**IEEE 802.1D Protocol – Summarization**

Protocol Operations

Multiple Existing Variants

New Proposed Changes

**Introduction:**

IEEE 802.1D is an international standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges. The MAC bridges can be used by any type of Local Area Network (IEEE 802) to connect with each other. The advantage of using MAC bridge is that even though each LAN has its own unique MAC, also being connected to separate LAN, MAC bridge allows the connection between these devices as if they are connected to a single LAN. The protocols which are in the Network layer or the Logical Link Control layer have access to MAC bridges as MAC bridges are transparent to these protocols. Also, these MAC bridges operate below the MAC service boundary. If there are one or more, MAC bridges it can affect the Quality of Service.

**Bridged Local Area Network:**

There are many advantages of using Bridged Local Area Network. A few of the important ones are listed below:

1. Increase the LANs total performance
2. Increase the number of permissible connection
3. Increase the physical extend
4. Help in maintenance and administrative activities by partitioning the LAN
5. In case of network components failure, this can help in keeping the network service active – providing increased availability

**Protocol Operations:**

**Support of the MAC Service:**

The MAC Bridges will be configured in such a way that the end points are provided with the redundant paths so that the network communication doesn’t get interrupted even in case of network failure. Thus, supporting network management and improving the availability of the service. An important point to note is that the bridge’s MAC address is never used as destination address field when transmitting between the end stations. Instead the peer end station’s MAC address is used. It is also made sure that all the important aspects of Quality of Services such as service availability, throughput, frame loss etc are very well handled. The filtering service provided by the MAC bridges helps in achieving the Quality of Service such as throughput, priority, transit delay etc.

**Bridge:**

Frames filtering and relay, maintaining the required information to perform the above activities and management of these activities are the main elements of the bridge operation. Bridged Local Area Networks consists of group of separate MACs. The MAC bridge sends the individual MAC between the group of separate MACs. As mentioned above these bridges perform filtering. They do this to reduce the network traffic. A bridge architecture consists of

* MAC relay entity
* Two or more ports
* Higher layer entities which includes Spanning Tree Protocol Entity.

The job of the MAC relay entity is to send the frames between the ports, managing the information needed for filtering, filtering process. The bridge consists of two ports. And each port connects to a single Local Area Network. The spanning tree protocol entity’s job is to compute the network topology.

**GARP Multicast Registration Protocol (GMRP):**

The MAC bridges and the end stations must register and deregister the group information with the bridges which are of the same Local Area Connection. Also, they would need to spread that information across all the other bridges which supports filtering in BLAN. GMRP provides this facility of registering/deregistering, spreading information across for the MAC bridges and the end stations. The service provided by Generic Attribute Registration Protocol (GARP) is very important for the GMRP to operate successfully. The information used for this purpose is of the following:

* Group Membership Information: Whenever there is this information, it means that there is presence of GMRP participants. These participants belong to a particular group and they have a group MAC address. Whenever this group information is exchanged, the entries in the group membership are updated in the database which contains filtering entries.
* Group Service Requirement: Whenever there is this information, it means that the default group filtering behaviour for the GMRP participants to forward for all the groups or for the unregistered groups.

This process of group membership registration is very important because it makes the bridge to be aware of the groups which are registered with it. Hence it could direct the frame to the correct destined group. Similarly, the process of group service requirement information registration is also very important because it makes the bridges to be aware of the ports which could forward the frame in a direction from which it has received the information and update the group forwarding behaviour accordingly.

**Generic Attribute Registration Protocol (GARP):**

Generic Attribute Registration Protocol permits the GARP application’s participants to register attributes with Bridged Local Area Network’s participants. The attributes mentioned here are very specific to each of the GARP application. A more formal definition of the GARP is as follows. GARP allows its participants to make declarations with the other applicants which would in turn result in these attribute registrations with the other participants of that application. In case if the participants have to withdraw the declaration, then the removal of registration takes place on the other participants of that application. An Application State Machine records the declaration whereas the Registrar state machine records the registration for each participants of the bridge port and the end station.

**Rapid Spanning Tree Protocol (RSTP):**

This Spanning tree algorithm and protocol (STP) is now replaced by Rapid Spanning Tree Protocol (RSTP).