

Call for interest

IEEE 802.3 Ethernet Working Group

Form an IEEE 802.3 Study Group in support of
“Distinguished minimum latency
traffic in a converged traffic
environment”

IEEE 802.3 Plenary, CFI
November, 13, 2012
San Antonio, TX

CFI Panel Members

- **Chair & presenter:**
 - Ludwig Winkel Siemens
- **Supporters and experts for the Q&A session:**
 - Thomas Hogenmüller Bosch
 - Yong Kim Broadcom
 - Oliver Kleineberg Hirschmann/Belden
 - Dan Sexton General Electric
 - Markus Jochim General Motors

Supporters (32 persons from 22 entities)

| <u>Last</u> | <u>First</u> | <u>Company</u> | <u>Last</u> | <u>First</u> | <u>Company</u> |
|--------------|--------------|-----------------------|-------------|--------------|-----------------|
| Matheus | Kirsten | BMW | Stanton | Kevin | Intel |
| Hogenmueller | Thomas | Bosch | Thananya | Baldwin | Ixia |
| Mihalache | Razvan | Bosch | Pannell | Don | Marvell |
| Diarra | Aboubacar | Bosch | Cummings | Rodney | National Instr. |
| Leurs | Ludwig | Bosch Rexroth | Suermann | Thomas | NXP |
| Grimwood | Mike | Broadcom | Chou | Joseph | Realtek |
| Teener | Michael J. | Broadcom | Moldovansky | Anatoly | Rockwell |
| Yong | Kim | Broadcom | Goetz | Franz-J. | Siemens |
| Zinner | Helge | Continental | Tretter | Albert | Siemens |
| Boiger | Christian | Deggendorf Univ | Winkel | Ludwig | Siemens |
| Schneelee | Stefan | EADS | Specht | Johannes | Univ.Essen |
| Jochim | Markus | General Motors | Iwaoka | Mitsuru | Yokogawa |
| Osella | Massimo | General Motors | Weibel | Hans | ZHAW |
| Sexton | Dan | General Electric | Müller | Thomas | ZHAW |
| DeMaria | Tom | General Electric | | | |
| Olsen | Dave | Harman | | | |
| Carlson | Steven B. | High Speed Design, I. | | | |
| Kleineberg | Oliver | Hirschman Belden | | | |

Objectives for the meeting

- To measure the interest in starting a study group for support of **Distinguished minimum latency traffic in a converged traffic environment.**
- At this time, we **don't need to**
 - Fully explore the problem
 - Debate strengths and weaknesses of solutions
 - Choose any one solution
 - Create PAR or five criteria
 - Create a standard or specification

Agenda

- Recap *Joint IEEE 802.1 / 802.3 Technical Session*
- Recap *Market opportunity*
- Recap *Technical Viability*
- Q&A
- Straw Polls

Recap

Joint IEEE 802.1 / 802.3 Technical Session

see http://www.ieee802.org/3/minutes/jul12/0712_joint_802d1_802d3_close_report.pdf

From July 2012 Plenary,
San Diego, CA

Summary of Meeting

- Met on Wednesday July 18th from 8.30am to 10.30am
- Attendance: full room
- Agenda
 - Heard presentations
 - Johas-Teener, Winkel / Kleineberg, Thaler, Thompson, Diab
 - Email of presentation sent to 802.3 reflector
 - Discussion and straw polls on proposed CFI questions
 - Refined a question for a potential 802.3 Nov 2012 CFI question to launch an IEEE 802.3 SG
 - Results to follow

Straw Polls (Editorial Revision)

| Options “Form an .3 SG.. for support of ...” | All in Room | 802.3: Voters or by Nov |
|--|----------------|----------------------------|
| A: <u>distinguished minimum latency</u> traffic in a <u>converged</u> traffic environment | Y: 33 N: 4 | Y: 9 N: 3 |
| B: minimum latency scheduled traffic in a heterogeneous traffic environment | Y: 8 N: 14 | Y: 3 N: 8 |
| C: scheduled traffic in a converged traffic environment | Y: 7 N: 20 | Y: 3 N: 9 |
| D: distinguished minimum latency time-sensitive traffic in a heterogeneous traffic environment | Y: 0 N: 23 | Y: 1 N: 11 |
| E: distinguished minimum latency traffic in a converged traffic environment with optimal bandwidth utilization | Y: 13 N: 12 | Y: 0 N: 10 |

Recap of market opportunity

From March 2012 Plenary,
Big Island, HI

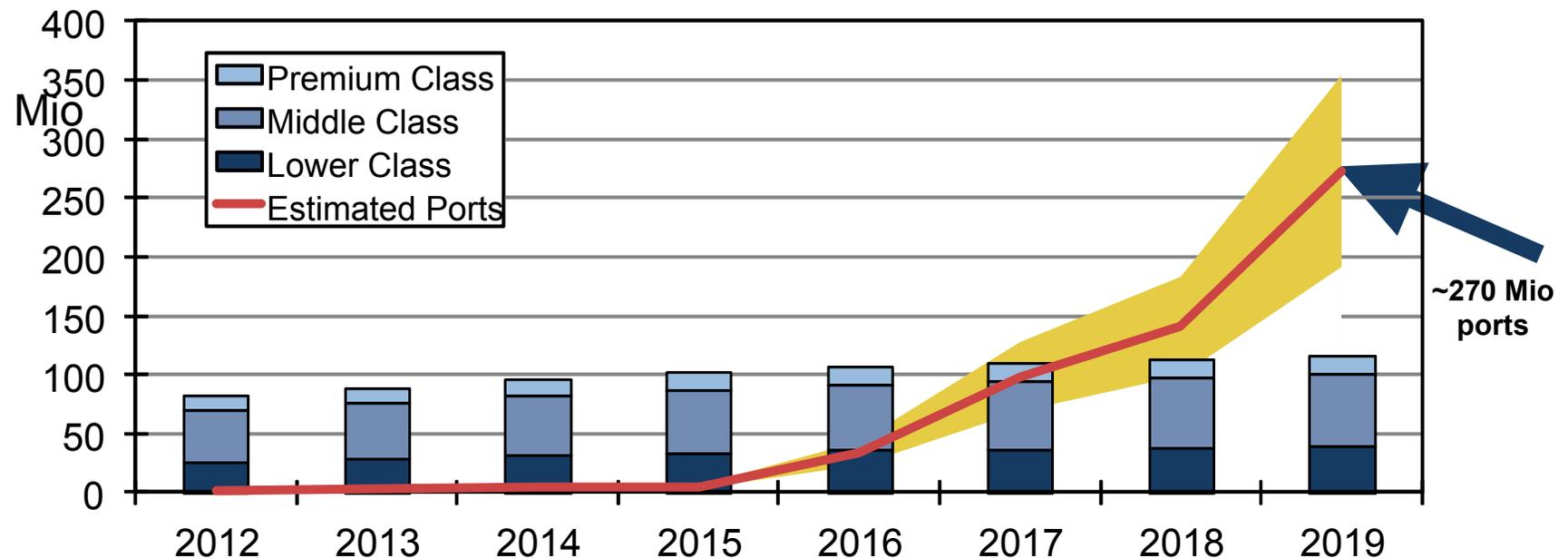
Automotive Ethernet Market

Introduction

- Ethernet use in automotive networks are now reality.
- Some mainstream in-car networks, e.g. CAN, Flexray, in use.

Forecast

- Strong desire and need for converged networks.
- Strong desire to interconnect mainstream in-car networks and emerging Ethernet networks.



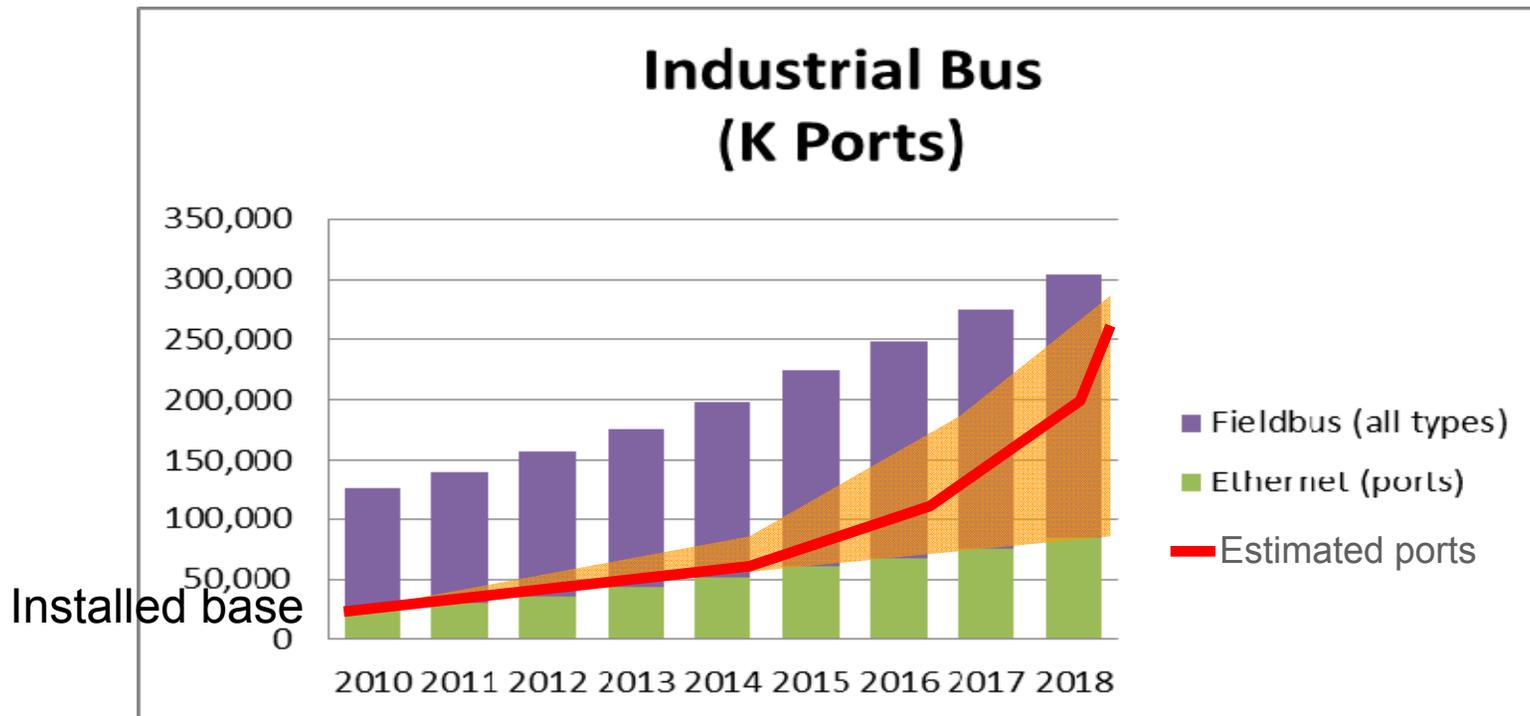
Industrial and Commercial Market

Introduction

- Ethernet use in industrial and commercial market is growing.
- About a dozen purposeful industrial protocols currently serve these networking needs

Forecast

- Strong desire and need for converged networks.
- Expect both conversion from fieldbus and growth of Ethernet over time.



Source: Contributions from Hirschmann, Siemens and Broadcom

Industrial and Commercial

Ethernet captures more and more Applications

Traditional Markets

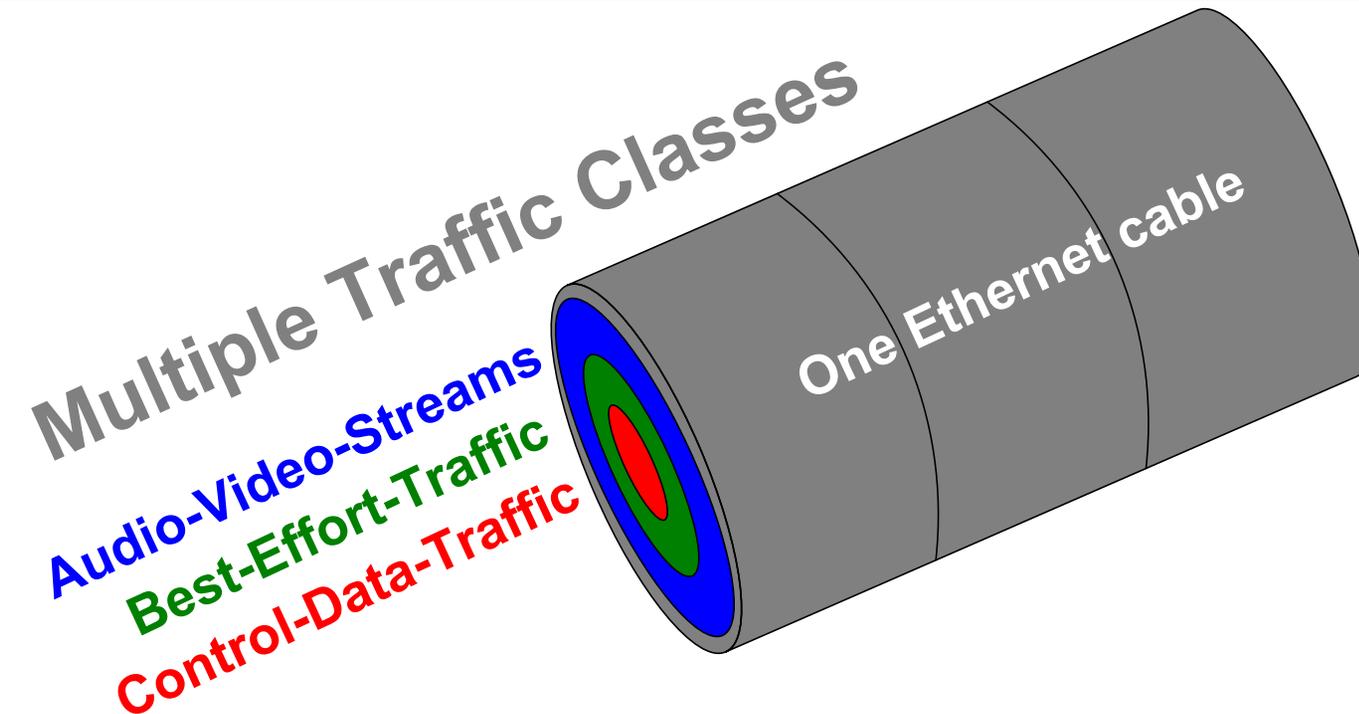
- Industrial Automation
 - Factory Automation
 - e.g. Material handling, Automotive Manufacturing, Transfer lines,
 - Process Automation
 - e.g. Oil, Gas, Chemical / Petrochemical, Food & Beverage
- Energy Automation
 - Power Generation
 - e.g. Fossil Power Plants, Wind Turbines
 - Power Transmission and Distribution
- Building Automation
 - Climate Control
 - Fire Safety



New Markets

- Avionics
 - Fly-by-Wire, Passenger Experience, etc.
- Railway Systems
 - Train Control
 - Railway Traffic Management Systems
 - etc.
- Medical
 - Patient Imaging,
 - Patient Management

Traffic Classes @ Converged traffic environment



Only one network with guaranteed bandwidth and guaranteed minimum latency for

Control-Data-Traffic and **Audio-Video-Streams**

while also providing capacity for Best-Effort-Traffic

Recap of technical viability

From July 2012 Plenary,
San Diego, CA

Recap of technical viability

- Possible solutions, most were shown in various presentations during the joint .1/.3 sessions, showing that it is viable.

Options for service supporting this interface.

- Preemption could be implemented in the MAC, in the PHY or in a new sublayer.

In the PHY at code group level: GraCaSI

- Proposed by Thompson
- PHY with 2 upper ports
- Done before in 802: Std 802.9a-1995 (10BASE-T and B-ISDN)
- Allows greater flexibility (2 ports into 1 bridge OR separate bridges)

PHY Layer Preemption

Possible PHY layer implementation

Details would need to be defined for each speed

Industrial Automation

Industrial Communications Services

Services:

- Best Effort Traffic
 - Configuration
 - Diagnostic
 - Web Services
 - Events
- AV Streams
 - Real Time Diagnostic
 - Visual Systems
- Control Data Traffic
 - General Automation to exchange typical analog or digital values
 - Manufacturing and process industry
 - Motion Control to exchange typical analog and digital values from actuators and sensors based on synchronized processes

Today vs Future comparison table:

| Service | Today | Future |
|----------------------|---|---|
| Best Effort Traffic | No guaranteed bandwidth | Guaranteed amount of bandwidth |
| AV Streams | Separate network | Guaranteed GoB for AV Streams in gss network |
| Control Data Traffic | Dedicated solutions to guarantee min latency, resources and bandwidth | Standardized solution to guarantee min latency, resources and bandwidth |

IEEE 802.3 Preemption CFI - Draft 12, 2012 March Plenary, Page 5

Option A

- Form an 802.3 study group to develop a PAR & 5 Criteria
- for support of distinguished minimum latency traffic in a converged traffic environment

Version 1.0, IEEE 802.1/802.3 Joint Session - July 2012 Plenary, Page 4

Guard bands are necessary

- If an interfering frame starts transmission just before the start of a reserved time period, it can extend critical transmissions outside the window.
- Therefore, a **guard band** is required before the window starts, equal in size to the largest possible interfering frame.



Questions and Discussion

Distinguished minimum latency traffic in a converged traffic environment

- Should an 802.3 Study Group be formed for

Distinguished minimum latency traffic in a converged traffic environment?

People in the Room

Y: _____

N: _____

A: _____

Dot 3 Voters Only

Y: _____

N: _____

A: _____

Straw Polls

- ___ Number of people in the room
- ___ Individuals who would attend and contribute to a

Distinguished minimum latency traffic in a converged traffic environment Study Group

- ___ Companies that support participation in a **Distinguished minimum latency traffic in a converged traffic environment Study Group**



Thank you!

Call For Interest

Distinguished minimum latency traffic in a converged traffic environment

For Plenary November, 2012
San Antonio, TX

CFI Request Text

- Title: Distinguished minimum latency traffic in a converged traffic environment.
- This CFI request is the result of the joint technical plenary between IEEE 802.3 and IEEE 802.1 in July 2012 (see http://www.ieee802.org/3/minutes/jul12/0712_joint_802d1_802d3_close_report.pdf#page=5). There is a need for support of distinguished minimum latency traffic in a converged traffic environment. This would help address the requirements in markets such as industrial and automotive control network, where control data is time-sensitive and often requires minimum latency.
- This call for interest will assess the interest within IEEE 802.3 to form a form an IEEE 802.3 study group to develop a PAR & 5 Criteria for support of distinguished minimum latency traffic in a converged traffic environment