2022 ETHERNET ROADMAP

The Past, Present and Future of Ethernet

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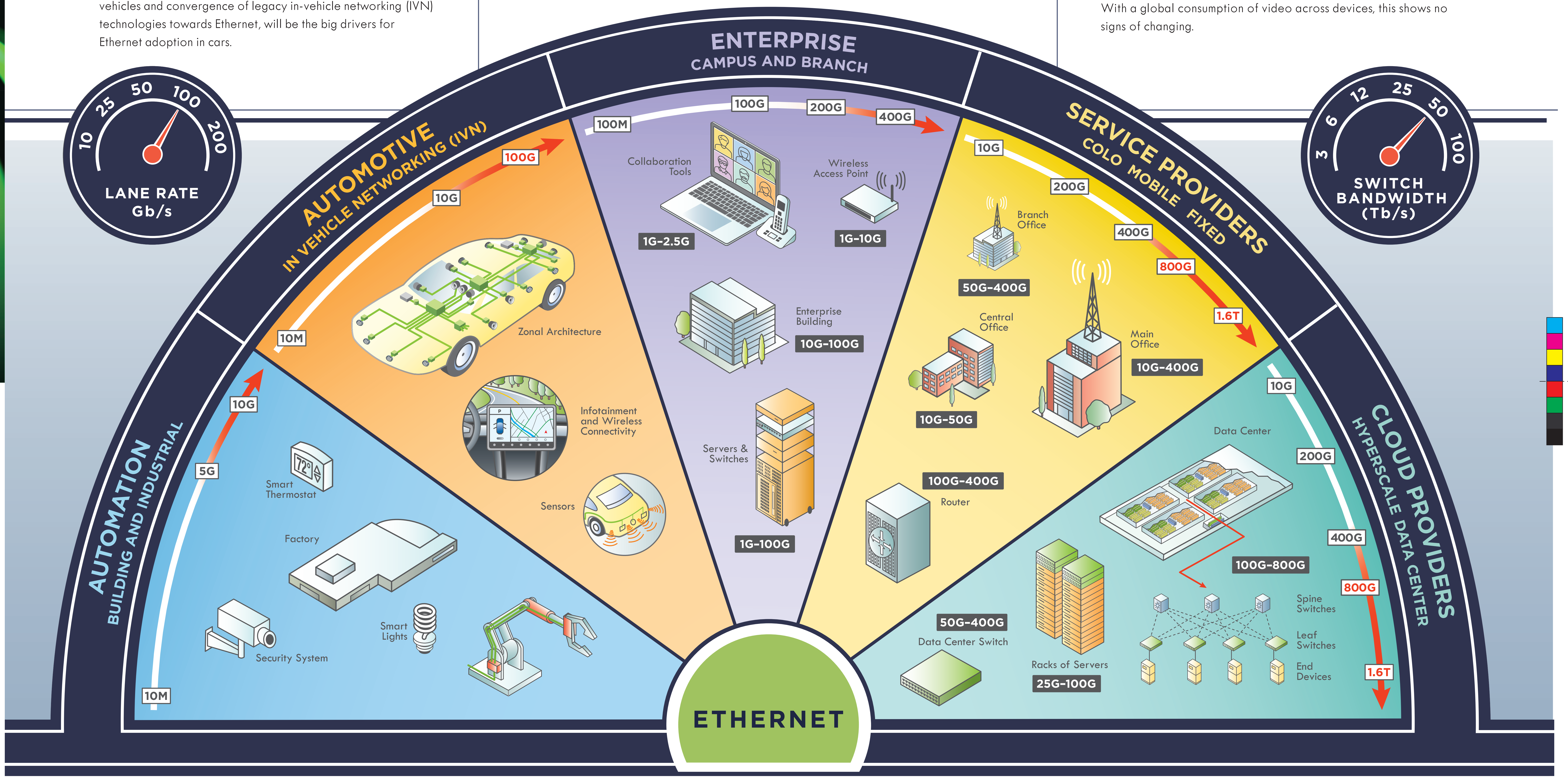
ETHERNET APPLICATIONS

AUTOMOTIVE is one of Ethernet's latest success stories. Forecasts predicted up to 500 million ports of Ethernet will ship in over 100M vehicles by 2021. Ethernet links within cars provide data using Single-Pair Ethernet (SPE) to reduce the cost and weight in vehicles while providing economies of scale and interoperability. Richer multimedia experience, autonomous driver assistance systems (ADAS), roll-out of autonomous vehicles and convergence of legacy in-vehicle networking (IVN) technologies towards Ethernet, will be the big drivers for Ethernet adoption in cars.

ENTERPRISE and Campus applications are a huge market for Ethernet with over a billion ports shipping per year. Most of these ports are BASE-T at the access layer, with both multi-mode and single-mode fiber links (MMF/SMF) further into the network.

The changing needs of Wi-Fi access points and Enterprise class client devices are driving technology transitions. BASE-T ports are making the transition from 1000BASE-T to 2.5G/5G/10G BASE-T, and optical ports are moving from 10G/40G to 25/100G.

SERVICE PROVIDERS have driven higher speed Ethernet solutions for decades. Their multi-service aggregation needs continue to grow with support for router connections, EPON, transport network (OTN), and wired and wireless backhaul. In particular, the 5G mobile deployment is driving dramatic increases in both fronthaul and backhaul applications, which continues to push Ethernet requirements for higher rates and longer distances. With a global consumption of video across devices, this shows no signs of changing.



INTEROPERABILITY AND CERTIFICATION

The Ethernet Alliance is committed to leading the charge to instilling industry confidence in Ethernet standards through its multi-vendor interoperability demonstrations and plugfests. Our PoE Certification Program takes this mission to the next level!

Our industry-defined PoE Certification Test Plan is based on the Ethernet PoE standard, and products passing this test will be granted the Ethernet Alliance PoE Certification Logo. The trademarked logo provides instant recognition for products based on the IEEE 802.3 PoE standard, and increases multi-vendor interoperability between products bearing it. The logos indicate the power class and product type providing clear guidance on which devices will work with each other.

The first generation of the program (Gen 1) certifies Type 1 and Type 2 products that use 2-Pair of wires (PoE 1). The second generation of the program (Gen 2) certifies Type 3 and Type 4 products using 2-Pair and 4-Pair of wires (PoE 2). See table below for details:

PoE Types and Classes	PoE 1 2-Pair PoE – Type 1 (PoE 1 2-Pair PoE – Type 2)				PoE 1 2-Pair PoE – Type 2	PoE 2 4-Pair PoE 2			
Class	0	1	2	3	4	5	6	7	8
PSE Power (W)	15.4	4	7	15.4	30	45	60	75	90
PD Power (W)	13	3.84	6.49	13	25.5	40	51	62	71.3
		PoE 2 4-Pair PoE – Type 3 (classes 1–6)						PoE 2 4-Pair PoE Type 4 (classes 7–8)	

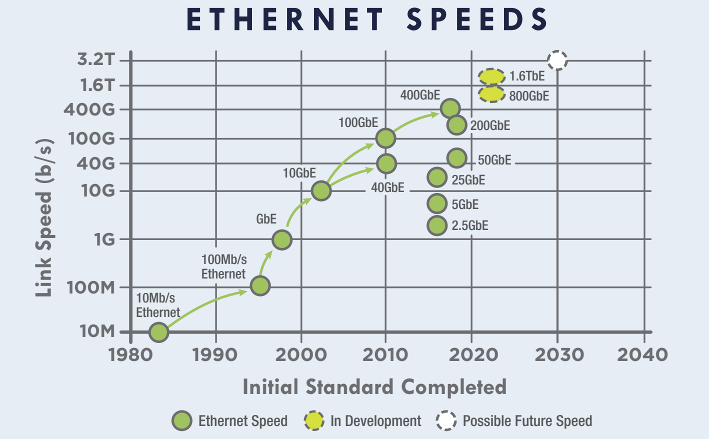
EA Certified™ EA Certified 2.0™

https://ethernetalliance.org/poecert/

AUTOMATION, BUILDING, AND INDUSTRIAL applications are moving from older fieldbus style networks to Ethernet. This move has been accelerating over the last decade, with Ethernet as a key enabling technology for the Fourth Industrial Revolution aka Industry 4.0. The main themes of Industry 4.0 are Interconnection, Information Transparency, Technical Assistance and Decentralized Decisions [1]. Adopting Ethernet provides OT access to all the networking technology that IT has been developing over the last 40 years, as well as physical layers developed specifically for harsh OT environments , e.g., 10BASE-T1L.

[1] M. Hermann, T. Pentek and B. Otto, "Design Principles for Industrie 4.0 Scenarios," 2016 49th Hawaii International Conference on System Sciences (HICSS), 2016, pp. 3928-3937, doi: 10.1109/HICSS.2016.488

ETHERNET SPEEDS



CLOUD PROVIDERS were the first to adopt 10GbE servers on a large scale in 2010 for hyperscale data centers. With voracious appetites for applications like AI and Machine Learning, hyperscale servers have moved to 25GbE, and are transitioning to 50GbE, 100GbE and beyond. Unique networking architectures within these warehouse scale data centers have driven a mix of copper cables, multi-mode fiber and single-mode fiber solutions at 100, 200 and 400 GbE. The bandwidth demands of both hyperscale data centers and service providers continue to grow exponentially and they are adopting similar technologies.

For digital version of the roadmap and for latest Ethernet industry resources, please visit: www.ethernetalliance.org