

# Cavium Solutions Deliver Energy Efficient Ethernet

## 10GBASE-T EEE Solutions for Rack and Tower Servers



With rack and tower servers and EEE-enabled Cavium™ 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. Cavium™ is a leader in Ethernet technology, providing high-performance, energy-efficient server network connectivity solutions for the data center.

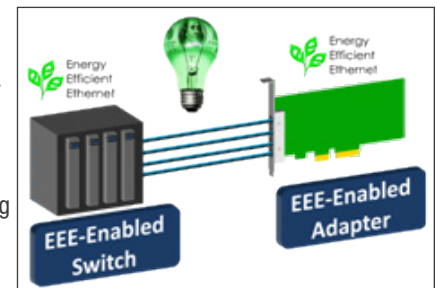
Cavium has leveraged its leadership position to improve not only the performance of their Ethernet solutions, but also their energy efficiency. Cavium has also supported and helped to drive industry initiatives designed to further reduce power consumption. One such initiative is IEEE® 802.3az, commonly 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), non-essential 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<sup>1</sup>. 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.



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 CAVIUM 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 Cavium EEE-enabled Ethernet adapters.

<sup>1</sup> ITU World Summit for an Information Society – EPFL – Working Group on the impact of ICT on the Environment: [http://www.itu.int/dms\\_pub/itu-s/md/03/wsispc2/c/S03-WSISPC2-C-0043!PDF-E.pdf](http://www.itu.int/dms_pub/itu-s/md/03/wsispc2/c/S03-WSISPC2-C-0043!PDF-E.pdf).

Table 1. Two-Port Power Consumption and Savings<sup>a</sup>

Cavium 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 <sup>b</sup>	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. Cavium-based EEE-enabled network adapters combined with EEE-enabled network switches double your power savings, making it a win-win combination.

## CONCLUSION


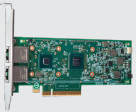
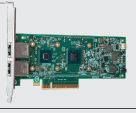

Technology innovation cycles, increases in volume of data traffic, and changes to computing models are driving the demand for greater bandwidth. This demand increases energy consumption. The Energy Efficient Ethernet (IEEE 802.3az) standard defines the mechanisms and protocols that transition Ethernet 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<sup>1</sup>. By deploying your servers with EEE-enabled Cavium adapters, IT administrators can reduce network adapter related energy costs by 27 percent when in an idle state. Furthermore, Cavium’s EEE-enabled adapters from Cavium 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 contributions in reducing operating expenses as well as their carbon footprint.

## ABOUT CAVIUM

Cavium, Inc. (NASDAQ: CAVM), offers a broad portfolio of infrastructure solutions for compute, security, storage, switching, connectivity and baseband processing. Cavium’s highly integrated multi-core SoC products deliver software compatible solutions across low to high performance points enabling secure and intelligent functionality in Enterprise, Data Center and Service Provider Equipment. Cavium processors and solutions are supported by an extensive ecosystem of operating systems, tools, application stacks, hardware reference designs and other products. Cavium is headquartered in San Jose, CA with design centers in California, Massachusetts, India, Israel, China and Taiwan.

<sup>1</sup> ITU World Summit for an Information Society – EPFL – Working Group on the impact of ICT on the Environment: [http://www.itu.int/dms\\_pub/itu-s/md/03/wsisp2/c/S03-WSISPC2-C-0043!PDF-E.pdf](http://www.itu.int/dms_pub/itu-s/md/03/wsisp2/c/S03-WSISPC2-C-0043!PDF-E.pdf).

Cavium FastLinQ 10GBASE-T Ethernet Adapter Utilizing Cavium Technology		
	Cavium FastLinQ 3442-RJ Dual-Port 10GBASE-T Intelligent Ethernet Adapter	<ul style="list-style-type: none"> <li>• Two 10GBASE-T Ports</li> <li>• L2 Networking</li> </ul>
	Cavium FastLinQ QL41112HxRJ Dual-Port 10GBASE-T Intelligent Ethernet Adapter	<ul style="list-style-type: none"> <li>• Two 10GBASE-T Ports</li> <li>• L2 Networking and Universal RDMA</li> </ul>
	Cavium FastLinQ QL41162HxRJ Dual-Port 10GBASE-T Converged Network Adapter	<ul style="list-style-type: none"> <li>• Two 10GBASE-T Ports</li> <li>• L2 Networking and Universal RDMA and iSCSI-Offload and FCoE-Offload</li> </ul>
	Cavium FastLinQ QL41134HxRJ Quad-Port 10GBASE-T iSCSI-Offload Adapter	<ul style="list-style-type: none"> <li>• Four 10GBASE-T Ports</li> <li>• L2 Networking and Universal RDMA and iSCSI-Offload</li> </ul>



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