

**Inserting Advertisements in IP multicast
draft-akhunger-ad-insert-multicast-00**

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Abstract

Providing a Standard method for Addition of regional Advertisements in the IP Multicast Video Streaming is very important , because the equipment deployed would most likely be from different vendors across a multicast network.

The idea is to introduce a special kind of Enhanced IGMP Ad-Insert control packet, which is passed from the multicast source to intermediate routers and which indicates that the source is going to stop sending multicast traffic for a particular group for specified

time and the Regional center can utilize this time to insert its regional advertisement.

1. Introduction

The Internet Group Management Protocol (IGMP) is used by IPv4 systems to report their IP Multicast group memberships to any neighboring Multicast routers. Typical applications for the IP multicast include video streaming , enterprise wide broadcasts, training etc. Video Streaming application has a lot of potential and is being worked upon by various vendors

The idea presented in this draft is to introduce a special kind of Enhanced IGMP Ad-Insert control packet for the Video Streaming application.

Television amonuts to 37 percent of total advertising revenue in US and 43 percent in Japan. Video Streaming using IP Multicast has a similar potential for generating advertising revenues and thus standardization efforts should be put to realize its potential.

This Ad-Insert message is passed from the multicast source to intermediate routers and it indicates that the source is going to stop sending multicast traffic for a particular group for specified time and the Regional center can utilize this time to insert its regional advertisement.

2. Motivation

One of the main advantages with Ad-Insert IGMP control packet is that, the schedule of when to insert ads in the content remains flexible . Thus if there is a game live telecast going on and you have a timeout then you can actually indicate to regional centers to utilize that time to insert their Ads.

Also having this Ad-Insert signalling removes need for huge configurations about hundreds of advertising slots in hundreds of multicast streams passing through network devices.

In any multicast, Original Source is the one who knows best the correct points when it makes logical sense to introduce advertisements. However regional centers are best suited for launch of ads which are targeted to a particular geographical audience. Also providing a mechanism to add their own advertisements, provides motivation for the regional centres to become intermediate multicast forwarders - leading to increase of multicast video streaming popularity.

Providing the coding mechanisms of traffic make it difficult for the regional centres to decipher when to insert advertisements without disturbing traffic's quality delivery and the mechanisms to do it can be quite complex. Thus providing them with a cue when to insert can be helpful.

3. Applicability

The source of the multicast will provide for two or multiple levels of advertisement slots in the traffic content. First level of advertisements are targeted to the audience of all receivers which subscribe to this multicast group. These are inserted with the content by source itself. Second levels can be based on service provider, region or any other criteria.

Taking an example of regional distribution , regional centres will be informed by source, by sending a Enhanced Ad-Insert IGMP control packet that the source has stopped or will stop sending the content for a particular time period and this time can be used by regional center to insert second level/regional advertisements.

There can be an overall agreement whereby the regional center knows that in every cycle period - there will be commercials for how much time - for example it could be that every one hour there will be five minute commercials - however it depends on the program being streamed as to how these five minutes are divided and when do they start.

The regional centre collects ads beforehand and these are played when the Ad-Insert message is received or at the time specified by source in Ad-Insert message

The Ad-Insert message can be used in two ways. One message is of Immediate nature, which indicates that the Ad-Insert message itself indicates that traffic from source has already stopped. The other one gives a schedule in terms of Date and Time when the source will stop sending content traffic and Regional center can then insert its advertisements.

For Scheduled Ad-Insert messages it is assumed that there is a standard method for obtaining time, adopted by each source and regional center

As there is no need for the regional center to decode content coming from source for inserting Ads - the time taken and complexity of equipment to insert ads should be much less than existing solutions.

Regional Center advertisement traffic also has group address as destination address. The destination IP address of the Ad-Insert IGMP packet is group multicast address itself, if the ad-insert is for a immediate play.

However if the source needs to send ad-insert information for scheduled inserts for multiple groups , it can send the traffic onto ALL-ROUTERS destination address.

The Regional Center is only supposed to play the ads to hosts within its network. If the regional center is also forwarding the traffic to another regional center (in another network) it will simply pass the Enhanced Ad-Insert IGMP message on the port connecting to other network. The regional center of other network will start playing its ad to subscribers which belong to its network once it gets Ad-Insert.

4. Impact on End Applications

Because the hosts will receive Ad's traffic with same multicast IP address they will not be able to separate it out. Thus the user cant just drop the traffic with those Ads.

However multicast applications running over IP on host, may have their own sequence numbering or ordering mechanisms for displaying multicast content - the source can provide this sequencing information to regional centers so that they can use these sequence numbers to generate traffic. Another mechanism could be that streams before and after the advertisement are considered as two separate sessions and client application is able to do sequencing correspondingly.

5. Message Formats

The following sections highlight the message formats

5.1. Ad-Insert IGMP Message

This message is sent by Source to the Intermediate muticast routers. It is processed by routers which act as Regional Centers to insert ads to their directly attached customers. The Ad-Insert message is passed as-it-is by these regional centers further on ports which connect to other regional centers.

```

      0               1               2               3
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  Type           | Start Flag       | Duration in millisec           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                   Number of Scheduled Ad-Insert Time Records           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

where each scheduled Ad-Insert Time Record is of the following type.

```

+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                   Group Address                                         |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  TimeZone       | Year           | Month           | Day           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  Hour           | Minutes       | Seconds         | Milliseconds  |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|  Duration in millisec           | Source Specific Info           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

The fields in this enhanced Report include the following information

Type

The value of Type indicates that this is a Ad-Insert type of IGMP message and distinguishes this message from other IGMP messages

Start Flag

This indicates whether the advertisement has to be inserted

immediately or at the scheduled times which are specified by further fields in the packet

Duration in millisec

This indicates the duration for which the regional center can play their Ads. This field is only relevant if the Start flag has value as Immediate Play.

Number of Scheduled Ad-Insert Time Records

If the start flag indicates Scheduled Inserts then this field indicates the number of Time Records which are present in this Ad-Insert message

Group Address

This indicates that for which Group Address this Ad-Insert Schedule is relevant.

TimeZone

Indicates the timezone as per which the following time is described

Year, Month, Day, Hour, Minute, Second, Millisecond

These indicate when the Insertion of Ad by regional center should start

Source Specific Info

This is used by sources if they wish to inform something specific to regional center, usage of this field will be developed in future

5.2. Future Directions

As the industry evolves there can be future evolution of methods of inserting regional advertisements.

Inserted commercials can be customized as per individual viewers/group profiles because regional centers can have better information about their viewers

The commercials can be made more interactive by providing a way for viewers to stream back their responses which can then be processed by regional centers

There can also be multiple levels where the hierarchy of who is

allowed to insert and who is not allowed in which timeslot can be defined

5.3. Security Considerations

As with all other IGMP messages Ad-Insert message will also need security provisions to avoid misuse. Also the cooperation between different network operators to pass the Ad-Insert would be crucial for success of this approach.

6. References

- [1] Cain, B., Deering, S., Kouvelas, I., Fenner, B., and A. Thyagarajann, "Internet Group Management Protocol, Version 3".

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