Modeling and Performance Evaluation of Hybrid Fiber-Coax Networks

Upstream channel - contention & data slots

Headend **Fiber** Fiber Node **Coax**

Downstream channel - data & control slots
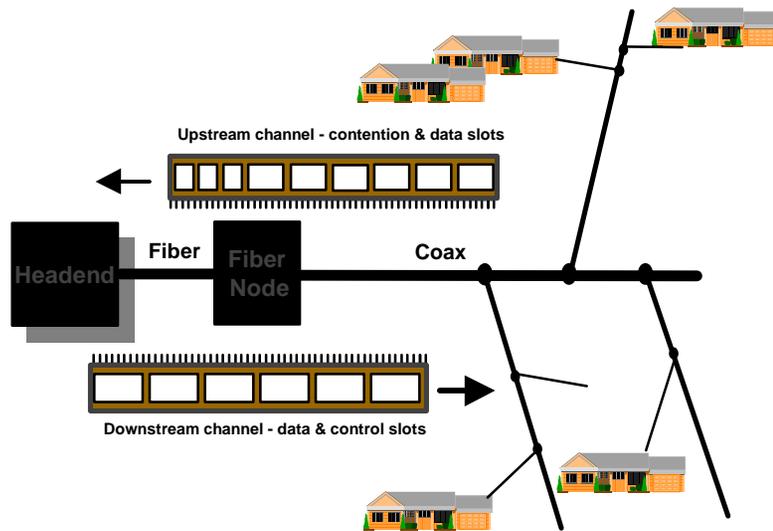
Goals

To conduct an unbiased evaluation and assist the IEEE 802.14 group in the standardization of MAC protocol for Hybrid Fiber/Coax networks.

Technical Objectives

- Model and evaluate MAC protocol proposals from IEEE802.14 members.
- Evaluate priority schemes to support Quality of Service.
- Study end-to-end performance issues: improving the effectiveness of ATM and TCP/IP traffic over HFC networks.

Impact

- Performance evaluation reports helped expedite standards for HFC networks (IEEE 802.14 WG, SCTE/ITU-T).
- Conference and journal papers informed the research community, cable system vendors and operators on the state-of-the-art in the area of MAC protocol modeling and implementation.

Customers and Collaborators

Customers

IEEE 802.14 WG, SCTE, Cable TV vendors and operators.

Collaborators

IBM, Zenith Electronics, Scientific Atlanta, LanCity, Com21, 3Com, Motorola, DEC.
University of Virginia, Charlottesville.

Accomplishments (FY 96 - 99)

- Developed evaluation process specification and produced MAC performance evaluation reports for IEEE802.14 group. Results were incorporated into draft standard. (FY96-97)
- Enhanced the NIST ATM network simulator to include HFC network protocols, IEEE802.14 & SCTE. (FY97-98)
- Produced papers on contention resolution algorithms, bandwidth allocation, and priority schemes: *4 conference papers, 3 journal articles*. (FY97)
- Studied end-to-end performance issues for TCP/IP, ATM traffic control: *2 conference papers, 2 journal articles*. (FY98)
- Continued research in comparison between IEEE 802.14 and SCTE MAC protocols, and in study of HFC QoS issues: *2 conference papers*. (FY99)
- Completed PICS Proforma for Annex B of the IEEE 802.14 standard. (FY99)