Request for National Body Contributions on Lower Layer Multicast Services and Mechanisms

The SC6 Interim Meeting on Enhanced Transport Mechanism Guidelines (Paris, 10-13 February 1992) considered a number of proposals for service elements and protocol mechanisms that could be used to support multicast data transmission in the lower layers of OSI. The participants in the Interim Meeting agreed on the potential usefulness of multicast in the lower layers, but did not reach agreement on the characteristics of a multicast service, and did not agree to circulate for NB comment any specific proposal for the specification of multicast functions in protocols.

The Interim Meeting reviewed proposals for multicast services and protocol mechanisms with a variety of different characteristics. Recognizing that this work is at a very preliminary stage, the participants in the Interim Meeting believe that it would be useful for National Bodies to review and comment on the following issues, which were discussed (but not resolved) during the Interim Meeting.

1. Multicast service semantics. At the Network and Transport layers, a multicast service could be defined in, for example, the following ways:

   a) Passive devolution to an underlying subnetwork or data link multicast facility that is provided as an intrinsic property of a particular multi-access transmission technology (e.g., ISO 8802 local area networks).

   b) Simple connectionless multicast, in which a packet is transmitted to a multicast destination address, and is either delivered to the individual destinations that are registered (statically or dynamically) as members of a defined multicast group, or propagated into some set of destination environments (directed broadcast) in which it is selectively received by (self-selected) participants in the multicast group.

   c) Connectionless multicast with various qualities, such as (1) a guarantee that each receiver of a series of multicast packets generated by a particular source will receive the packets in the same order as every other receiver of packets from the same source, and (2) a guarantee that either every member of a defined multicast group will receive a particular packet, or the sender will be notified by the service provider

   d) Connection-oriented multicast, in which some or all of the properties of a point-to-point connection are preserved in the context of a point-to-multipoint connection or “conversation”.

2. Scope control. The sender of a multicast packet may wish to explicitly control the scope of the multicast, to ensure that it is not propagated beyond a specified perimeter (e.g., to ensure that it is delivered to "nearby" group members only). The desire to control the scope of a multicast transmission may be related to the cost (both to the sender and to the members of the destination multicast group) of propagation beyond a certain perimeter; or to the possibility of generating an explosion of network traffic on an ever-increasing number of links as a multicast wave spreads out from the sender beyond a certain horizon; or to some combination of these and other factors.

3. The characteristics of multicast (group) addresses. In particular, should multicast addresses be identified by an explicit syntactic marker that enables them to be recognized as "multicast" regardless of the context in which they are encountered?

4. The characteristics of multicast packets (PDUs). In particular, should multicast packets be identified by an explicit syntactic marker that enables them to be recognized as "multicast" regardless of the context in which they are encountered?

[Items 3 and 4 can be summarized as "do you mark the addresses, or the packets, or both?"]

5. Mechanisms for establishing and managing multicast group membership. Group membership may be defined statically (by, for example, a system management function) or dynamically (in which case members may enter and leave the group on their own initiative). In some cases, the sender is aware of the membership of the group; in others, the group is defined by self-selection on the part of destinations that choose to listen to multicast transmissions to a particular group address.

6. National Bodies may also wish to consider CCITT Draft Recommendation X.6 on multicast services (SC 6/N xxxx).