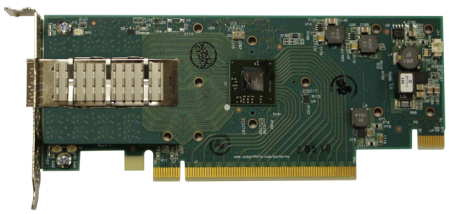
SOLARFLARE®

PRODUCT BRIEF

XtremeScale™ X2541

Single Dual Port 100Gb Ethernet PCIe NIC

For applications demanding the highest throughput and lowest latency Ethernet networks, the XtremeScale X2541 is a full-featured and powerful 100GbE NIC designed specifically for scale-out applications such as distributed databases, machine learning, and cloud hosting.



X2541 lays a new foundation for NIC-based server and network virtualization. This enables highly distributed applications with thousands of inter-connected web hosting, machine learning and big data workloads. X2541 is the first and only NIC platform that provides ultra-scale connectivity for thousands of server nodes in today's virtual networks, simultaneously providing real-time packet and flow analytics. This combination of ultra-high bandwidth, ultra-low latency, ultra-scale connectivity and packet telemetry, allows X2541NICs to serve as the industry's first commercial platform for micro-segmented NIC fabric services that scale with each server, virtual machine or container.

Features and Benefits

A powerful 100GbE NIC—The XtremeScale X2541 delivers ultra-high throughput and latency as low as 500ns. The base NIC includes ScaleOut Onload kernel bypass, combined with DPDK, to provide both TCP and packet-based APIs for application acceleration. The X2541 also supports precision timing protocol (PTP) software for apps that require synchronized time stamping of packets with single-digit nanosecond accuracy.

A Programmable NIC that Performs Packet Inspection and Classification—Inside the ASIC of every X2541 NIC is an XtremePacket™ Engine which provides this general-purpose NIC the unique ability to inspect every packet at line-speed. Network engineers can then use Solarflare APIs to control the visibility, security and performance of network traffic.

A Platform for a Micro-Segmented NIC Fabric—Cloud service providers are deploying Smart NIC fabrics to achieve micro-segmentation of their network services that scale linearly. The X2541 from Solarflare is a platform for the industry's first commercially available NIC Fabric, including shrink-wrapped applications for micro-segmented acceleration, telemetry, and security.

Solarflare Advantage

- Ultra-high throughput
- Up to 400% acceleration of caching databases, software load balancers and distributed web applications
- High performance TCP-based NVMe storage
- Packet parsing and switching with programmable control plane
- Latency as low as 500ns
  - Used by 9 of top 10 exchanges worldwide
- Hardware-based filtering and micro-segmentation
- Telemetry and packet capture
- Hardware and software PTP solution

Specifications

Acceleration
Universal Kernel Bypass
- DPDK Poll Mode Driver - Packet (Cloud, Telco)
- ScaleOut Onload - TCP (Cloud, Telco, Enterprise)
- Onload - TCP/UDP (Fintech)
- TCP Direct - TCP/UDP (Fintech)

MSI-X Support
Interrupt Coalescing

Security
ServerLock™ Local Hardware Filtering - Monitor, report, analyze, filter and enforce policies
Tamper resistant adapter – Digitally signed firmware and secured private keys

Time Synchronization and Hardware Timestamping
Hardware timestamping for all packets, sent and received including PTP.
On-board Stratum 3 compliant oscillator
Solarflare Software PTP Daemon delivers enhanced stability and clock synchronization accuracy and can be used to synchronize the adapter clock to external time source.

Stateless Offloads
TCP/UDP Checksum Offload (CSO)
TCP Segmentation Offload (TSO)
Giant Send Offload (GSO)
Large Send Offload (LSO)
Large Receive Offload (LRO)
Receive Side Scaling (RSS)
Receive Segment Coalescing (RSC)

Manageability and Remote Boot
PXE and UEFI
Solarflare Secure Boot
Tamper resistant Secure Firmware Upgrade
NC-SI over MCTP SMBus
PLDM over MCTP SMBus
MCTP PCIe VDM

Management and Utilities
Ethtool Support
vCenter Plug-in
Solarflare Boot Manager

Adapter Hardware
PCIe Gen 3.1 x16
100G QSFP28 direct attach copper or optical transceiver
XtremeScale™ SFC9250 Ethernet Controller

Hardware Certifications
FCC, UL, CE
RoHS - Complies with EU directive 2011/65/EU

Traffic Engineering
XtremePacket™ Engine for dedicated parsing, filtering, and flow steering
TCP/UDP/IP, MAC, VLAN, RSS filtering
Accelerated Receive Flow Steering (ARFS)
Transmit Packet Steering

Storage
NVMe-TCP Plug-in for low latency, high performance storage networking on standard Ethernet fabric

Virtualization
Linux Multiqueue
VMware NetQueue
Microsoft Hyper-V Virtual Machine Queue (VMQ)
SR-IOV: 16 physical functions; 240 virtual functions
2048 Guest OS protected vNICs
Full hardware switch fabric in silicon capable of steering any flow based on Layer 2 to Layer 4 protocols, between physical and virtual interfaces.
VXLAN, NVGRE, and GENEVE tunneling offloads; adaptable to custom overlays.
VLAN and VLAN Q-in-Q Insertion/Stripping

Ethernet Standards
IEEE802.3-2012 Ethernet Base Standard, including 802.3bx
IEEE 802.3ad, 802.1AX Link Aggregation
IEEE 802.1Q, 802.1P VLAN Tags and Priority
IEEE 1588-2008 PTPv2
Jumbo Frame support (9000 bytes)

OS Support
Red Hat RHEL, SUSE SLES, Debian, Ubuntu
Windows Server
VMware ESXi
For complete list of supported OS versions visit:
http://support.solarflare.com

Physical Dimensions
L: 16.75 cm (6.6 in)
W: 6.9 cm (2.7 in)
End bracket height: PCI Express standard, 12.0 cm (4.725 in)
PCI Express low-profile: 7.92 cm (3.12 in)

Environmental Requirements
Temperature:
Operating: 0°C to 55°C (32°F to 131°F)
Storage: –40°C to 65°C (–40°F to 149°F)
Humidity:
Operating: 10% to 80%
Storage: 5% to 90%

Ordering Information
X2541, X2541-PLUS

SF-119851-CD Issue 2
X2541 Product Brief 031918

Note: Feature availability is dependent on software release support. Please contact Solarflare support for details.