AOE Resilient Ethernet

The Solarflare® Resilient Ethernet application for ApplicationOnload™ Engine (AOE) provides a resilient Ethernet data stream between publishers and consumers that is fully transparent to the application software. This AOE application ensures a higher degree of reliability that improves overall financial data delivery performance, reduces network processing load, and provides industry-leading, ultra-low latency, all without requiring any changes to application software.

In many environments, financial services firms use UDP multicast extensively to distribute financial data (e.g. market data feeds, message-oriented middleware, etc.) on their internal networks. This technique allows efficient delivery of a high volume of messages to a broad set of consumers. However, the UDP protocol is inherently unreliable, and messages can be lost or delivered out of order.

Packet loss in the network requires both the detection and retransmission of the lost data, which are typically handled by application middleware. Once identified, the retransmission of lost packets causes substantial delay in the delivery of data. For example, a retransmission from London to New York could take 70 milliseconds, or more: 35 milliseconds of transit time to request a retransmission, and an additional 35 millisecond of transmit time to

retransmit the packet. In addition to substantial delay in delivery, a retransmission puts extra load on the servers and the network, further impacting overall performance. An escalation of data loss may occur as the cycle of re-transmissions cause increased network load resulting in additional retransmissions.
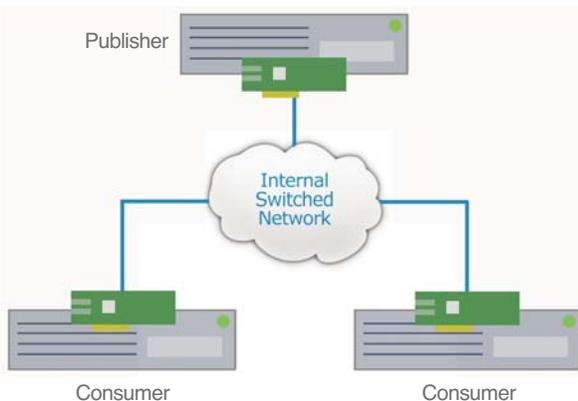
AOE Resilient Ethernet Benefits

Although firms can construct networks with the aim of reducing packet loss, such networks either add considerable cost by requiring redundant servers and network hardware, or require substantial changes to the application software to accommodate redundant network traffic on both the transmitting and receiving servers. This adds significant deployment costs while increasing server load and network latency. AOE Resilient Ethernet is a unique application that provides the following benefits for financial data applications:

- Highly reliable, ultra-low latency communication channels between publisher & consumers
- Improved feed data delivery performance with reduced network processing load
- No additional host CPU load
- No changes to host software

AOE Resilient Ethernet Operation

In this environment, AOE Resilient Ethernet transmits redundant UDP multicast data streams, reconciles the redundant streams to a single data stream at the receiver, and is fully transparent to the application software at both ends.
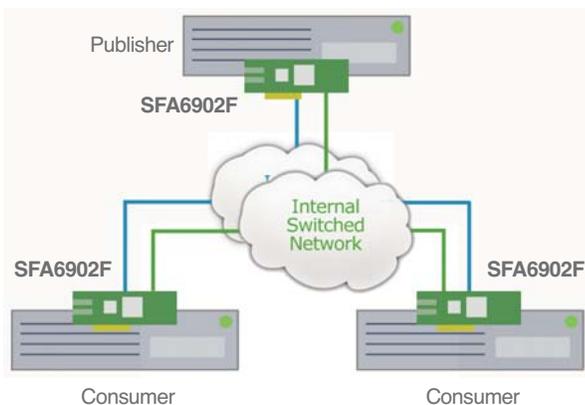
The AOE application in the publisher constructs an A/B feed from each UDP multicast stream transmitted by the publisher by duplicating the specified UDP streams and transmitting these redundant streams on both network ports. Each redundant payload is encapsulated with a small header which includes a sequence number, and additional network headers for each port.

The AOE Resilient Ethernet application in the consumer server performs line arbitration on these multicast streams.

• For each sequence number AOE delivers the first packet received from either of A or B streams minimizing latency.
• AOE restores lost packets from the alternate stream providing resilience to packet loss.

AOE removes the encapsulation added to the payloads by the publisher, restores the original network headers, and delivers the packets to the host application. The host application therefore receives a continuous stream of feed data reconciled from the two A/B streams and is unaware of the A/B functionality.

AOE Resilient Ethernet is suitable for any enterprise financial middleware or business logic that needs a higher level of reliability for network traffic transmitted over Ethernet.

System Requirements

• AOE hardware: SFA6902F-A5, ordered separately
• Linux operating system (as supported by Solarflare server adapters)

Resilient Ethernet v1.0 Features Include:

• Two-way transmit duplication
• Two-way arbitration of up to 512 redundant pairs of flows
• GRE encapsulation/decapsulation of unicast, multicast, UDP, TCP
• Maximum resilience configuration (with host-based packet re-ordering)
• Tool for specifying flows to duplicate & arbitrate
• Transparent header reconciliation
• Packet statistics for A & B feeds

Resilient Ethernet v2.0 includes all features above and support for "Maximum Reliability" mode with AOE-based packet re-ordering, and support for external buffering (up to 16GB) to support large latency differences between A and B feeds.

Order Information

AOE-RESETH-SOLR
AOE Resilient Ethernet application includes license, 1 year of maintenance.

SOLARFLARE®

sales@solarflare.com

US 1.949.581.6830 x2930

UK +44 (0)1223.518040 x5530

HK +852 2624-8868

www.solarflare.com