

ISP Requirements for IEEE 802.3ah

Fletcher Kittredge

GW

fkittred@gwi.net

Biddeford, Maine;

**11/09/01
USA**



Why is IP important to IEEE 802.3ah?

- Raw Ethernet without a network layer protocol is seldom used**
- Most use of 802.3ah will be for delivery of IP data**
- IP poses the same requirements as other types of packet switched protocols such as Novell, DECnet, etc.**

IP's fundamental design requirement is to be data layer independent

• **Purpose of IP is to build networks on top of disparate data layers. If we only had one data layer, no IP would be necessary...**

• **IP layer expects data to be out-of-order, duplicated, corrupt, unreliable. The IP layer supplies functionality to deal with these problems.**

• **Because an IP packet transitions multiple data layers, functions must be End-to-End. Even if one data layer supplies one of the above functions, IP must duplicate.**

Therefore, IP places no requirements on IEEE 802.3ah

Prior Statement is misleading: IP will work with almost any data layer, but some data layers are better than others

• **Example of Inefficient match for Data Layer: ATM**

• **ATM attempts to reproduce IP's network layer functions.**

• **Results in Packet Shredding and Cell Tax**

• *ATM Supplies Quality of Service(QoS), but solution not End-to-End. Therefore, benefit is lost for IP.*

IP Works Well with Other Data Layers

„Example of efficient match for Data Layer: Ethernet

„Ethernet inflicts minimal overhead

„Ethernet is packet oriented and is only concerned with local addressing of packets. No QoS (in classical Ethernet.)

„Frame size can be a problem in terms of efficiency

„Second example of efficient match for data layer: HDLC

„Again, packet oriented, only concerned with local addressing of packets and no QoS.

ISP Goals for any IEEE 802.3ah Protocol

0 Time-to-market, Time-to-market, Time-to-market...

1 Maintain the efficient data layer qualities of Ethernet.

2 Maximum speed at an served distance while meeting goal 1 (100mb/sec equivalent to Etherloop 2.)

1 Maximum reach meeting goal 1 (30,000 foot; 10,000 meter equivalent to Etherloop?)

2 Minimize cost while meeting goal 1.

- a. In the US, must be capable of using an FCC tariffed shared line, handle poor line quality, bridge taps**
- b. minimize truck rolls**
- c. Cheap equipment (what would make 802.3ah cheap for chip, equipment, software vendors?)**
- d. Protect investment in current Ethernet-based tools and knowledge.**

What should we do to make IEEE 802.3ah work well with IP?

•Keep it as simple as possible. Simple means cheap. Simple means fast. Simple may help with time to market by allowing rapid consensus.

•Pay attention to MTU size (I have no idea what the correct MTU size should be...)

What requirements should we avoid in order to make IEEE 802.3ah work well with IP?

• Requirements which duplicate functionality of the IP layer such as circuits, security, QoS, etc.

• There is no consensus on how to do QoS in an IP environment (rat hole warning.) Therefore, it should avoided.

Summary

- **IP was designed to handle most problems via End-To-End.**
- **For those who want to add security, QoS, etc. to IEEE 802.3ah, look to ATM as a data layer to get that functionality... and as a warning.**
- **Etherloop is already out there, if Etherloop is not selected as the IEEE 802.3ah Copper spec, then the IEEE 802.3ah copper spec must be at least as good as Etherloop.**
- **IEEE 802.3ah is primarily a ESLAM to CPE spec.**