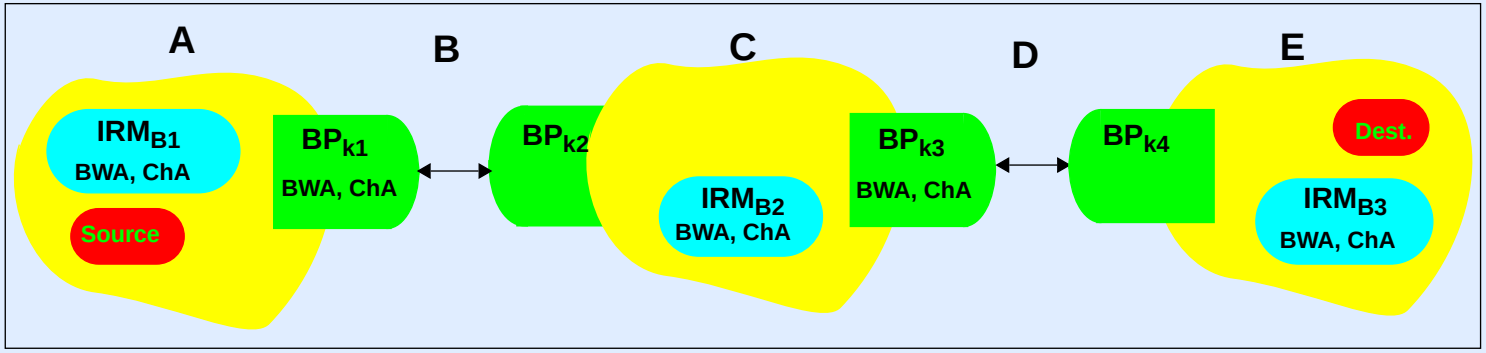
Isochronous Stream Packets Handled by the Bridge



Setup

- Single bus operation: Sec. 8.4.3.1. in IEEE1394-1995 std.
  (Target BW and Minimum Acceptable BW)
- If desired BW is currently not available and the connection is setup at a lower rate and then if more BW becomes available later, additional BW, up to Desired BW, shall be allocated automatically
  (User doesn't like the DVCR-DTV picture quality and decides to turn off music download from Internet. Picture quality should improve automatically)
- If BP is IRM then we don't need any change to regular 1394 nodes otherwise we do
  Remote Transaction capable nodes shall implement the SPLIT_TRANSACTION control register so that SPLIT_TIMEOUT can be increased from the default value of 100ms.

Iso. Stream Setup Algorithm

1. **Operations Performed by the Source Node**

   ❶ Min_BW = Min. acceptable bandwidth specified by source

   ❷ Usual procedure to reserve *Target_BW* with local IRM

   ❸ Usual procedure to reserve a channel (Ch_Resv) with local IRM

   ❹ Async transaction request with dest_addr = dest_bus•dest_phy_ID and parameters: (“setup_iso_stream”, Original_Source_ID, Min_BW, Target_BW, Ch_Resv)

2. **Operations Performed by Bridge Portals (BPs)**

   ➨ BP receiving “setup_iso_stream” from local bus with proper routing bounds will Accept the request and send ack_pending ACK to local bus

   ➨ If Min_BW and an open channel are not available then

   Send a reject message to the Original_Source_ID

   Else

   Target_BW = Min (packet.Target_BW, Iso BW available at Bridge)

   Reserve Target_BW

   Allocate a Stream_Control Register and set the channel nunber

   ➨ Forward request to other portal with parameters (“setup_iso_stream”, Original_Source_ID, Min_BW, Target_BW, stream_number);

3. Bridge Portal receiving a "setup_iso_stream" from other_portal

- A: Read BW_AVAILABLE and Channels_Available at its local IRM
- If ((BW_AVAILABLE < Min_BW) or (Channels_Available == 0)) then

  Send a reject message to the Original_Source_ID

  (this message will release all reservations on its way to the source)

  Else

  Target_BW = Min (packet.Target_BW, Iso BW available at local IRM)

  Attempt to reserve Target_BW and a Channel with local IRM

  If unsuccessful then goto label A:

- If (BUS_ID of Bridge_Portal != dest.BUS_ID) then

  Async trans. req. on local bus with dest_addr = dest_bus•dest_phy_ID& parameters

  ("setup_iso_stream", Org_Source_ID, Min_BW, Target_BW, Channel_Number)
- Else // reached dest bus, setup successful

  send an async message to Original_Source_ID with

  parameters ("setup_successful", Original_Source_ID, BW_Reserved, Ch_Number);

4. Bridge Portal receiving a "setup successful" or "reject" message is received by a BP

- Deallocate extra resources, if any, that was reserved for that channel
- Forward the message towards Original_Source_ID

Iso. Stream Release Algorithm

1. Source node shall send a "iso_stream_release" async_write packet with
   - dest_ID = remote destination
   - dest_offset="release"
   - quadlet_data=channel to be released
   - (retransmissions, dual_phase if available, shall be enabled)
2. BP with proper routing bounds shall accept the "iso_stream_release" packet and shall
   - Send an ack_pending ACK
   - Calculate the BW allocated to the channel from STREAM_CONTROL.overhead,payload
   - Increase BW_AVAILABLE appropriately
   - Set the bit in CHANNELS_AVAILABLE corresponding to the released channel.
   - Forward the "iso_streams_release" packet towards the dest. address with

     a different channel number in the quadlet_data field, if required

References.

1. R.G. Gallager, P.A. Humblet, P.M. Spira, "A distributed algorithm for minimum weight spanning trees," *ACM Trans. on Programming Languages and Systems*, 5(1):66-77, Jan. 1983.