# QuickSpecs    HPE Ethernet 10Gb 2-port 535 Adapter

# Overview

## HPE Ethernet 10Gb 2-port 535 Adapter

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## 1. Product description

HPE Ethernet 10Gb 2-port 535FLR-T adapter

HPE Ethernet 10Gb 2-port 535T adapter



The HPE Ethernet 10GBase-T 2-port 535 adapters (Include HPE Ethernet 10Gb 2-port 535FLR-T adapter and HPE Ethernet 10Gb 2-port 535T adapter) for ProLiant Gen10 rack and Apollo Servers feature Broadcom's BCM57416 Ethernet solution. The 535 adapters offer a rich set of offload technologies including tunnel offload support for VXLAN, NVGRE, Geneve network virtualization that increase virtualization performance. The HPE Ethernet 535 adapters can provide up to 40 Gb/s of bi-directional Ethernet bandwidth, helping to alleviate network bottlenecks

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## 2. Product features

| Feature | Description |
|---|---|
| At a glance features | Dual 10Gb ports provide up to 40 Gb/s of bi-directional Ethernet bandwidth<br><br>Jumbo frame<br><br>FlexibleLOM (535FLR-T) and stand up (535T)<br><br>HPE sea of sensors 3D<br><br>Tunnel offload (NVGRE and VXLAN)<br><br>RDMA over converged Ethernet (RoCE v1, RoCE v2)<br><br>Single-Root Input/Output Virtualization (SR-IOV)<br><br>IPv6 acceleration<br><br>Preboot eXecution Environment (PXE)<br><br>Wake-on-Lan (WoL) - (only 535FLR-T)<br><br>Checksum and segmentation offload<br><br>VMware NetQueue and Microsoft Virtual Machine Queue (VMQ)<br><br>Data Plane Development Kit (DPDK)<br><br>Receive-Side Scaling (RSS)<br><br>Large Receive Offload (LRO), Generic Receive Offload (GRO), Receive Side Coalescing (RSC)<br><br>Accelerated Receive Flow Steering (aRFS)<br><br>Active Health Systems (AHS) support<br><br>Security features - Digitally signed firmware components, secure firmware loading, secure firmware update, UEFI secure boot<br><br>Authentication of digitally signed firmware through true hardware root of trust and chain of trust on the NIC<br><br>Additional security features include: Device-level firewall, audit logs and sanitization |
| Throughput - theoretical bandwidth | This adapter delivers 20 Gb/s bi-directional Ethernet transfer rate per port (40 Gb/s per adapter), providing the network performance needed to improve response times and alleviate bottlenecks |
| Audit logs | Audit logs are a forensics capability that provides traceability into authenticated firmware updates by capturing changes in standard system logs |
| Authenticated updates | Authenticated updates brings cryptographic keys onto the NIC (For hardware authentication) to protect user and configuration data from unauthorized access and verify digitally signed firmware |
| Checksum and segmentation offload | Normally the TCP checksum is computed by the protocol stack. Segmentation offload is technique for increasing outbound throughput of high-bandwidth network connections by reducing CPU overhead. The technique is also called TCP Segmentation Offload (TSO) when applied to TCP, or Generic Segmentation Offload (GSO) |
| Device-level firewall | Device-level firewall blocks any unmanaged access to memory or storage. This ensures that on-device firmware and configuration data can only be accessed by authorized agents |
| DPDK | This adapter supports DPDK with benefit for packet processing acceleration and use in NFV deployments |

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|---|---|
| Form factor | This adapter series offers both FlexibleLOM and stand up |
| HPE sea of sensors 3D | Support for the HPE sea of sensors which is a collection of 32 sensors that automatically track thermal activity – heat – across the server. When temperatures get too high, sensors can initiate fans and make other adjustments to reduce energy usage. A significant improvement lies in the ability to apply fan speed increases only to the portion of the system that is rising in temperature, rather than all six fans in unison, which reduces the amount of energy used for cooling |
| Hardware root of trust | Root of trust enables a chain of trust for authenticating updates to firmware via signature validation. This blocks installation of rogue or corrupted firmware and ensures that the executing firmware is trusted |
| IPv6 | IPv6 uses 128-bit addressing allowing for more devices and users on the internet. IPv4 supported 32-bit addressing |
| Jumbo frames | This adapter supports jumbo frames (Also known as extended frames), permitting up to a 9.6KB transmission unit (MTU) when running Ethernet I/O traffic. This is over six times the size of a standard 1500-byte Ethernet frame. With jumbo frames, networks can achieve higher throughput performance and greater CPU utilization. These attributes are particularly useful for database transfer and tape backup operations |
| Management support | This adapter ships with agents that can be managed from HPE Systems Insight Manager (SIM) or other management application that support SNMP |
| Preboot eXecution Environment (PXE) | Support for PXE enables automatic deployment of computing resources remotely from anywhere. It allows a new or existing server to boot over the network and download software, including the Operating System (OS), from a management/ deployment server at another location on the network. Additionally, PXE enables decentralized software distribution and remote troubleshooting and repairs |
| RoCE v2 | This adapter supports RoCE v1 and v2. RoCE v2, also sometimes called **routable RoCE** which adds concurrent RoCE v1 and v2 support, SR-IOV support, QoS with hierarchical TX scheduling, ECN-based congestion control for RoCE v2. RoCE is an accelerated I/O delivery mechanism that allows data to be transferred directly from the user memory of the source server to the user memory of the destination server bypassing the OS kernel. Because the RDMA data transfer is performed by the DMA engine on the adapter's network processor, the CPU is not used for the data movement, freeing it to perform other tasks such as hosting more virtual workloads (Increased VM density). RDMA also bypasses the host's TCP/IP stack, in favor of upper layer InfiniBand protocols implemented in the adapter's network processor. The bypass of the TCP/IP stack and the removal of a data copy step reduce overall latency to deliver accelerated performance for applications such as Microsoft Hyper-V Live Migration, Microsoft SQL and Microsoft sharePoint with SMB direct |
| Receive Side Scaling (RSS) | RSS resolves the single-processor bottleneck by allowing the receive side network load from a network adapter to be shared across multiple processors. RSS enables packet receive-processing to scale with the number of available processors |
| Sanitization | Sanitization (Secure user data erase) renders user and configuration data on the |

| Feature | Description |
|---|---|
| | NIC irretrievable so that NICs can be safely repurposed or disposed |
| Secure boot | Secure boot safeguards the system and ensures no rogue drivers are being executed on start-up |
| Server integration | This adapter is a validated, tested, and qualified solution that is optimized for HPE ProLiant servers. Hewlett Packard Enterprise validates a wide variety of major OS drivers with the full suite of web-based enterprise management utilities including HPE Intelligent Provisioning and HPE SIM that simplify network management <br><br> This approach provides a more robust and reliable networking solution than offerings from other vendors and provides users with a single point of contact for both their servers and their network adapters |
| SR-IOV | SR-IOV provides a mechanism to bypass the host system hypervisor in virtual environments providing near metal performance and server efficiency. SR-IOV provides mechanism to create multiple Virtual Functions (VFs) to share single PCIe resources. The device is capable of SR-IOV, and requires Server BIOS support, controller firmware, and OS support |
| Tunnel offload | Minimize the impact of overlay networking on host performance with tunnel offload support for VXLAN and NVGRE. By offloading packet processing to adapters, end users can use overlay networking to increase VM migration flexibility and virtualized overlay networks with minimal impact to performance. HPE tunnel offloading increases I/O throughput, reduces CPU utilization, and lowers power consumption. Tunnel offload supports VMware's VXLAN and Microsoft's NVGRE solutions |
| VMware NewQueue and Microsoft Virtual Machine Queue (VMQ) | VMware NetQueue is technology that significantly improves performance of 10 GbE network adapters in virtualized environments <br><br> Windows Hyper-V VMQ (VMQ) is a feature available on servers running Windows Server 2008 R2 with VMQenabled Ethernet adapters. VMQ uses hardware packet filtering to deliver packet data from an external virtual machine network directly to virtual machines, which reduces the overhead of routing packets and copying them from the management OS to the virtual machine |
| WoL | This adapter provides WoL support through the PCI Express bus. A system that supports WoL can remain available to the systems administrator during its normal downtime. Once the machine is awakened, the systems administrator can remotely control, audit, debug, or manage the machine – (Only supported on 535FLR-T) |
| Compatibility – Supported Servers[1] | DL360 Gen10 (535FLR-T, 535T) <br> DL380 Gen10 (535FLR-T, 535T) <br> DL560 Gen10 (535FLR-T, 535T) <br> Apollo 6000 – XL230k Gen10 (535T) |
| NOTE: | |

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This is a list of supported servers. Some may be discontinued