Stream Setup and Teardown

John Nels Fuller

Computer Scientist

jfuller@computer.org
Assumption about Higher Layers

- Talker has acquired a unique Stream ID for each stream it can source
- Listener has discovered Talker
- Listener has negotiated with Talker to determine:
  - Stream ID
  - Stream Format & Bandwidth
  - Any stream security issues, DRM use, etc.
Stream Setup Overview

• First Listener application issues a REGISTER_MAC_ADDRESS(StreamID) through the service interface

• MMRP propagates the registration throughout the network

• When registration reaches Source Talker, its application is notified to start reservation process

• SRP reservation propagates along path defined by MMRP back to First Listener
Notes to Following Diagrams

• I have purposely changed the terminology in the following from terms used in 802.1ak: “Declare” becomes “Listen” and “Register” becomes “Talking”
  – Think of it as a port declares that it is a listener for a particular stream or that a port registers that it is a talker for a particular stream.

• Listening ports are marked with “L”, Talking ports are marked with “T”, Listening ports with reservation are marked with “L” and talking ports with reservation are marked “T”
First Listener issues REGISTER_MAC_ADDRESS for StreamID. Its port declares it is a listener and MAD sends this to an ingress port on the bridge which registers that it is a talking port for StreamID.
Propagation of MMRP
REGISTER_MAC_ADDRESS (2)

Bridge port uses MAP to tell other ports of bridge to declare that they are listeners which in turn causes MAD messages to be sent and other ports of other devices to become talkers.

End Stations that don’t source the stream ignore the registered talker state or need not implement registrant portion of MMRP.
Propagation of MMRP
REGISTER_MAC_ADDRESS (3)
Application at Source Talker is notified of the registration as a talker for StreamID. Application notes that it is source for StreamID and initiates the reservation process. Registrations may still be propagating in rest of network.
Propagation of SRP Reservation Request (1)

Source Talker initiates reservation by first verifying both its ability to serve it and the LANs ability to carry it. Then sends it to listening ports on its LAN.

Propagation of MMRP continues.

First Listener
Listening Port saves reservation then passes it to any Talking ports on bridge

Source Talker

End Station

LAN

Bridge

First Listener
Talking port verifies that both it and LAN can accommodate reservation then sends reservation to listeners on LAN.

TBD: How are reservations verified if operPointToPointMAC is FALSE?
Propagation of SRP Reservation Request (4)
First Listener receives reservation for stream and knows setup was successful. If necessary it can tell source talker to begin streaming (through higher layer protocol).
Overview of Joining an Existing Stream (Case 1)

- This case only happens on LANs where operPointToPointMAC is FALSE
- New Listener initiates MMRP actions by issuing REGISTER_MAC_ADDRESS to its MAC service interface
- MMRP propagates as usual, but if a port that is already a talker without a reservation is told to be a listener (state transition non-listener to listener) it sends an SRP reservation refresh request on its LAN
- The talker with a reservation, if present, responds to the SRP reservation refresh request by sending the reservation information to all listeners on its LAN
- The reservation propagates to New Listener
New Listener issues REGISTER_MAC_ADDRESS for StreamID. Its port declares it is a listener and MAD sends this to an ingress port on the bridge which registers that it is a talking port for StreamID.
Propagation of Join – Case 1 (2)

Ports that were already talkers take no action

Bridge port uses MAP to tell other ports of bridge to declare that they are listeners which in turn causes MAD messages to be sent and other ports of other devices to become talkers

This port was already a listener so no additional action is necessary

New Listener

First Listener

End Station

LAN

Bridge

Source Talker

T

L

L

T

L

T

L

L

T

L

T

L

T

T

L

T
Propagation of Join – Case 1

Bridge port was a Talker w/o reservation and has just transitioned to being a listener w/o reservation so sends SRP reservation refresh request on LAN in case there is a talker with reservation.

TBD: Find a way to limit the SRP refresh req to only MAC addrs used as StreamIDs.
The talker with a reservation that receives an SRP reservation refresh request sends the reservation information to all listeners on its LAN.

Talkers without reservations do not respond to SRP reservation refresh.
Propagation of Join – Case 1

Listener ports that were previously without a reservation propagate the reservation to other ports on bridge that are talkers.

Listener ports who already have this reservation need take no further action.

New Listener

First Listener

Source Talker

End Station

LAN

Bridge
Propagation of Join – Case 1 (6)

New Listener receives reservation and can now receive stream. If necessary, it may tell Source Talker (through Higher Layer protocol).
Overview of Joining an Existing Stream (Case 2)

• New Listener initiates MMRP actions by issuing REGISTER_MAC_ADDRESS to its MAC service interface
• MMRP propagates as usual, but if a port that is already a listener without a reservation is told to be a talker (state transition non-talker to talker) it checks other ports on bridge to see if there is a Listener with a reservation and issues a reservation refresh request to it
• The listener with a reservation responds to the reservation refresh request by sending the reservation information to all talking ports in the bridge
• The reservation propagates to New Listener
Propagation of Join – Case 2 (1)

New Listener issues REGISTER_MAC_ADD RES for StreamID. Its port declares it is a listener and MAD sends this to an ingress port on the bridge which registers that it is a talking port for StreamID.
Propagation of Join – Case 2

Listener port without reservation gives reservation refresh request to Listener port with reservation which sends reservation to new talking port and previous talking port (which does nothing). Newly talking port propagates reservation on its LAN where New Listener receives it.
Steady State with 3 Listeners
Overview of Stream Teardown, Case 1: Listener goes away

- Listener either issues DEREGISTER_MAC_ADDRESS or is removed
- MMRP propagates
  - as ports leave the registered talker state they release their reservation
  - as ports leave the declared listener state they also release their reservation.
Overview of Stream Teardown, Case 2: Talker goes away

• Talker issues an SRP Release Reservation Request or fails to refresh reservation within time TBD

• Listener port with reservation notifies talker ports with reservations to release those reservations (and propagate SRP Release Reservation Request)

• End station listener issues DEREGISTER_MAC_ADDRESS