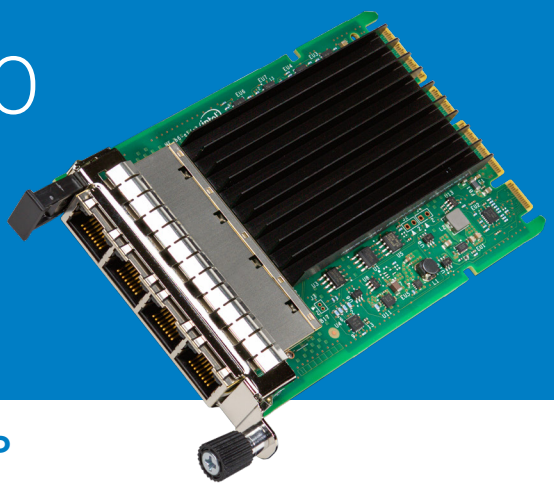
Product Brief

Intel® Ethernet Network Adapter I350-T4 for OCP 3.0



Quad-port Gigabit Ethernet network adapter for OCP NIC 3.0 specification designed with performance enhancing features and power management technologies

Key Features

- OCP NIC 3.0 adapter
- Innovative power management features including Energy Efficient Ethernet (EEE) and DMA Coalescing for increased efficiency and reduced power consumption
- Scalable iSCSI performance delivering cost-effective SAN connectivity
- Reliable and proven Gigabit Ethernet technology from Intel Corporation

Overview

The Intel® Ethernet Network Adapter I350-T4 for OCP 3.0 includes enhancements for both virtualized and iSCSI environments. Intel uses a suite of hardware assists that improve overall system performance by lowering the I/O overhead in virtualized environments. iSCSI simplifies SAN connectivity by eliminating the need for SAN-specific adapters or switches.

This adapter also includes power management technologies such as Energy Efficient Ethernet (EEE) and direct memory access (DMA) Coalescing. With Advanced Power Management Technologies, customers can configure power options on the adapter and more effectively manage their power consumption.

The OCP NIC 3.0 specification defines a standardized design for a new generation of network adapters. Simple and straightforward form factors, clear manageability requirements, and improved serviceability help simplify deployment for current and emerging capabilities.

All Intel® Ethernet I350 Series Adapters include these technologies:

Flexible I/O Virtualization

The Intel® Ethernet Network Adapter I350 family includes Intel® Virtualization Technology for connectivity (Intel® VT-c) to deliver I/O virtualization and Quality of Service (QoS) features designed directly into the controller on the adapter. I/O virtualization advances network connectivity models by providing Flexible Port Partitioning (FPP), multiple Rx/Tx queues, and on-controller QoS functionality that can be used in both virtual and non-virtual server deployments.

By taking advantage of the PCI-SIG SR-IOV specification, Intel® Ethernet products enable Flexible Port Partitioning (FPP). With FPP, virtual controllers can be used by the Linux host directly and/or assigned to virtual machines. With this port partitioning, administrators can create up to eight dedicated connections on a single Ethernet port for use in bare-metal and virtualized server deployments.

In a bare-metal Linux server, host processes can be assigned to dedicated network resources to provide traffic isolation and balanced bandwidth allocation.

In a virtualized environment, a VM can be assigned to a virtual controller to reduce the CPU overhead seen when using a software-based network bridge by offloading network traffic management to the controller.

Scalable iSCSI Performance

An Intel Ethernet Network Adapter I350-T4 for OCP 3.0, with native iSCSI initiators for Microsoft Windows, Linux, and VMware ESX platforms, provides a simple, dependable, cost-effective way to connect to iSCSI SANs. These native initiators are broadly tested using multiple generations of operating systems, storage systems, and OS tools to help ensure reliability and ease of use. Standardizing on Intel® Ethernet Adapters enables administrators to use a single initiator, TCP/IP stack, and a common set of management tools and IT policies. In addition, Intel® Ethernet Network Adapters include a number of hardware features designed to accelerate iSCSI traffic and enhance data processing. For example, TCP segmentation offload and checksum offload capabilities help reduce processor usage, increase throughput, and deliver exceptional iSCSI performance. Finally, using native OS initiators, an Intel Ethernet Network Adapter I350-T4 for OCP 3.0 supports the CRC-32 digest instruction set included with Intel® Xeon® processor products, that improves transmission reliability and delivers an enterprise-class iSCSI solution.

Power Management Technologies

Today, companies everywhere are looking for ways to decrease energy consumption across the enterprise to reduce costs and environmental impact, while at the same time solving increasingly important power density challenges. Power Management Technologies (PMTs) included in the Intel Ethernet Network Adapter for OCP 3.0 enable enterprises to configure power options on the adapter and more effectively manage their power consumption.

Energy Efficient Ethernet (EEE)

During periods of low network activity, EEE reduces the power consumption of an Ethernet connection by negotiating with a compliant EEE switch port to transition to a low power idle (LPI) state. EEE reduces the controller power to approximately 50 percent of its normal operating power, saving power on the network port and the switch port. As soon as increased network traffic is detected, the controller and the switch quickly come back to full power to handle the increased network traffic. EEE is supported for both 1000BASE-T and 100BASE-TX.

DMA Coalescing

Another power management technology that can reduce power on the server platform is DMA Coalescing. Typically, when a packet arrives at a server, DMA calls are made to transfer the packet within the server. These calls wake up the processor, memory and other system components from a lower power state in order to perform the tasks required to handle the incoming packet.

Based on the configurable DMAC settings, incoming packets are buffered momentarily before any DMA calls are made. The controller can then identify opportunities to batch multiple packets together. When components are wakened from lower power states, they can efficiently handle the batched packets at the same time. The platform components can then remain in lower power states longer, which can dramatically reduce platform energy consumption. DMAC synchronizes DMA calls across all controller ports to ensure maximum power savings.

Features	Description
General	
RJ45 Connectivity	• Up to 100 meters using twisted-pair copper cabling: • CAT3 or higher for 10BASE-T operation • CAT5 or higher for 100BASE-TX operation • CAT5e or higher for 1000BASE-T operation
IEEE802.3az - Energy Efficient Ethernet (EEE)	• Power consumption of the PHY is reduced by approximately 50% link transitions to low power Idle (LPI) state as defined in the IEEE802.3az (EEE) standard.
DMA Coalescing	• Reduces platform power consumption by coalescing, aligning, and synchronizing DMA. • Enables synchronizing port activity and power management of memory, CPU and RC internal circuitry.
Load balancing on multiple CPUs	• Increases performance on multi-processor systems by efficiently balancing network loads across CPU core when used with Receive-Side Scaling (RSS) from Microsoft or scalable I/O on Linux.
Support for most network operating systems	• Enables broad deployment for different applications.
ROHS-compliant	• Product is compliant with EU RoHS Directive 2 2011/65/EU (Directive 2011/65/EU) and its amendments (e.g. 2015/863/EU)
Halogen Free[1]	• Leadership in an environmentally friendly ecosystem.
Time Sync (IEEE 1588, 802.1as)	• Enables network Ethernet equipment to synchronize internal clocks according to a network master clock; endpoint can then acquire an accurate estimate of the master time by compensating for link latency.
I/O Features for Multi-Core Processor Servers	
Intel® Ethernet Flow Director (Intel® Ethernet FD)	• An advanced traffic steering capability increases the number of transactions per second and reduces latency for cloud applications like Memcached.
MSI-X support	• Minimizes the overhead of interrupts. • Load-balancing of interrupt handling between multiple cores/CPUs.
Multiple Queues: Eight transmit (Tx) and receive (Rx) queue pairs per port	• Supports VMware NetQueue and Microsoft VMQ.
TCP/UDP, IPv4 checksum offloads (Rx/ Tx/Large-send); Extended Tx descriptors for more offload capabilities	• Lower processor usage. • Checksum and segmentation capability extended to new standard packet type.
Virtualization Features	
VMDq	• Up to eight VMDq VMs supported. • Improves data throughput and CPU usage by offloading data-sorting (based on MAC addresses an VLAN tags) from the Hypervisor to the network silicon.
PCI-SIG SR-IOV specification	• Up to 8 Virtual Functions per port.
Flexible Port Partitioning: 32 Virtual Functions	• Virtual Functions (VFs) appear as Ethernet Controllers in Linux OSes that can be assigned to VMs, Kernel processes or teamed using the Linux Bonding Drivers.
Virtual Machine Load Balancing (VMLB)	• VMLB provides traffic load balancing (Tx and Rx) across VMs bound to the team interface as well as fault tolerance in the event of switch, port, cable, or adapter failure.
VLAN support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags	• Ability to create multiple VLAN segments.
Manageability Features	
Preboot Execution Environment (PXE) support	• Enables system boot via the EFI (32-bit and 64-bit). • Flash interface for PXE 2.1 option ROM.
Intel Boot Agent software: Linux boot via PXE or BOOTP, Windows Deployment Services, or UEFI	• Enables networked computer to boot using a program code image supplied by a remote server. • Complies with the PXE 2.1 Specification.
Management Component Transport Protocol (MCTP)	• Baseboard management controller (BMC) communication between add-in devices using a standardized protocol.
Manageability type	• RBT

Specifications

General

Connections	Four RJ45 ports
Network Standard Physical Layer Interfaces	IEEE 802.3/10BASE-T 100BASE-TX 1000BASE-T
Form Factor	OCP NIC 3.0 Small Form Factor

Technical Features

Operating Temperature	Hot Aisle and Cold Aisle: 0 °C to 65 °C (32 °F to 149 °F)
Airflow	0 LFM
Storage Temperature	-40 °C to 70 °C (-40 °F to 158 °F)
Storage Humidity	90% non-condensing relative humidity at 35 °C
LED Indicators	Link: green=1 Gb/s; amber=100Mb/s, 10 Mb/s; not illuminated=no link Activity: blinking=activity; off=no activity

Adapter Features

Data Rate Supported Per Port	1000/100/10 Mbps
Bus Type	PCI Express 2.1 (5 GT/s)
Bus Width	PCI Express x4
Interrupt Levels	INTA, INTB, INTC, INTD, MSI, MSI-X
Hardware Certifications	FCC A, UL, CE, VCCI, BSMI, CTICK, KCC
Controller	Intel® Ethernet Controller I350

Power Consumption

Typical (1000BASE-T)	4.63 W
Maximum (1000BASE-T)	5.16 W

Physical Dimensions

Dimension	115mm x 76mm (OCP NIC 3.0 Small Form Factor)

Product Order Code

Configuration	Product Code
Single Unit	I350T4OCPV3
Bulk Pack	I350T4OCPV3G1P5

Supported Operating Systems

For a complete list of supported networking systems for Intel® Ethernet I350 Series Adapters visit:
intel.com/support/EthernetOS

Warranty

Intel limited lifetime hardware warranty, 90-day money-back guarantee (U.S. and Canada) and worldwide support.

Product Information

For information about Intel® Ethernet Products, visit:
intel.com/ethernetproducts

Customer Support

For customer support options in North America visit:
intel.com/content/www/us/en/support/contact-support.html

1. Low Halogen applies only to halogenated flame retardants and PVC in components. Halogens are below 1,000 ppm bromine and 1,000 ppm chlorine.

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