

Status of IEEE P802.3ar/D1.3

Kevin Daines

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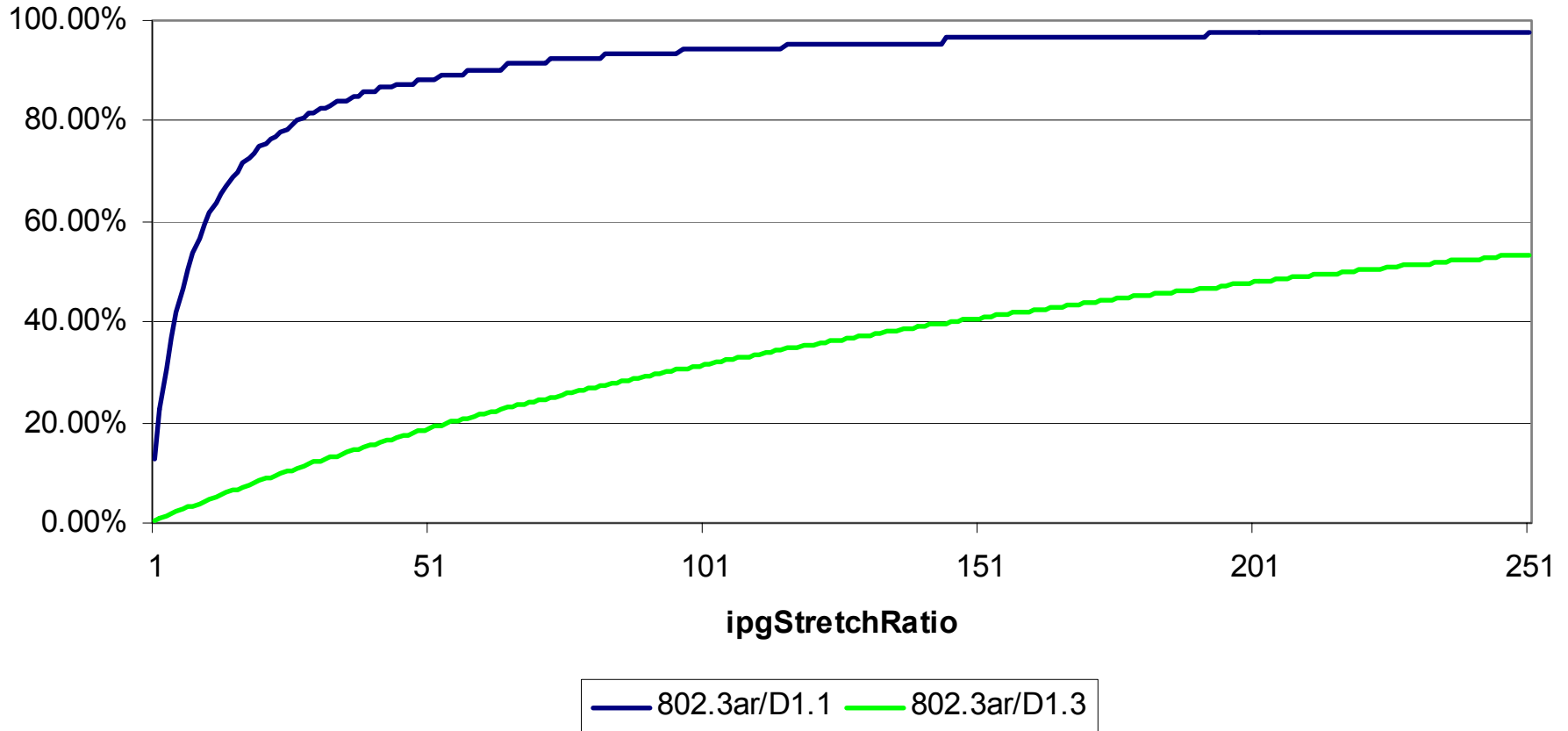
Outline

- **Concerns raised in Denver meeting by a few 802.3 WG members have been addressed**
- **802.3ar/D1.3 is ready for WG ballot**

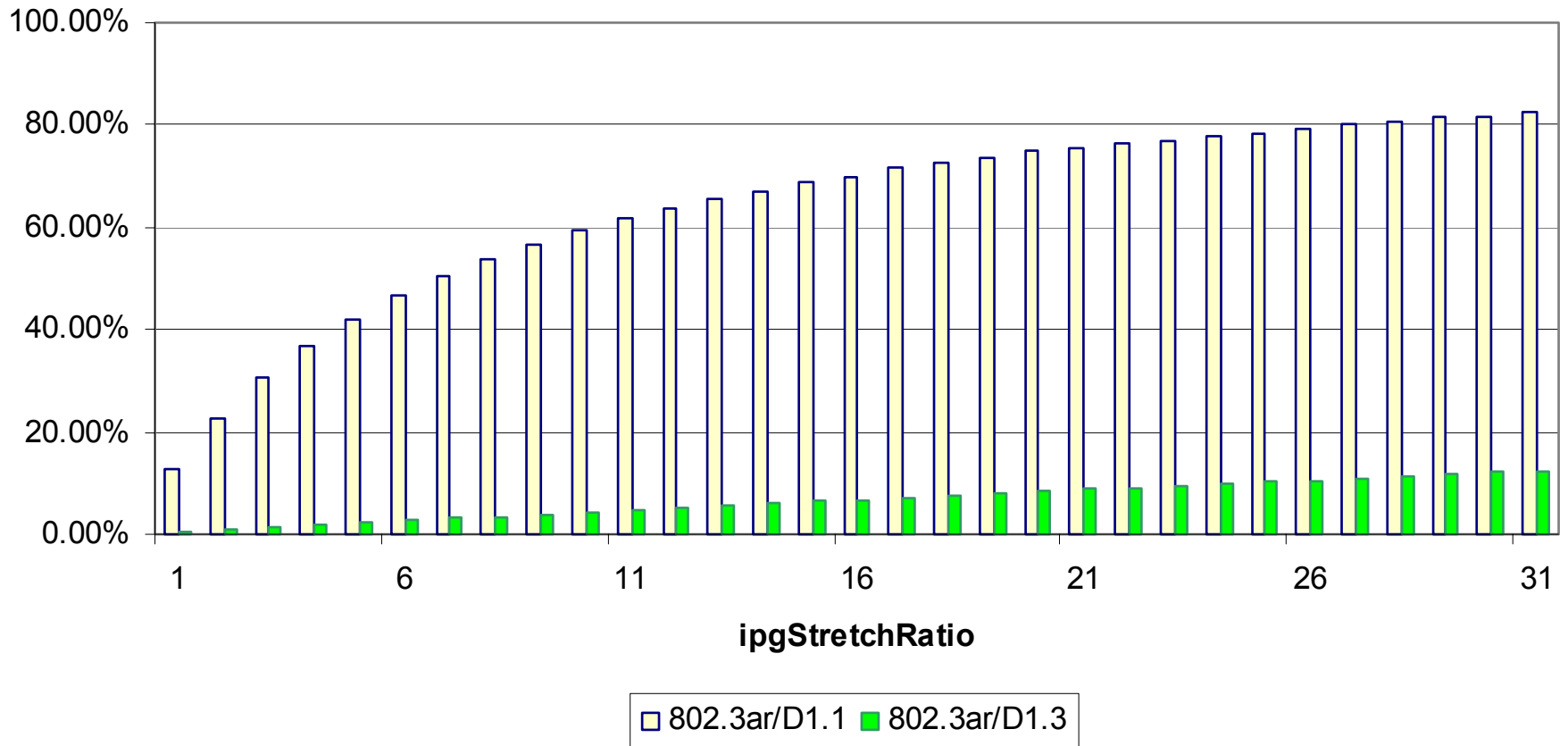
Concerns raised about .3ar/D1.1

- **Granularity of ifsStretch**
 - D1.1/ifsStretch does not provide a useful means for limiting the effective data rate to a small (<70%) fraction of the nominal rate.
- **D1.1 vs. PAR**
 - The PAR title should be changed to reflect this reality, to avoid confusion in the marketplace
- **D1.1 vs. Objectives**
 - Does not address 2 of the 4 objectives and poorly addresses the rate limiting objective
- **D1.1 vs. 5 Criteria**
 - Reflects initial broader scope of congestion management, of which rate limiting was one component
- **D1.1 vs. 802.3 operating rules**
 - Incomplete due to missing editing instructions for Annex 4A and absence of Annexes 30A and 30B

Granularity of ipgStretch (1)



Granularity of ipgStretch (2)



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 Rate Limiting

802.3ar TF Objectives

- 1) Specify a mechanism to limit the rate of transmitted data on an Ethernet link**
- 2) Preserve the MAC/PLS service interfaces**

Revised by IEEE 802.3ar TF on 07-March-2006

5 *Criteria/Broad market potential*

- Broad set(s) of applications
 - Multiple vendors, multiple users
 - Balanced cost (LAN vs. attached stations)
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- Ethernet networks are being used in an increasing number of application spaces 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 rate limiting.
 - Rate control is an effective technique to reduce buffer requirements and to reduce frame delay, delay variation and loss when there are known/fixed bottlenecks in the networks.
 - 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. This level of commitment indicates that a standard will be developed by a large group of vendors and users. During the study group and task force meetings, there have been up to 35 people representing 16 companies in attendance.
 - A standard to support rate limiting will respect the balance of cost between LAN and attached stations.

5 *Criteria/Compatibility*

- Conformance with CSMA/CD MAC, PLS
 - Conformance with 802.2
 - Conformance with 802
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- The proposed standard will be consistent with 802.1d, 802.1Q, and relevant portions of 802.1f.
 - The MAC will be enhanced with optional capabilities that are fully compliant with the existing 802.3 MAC specification.
 - 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.

5 *Criteria/Distinct identity*

- Substantially different from other 802 & 802.3 specs
 - One unique solution for problem
 - Easy for document reader to select relevant spec
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- 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.
 - 802.3x PAUSE Flow Control is not the best solution for addressing known/fixed bottlenecks because it requires additional buffering and introduces additional frame delay variation.
 - Rate limiting, when used, will reduce the offered load at bottlenecks without spreading congestion. Rate limiting could address bottlenecks due to data rate mismatches as well as mismatches due to protocol overheads. This specification will define a means of decreasing frame loss while permitting increased efficiency in the Ethernet network.
 - The proposed standard may include multiple parameters to support a single rate limiting mechanism addressing various forms of bottlenecks.
 - The specification will be done in a format consistent with the IEEE document requirements.

5 *Criteria/Technical feasibility*

- Demonstrated system feasibility
 - Proven technology, reasonable testing
 - Confidence in reliability
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- Rate limiting is not technologically challenging.
 - Rate control is commonly implemented in Ethernet devices (e.g., MAC ifsStretch supporting 10 Gb/s WAN PHY operation) demonstrating rate limiting techniques are feasible and reliable. Anticipated solutions are only expected to enhance this existing capability.
 - Providing common framework, method(s), and parameters will enable interoperability between vendors.
 - The anticipated solution has no known negative impact on higher layer operation, including congestion management/notification proposals. A higher layer protocol that requires knowledge of link speed will benefit from this enhancement.

5 *Criteria/Economic feasibility*

- Cost factors known, reliable data
 - Reasonable cost for performance
 - Total installation costs considered
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- Possible solutions investigated for technical feasibility do not add significant complexity to Ethernet devices.
 - Rate limiting 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.

Draft doesn't meet operating rules

- Editing instructions incomplete
- Missing clauses/annexes

Clause	802.3ar/D1.1 (pages)	802.3ar/D1.3 (pages)
4	0	10
30	6	7
Annex 4A	4	6
Annex 4B (new annex)	0	3
Annex 30A	0	6
Annex 30B	0	2
Total (includes boilerplate)	22	43

Concerns raised about .3ar/D1.1

- **Granularity of ifsStretch** ← **FIXED**
 - D1.1/ifsStretch does not provide a useful means for limiting the effective data rate to a small (<70%) fraction of the nominal rate.
- **D1.1 vs. PAR** ← **REVISED**
 - The PAR title should be changed to reflect this reality, to avoid confusion in the marketplace
- **D1.1 vs. Objectives** ← **REVISED**
 - Does not address 2 of the 4 objectives and poorly addresses the rate limiting objective
- **D1.1 vs. 5 Criteria** ← **NARROWED**
 - Reflects initial broader scope of congestion management, of which rate limiting was one component
- **D1.1 vs. 802.3 operating rules** ← **COMPLETE**
 - Incomplete due to missing editing instructions for Annex 4A and absence of Annexes 30A and 30B

Summary

- **802.3ar/D1.3 is ready for WG ballot**