IEEE 802.5 Technical Presentation

Token Ring MAClite

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Overview

- Cost of Token Ring vs. Ethernet
- Functionality of Token Ring MAC
- Goals and assumptions for MAClite
- Proposal for Token Ring MAClite functionality
- Conclusions
Token Ring vs. Ethernet

- Complexity and cost of implementation vs. Benefit of functionality

Increasing complexity and cost

Increasing functionality

- 10BASE-T
- 100BASE-T
- 1000BASE-T
- TR 4/16 Shared
- TR 4/16 DTR
- TR 100 DTR
What is the benefit of Token Ring MAC?

- Token Ring MAC adds functionality for the user and network manager
  - Lobe media testing
  - Registration (DTR only)
  - Link maintenance
  - Hard error recovery
  - Fault isolation (limited in DTR)
  - Error reporting
Where is the increased cost of Token Ring MAC?

- Implementing Token Ring MAC
  - Requires a processor to implement high priority foreground tasks
    - On chip
    - Off chip
    - Shared central processor
  - Requires multiplexing of Token Ring MAC control traffic with normal data traffic
  - Requires queuing of Token Ring MAC control traffic
MAClite Goals

- Remove the need for a dedicated processor
- Remove the need for MAC control traffic multiplexing
- Remove the need for MAC control traffic queuing
  - Design for a single traffic stream
- Retain beneficial Token Ring MAC functionality
- Add new functionality
**MAC\textit{lite} Assumptions**

- **Dedicated Token Ring only**
  - Point to point links
  - Station and C-Port

- **High Media Rate only**
  - 100 Mbit/s
  - 1000 Mbit/s
  - ...and above
Proposed MAClite Functionality

- **Lobe Media Testing**
  - Retain HSTR LMT
  - Can be implemented in hardware
    - High bandwidth requirement

- **Registration**
  - Retain HSTR registration
    - Extensibility is a useful feature
  - Can be implemented in a shared processor

- **Lobe Maintenance**
  - Retain heart beat and link_status monitoring
  - Can be implemented on a shared processor with hardware assist
Proposed MAC\textit{lite} Functionality (cont.)

- **Hard Error Recovery**
  - Remove recovery process
  - Close link on detection of hard error
    - Report fault in remove alert MAC frames
    - No need for beacon frames
  - Can be implemented on shared processor

- **Error Reporting**
  - Retain HSTR error reporting
  - Add symbol error reporting
  - Low priority task
  - Can be implemented on shared processor
New MAClite Functionality

- Zero Configuration End Stations
  - Central management of end station configuration
  - Configuration sent to end station during registration
  - Opportunity to standardise CRS functionality which was missing from DTR
    - LAA
    - Frame size
    - etc.
Issues

- This is only a proposal...
- Must be compatible with HSTR DTR
  - Registration will include MAC\textit{lite} negotiation
  - Can implement MAC\textit{bloat}, an entity that can support both MAC and MAC\textit{lite} connections
Conclusions

- Proposed MAClite functionality meets most of the stated goals
  - Simple multiplexing requirement is still needed, but so does Ethernet when 802.3x is implemented.

- Proposed MAClite has the opportunity of providing Token Ring functionality at Ethernet cost and complexity

- Proposed MAClite can be further enhanced

- Proposed MAClite can be standardised by the IEEE 802.5 committee