



**IEEE 802.3 Congestion
Management Study Group
September interim report
& plans for the week**

San Antonio, TX

15-18 November, 2004



Reflector and Web

- To subscribe to the Congestion Management Study Group reflector send an email to:

listserv@ieee.org

with the following in the body of the message:

***subscribe stds-802-3-cm <your first name>
<your last name>***

- Congestion Management Study Group web page URL:

http://www.ieee802.org/3/cm_study/



Documents URLs

- Objectives:

http://www.ieee802.org/3/cm_study/public/september04/objectives_0904.pdf

- 5 Criteria:

http://www.ieee802.org/3/cm_study/public/september04/critters_0904.pdf

- PAR:

http://www.ieee802.org/3/cm_study/public/september04/par_0904.pdf

http://www.ieee802.org/3/cm_study/public/september04/802-3ar.pdf



September Interim

2 days – 6 Presentations

- 1:1 Oversubscription
 - Kevin Daines: WWP
- CM Value Proposition: Aligning the Objectives
 - Brad Booth: Intel
- Congestion Spreading
 - Pat Thaler: Agilent
- Rate Control in Short Range 802.3 Interconnects
 - Manoj Wadekar: Intel
- Problem Space for Ethernet Congestion Management
 - Hugh Barrass: Cisco
- Objectives split between 802.1 and 802.3
 - Manoj Wadekar: Intel



Accomplishments

- Refined/aligned objectives adopted in July
- Adopted response to the 5 Criteria
- Adopted PAR Title, Scope and Purpose
- Adopted a presentation recommending a parallel project with 802.1
- Presented that recommendation during 802.1's interim meeting



Objectives

- Specify a mechanism to support the communication of congestion information
- Specify a mechanism to limit the rate of transmitted data on an Ethernet link
- Preserve the MAC/PLS service interfaces
- Minimize throughput reduction in non-congested flows



Broad Market Potential

Broad set(s) of applications

Multiple vendors, multiple users

Balanced cost (LAN vs. attached stations)

- **Ethernet networks are being used in an increasing number of application spaces (clustering, backplanes, storage, data centers, etc.) that are sensitive to frame delay, delay variation and loss. Study Group presentations have shown that Ethernet networks can experience higher throughput, lower delay, and lower frame loss by performing congestion management. This will improve Ethernet in its growing number of applications.**
- **During the discussion of the WG 802.3 motion to initiate this study group, 23 people from 16 companies indicated that they plan to participate in the standardization effort for congestion management. This level of commitment indicates that a standard will be developed by a large group of vendors and users. During the study group meetings, there have been up to 30 people from at least 16 companies in attendance.**
- **A standard to support congestion management will respect the balance of cost between LAN and attached stations.**



Compatibility with IEEE Std 802.3

Conformance with CSMA/CD MAC, PLS

Conformance with 802.2

Conformance with 802

- The proposed standard will conform to the 802.3 MAC, and therefore will be consistent with 802.1d, 802.1Q, and relevant portions of 802.1f.
- As was the case in previous 802.3 standards, additional MAC Control sublayer functionality and MAC Control frame opcodes may be defined.
- The proposed standard will conform to the 802.3 MAC Client Interface, which supports 802.2 LLC.
- The proposed standard will conform to the 802.1 Architecture, Management and Internetworking.
- The proposed standard will define a set of systems management objects, which are compatible with OSI and SNMP system management standards.
- The proposed standard will conform to the requirements of IEEE Std 802-2001.



Distinct Identity

Substantially different from other 802 & 802.3 specs
One unique solution for problem
Easy for document reader to select relevant spec

- **The current 802.3 standard specifies a means of flow control using PAUSE. While this can decrease the frame loss due to oversubscription, the periods of no data transmission result in increased delay in the Ethernet link. The use of PAUSE as back pressure can result in congestion spreading and therefore it is rarely used.**
- **Congestion management, when used, may reduce the offered load at the congestion points without spreading congestion. This specification will define a means of decreasing frame loss while permitting increased efficiency in the Ethernet network.**
- **The specification will be done in a format consistent with the IEEE document requirements thus making it easy for implementers to understand and to design.**



Technical Feasibility

Demonstrated system feasibility
Proven technology, reasonable testing
Confidence in reliability

- **Mechanisms for congestion management using congestion indication are known in the industry for some protocols and standards. Simulations of similar protocols show there are alternatives that can be feasibly implemented to accomplish the objectives within IEEE 802.**
- **The inclusion of congestion indication in layer 2 devices was anticipated in RFC 3168 “The Addition of Explicit Congestion Notification (ECN) to IP”.**
- **Rate control is commonly implemented in Ethernet devices.**



Economic Feasibility

Cost factors known, reliable data
Reasonable cost for performance
Total installation costs considered

- **Possible solutions investigated for technical feasibility do not add significant complexity to Ethernet devices.**
- **Congestion management standardization will increase the broad market potential of Ethernet which will increase deployment and further reduce cost.**
- **System design, installation and maintenance costs are minimized by utilizing Ethernet system architecture, management, and software.**



PAR Title

Information technology --

Telecommunications and information exchange between systems -- Local and metropolitan area networks -- specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Enhancements for Congestion Management



PAR Scope

To specify IEEE 802.3 MAC parameters and minimal augmentation of MAC operation and management parameters of IEEE Std 802.3 to provide rate control and support of IEEE 802 congestion management.



PAR Purpose (14)

This project will enable accelerated deployment of Ethernet into emerging limited-topology applications that require improved delay, delay variation and frame loss characteristics.



PAR Purpose (14a)

Ethernet networks are being used in an increasing number of application spaces (clustering, backplanes, storage, data centers, etc.) that are sensitive to frame delay, delay variation and loss.

Study Group presentations have shown that Ethernet networks can experience higher throughput, lower delay, and lower frame loss by performing congestion management. This will improve Ethernet in its growing number of applications.



Plans for the Week

- Tutorial planned for Tuesday evening
- 802.1 discussion on Tuesday morning
- Consider any modifications to the Objectives, PAR or 5 Criteria
- Review more simulation results
- Consider task force schedules and plans
- Request approval of Objectives, PAR and 5 Criteria on Thursday afternoon
- Request study group extension