The concept of MBS session is very different from the call session typically used in the Internet telephony field. In fact, in our case signaling is used to set up a unidirectional point-to-multipoint media flow, whereas in the Internet telephony it is typically used to set up a bidirectional, point-to-point media flow. Thus, we have decided to use simple, session stateless, SIP MESSAGE requests to wrap data exchanged between MBS entities [4][25], instead of the classic SIP INVITE used in IMS-based systems [17][18][21][36]. This approach simplifies signaling management (e.g. see [21]) and maintains user state consistent by keeping its information updated in the database running in the MBSC-DB.

Finally, IGMP is used to manage multicast groups. Clients use IGMP to report their multicast group memberships to any immediately-neighboring multicast router. There are essentially three IGMP message types: Report, Query, and Leave Group. A Report message is used in two situations. When a client wants to receive a specific multicast stream, it sends out an unsolicited Join Report message to the local router in order to join the group. Another situation is when the client passively generates a Membership Report for its interested groups in response to a Query message. A Leave message is sent by a client when it leaves a multicast group. It allows group membership termination to be quickly reported to the router in order to release resources.

Our MBS architecture has been designed according to the service flow shown in Fig. 2 (see also [9]). First of all, a user must authenticate its software client with the MBSC-SS by using its credentials, which implies that he has to log in to the system. User’s credentials (user name and password or digital certificates) are usually obtained during the initial service registration, which is typically performed through a web page advertising the multicast/broadcast service (i.e. an IPTV web portal). Clearly the registration step to activate a service has to be executed only once.

![Fig. 2. – MBS service flow](image-url)

When the first user access to the MBS system is gained, he is asked to subscribe to categories of interest. For example, in an IPTV service user can subscribe to a package containing his favorite TV channels, whereas in a software update service user can select the software type to be updated (e.g. anti-virus or system updates). Users can add or remove subscriptions at any time, after being authenticated by the MBS system through the login phase described above.

In the announcement phase, users are informed about the subscribed MBS sessions, such as list of TV channels and the relevant contents. An announcement can be distributed in either multicast or unicast fashion. We have implemented both