Cloud Onload®

Application Acceleration Software

Network Acceleration for High-Performance Applications

Solarflare's Cloud Onload is a highly scalable software solution that dramatically accelerates network-intensive applications such as in-memory databases (IMDBs), software load balancers, and web servers. The business benefits of Solarflare's Cloud Onload software include:

- Improved elasticity and efficiency, leading to a lower total cost of ownership (TCO)
- Increased peak application transaction rates, eliminating service brownouts
- Reduced network jitter with greater response times, equating to superior quality of service (QoS)
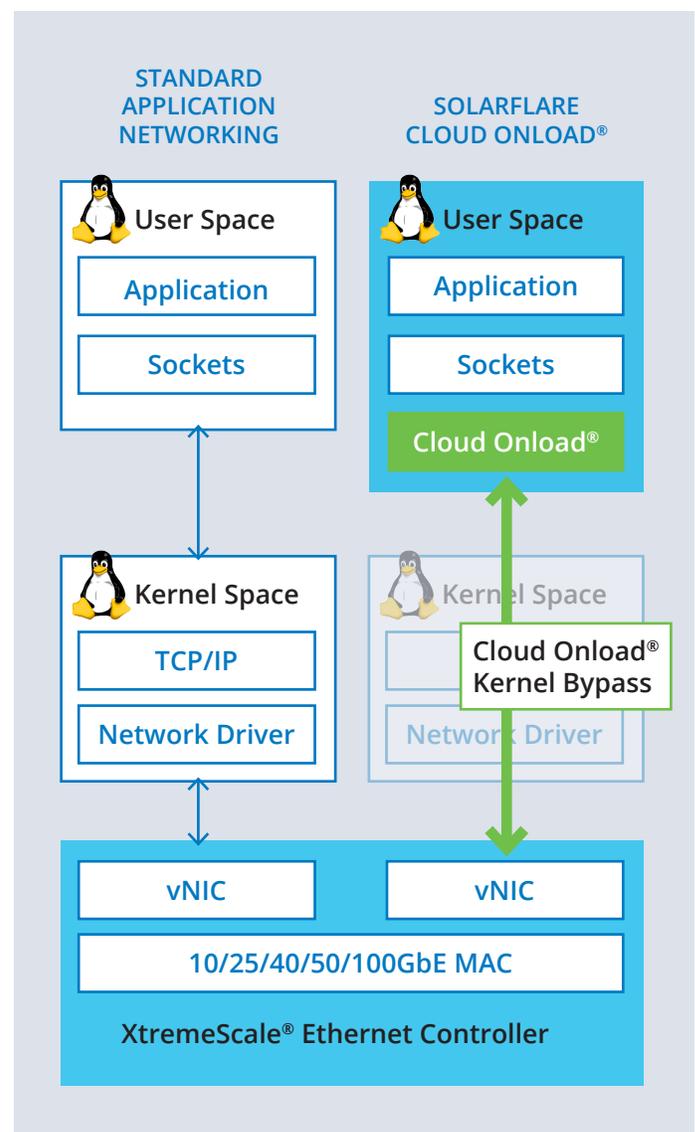
Solarflare's Kernel Bypass Technology – The Key to Cloud Onload Performance

The heart of the Cloud Onload software solution is Solarflare's patented kernel bypass technology. By operating in user space instead of kernel space, Cloud Onload:

- Reduces CPU Interrupts
- Eliminates Context Switches
- Minimizes Memory Copies on all network data

Compatibility with Existing Applications and Networks

Cloud Onload is compatible with industry-standard POSIX sockets and can be deployed across x86-based platforms running Linux – bare metal, virtual machine or container – ensuring compatibility with existing applications, management tools, and network infrastructure. It avoids any need to rewrite or recompile the application or run a new protocol on the wire. In contrast, RDMA, iWARP and other protocols like InfiniBand require modifications to user applications at both ends of the connection and support for higher cost network infrastructure. Applications accelerated with Cloud Onload are able to seamlessly coexist with other accelerated and unaccelerated applications, and can choose to run either with Cloud Onload or the standard Linux kernel stack at run-time. The result: RDMA-like performance without requiring a forklift upgrade to your data center's existing network infrastructure.

STANDARD
APPLICATION
NETWORKING

SOLARFLARE
CLOUD ONLOAD®

User Space

Application

Sockets

User Space

Application

Sockets

Cloud Onload®

Kernel Space

TCP/IP

Network Driver

Kernel Space

Cloud Onload®
Kernel Bypass

Network Driver

vNIC

vNIC

10/25/40/50/100GbE MAC

XtremeScale® Ethernet Controller

## Using Cloud Onload to Accelerate Applications in a Virtualized Environment

Solarflare's Cloud Onload software solution provides unmatched acceleration and support for virtualized environments. With Cloud Onload, hypervisors can be configured for VM PCIe Passthrough, providing near-bare metal Linux kernel network performance to virtualized Linux guests. When used within a Linux guest, Cloud Onload delivers the same acceleration benefits as adding Linux Kernel Bypass to hypervisor bypass, resulting in virtualized applications with 2 microseconds or less of I/O latency.

Leveraging the XtremeScale® ASIC within Solarflare Network Adapters

Solarflare's XtremeScale 10/25/40/50/100 GbE adapter portfolio contains unique hardware to support Cloud Onload, such as dedicated vNICs, protected memory and extremely efficient frame and packet switching. By taking advantage of specialized features within Solarflare's server adapter hardware, Cloud Onload delivers the highest possible throughput and lowest latency jitter, while maintaining very low CPU utilization.

Achieving 100% Improvement in Messaging Rates

This graph demonstrates the value of Cloud Onload versus kernel drivers for a real application (Redis IMDB) at various network speeds. As can be seen from the chart, Cloud Onload enables the adapter to fully utilize the network bandwidth at 25GbE and provides a 50-100% performance increase on 25GbE and 100GbE, with significantly reduced CPU utilization.

GET : Kernel vs Cloud Onload (redis-performance profile)
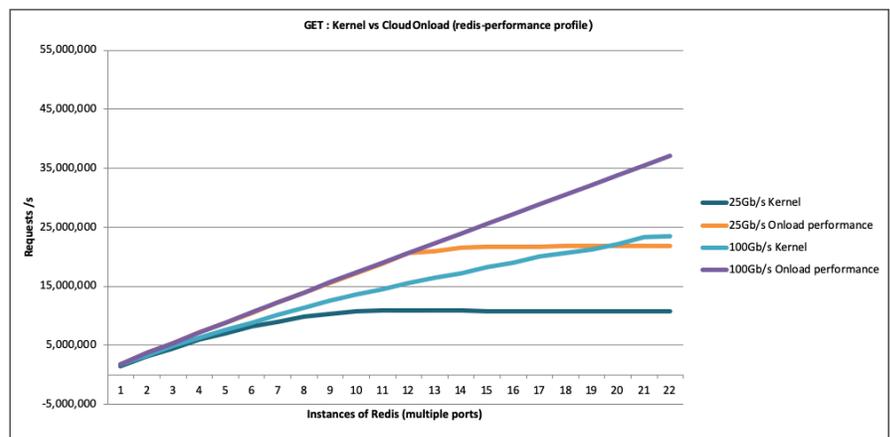
Specifications

Cloud Onload supports the following Linux distributions:

Red Hat Enterprise Linux 6.7 - 6.10
Red Hat Enterprise Linux 7.3 - 7.6
SuSE Linux Enterprise Server 12 sp3 and sp4*
SuSE Linux Enterprise Server 15

Canonical Ubuntu Server LTS 18.04
Canonical Ubuntu Server 18.10
Debian 8 "Jessie"
Debian 9 "Stretch"
Linux kernels 3.0 - 4.19

*SLES 12 was only available in pre-release form at the time this was released.

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