MARVELL

White Paper

Marvell® Solutions Deliver Energy Efficient Ethernet

10GBASE-T EEE Solutions for Rack and Tower Servers

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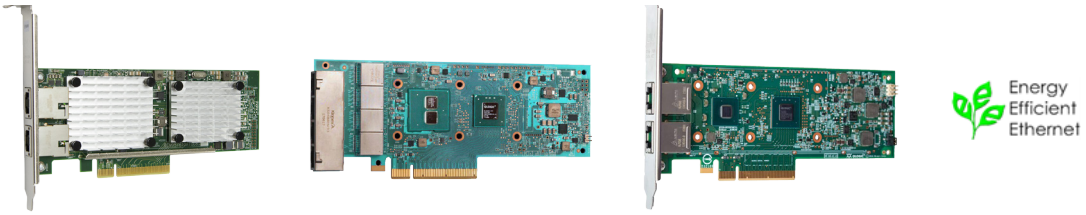


- With rack and tower servers and EEE enabled Marvell® FastLinQ® Adapters, IT administrators can reduce idle-state network adapter related energy costs by 27 percent.

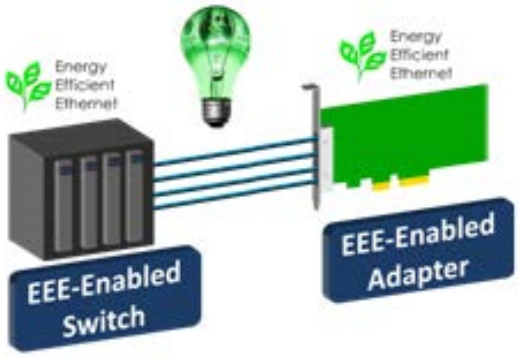
Overview

Ethernet is the most ubiquitous networking technology in the data center. A recent end-user survey by IT Brand Pulse indicates that 88 percent of the ports within a data center are Ethernet ports. Ethernet technology allows IT infrastructure to provide critical connectivity for communications between servers, clients, and storage resources. Marvell® is a leader in Ethernet technology, providing high-performance, energy-efficient server network connectivity solutions for the data center.

Marvell has leveraged its leadership position to improve not only the performance of their Ethernet solutions, but also their energy efficiency. Marvell has also supported and helped to drive industry initiatives designed to further reduce power consumption. One such initiative is IEEE® 802.3az, commonly referred to as Energy Efficient Ethernet™ (EEE).

What is EEE?

EEE is designed to help IT administrators reduce the energy consumption of Ethernet-attached devices within their networks. Examples of such devices are Ethernet adapters and Ethernet switches. A key feature of the EEE standard is called Low Power Idle (LPI). As the name implies, when the Ethernet device is in an idle state (no data transmission activity), nonessential components of the Ethernet interface are placed in a low power state (sleep mode). A wake-up signal sent by the link partner allows the sleeping Ethernet device time to prepare for the receipt of incoming Ethernet data frames. EEE makes network energy conservation seamless and easy.



Why EEE?

Minimizing energy consumption is an ongoing challenge, and pressure is constantly on IT managers to do more with less resources. Studies have shown that approximately 50% of the electricity consumed is wasted by “powered on” equipment[1]. Ethernet devices are an example of such equipment. The increasing availability of digital content and our ever-growing reliance on such content are both driving up the demand for network bandwidth.

1 ITU World Summit for an Information Society – EPFL – Working Group on the impact of ICT on the Environment:
https://www.itu.int/dms_pub/itu-s/md/03/wsispc2/c/S03-WSISPC2-C-0043!!PDF-E.pdf

To meet these demands, SAN administrators deploy more Ethernet server ports and switch ports, which consume more energy. In most cases, network links are not utilized 100% of the time, and while in an idle state, they consume a substantial amount of energy. This represents only half the potential power savings. For each idle Ethernet port, a corresponding switch port also drains energy. Given the number of ports in a typical data center, the energy consumed by idle ports can add up quickly.

Why Marvell EEE-Enabled 10GbE Adapters?

With EEE-enabled adapters, power consumption during idle state is reduced by up to 27%. Table 1 below quantifies the power savings potential for server networking solutions using Marvell EEE-enabled Ethernet adapters.

Table 1. Two-Port Power Consumption and Savings[a]

Marvell FastLinQ 3442-RJ Based 10GbE Adapters	
NIC Ports Idle without EEE Watts	12.8
NIC Ports Idle with EEE Watts	9.4
NIC Ports Power Savings with EEE Watts	3.4
NIC Port EEE Savings[b]	27%

a. When used in conjunction with an EEE-enabled switch.
b. Includes PHY, processor, and other components on the adapter.

As noted earlier, this only represents a portion of the energy savings. There is also a comparable energy savings to be realized when the corresponding EEE-enabled switch port is in idle mode. Marvell-based EEE-enabled network adapters combined with EEE-enabled network switches double your power savings, making it a win-win combination.

Conclusion

Technology innovation cycles, increases in volume of data traffic, and changes to computing models are driving the demand for greater bandwidth. This demand increases energy consumption. The Energy Efficient Ethernet (IEEE 802.3az) standard defines the mechanisms and protocols that transition Ethernet links into a low power state during periods of low link utilization and help reduce energy consumption. When IEEE 802.3az-compliant products have been fully deployed in new and existing Ethernet networks, it is estimated that the power savings in the United States 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[1]. By deploying your servers with EEE-enabled Marvell adapters, IT administrators can reduce network adapter related energy costs by 27 percent when in an idle state. Furthermore, Marvell's EEE-enabled adapters from Marvell do not require complex configuration. Simply install the adapter and you are ready to go! Coupled with the energy savings realized with EEE-enabled switches, IT managers can make significant contri- butions in reducing operating expenses as well as their carbon footprint.

1 ITU World Summit for an Information Society – EPFL – Working Group on the impact of ICT on the Environment: https://www.itu.int/dms_pub/itu-s/md/03/wsispc2/c/S03-WSISPC2-C-0043!!PDF-E.pdf

Marvell FastLinQ 10GBASE-T Ethernet Adapter Utilizing Marvell Technology		
	Marvell FastLinQ 3442-RJ Dual-Port 10GBASE-T Intelligent Ethernet Adapter	• Two 10GBASE-T Ports • L2 Networking
	Marvell FastLinQ QL41112HxRJ Dual-Port 10GBASE-T Intelligent Ethernet Adapter	• Two 10GBASE-T Ports • L2 Networking and Universal RDMA
	Marvell FastLinQ QL41162HxRJ Dual-Port 10GBASE-T Converged Network Adapter	• Two 10GBASE-T Ports • L2 Networking and Universal RDMA and iSCSI-Offload and FCoE-Offload
	Marvell FastLinQ QL41134HxRJ Quad-Port 10GBASE-T iSCSI-Offload Adapter	• Four 10GBASE-T Ports • L2 Networking and Universal RDMA and iSCSI-Offload