Chapter 38 of the Society of Broadcast Engineers
SBE
EL PASO - LAS CRUCES - JUAREZ

AUGUST 2022

PO Box 3561 El Paso, TX 79923-3561 www.kint98.com

NEWS

The Race to Deliver 800G Ethernet

Aniket Khosla, Vice President of Product Management - Spirent Communications

If you follow the world's biggest cloud companies, you've probably seen momentum building around the next big thing in hyperscale datacenters: 800 Gigabit Ethernet (800G). "Big" is the right adjective. Emerging 800G optics will unleash huge performance gains in these networks, providing much-needed capacity to satisfy customers' insatiable demand for bandwidth. While the industry can broadly agree on the need for 800G interfaces, however, the path to actually implementing them remains less clear.

Today, those with the biggest stake in delivering early 800G technologies—chipset makers, network equipment manufacturers (NEMs), transceiver and cable vendors—find themselves in a bind. With hyperscale cloud providers clamoring for 800G solutions *now*, vendors need to start delivering—or stand aside while competitors do. Yet just because customers want 800G, that doesn't mean the technology is ready for primetime.

The industry continues to work through several complicated issues—not least of which, competing standards that remain immature and open to interpretation. Vendors can't wait for the dust to settle on these questions. They need to move products forward now. So early, comprehensive testing has become crucially important.

Why is the jump to 800G proving harder than previous Ethernet evolutions? And what are vendors and their customers doing to stay ahead of the game? Let's take a closer look.

A Need for Speed in Cloud Datcenters

If you're only peripherally involved in this space, you might be confused. Aren't large-scale networks and datacenters just starting to use *400G* optics? Yes. But it's already clear that gains from that fourfold increase over yesterday's 100G interfaces won't satisfy the demand for long.

You can blame the explosion of cloud traffic from home-based workers, new Internet of Things (IoT) deployments, huge increases in artificial intelligence and machine learning (AI/ML) workloads, and other enterprise digital transformation efforts. To keep up, hyperscalers are already deploying first-generation 800G technologies in their massive cloud datacenters, and telecommunications service providers aren't far behind.

Regardless of what vendors and standards bodies thought their timelines might look like a few years ago, the market for 800G technologies is taking shape right now. And unlike past Ethernet evolutions, which saw standards adopted slowly over years, customers want this shift to happen quickly. For the NEMs, transceiver/cable suppliers, and chipmakers looking to lead the charge in 800G, solutions need to be well on their way to customers. But as vendors and their hyperscale customers are discovering, delivering production-ready 800G technology is easier said than done.

KTSM-TV

KVIA-TV

KRWG-TV

KBNA-AM/FM & KAMA-AM

KHEY-AM/FM, KPRR-FM & KTSM-AM/FM

KLAQ-FM, KISS-FM & KROD-AM

KPAS-FM-
ALGIE A. FELDER CSBE

KINT98.COM
INTERNET RADIO NETWORK

BURST COMMUNICATIONS INC.- KIRK BASEFSKY

JOHN LACKNESS

ENTRAVISION COMMUNICATIONS

SCMS, INC.-

ABS ADVANCED BROADCAST SERVICES, LLC

KSCE-TV

RF Specialties of Texas

KCOS-TV

KELP-AM
ARNOLD McClatchy.

MARSAND,INC.

Ho Tah Say. LLC

Significant Technical Hurdles Remain

The good news is that 800G isn't a radically new concept. It's based on well-understood 400G technology. But that doesn't mean evolution will be simple. 800G brings huge increases in speed, power consumption, and heat, creating challenges in physical layer performance and interoperability that vendors haven't had to contend with before. That includes issues like:

- **Fundamental electrical changes:** Among the most exciting innovations of 800G is the shift to 112G electrical lanes, doubling the spectral content per lane versus 400G technology. This change will enable greener, higher-density solutions. But it also creates enormous challenges for the entire industry. Equipment manufacturers will need to sort through complex physics to develop electrical technology that operates well at twice yesterday's symbol rate. And, given the interdependence of the many components involved in 800G technologies, vendors across the ecosystem—chipmakers, cable manufacturers, test equipment providers, and others—will all need to scale up in concert to deliver it

- **Standards that are still in flux:** Just as vendors are clamoring for guidance, the standards space has gotten… complicated, with two major industry groups developing different standards. The IEEE has specified 112G electrical lanes through 802.3CK, but its full 800G standard is still under development. Meanwhile, the Ethernet Technology Consortium (ETC) has released the industry's only live standard: 800GBASE-R. Should vendors embrace the ETC standard and start getting products out to customers? Should they hold off until the IEEE standard is released and the market coalesces around a winner? What first-mover advantages will they sacrifice if they do? These and other questions remain to be answered.

SBE CHAPTER 38 OFFICERS

CHAIRMAN
Antonio Castro
SBE member # 11456.
KFOX/COX retired Chief Eng.
800 Arredondo dr.
El Paso. TX 79912
915-584-1220 home
915-525-8507 cell
farahjac@sbcglobal.net

VICE CHAIRMAN
Bruno Cruz
SBE member # 25867
200 E.Alto Mesa
El Paso, TX.79912
915-757-7898
915-526-1842 cell
Bruno.cruzJR@kfoxtv.com

TREASURER
Walter Hanthorn
SBE member # 18307
KSCE TV
4461 Gen. Maloney
El Paso, TX. 79924
915-269-7583 home
915-532-8588 office

CERTIFICATION COMMITTEE:
David Halperin.

MEMBERSHIP COMMITTEE:
Antonio Castro
Warren Reeves

FREQUENCY COORDITATION COMMITTEE:
Warren Reeves
Owen Smith

SCHOLARSHIP COMMITTEE:
Rick Vilardell

WEB SITE COMMITTEE:
Norbert Miles

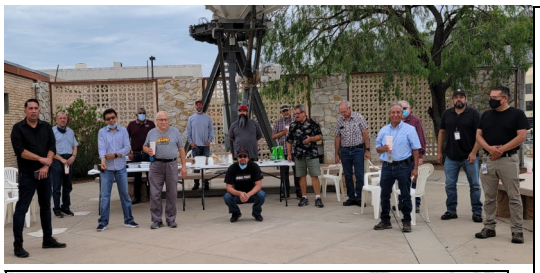
SUSTAINING MEMBERSHIP:
Antonio Castro

PROGRAM CHAIRMAN:
Warren Reeves

NEWSLETTER:
Antonio Castro

EAS CHAIRMAN:
David Halperin

EXECUTIVE COMMITTEE:
Antonio Castro
Bruno Cruz
Walter Hanthorn



EL PASO, TX SBE CHAPTER 38 MEETING MINUTE

DATE 7/19/2022 LOCATION: LUBY'S UTEP

MEETING CALLED TO ORDER: 12p:25 PM, BY ANTONIO CASTRO. THERE WERE ONLY 8 (EIGHT) ATTENDANTS

REPORT OF THE SECRETARY: MINUTES IN THE JULY NEWSLETTER. ACCEPTED BY NORBERT MILES, SECONDED BY WARREJN REEVES.

REPORT OF THE TREASURER: $ 4,777.14 IN THE BANK , ACCEPTED BY NORBERT MILES, SECONDED BY WARREN REEVES.

REPORT OF THE CERTIFICATION COMMITTEE: RICK VILARDELL MENTIONED THAT HIS STUDENTS WILL GO FOR THE CRO.

REPORT OF THE MEMBERSHIP COMMITTEE: DAVID GRICE OFFER TO HAVE HIS ALAMOGORDO RADIO STATIONS GROUP AS SUSTAINING MEMBER. .

REPORT OF THE FREQUENCY COORDINATOR COMMITTEE: **STIL AN ISSUE WITH THE MEXICAN (CD. JUAREZ) WITH CHANEL 14-1, CONFUSING THE BRANDING OF KFOX. NO RESPONSE OF FCC, CONSUMER OR SBE NAT.FREQ. COORD. BRUNO CRUZ WILL BRING THE SINCLAIR GROUP TO THE RESCUE.**

REPORT OF THE SCHOLARSHIP COMMITTEE NO REPORT.

REPORT OF THE WEBSITE COMMITTEE: NOW 3770 VS. 3707 EQUAL 63 HITS. WILL CONTEMPLATE THE SBE.ORG AS OUR DOMAIN NAME.

REPORT OF THE EAS CHAIRMAN: MONTHLY TEXAS AND NEW MEXICO TESTS WERE FINE.

REPORT OF THE PROGRAM COMMITTEE: TO LOOK INTO THE NATIONAL SUSTAINING MEMBERS FOR A ZOOM PRESEENTATION

NEW BUSINESS OR ANY ITEMS FOR THE CHAPTER INTEREST: TRAM WAY FROM KFOX DID NOT START OPERATING THIS TIME.
.

OTHER. .NONE.

NEXT MEETING DATE AND LOCATION: AUGUST 9 AT 11 AM FOR A ZOOM PRESENTATION.

MEETING ADJOURNED: AT 12:58 PM.

OCTOBER 27, 2009…..REMEMBER?

AUGUST PROGRAM

FOR LAST MONTH OF JULY, WE HAD OUR REGULAR MEETING IN THE "LIVE" MODE ……..AND THERE WAS NO PRESENTATION. WE MET AT THE LUBY'S CAFETERIA OF UTEP

NOW, FOR THIS JULY MONTH, WE ARE GOING TO HAVE A ZOOM MODE CHAPTER MEETING

WHEN: TUESDAY AUGUST 9 TH

WHERE: AT YOUR PC OR CEL PHONE

TIME: 10:30 AM FOR WELCOME AND CHAT AND THEN, 11:00 AM MEETING WILL SART.

IF WE GET A PRESENTER, YOU WILL BE NOTIIFIED.

HAVE A GREAT AUGUST !!

- **Early devices that won't support full standards:** The ETC 800G standard requires both Auto-Negotiation (AN) and Link Training (LT) for electrical signal handling, but current chipsets don't always support both. Complicating matters, ASICs that support only LT might not be compatible with those that support both AN and LT—requiring customers to manually tune links. Without the ability for receivers to automatically adjust a link partner's transmit settings, it becomes much harder to achieve links—and much easier to introduce link flaps that deteriorate throughput.

- **Extensive—and expensive—debugging demands:** 800G optics consume large amounts of power and generate huge amounts of heat, which can have unpredictable effects on performance. Vendors need to implement novel cooling techniques and thoroughly validate basic functionality, including signal communications between optics and the line, and interoperability on optical channels and electrical host interfaces. Given the high cost of optics—thousands of dollars each—plus ongoing supply chain issues, testing is neither easy nor cheap.

- **Little margin for error:** In many ways, 800G holds a magnifying glass up to the biggest challenges with 400G—challenges we still haven't fully solved. By moving to higher speeds and frequencies, and doubling the sample size and symbol rate, minor issues that had negligible effects at 400G can now directly impact electrical performance. These problems can affect printed circuit boards (PCBs) in a number of ways, requiring more advanced ASIC designs and fabrication processes with higher tolerances.

Moving Forward Amid Uncertainty

The market won't wait while vendors and standards bodies work through these issues. Vendors are racing to ship first-generation 800G Ethernet devices, and customers are validating and implementing them as quickly as they can. If vendors want to meet this urgent demand—without causing more problems for customers than their solutions actually solve—they need to test earlier and more comprehensively than in any previous Ethernet evolution. And that's exactly what we're seeing.

Transceiver and cable vendors are hard at work assuring 800G interoperability, even as the standards themselves continue to evolve. Chipset makers are focusing on pre-silicon validation techniques like hardware automation and software-based traffic emulation, and post-silicon verification best practices. NEMs are looking to assure link and application performance for a variety of use cases under real-world conditions. Meanwhile, the hyperscalers most anxious about these solutions are thoroughly testing implementations and network and application performance, between and within datacenters.

This work will continue for the foreseeable future, as much of the story of 800G Ethernet remains to be written. But by diligently applying state-of-the-art testing and validation, vendors can start giving customers the high-speed Ethernet interfaces of the future today.