

WHITE PAPER

Networking as a driving force of the semiconductor industry in Europe

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TABLE OF CONTENTS

Summary	2
Synopsis	2
Key Takeaways.....	2
IDC's Recommendations	2
In THIS Whitepaper.....	3
Network Driving Change	4
The Future of Networking – Innovating with Silicon One.....	5
The Impact of Networking on the Semiconductor Industry	7
Copyright Notice.....	8
About IDC.....	10
IDC U.K.....	10



CONSORTIUM



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SUMMARY

The white paper, "Networking as a Driving Force of the Semiconductor Industry in Europe," sponsored by ALLPROS.eu, discusses the pivotal role of networking in the semiconductor industry. Moderated by Luis Fernandes from IDC, the webinar featured insights from industry leaders like Len Padilla (IDC), Enrico Mercadante (Cisco), and Patrick Schmidt (AMD).

Len Padilla highlighted IDC research indicating that IT investment priorities are shifting towards Generative AI, Automation, and Cybersecurity. He emphasized the need for robust network infrastructure to support AI workloads and the importance of sustainability in network design. Padilla also stressed the necessity of resilient semiconductor supply chains in Europe.

Enrico Mercadante discussed Cisco's Silicon One project, which aims to innovate network design by simplifying and optimizing it for better performance and lower power consumption. This project addresses the unique challenges posed by AI/ML workloads, such as load balancing, congestion management, and failure recovery. Cisco's approach allows for flexible deployment across various network environments, enhancing compatibility and efficiency.

Patrick Schmidt from AMD focused on the need for flexible, available, and open-standard-based semiconductors. He highlighted the importance of integrating semiconductors with CPUs, GPUs, and DPUs to maximize network performance, especially for AI/ML workloads. Schmidt also mentioned AMD's role in the Ultra Ethernet Consortium, which aims to advance Ethernet standards for future networking solutions.

Key takeaways include the need for proper legislation in Europe, the importance of reducing dependency on external supply chains, and the growing significance of sustainability in network infrastructure. The white paper recommends reinforcing supply chains, prioritizing sustainability, leveraging innovative network silicon, and designing programmable, power-efficient silicon based on open standards.

In summary, the white paper underscores the transformative impact of networking on the semiconductor industry, advocating for strategic investments in network infrastructure, sustainable practices, and collaborative efforts to enhance Europe's semiconductor ecosystem.

SYNOPSIS

The white paper discusses the pivotal role of networking in the European semiconductor industry, as highlighted in the ALLPROS.eu webinar. Key insights include the importance of generative AI, automation, and cybersecurity in IT investments, the innovative impact of Cisco's Silicon One project, and AMD's emphasis on flexible, open-standard semiconductors. The paper underscores the need for robust legislation, resilient supply chains, and sustainable practices to support the evolving demands of AI and networking technologies.

KEY TAKEAWAYS

- » Proper legislation is still lacking when it comes to networking and the semiconductor industry in Europe.
- » European supply chains are overly dependent on external sources, posing risks of disruption (e.g. the COVID pandemic).
- » Sustainability is crucial due to increasing power consumption from new workloads, necessitating efficient network infrastructure.
- » Innovative, flexible, and programmable silicon designs are essential for long-term impact and integration across multiple devices, emphasizing open standards.
- » Chips in Networking are often device specific and rigid, not allowing for a streamlined reuse or integration with other devices/systems/solutions.

IDC'S RECOMMENDATIONS

- » Regulation must be created and upheld, to ensure the best practices are met in a European ecosystem.
- » Supply chains need to be reinforced with development, design, manufacturing and production near shored.
- » Sustainability needs to be a priority given the increasing power consumption of new workloads.
- » Leverage groundbreaking innovation on Network silicon for a long-term impact, using one architecture for multiple devices.
- » Designing new silicon with power management and sustainability at the core will be a key feature in future designs.
- » The new silicon design should be built from the ground up as programmable to be able to allow flexibility of use and rely on open standards.

In THIS Whitepaper

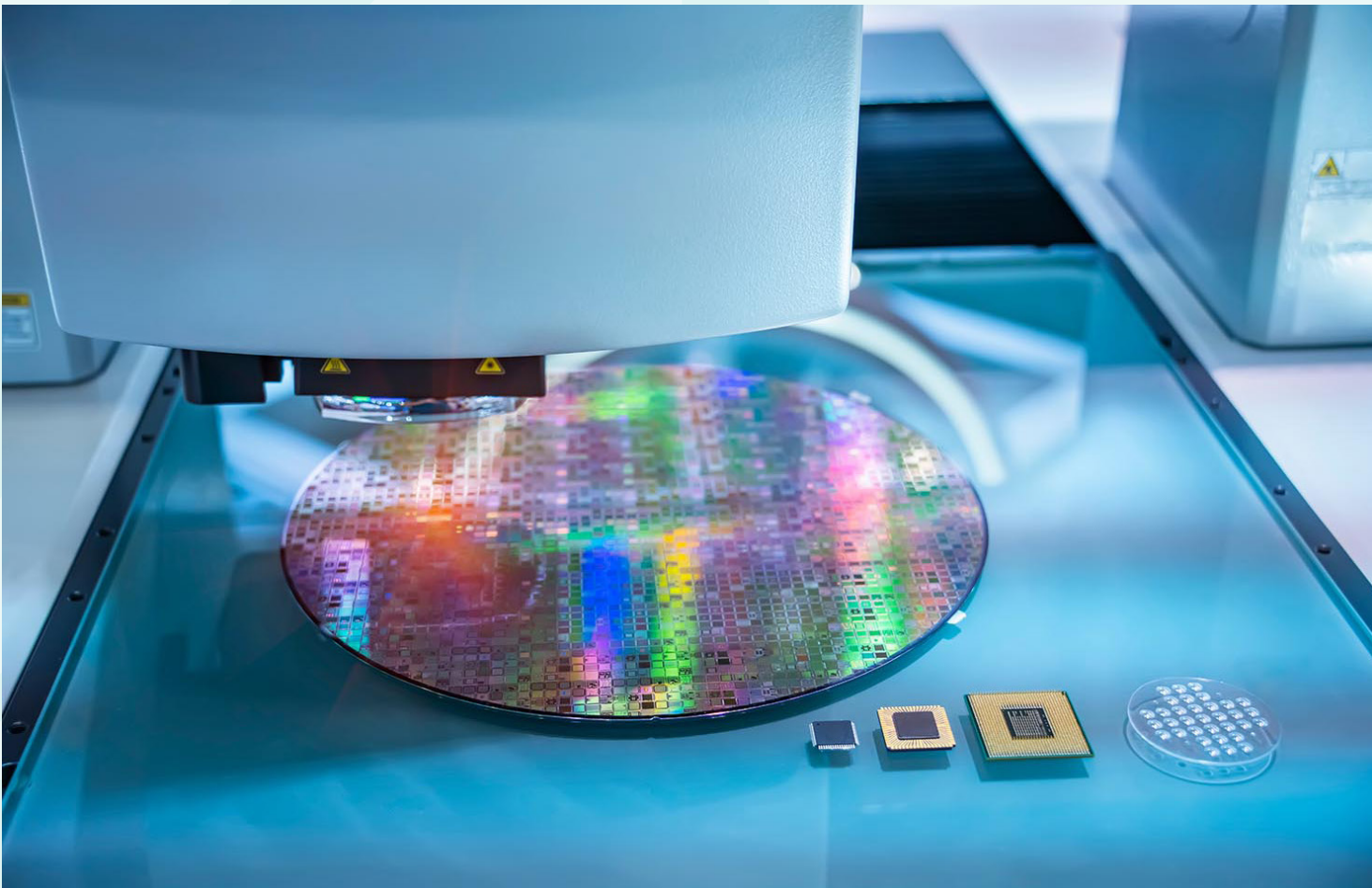
This White Paper highlights the main points of [Networking as a driving force of the semiconductor industry in Europe](#) | [ALLPROS.eu](#) webinar that took place in December 2024.

Luis Fernandes, Senior Research Manager at IDC moderated the webinar that had multiple stakeholders related to the Semiconductor Industry sharing their views on the role Networking is having.

First, Len Padilla, Senior Research Director at IDC for European Networking and Lifecycle Services gave a review about the semiconductor industry when it comes to Networking.

Next, Enrico Mercadante, Managing Director at Cisco for Networking Sales in EMEA, explained where the Networking market is headed and what part does the semiconductor industry play in that path.

Lastly, Patrick Schmidt, Managing Director at AMD showed how the semiconductor industry has an immensely important role to play in Network modernization, especially around automation.



Network Driving Change

✍ By Len Padilla, IDC

Len Padilla started the webinar by pointing out research done by IDC where IT managers were asked what their IT investment priorities were and the top priorities were Generative AI in first place, Automation second and Cybersecurity in third place.

“Cybersecurity tends to be one of the top investment areas, (...) but what’s really (...) interesting here, what stands out, anytime there is an investment priority that is higher than security, that’s something worth taking note of and what we see here is that GenAI is the top technology investment, according to the C-suite.”
- Len Padilla

Another data mentioned is that the forecast shows a growth in investment for 2025. 2024 was a correction year, but 2025 and forward will growth at a higher rate.

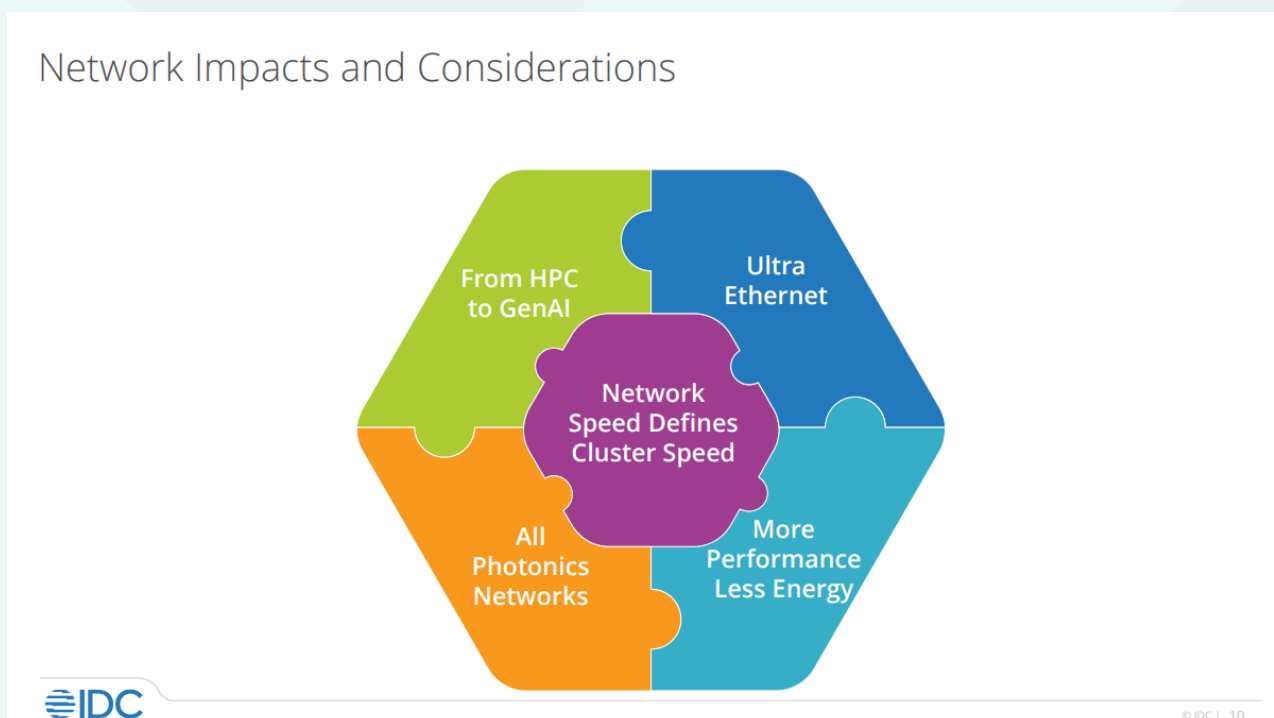
A portion of this investment will be in the network to support AI workloads, making sure the network has the performance and low latency and predictable latency required by these workloads.

Even in markets where there might be a downturn, the initiatives more immune to budget reduction are Security, Risk & Compliance; AI & Automation; Infrastructure & IT Ops.

On the topic of sustainability, Len mentioned the impact it is having on the network infrastructure and the procurement of network vendors. Research in IDC also shows the trend in power consumption with the advent of AI workloads.

Speaking in European terms, Len mentioned the need to make semiconductor supply chains more resilient, closer production to the end customers, with specialized chips and accurate legislation and with a core focus on sustainability.

Figure 1: The biggest impacts and considerations when designing network equipment



Source: IDC, 2024

The Future of Networking – Innovating with Silicon One

✍ By Enrico Mercadante, Cisco

Enrico Mercadante talked about the Innovation being driven in the networking side of the semiconductor industry. A new way of thinking is required to design the networks of the future.

He showcased Cisco's Silicon One project, a long investment project in innovation, dedicated to redesigning the network, simplifying it and making it a staple for all customers instead of having a bespoke approach to each customer.

Figure 2: Cisco Silicon One



Source: Cisco, 2024

This created a fundamental change in the industry, allowing a lower level of entry, with an optimized power consumption and with high performance. This is achieved by key innovations:

A data plane innovation, with implementing slices, which was only done in switching and now can be done in routing.

A very efficient packet processing architecture. Efficient from a power and throughput perspective.

A unified memory packet buffer, far more efficient than previous architectures and more sustainable in terms of energy processing.

From an applicability perspective, the new architecture can be deployed in different networking areas – campus network, telco or service provider network and web scale datacenter, as well as new workloads like AI/ML. It is therefore very flexible.

It has been a long investment with various generations that have developed the way of moving forward in creating new products and services. For big customers it has allowed for a reduction in over 90% power consumption.

When it comes to AI/ML workloads, Enrico mentioned the huge disruption AI has caused in the industry, not only in the application part of it, using AI as a competitive advantage, but also how companies need to have the infrastructure ready to adopt AI

The uniqueness of these applications creates specific challenges faced by them.

“The AI/ML workloads have, I would say, unique characteristics, different from applications that we are used to discuss [...] So, [...] the challenges are: How do I load balance with the connection I have available? How do I react to congestion, how do I avoid a congestion in the underlying network? And how do I work around a failure that probably I will have sooner or later in the network?”


- Enrico Mercadante

To face these challenges, Cisco Silicon One can help, by allowing three deployment models on a unique value proposition, aiming for ultimate compatibility, ultimate performance or a middle ground, for a better completion time with a smaller investment in network elements.

This is achieved by a flatter design of the network architecture, becoming cheaper but also more power efficient.



The Impact of Networking on the Semiconductor Industry

 - Patrick Schmidt

Patrick Schmidt showed his view on how Networking is changing the semiconductor industry.

As part of a semiconductor creator and developer, AMD sees that semiconductors need to be flexible, availability and based on open standards.

Flexibility on how networks are deployed, flexibility in terms of how networks co-exist with CPUs and GPUs.

Availability not only these days in terms of redundancy of components but also in the built-in telemetry and visibility to monitor and manage in terms of keeping the network safe from attacks, as well as protection features embedded in the systems.

As for being based on open standards, the semiconductor industry has to work with its partners, customers and even competitors, all the relevant stakeholders, to ensure an ecosystem that can be easily integrated in a seamless fashion. This will allow for a healthy development of new software, features and capabilities without stifling innovation.

Regarding this point, Patrick pointed out AMD's use of a system on a chip, programmable, highly customizable, allowing for a multitude of functions in a single system. In the case of networking, the semiconductor vendors are creating multipurpose network devices in the form factor of a chip.

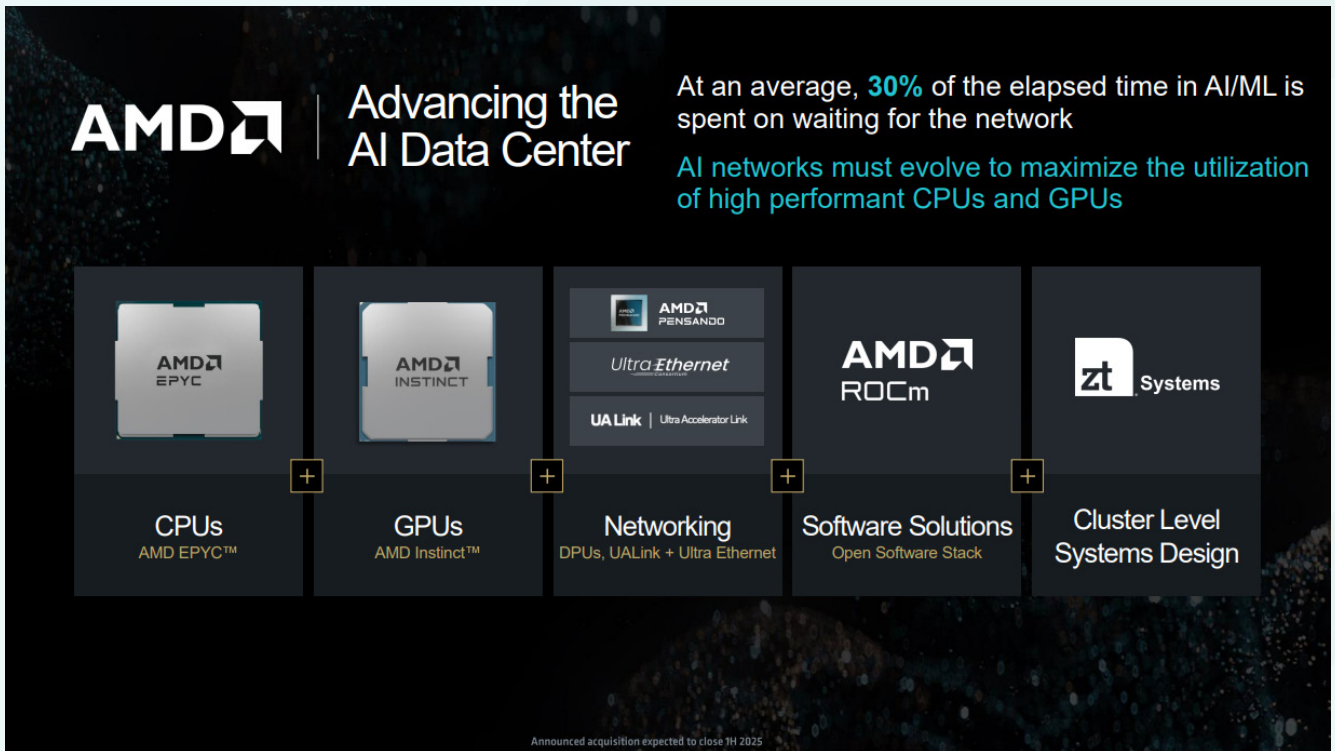
⋮ "You've got the programmable chip, the programmable silicon, you have the software that runs in those chips that delivers the services, might be networking services, security services, storage services; but you also have to be able to manage all of these, because if you deploy these types of chips, you have to control the way you roll out and enable those types of features. That's also being made by software and based on open XML APIs."

⋮ - Patrick Schmidt

Lastly, Patrick mentioned the system approach required by networking silicon vendors, instead of a traditional component approach. Networking is currently the bottleneck of a network, in the case of AI/ML workloads, 30% of elapsed time is spent waiting on the network.

Therefore, networking silicon needs to be aligned, designed, manufactured and tested together with CPUs and GPUs, with DPUs, to ensure the maximum performance ration from the whole system.

Figure 3: Semiconductor landscape in use in Networking

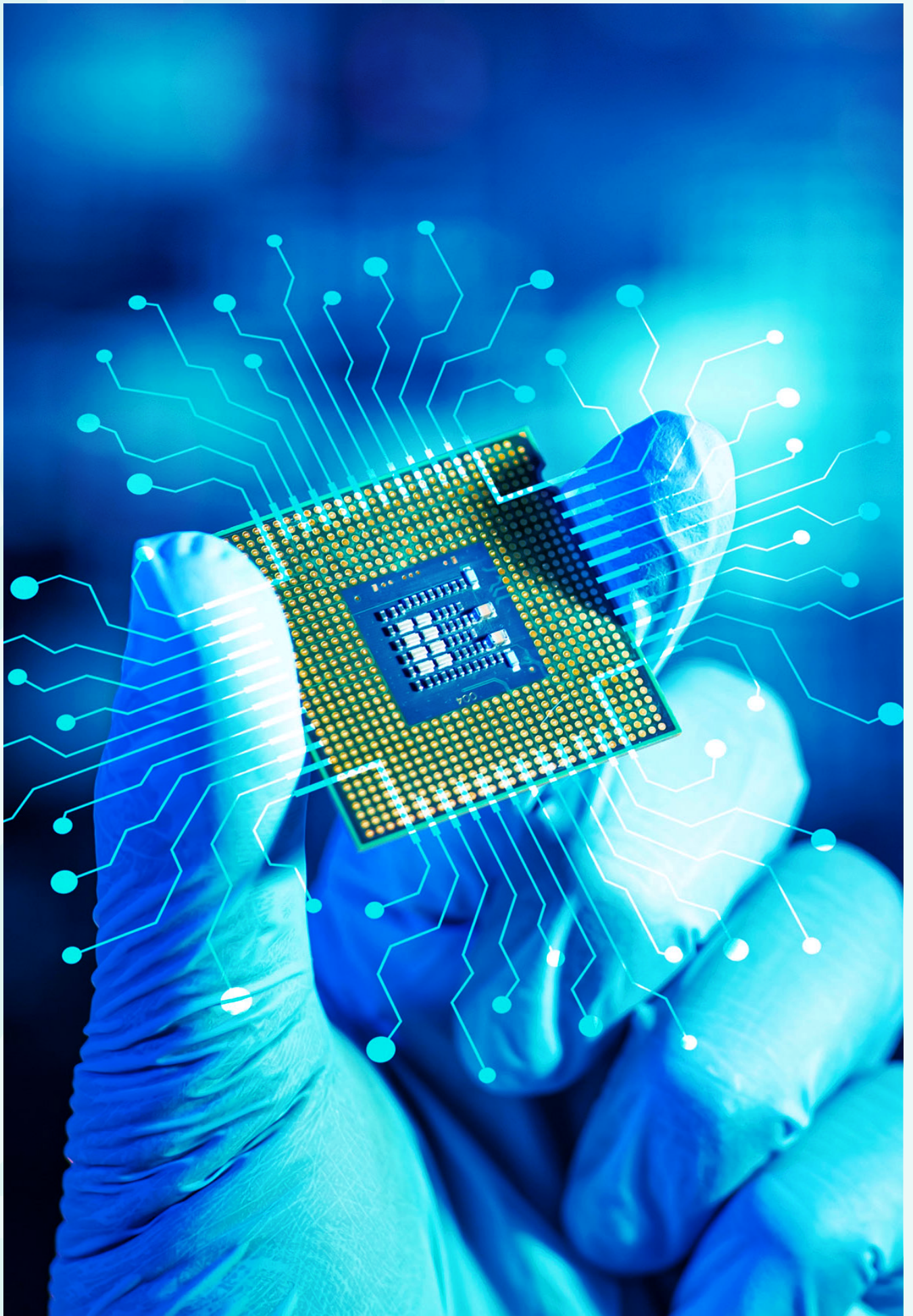


Source: AMD, 2024

To push these open standards, AMD, together with Cisco and other major players, created the Ultra Ethernet Consortium, pushing the existing boundaries in Ethernet to make the most of existing infrastructure and preparing the next generations of networking devices and solutions.

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