IEEE 802 Nov 2020
Electronic Plenary

IEEE 802.3 Ethernet WG
Opening Plenary
09 Nov 2020

Beyond 400 Gb/s Ethernet
Call-for-Interest
Opening Report

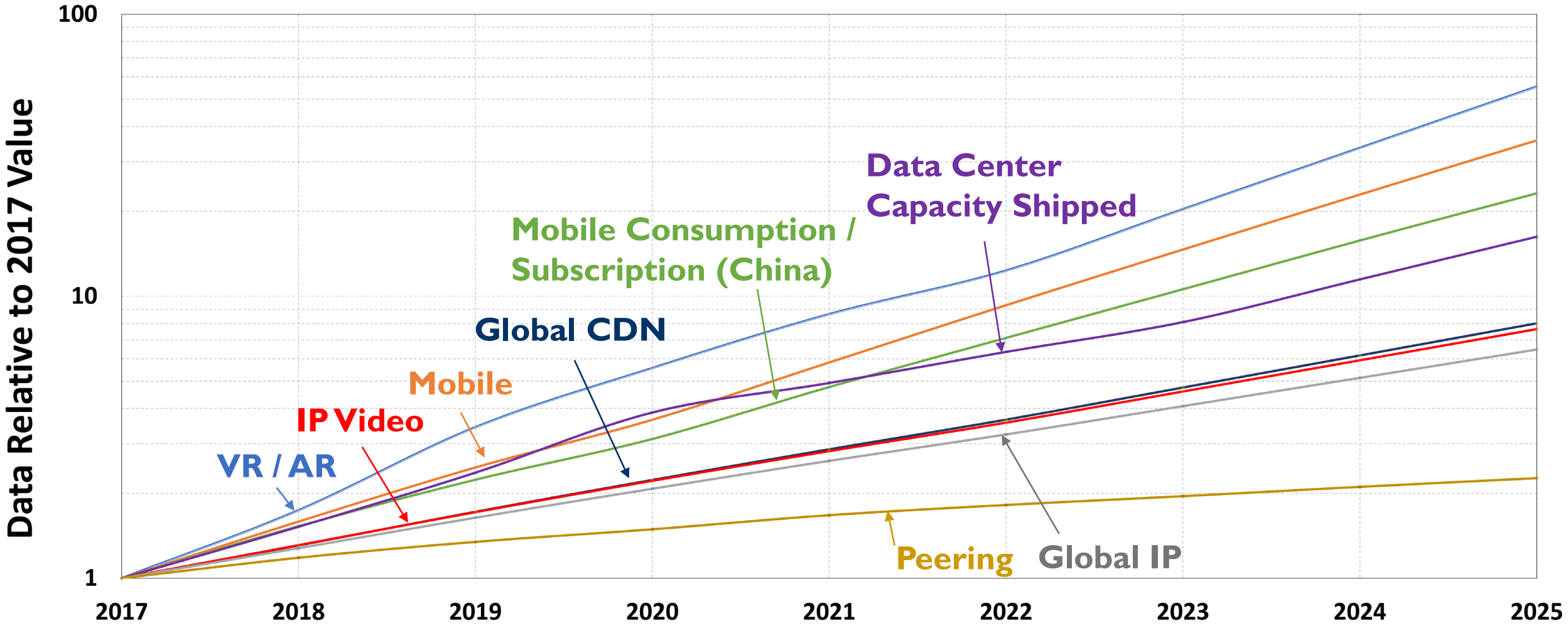
THE SONG REMAINS THE SAME

- **2020 Ethernet Bandwidth Assessment (BWA) documented latest analysis of industry bandwidth needs and driving factors**

Increased # of users	**x**	**Increased access methods and rates**	**x**	**Increased services**	**=**	**Bandwidth Explosion**

- **2020 Ethernet BWA**
  - **Report - https://bit.ly/802d3bwa2**
  - **Tutorial – https://bit.ly/802d3bwa2_tut**

The 2020 Ethernet Bandwidth Assessment

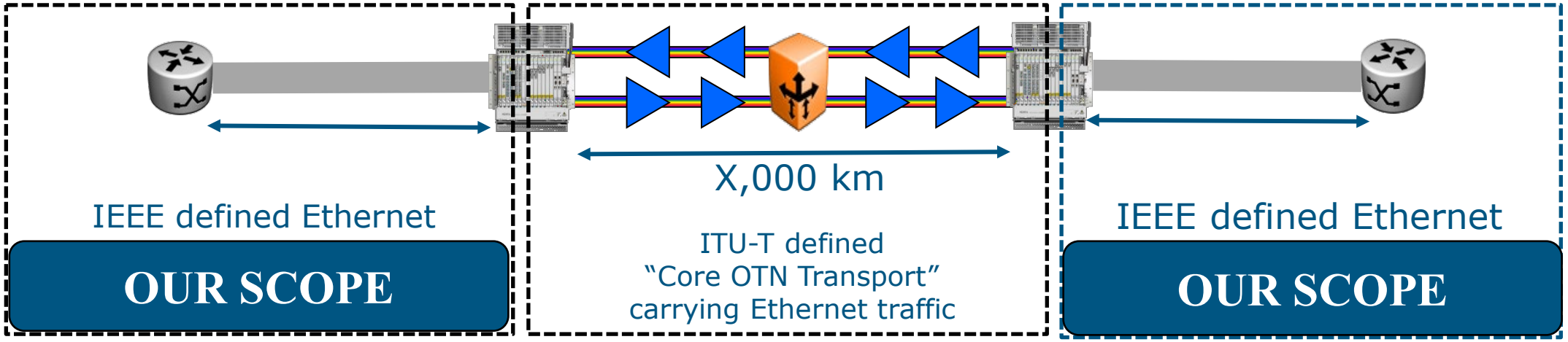


What are We Talking About?

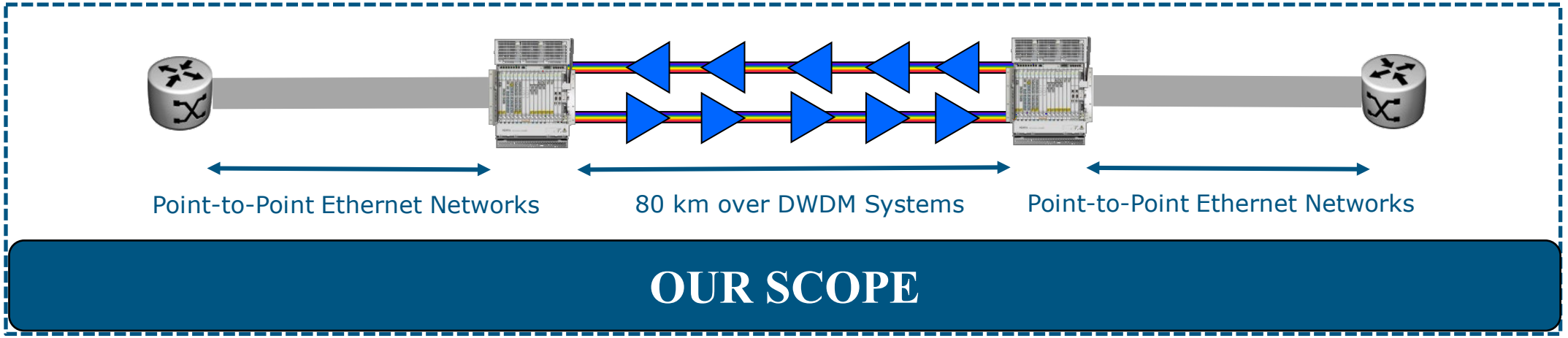
- Continuous bandwidth growth everywhere!
  - By 2025 traffic levels of applications studied will be 2.3x to 55.4x 2017 levels
  - Underlying trends support continued bandwidth growth
- Ethernet interconnect must continue to scale to support bandwidth growth of multiple applications
- Goal of the CFI is to form a study group to explore the market need and solutions for Beyond 400 Gb/s Ethernet

THE SCOPE OF ETHERNET TODAY

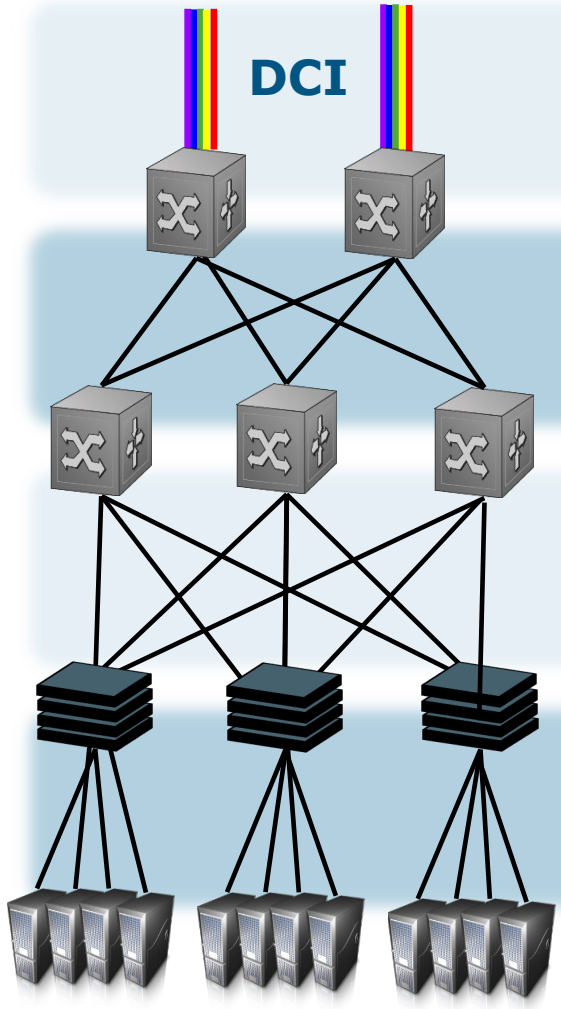
Scenario #1



Scenario #2



The Entire Ethernet Family Needs Consideration



	Next Speed?	Reach	Medium
Router	> 400 GbE	80 km	DWDM SMF
Leaf/Spine	> 400 GbE	500 m to 40 km	Duplex SMF
TOR / MOR / Leaf	> 400 GbE	50 m to 500 m	MMF / SMF (duplex or parallel)
Server	> 100 GbE	< 30 m	MMF Twin Axial

Coherent ?

Direct Detect

CFI Consensus Presentation

- A consensus building presentation was held in the New Ethernet Applications Ad hoc on Thursday, Oct 29, 2020
  - CFI Consensus Presentation - http://bit.ly/B400G_CFIC
  - # of attendees – 117 (per IMAT)

- Strawpoll summary

1. Should a Study Group be formed for "Beyond 400 Gb/s Ethernet"?	1. Y/N/A - 98 / 2 / 3
2. I would participate in the "Beyond 400 Gb/s Ethernet" Study Group in IEEE 802.3	2. Tally – 88
3. I believe my affiliation would support my participation in the "Beyond 400 Gb/s Ethernet" Study Group in IEEE 802.3	3. Tally: 51

Supporters (Page 1 of 4)

John	Abbott	Corning Incorporated
Venu	Balasubramonian	Marvell
Thananya	Baldwin	Keysight Technologies
Davinder	Basuita	Glenair
Vipul	Bhatt	II-VI Incorporated
Brad	Booth	Microsoft
Mark	Bordogna	Intel
Ralf-Peter	Braun	DEUTSCHE TELEKOM AG
Theodore	Brillhart	Fluke
Paul	Brooks	VIAVI Solutions
Matt	Brown	Huawei Technologies Canada
Leon	Bruckman	Huawei
John	Calvin	Keysight Technologies
Steve	Carlson	High Speed Design
Clark	Carty	Cisco
Derek	Cassidy	IET / ICRG
Frank	Chang	Source Photonics
Ayla	Chang	Huawei
Jacky	Chang	Hewlett Packard Enterprise
David	Chen	AOI
Gang	Chen	Baidu
Weiqiang	Cheng	China Mobile
Mabud	Choudhury	OFS
Robert	Coenen	InterOptic
John	D'Ambrosia	Futurewei, U.S. Subsidiary of Huawei
Eli	Dart	ESnet
John	DeAndrea	II-VI Inc
Mark	Dearing	Leviton
Claudio	DeSanti	Dell Technologies
Stephen	Didde	Keysight
Chris	Diminico	MC Communications / PHY-SI, Panduit
Mike	Dudek	Marvell
Frank	Effenberger	Futurewei
Dave	Estes	Spirent
John	Ewen	Marvell
Vince	Ferretti	Corning Incorporated
Ali	Ghiasi	Ghaisi Quantum LLC
Joel	Goergen	Cisco
Steve	Gorshe	Microchip Technology
Bob	Grow	RMG Consulting
Chin	Guok	Esnet
Mark	Gustlin	Cisco
Ruibo	Han	China Mobile
Xiang	He	Huawei
Adam	Healey	Broadcom
Howard	Heck	Intel
Briah	Holden	Kandou
Tom	Huber	Nokia
Jeff	Hutchins	Ranovus
Jonathan	Ingham	Independent
Kazuhiko	Ishibe	Anritsu
Hideki	Isono	Fujitsu Optical Components
Tom	Issenhuth	Huawei
Ken	Jackson	Sumitomo Electric Device Innovations USA

Supporters (Page 2 of 4)

John	Johnson	Broadcom
Lokesh	Kabra	Synopsys
Inho	Kim	MaxLinear
Mark	Kimber	Semtech
Mike	Klempa	Amphenol
Curtis	Knittle	CableLabs
Beth	Kochuparambil	Cisco
Samuel	Kocsis	Amphenol
Kishore	Kota	Inphi
Cedric	Lam	Google
Dominic	Lapierre	EXFO
Ryan	Latchman	MACOM
Greg	Le Cheminant	Keysight Technologies
David	Lewis	Lumentum
Jon	Lewis	Dell Technologies
Junjie	Li	China Telecom
Mike	Li	Intel
Robert	Lingle	OFS
Hai-Feng	Liu	HG Genuine
Ron	Logan	Davinder
Kent	Lusted	Intel
Ilya	Lyubomirsky	Inphi
Valerie	Maguire	Siemon
Jeff	Maki	Juniper
David	Malicoat	Malicoat Networking Solutions
Eric	Maniloff	Ciena
Flavio	Marques	Furukawa Electric
Brett	McClellan	Marvell
Larry	McMillan	Western Digital
Rich	Mellitz	Samtec
Guangcan	Mi	Huawei
Mario	Milicevic	MaxLinear
Osa	Mok	Innolight
Inder	Monga	Esnet
Andy	Moorwood	Keysight Technologies
Jianwei	Mu	Hisense
Shimon	Muller	Enfabrica Corp. / Axalume Inc.
Dale	Murray	LightCounting
Ray	Nering	Cisco
Shawn	Nicholl	Xilinx
Gary	Nicholl	Cisco
Paul	Nikolich	Independent
Mark	Nowell	Cisco
David	Ofelt	Juniper
Kumi	Omori	NEC
Tom	Palkert	Samtec, Macom
Carlos	Pardo	KDPOF
Charles	Park	Juniper
Earl	Parsons	CommScope
Vasu	Parthasarathy	Broadcom
Jerry	Pepper	Keysight Technologies
Phong	Pham	EPCOMM Inc.
David	Piehler	Dell Technologies
Rick	Pimpinella	Panduit

Supporters (Page 3 of 4)

Fabio	Pittala	Huawei
Rick	Rabinovich	Keysight Technologies
Sridhar	Ramesh	Maxlinear
Adee	Ran	Intel
Randy	Rannow	Silverdraft Supercomputing
Francisco	Rodrigues	PICadvanced
Olindo	Savi	Hubbell
Ed	Sayre	North East Systems Associates, Inc.
Steve	Sekel	Keysight Technologies
Steve	Shellhammer	QualComm
Bailin	Shen	ZTE
Kapil	Shrikhande	Innovium
Priyank	Shukla	Synopsys
Mike	Sluyski	Acacia Communications
Scott	Sommers	Molex
Yoshiaki	Sone	NTT
Massimo	Sorbara	GlobalFoundries
Ted	Sprague	Infinera
Peter	Stassar	Huawei
Henk	Steenman	AMS-IX
Rob	Stone	Facebook
Steve	Swanson	Corning Incorporated
John	Swanson	Synopsys
Bharat	Tailor	Semtech
Tomoo	Takahara	Fujitsu
Jack	Tang	Guangdong Ruigu Optical Network Communications Co.,Ltd.
Jim	Theodoras	HG Genuine USA
Nathan	Tracy	TE Connectivity
Viet	Tran	Keysight Technologies
Steve	Trowbridge	Nokia
Jeff	Twombly	Credo Semiconductor
Ed	Ulrichs	Intel
Paul	Vanderlaan	UL LLC
Prasad	Venugopal	Arista Networks
Xinyuan	Wang	Huawei
Winston	Way	Neophotonics
Markus	Weber	Acacia Communications
Glenn	Wellbrock	Verizon
Tom	Williams	Acacia Communications
James	Withey	Fluke
Chongjin	Xie	Alibaba
Shuto	Yamamoto	NTT
Zhiwei	Yang	ZTE
Wen	Yangling	Futurewei
James	Young	Commscope
Xu	Yu	Huawei
Hua	Zhang	Hisense Broadband
Bo	Zhang	Inphi
Wenyu	Zhao	CAICT
Xiang	Zhou	Google
Yan	Zhuang	Huawei
George	Zimmerman	CME Consulting
Pavel	Zivny	Tektronix

Supporters (Page 4 of 4)

Yasuhiro	Hyakutake	Adamant Namiki Precision Jewel
Pirooz	Tooyerkani	Cisco
James	Weaver	Arista Networks
Ahmad	Atieh	Optiwave Systems, Inc.
Upen	Reddy Kareti	Cisco
Qingya	She	Fujitsu
Jianwei	Mu	Hisense

168 supporters from 95 affiliations

Call-For-Interest

The IEEE 802.3 2020 Ethernet Bandwidth Assessment examined a multitude of applications and forecasts a broad diversity in network traffic growth rates by 2025 ranging from 2.3x to 55.4x the amount of traffic these same applications experienced in 2017. This same assessment also examined the underlying factors of bandwidth growth, i.e. users, access rates, and applications, and highlighted the forecasted growth of these factors, which will only provide further pressure on future network bandwidth requirements. Furthermore, the COVID-19 pandemic, which occurred after the completion of the 2020 Ethernet Bandwidth Assessment, highlighted the critical role of networking in everyday life. The importance of these networks to support the bandwidth demand of these times cannot be overstated.

The development of a new Ethernet rate and physical layer solutions supporting greater than 400 Gb/s will provide the industry with the next solution set it needs to address the bandwidth demands of the various applications examined, such as mobile, data center, and IP video. It is also recognized that any signaling rates used for higher speed physical layer specifications may be applicable to creating physical layer specifications for existing Ethernet rates, which would enable optimized solutions to meet bandwidth demands throughout network architectures.

This call for interest is to request the formation of the "Beyond 400 Gb/s Ethernet" Study Group to consider the development of solutions supporting Ethernet rates greater than 400 Gb/s, and the application of any signaling rates used to support Ethernet rates greater than 400 Gb/s to existing Ethernet rates.

THANK YOU!