

DRAFT NOT FOR PUBLICATION

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IEEE ENABLES REDUCTION IN NETWORK ENERGY FOOTPRINT WITH THE NEW IEEE 802.3az STANDARD

First Ethernet standard to address proactive reduction in energy consumption for networked devices

PISCATAWAY, N.J., USA, October [XX], 2010 - IEEE, the world's leading professional association for the advancement of technology, today announced the ratification of the IEEE P802.3az™ Energy-Efficient Ethernet (EEE) standard, the first standard in the history of Ethernet to address proactive reduction in energy consumption for networked devices.

Ethernet is the dominant network technology in the world today, with billions of interfaces deployed. It is a critical component in environments ranging from high-performance links at the Internet core to home entertainment networks. The IEEE 802.3az standard, approved September XX, 2010, provides network managers and everyday consumers of networking services with the tools they need to reduce energy consumption in network-attached devices, network routers and switches, computers, and printers.

Throughout the networking industry, cycles of innovation, consumer adoption, and increasing demand for bandwidth have been driving energy consumption ever higher. In some cases, network links are fully utilized, and there is little opportunity for energy savings. However, in most cases, network links are utilized only occasionally, expending substantial energy sitting idle.

According to the ITU World Summit on the Information Society, electricity demand by the ICT sector for industrialized countries is between 5 percent and 10 percent of total electricity demand. About 50 percent of this electricity is wasted by equipment that is powered on, but idle. The IEEE 802.3az amendment to the IEEE 802.3 Ethernet standard defines mechanisms and protocols designed to reduce the energy consumption of network links during periods of low utilization, by transitioning interfaces into a low-power state.

IEEE P802.3az also uses the Link Layer [Discovery](#) Protocol (LLPD) from IEEE P802.1AB and Type, Length, Values (TLVs) from IEEE 802.3bc. This enables system designers to save more than the Ethernet interface energy, by allowing communication of energy-utilization information between link partners without interrupting the network link.

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Reducing energy used by computers during idle time is not a new concept. For example, some notebook computers reduce energy use by dropping the network link and reconnecting at a lower speed. Unfortunately, these techniques cause lengthy interruptions of connectivity. The new IEEE standard defines a method to reduce power consumption without interrupting the network connection.

When IEEE 802.3az compliant products have been fully deployed in new and existing Ethernet networks, it is estimated that power savings in US alone can reach 5 terawatt-hours per year, or enough energy to power 6 million 100 watt light bulbs. This translates into a reduction of the Information and Communication Technologies (ICT) carbon footprint by roughly 5 million tons per year.

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"Minimizing energy-use is an ongoing battle, and there is always pressure on ICT managers to do more with less. The Energy Efficient Ethernet will save energy and lower operational expenses," said Michael J. Bennett, Chair of the IEEE 802.3az Energy-Efficient Ethernet Task Force and Senior Network Engineer at Lawrence Berkeley National Laboratory. "The great advantage of using products supporting EEE is that there is no complex configuration necessary. In most cases, energy will be saved automatically."

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"Saving energy in networked systems needs to be seamless and easy in order to achieve the greatest savings," Bennett said. "IEEE 802.3az enables this ease of use through standards-based protocols."

"Market pressure and legislative action worldwide are demanding improvements in the energy efficiency of networked systems," says David Law, Distinguished Engineer, HP Networking and Chair for the IEEE 802.3 Working Group. "The capabilities provided by the IEEE 802.3az extension will be important as Ethernet becomes an enabler for low-duty cycle, consumer-class applications. Additionally it will enable new system-level energy management techniques that will save energy beyond the network interface."

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Paul Nikolich, Chairman, IEEE 802 LAN/MAN Standards Committee, stated: "I wish to extend my congratulations to the IEEE 802.3 Work Group and the IEEE P802.3az Task Force on the success of this project. It truly exemplifies research and industry coming together in IEEE 802 to develop a standard that achieves the mission of the IEEE while benefiting society as well as users and providers of network-based services and products."

For additional information on IEEE 803.3az, please visit [\[URL goes here\]](#). The standard is immediately available for purchase in draft format at [\[URL goes here\]](#).

About IEEE

IEEE, the world's largest technical professional association, is dedicated to

advancing technology for the benefit of humanity. Through its highly cited publications, conferences, technology standards, and professional and educational activities, IEEE is the trusted voice on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics. Learn more at <http://www.ieee.org>.

ADDITIONAL QUOTES:

[Rosio Alvarez, Ph.D. CIO Lawrence Berkeley National Laboratory](#)

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U.S. Secretary of Energy†

Improving the energy efficiency of Ethernet - one of the most widely-deployed networking technologies - will make a significant impact on greenhouse gas emissions generated by the Information and Communications Technologies (ICT) sector. There are no silver bullets when it comes to reducing our carbon impact, but Energy Efficient Ethernet represents a valuable new tool for ICT managers around the world. I'm pleased to see the IEEE proactively developing standards that reduce the impact of components used throughout our communications infrastructure. I'm also very pleased that the Department of Energy contributed actively to developing and standardizing this important new technology.

Steve Cotter, manager of ESnet, Energy Sciences Network, U.S. Department of Energy (DoE)

Enabling DoE scientists to transmit their data more efficiently is at the core of ESnet's mission," said Steve Cotter, head of ESnet. "Likewise, developing energy-efficient Ethernet is an important milestone for IEEE. At ESnet, we are constantly investing in research to improve our capabilities so scientists can better utilize the network even as data volume increases. We look forward to leveraging this new standard as it is established and view it as a catalyst for the development of future networking technologies that promote the energy efficient use of resources. We hope that the IEEE community continues to accelerate the process of delivering standards that prioritize energy efficiency in the development of next generation network infrastructure.

Ann Bailey, Director, ENERGY STAR Product Labeling Program

The U.S. Environmental Protection Agency will be working with our manufacturing partners to encourage them to adopt and incorporate the IEEE P802.3az into their products so consumers can be assured they are getting the most energy efficient technology with their ICT equipment. EPA has continued to monitor the efforts of IEEE in developing this standard and it has been a topic of discussion during the revision process for multiple ENERGY STAR programs. Networking efficiency has the potential to touch many different products covered

by ENERGY STAR. EPA anticipates using the Energy-Efficient Ethernet standard in the ENERGY STAR specifications for networking and data center equipment as soon as it has been implemented in the marketplace.

Andrew Hillier, CTO and Co-Founder, CiRBA Inc.

We have seen increasing emphasis on power efficiency in the data center, driven both by economics and by hard constraints on how much power can be delivered. Up to this point, a lot of focus has been placed on optimizing power efficiency at the processor level, both through the low-level management of processor states as well as the intelligent placement of workloads to optimize use of resources. The new Energy-efficient Ethernet standard brings these capabilities to the network level, and ushers in a new dimension upon which a data center can be optimized. And because networking equipment relies heavily on standardization to ensure interoperability, achieving this kind of efficiency would likely not be possible without it.