

Address Resolution For IP Datagrams Over MPEG-2 Networks

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Address Resolution for MPEG-2

- Associates an IPv4/IPv6 with to a specific L2 MPEG-2 address (transmission multiplex, PID, MAC)
- Complements the higher layer resource discovery tools that advertise IP sessions
- Must be robust to the layer 2 address characteristics especially non unique addresses
- It can also complement other mechanisms related to QoS and load balancing (filtering, favorite addresses)
- Inform the IP over MPEG-2 community about mechanisms that may bind an IPv4/v6 address to a specific L2 MPEG-2 address

Multicast Issues

- MPEG2 networks are well suited for IP multicast
- IP multicast over MPEG-2 Transmission also involves:
 - Differentiate between multicast and non multicast transmission using the same lower layer addresses
 - Provide signaling information to allow a Receiver to locate an IP multicast flow within an MPEG-2 TS Multiplex
 - Map IP multicast groups to the underlying MPEG-2 TS Logical Channel (PID) and the MPEG-2 TS Multiplex
 - Determine group membership (using IGMP/MLD)
 - Determine if duplicate packets were received
- Involves not only address resolution, but also address filtering
- Some applications require dynamic update of multicast addresses

Potential Solutions (1)

- Static configuration
 - Simple, but not very flexible
- MPEG-2 Table based solutions
 - Use the SI table to transmit the addressing information
 - The Receiver needs to process the information
 - Some approaches:
 - IP/MAC Notification Table (INT) of DVB
 - Application Information Table (AIT) in the Multimedia Home Platform (MHP) specifications
 - Multicast Mapping Table (MMT) by some DVB-RCS systems
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Input required for other systems (e.g. ATSC, ISDB-T, ...)

(1) Potential Solutions

- Use an IPv6 ND or IPv4 ARP “like” protocol
 - Query/response mode:
 - “I want this IP address, what is your MAC/PID”
 - Unsolicited distribution:
 - “Here are the MAC/PIDs for these IP addresses”
 - Simple, flexible but potentially operator specific
 - PIDs are not addresses, but unidirectional virtual channels
 - Some ideas, no standard yet
- Related solutions?
 - DVB working group IP Infrastructure - DVB-IPI
 - More the inverse problem of DVB over IP
 - DVB IP Datacast
 - Cablelabs – DOCSIS and PacketCable projects (IP over DVB-like)
 - Inputs needed from these groups

(2) INT Table Solution

- Part of the current DVB Data standard
Development by DVB WG on data broadcasting (DVB-GBS)
- Uses broadcast MPEG-2 SI tables
 - Centralized management of addresses
 - Issue for dynamic address resolution
- Supports subnets and overlapping IP networks
- Set of descriptors for IP address resolution to MAC addresses
- Defined for MPE- extensions needed for other approaches
- Complex method - users need guidance
- Support for dynamic addresses / authentication / encryption?

Status

- IETF draft (for informational) published:
 - draft-fair-ipdvb-ar-00, June 2003
- To be refined with comments from the IP over MPEG-2 community

Open Issues

- Dynamic Address Resolution
- Mapping MAC Addresses to PIDs
- Multicasting support
- Ensuring a technology agnostic solution

Inputs needed:
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