Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks

13. Scope of Proposed Project:

The proposed standard specifies protocol elements and filtering functions that allow time synchronization to be distributed through bridged local networks. The synchronization distribution will be done via the exchange of time stamp messages between adjacent network elements (bridges and/or end stations). The result will be to provide a synchronization signal at each network element that is traceable to one element, termed the grandmaster. The standard will specify (1) the time stamp information that is exchanged, (2) how the time stamp information is used to obtain a synchronization signal at each network element, and (3) the procedures for selecting the grandmaster. Items (1) and (2) will include sufficiently detailed specification of the time stamp information exchange (e.g., frequency of the time stamps, time stamp granularity), the algorithms for using the information (e.g., algorithm for computing phase corrections), and the filtering functions that processes the time stamp information (e.g., filter bandwidth and gain peaking) to guarantee the synchronization performance required for time-sensitive applications.

14. Purpose of Proposed Project:

This standard will enable bridged LANs to transport time-sensitive applications and meet the respective jitter, wander, and time synchronization requirements for those applications. Its primary purpose is to provide timing information at each network element where a time-sensitive application may be mapped or demapped. The application mapping can use this timing information to determine and record when particular information is mapped. The recorded information can then be used at the demapper, relative to the timing information there, to determine when to present the demapped information to the application layer. This process requires that the timing information at the mapper and demapper be synchronized. The manner in which the application uses the timing information at the mapper and demapper is not part of this standard; rather, this standard covers the synchronization of the timing information at the mapper and demapper. The synchronization of the grandmaster to an externally provided timing signal is not part of this standard but is not precluded. If the grandmaster is synchronized to an externally provided timing signal that provides time of day , the standard will allow applications that require time of day to perform.

14a. Reason for the standardization project:

The use of current IEEE 802 technologies for time sensitive applications, such as high quality audio/video streaming, does not assure that the applications be delivered at the network egress with acceptable jitter and wander. In addition, applications that involve multiple streams delivered to different locations may require that the delivery be synchronized in time. Finally, some applications may require knowledge of time of day. To facilitate the widespread use of bridged LANs for these applications, synchronization information is needed at each network element where a time-sensitive application is mapped or demapped or a time sensitive function is performed. The synchronization information provided to each network element will allow the jitter, wander, and time synchronization requirements of the most demanding applications in a residential environment to be met.