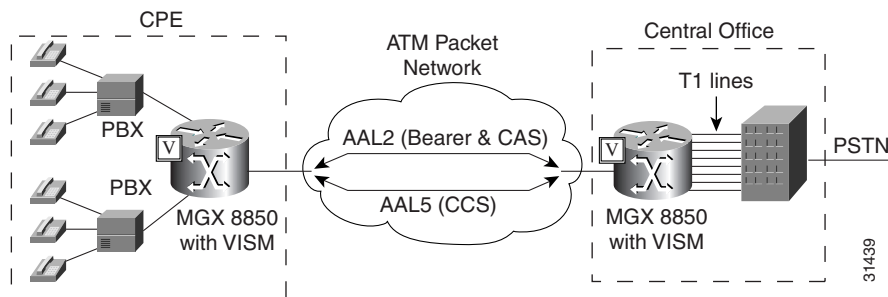


Figure 6-2 AAL2 Trunking - Two Ends



The TDM Interface

Each VISM supports up to eight T1 lines connected either to a telephone central office or a PBX (depending upon which end of the trunk, VISM is installed). Each T1 line can be configured for B8ZS or AMI coding. Both SF and ESF frame formats are supported with the default being ESF. Line failures cause the VISM to generate T1 facility alarms (AIS,RAI) and lines can be tested using continuity tests and line loopbacks. CAS signaling and DTMF tones in the TDM voice streams are monitored, passed across the trunk, but not acted on.

Voice Signal Processing

VISM supports both Mu law or A law PCM and G.711, G.726-32, G.729ab compression codecs for transmission across the trunk, Voice Activity Detection (VAD) for silence suppression, and comfort noise generation at the transmitting end. Idle channel suppression is supported in which the cells for idle channels are not transmitted. By default each DS0 has echo cancellation enabled with the tail set to 32 msec (the tail delay can be configured from 24 to 128 msec). Codec type, VAD, and echo cancellation can be configured on a call-by-call basis.

Modem and Fax detection are supported. Upon detection of a tone phase reversal, echo cancellation is disabled and the codec is converted to clear channel upspeed if currently in G.726-32 or G.729ab. While in data mode, the line is monitored for carrier and if carrier is lost for more than 100 msec, the original codec is restored.

Packet Network Interface

VISM communicates with the packet network for transmitting the voice payload and signaling to and from the trunk by using the SONET OC-3 ports on the MGX 8850 PXM card. If the remote end of the trunk is a Cisco 3810, the physical interface on the Cisco 3810 is T1 and a Cisco 8220 is used to convert between the two physical channel types.

Voice payload and CAS signaling are transmitted over the ATM network as AAL 2 cells (ITU I.366.2). CAS, dialed digits, and Alarm packets are transmitted as AAL 2 type 3 packets with CRC 10 checking and triple message redundancy. Each DS0 channel is assigned a Channel Identifier (CID) which links it to a particular AAL2 PVC. Multiple calls can be transmitted simultaneously over one AAL2 PVC using the CID in the header to identify calls. Sub-cell multiplexing permits multiple voice samples to be transmitted in a single ATM cells thereby making more efficient use of the PVC's bandwidth. Up to 64 PVCs per VISM are supported.

CCS signaling is transmitted over the ATM network as AAL5 cells. Each CCS channel has its own PVC. Up to 8 PVCs per VISM are supported.

If the MGX 8850 is configured with service modules to support Frame Relay and other data services, the OC-3 interface is used for these services also using their own adaptation types and PVCs.

Configuration using the CLI

VISM configuration is performed by entering CLI commands either from an alpha-numeric terminal connected to the PXM's serial port, through a Telnet session or through CiscoView.

The following sections describe the commands that are executed to setup the AAL2 Trunking application. A detailed description of all the VISM commands can be found in Chapter 7.

VISM Card Configuration

Logon to the MGX 8850 shelf using a valid user name and password and enter the slot number of the VISM card to be configured.



Note

If the VISM slot number is not known, enter a slot number of 7 or 8 depending upon which PXM card is active (this will switch to the PXM card) and execute the display cards command, **dspcds**. The resulting display indicates the slot locations of all the cards in the shelf. Then use the change card command, **cc**, to switch to the VISM card.

Step 1 Basic Card Configuration

- c. The default mode of VISM is VoIP. Use the **dspvismparam** command to display VISM's current mode. If necessary, set the VISM card to AAL2 Trunking mode using the **cnfvismmode** command.
- d. Allocate resources on the card by executing the **addport** command followed by the **addrscprtn** command.

The **addport** command adds an ATM port on a VISM. When you add the ATM port, the bandwidth (200,000 cps), VPI range, and VCI range are determined. The VPI range is a single VPI value, the slot ID. The added port is not detected by the controller until you create a resource partition. The VISM ATM port is pseudo physical.

The **addrscrptn** command requires you to enter a controller ID parameter value, which identifies the number of the controller to which the partition is assigned. The controller ID can be a value in the range from 1 to 255. This command allows you to specify the resources of a controller. A port can be controlled by more than one controller (for example PNNI and PAR), but supports only one controller at a time. VISM can create one resource partition for each controller in a non-overlapping way. The controller number you specify associates a resource partition to a controller. All resources of a port are associated to the resource partition you specify. When you add a resource partition, the associated controller detects the port as limited by the resource partition.

e. Specify DSP Template

Use the **cnfcodectmpl** to specify which codecs are to be made available for voice traffic processing. Template 1 includes G.711, G.726-32, G.729a,G.729ab and clear channel, template 2 includes G.711 and clear channel.

If the default echo cancellation values are not to be used, configure the echo canceller DSPs parameters using the appropriate **cnfecanxxx** commands to specify idle pattern, noise match re-enable, echo canceller re-enable, tone disable, and maximum tail. Configure the voice compression DSPs using the appropriate **cnfcompxxx** commands to specify voice detection and packet size. Confirm all DSP parameters using the **dsplndsp** command for each line.

Step 2 Bring up T1/E1 lines.

- a. For each T1/E1 line being used, use the **addln** command where the parameter, line number, corresponds to the port number on the back card.
- b. For each T1/E1 line being used, use the **cnfln** command to specify the desired coding, length, clock source parameters.
- c. Use the **cnflnsig** command to configure a signaling mode for a specified line. Signaling types are CAS, CCS, and no signaling. This command requires confirmation by the user before execution to ensure that the signaling type cannot be changed while endpoints are configured for that line. This command is not allowed when CIDs/CCS channels are present. When used with E1 lines, the line type must be either E1 or E1CRC otherwise the command will not execute.

Step 3 Specify Endpoints

- a. Use the **addendpt** command to add an endpoint for each T1 or E1 DS0 port. The **addendpt** command assigns an endpoint number to the endpoint and links it to a specific line (DS1) and DS0 on that line

Configure the Trunk

Bearer Trunking and Signaling circuits must be established across the network between the VISM cards at each end of the trunk.

Step 1 Setup Trunk PVCs across the network

Each PVC across the network consists of three segments, namely, two local segments, and one network segment.

Local segments are setup within an MGX8850 shelf and extend between the VISM card and its PXM card. There is a local segment at each end of the trunk. A network segment is setup across the packet network and extends between the PXM cards at each end of the trunk.

PVCs can be specified as bearer or CCS signaling. Bearer PVCs use AAL2 and CCS signaling PVCs use AAL5.

Up to 64 bearer PVCs and 8 signaling PVCs are supported.

For each end of the trunk and for each CCS and Voice PVC to be used:

- a. On the VISM, use the **addcon** command to create a master local segment between the VISM card its PXM card. Adding a PVC on VISM must be done with the CLI and cannot be performed under CiscoView.
- b. Setup the equivalent PVCs across the ATM network. If Cisco BPX switches are used, this would require setting up the PVCs on the BPXs and using the BPXs to route the PVCs across the network (see appropriate BPX documentation for details).

Step 2 Add Channel Identifiers (CIDs)

- a. Use the **addcid** command for each logical channel. This command establishes a binding between an endpoint and a LCN/CID pair. This command permits the codec, VAD, etc. to be specified for calls using this CID.

This step must be carried out after the endpoints and PVC channels have been added with the **addendpt** and **addcon** commands.



Note

Once the **addendpt**, **addcon**, and **addcid** commands have been completed, an endpoint forms a link from a DS1/DS0 pair in the TDM domain to a DSP number/Channel number pair in the digital domain with a LCN/CID pair in the packet domain.

Step 3 Define Common Channel Signaling Channel

- a. If CCS signaling is used, use the **addccs** command to configure a channel as a CCS channel. This command associates an AAL 5 PVC with a DS0 for transporting CCS signaling.
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