

Introduction to Solace Systems

Solace Systems is the leading provider of middleware appliances. Middleware, which has historically been delivered as software, enables disparate enterprise applications and information systems to share information.

By moving middleware into hardware, Solace transforms the economics, ease of use and performance of enterprise IT systems, just like the introduction of purpose-built routers and switches took the simplicity, speed and scalability of IP networks to levels inconceivable when packets were routed in software.

Solace products have been successfully deployed by global leaders in many segments of the financial services market (buy side firms, investment banks, exchanges, and financial information providers) and other markets such as government, telecommunications, transportation and logistics, and utility computing. Serisys Solutions, based in Hong Kong, has partnered with Solace to introduce Solace messaging solutions to the Asian financial services market.

Solace products provide a next generation enterprise-wide messaging platform for financial services firms that need more throughput, speed, predictability and reliability than traditional enterprise messaging systems such as IBM MQ or TIBCO EMS provide. Banks such as Barclays Capital have implemented Solace throughout their front, middle and back office, resulting in a simplified infrastructure that costs less to deploy, manage and scale.

Solace's solution delivers the following advantages:

- **Simplicity:** The "rack it and run it" operation of an appliance minimizes provisioning, management, and operational expenses.
- **Savings:** Each Solace appliance can replace 10-30 servers from a capacity perspective, and can be shared by many applications with different needs.
- **Speed:** Solace offers higher throughput and lower latency for a wide-range of system communication requirements in both LAN and WAN environments.
- **Scalability:** Solace brings linear scalability to your middleware infrastructure using an approach and architecture a lot like that of IP routers.
- **Stability:** Solace's appliance has been specially designed to keep latency low even under load, and built-in fault tolerance ensures high availability.



Financial Services Use Cases

These days the financial services industry is as much about real-time information as it is about money.

Solace has delivered value to many leading banks, exchanges, hedge funds, and other institutions in North America, Europe and Asia Pacific. Solace's products address challenges in the following areas:

- Enterprise-Wide Messaging:** For retail, commercial and investment banks with very high transaction volumes, Solace routers stabilize and improve the resilience of IT networks even under massive data loads at peak transaction times. With support for 10 to 100 times more throughput than traditional messaging buses, Solace can eliminate the network traffic bottlenecks that cause delays and queues at ATMs and branches. Customers appreciate quicker and more responsive service, and IT network managers spend less time and money managing their LANs and WANs.
- Algorithmic Trading:** Solace provides a hardware-based platform that can help financial institutions dramatically increase the speed and efficiency of their trading environment, thus enabling earlier capture of price opportunities.
- Market Data Distribution:** The Solace appliance enables ultra-fast routing of market data within a financial services organization to any number of applications or users, while simplifying what has traditionally been a complex area.
- Order Execution:** Solace's technology enables the guaranteed delivery of messages with throughput 10 to 100 times higher than current solutions, and much lower, more consistent latency than alternatives.

Message Size	Messages per Second	User Payload Bandwidth
100 bytes	149,000	119 Mbps
500 bytes	146,000	584 Mbps
1,000 bytes	128,000	1,024 Mbps
12,000 bytes	17,000	1,632 Mbps
30,000 bytes	7,500	1,800 Mbps

Guaranteed Messaging

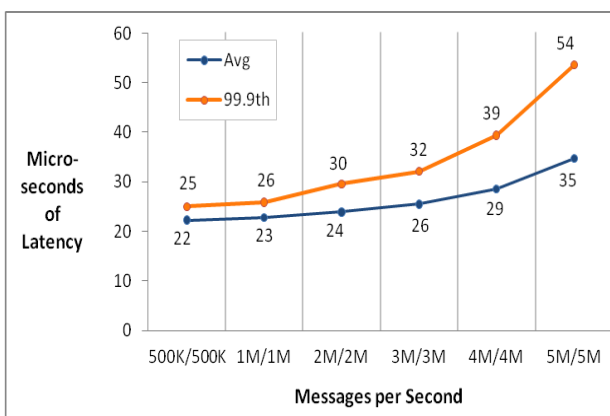
150,000 messages per second is beyond the capacity of most WANs, but when data rates exceed capacity messages are buffered to a combination of redundant memory and SAN storage to weather outages and traffic spikes without losing messages

Advantages and Business Benefits

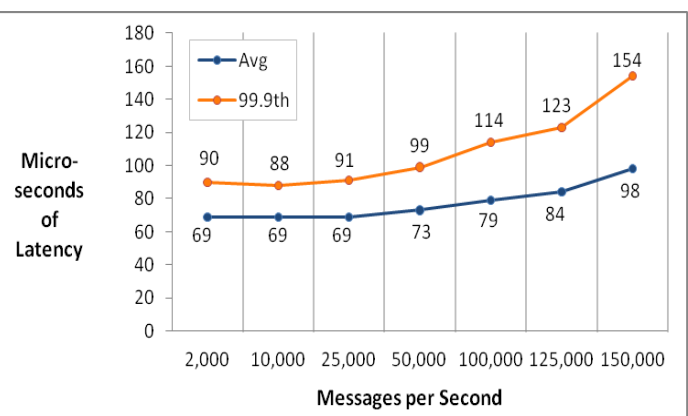
Solace's middleware appliances deliver the following advantages:

- **Cost:** Each Solace appliance can handle the workload of dozens of conventional servers, so there are fewer devices to administer and the system as a whole requires less rack space, power and cooling. Solace's appliances are modular chassis to house specialized blades, so a single device can support multiple types of messaging, such as reliable, guaranteed and JMS. Each Solace device can provide many applications their own fully compartmentalized and secure virtual messaging environment.
- **Performance:** Solace's platform utilizes a pure hardware datapath to enable the delivery of messages at high rates, and since hardware doesn't suffer from the variability typically associated with software running on general purpose operating systems, Solace's solution maintains its performance characteristics even when routing millions of messages per second.

Reliable Messaging Performance



Guaranteed Messaging Performance



- **Manageability:** It's less complicated to maintain and upgrade Solace appliances because there are no dependencies between software, utilities, drivers or databases to worry about. Another advantage is that since all messaging types are handled by a single platform, and messages flow over client-specific TCP connections, it's easy to identify and address problems.
- **Flexibility:** Solace's appliances are based on easily modified firmware so their behavior and functionality can be altered and extended in much the same way as devices such as IP routers, reducing the time and expense associated with upgrades.
- **Robustness:** Solace's hardware has been designed with fully-integrated, tightly-coupled features for high availability and general networking robustness, such as redundant components, the automatic fail-over of paired devices, the isolation of control and data planes, and per-client queue management.
- **Scalability:** Each Solace message router is a discrete self-sufficient asset that can do its job without relying on or impacting software running on servers, so Solace's platform provides the linear scalability IT people are used to getting from their IP routers and switches.
- **Security:** Solace appliances handle message distribution via discrete TCP connections, so the platform can be made more secure than multicast-based systems. Administrators must be authenticated to gain access to the message router, and they can control which topics each client, which must also provide login and password to access the router, is allowed to publish or subscribe or publish.

Products and Capabilities

Solace offers two middleware appliances, the Solace Message Router and the Solace Content Router, and complementary software products for inter-process communications and last value caching. Both appliances come in two models. The Solace 3260 is a high-capacity model that's field-upgradeable, and the Solace 3230 is a smaller 2U device for departmental applications and satellite datacenters. Solace's unified API provides uniform client access to both products, and is available in C, Java, JMS and .Net.

Solace Message Router

The Solace Message Router performs all common enterprise messaging functions.

- **Reliable messaging:** Solace delivers consistently low latency even at high volume, and its appliance form factor makes it easy to expand capacity so companies can stay ahead of the most extreme requirements.
- **Ultra-low-latency messaging:** Solace's low-latency messaging solution keeps market data in hardware from feeds to algorithmic engines, enabling extremely low latency with consistency software can't touch.
- **Guaranteed messaging:** Solace uses an innovative, patent-pending approach to message queuing that enables guaranteed delivery at higher rates and with lower latency than software-based alternatives.
- **JMS messaging:** Solace's hardware can serve as a hardware-based Java Message Service broker that enables JMS messaging with better performance, resilience and scalability than software-based providers.
- **WAN distribution:** Solace enables fast, efficient WAN distribution by only sending information where it's needed, compressing messages in hardware, and fanning out messages at the edge.

Solace Content Router

The Solace Content Router filters, customizes and delivers information to the applications and people who need it. It supports reliable delivery and is capable of guaranteed delivery and geospatial routing.

- **Enterprise Content Routing:** Solace enables the routing and real-time transformation of content as it moves between applications and users.
- **Content & News Distribution:** Solace enables the routing and real-time transformation of news and information content as it moves between applications and users.
- **Geospatial Routing:** Solace enables the routing of information based on the location of an event, the sending application, and potential recipients.
- **Complex Event Processing Pre-Processing:** Solace can aggregate, filter, and rationalize large volumes of events for CEP applications such as fraud detection, algorithmic trading and risk management.
- **Distributed Database Synchronization:** Solace can synchronize data across diverse data sources in real-time, even over wide area links, regardless of the number of recipients.

Complementary Software Solutions

- **IPC Shared Memory Messaging:** For latency-critical scenarios where running applications on a single multi-core server is possible, Solace's API supports IPC with average latency just over 500 nanoseconds.
- **Message Caching:** Solace's message caching solution enables the rapid in-memory storage and retrieval of data in a message stream. It can run on a Solace appliance or be deployed on distributed servers.

Key Features and Functions

Enterprise Messaging

- Publish/Subscribe and Request/Reply
- Reliable delivery
- Guaranteed delivery, in order, only once
- Support for Topic, Queues and Content routing
- Inter-process communication (IPC) for ultra low latency application communication

Transport

- TCP
- HTTP

Speed

- Reliable delivery at up to 10M messages per second with average latency of 35 microseconds
- Guaranteed delivery at up to 150K messages per second with average latency under 100 microseconds

Scalability

- 10Mtopics; support for multi-level, wild cards
- 6,000 clients connections
- 150,000 msg/sec Guaranteed messaging
- 10 million msg/sec Reliable messaging
- Modular chassis

High Availability and Reliability

- Active-Active redundancy via VRRP
- Active-Standby redundancy via VRRP
- Chassis based system with dedicated hardware data plane, separated from the control plane
- 99.999% reliability on the system

Security

- Per Client Authentication (Radius, LDAP,Local)
- Publisher and subscriber access control lists
- IP layer access control lists

- Nessus for prevention of DoS attacks

Distribution

- **Routing** – Integrated protocols for distributed routing over the WAN between data centers. Supports both reliable and guaranteed messaging
- **Message Eliding/Conflation** – per topic, per subscriber rate control for WAN consumers who can't consume messages at the real-time tick rate
- **Compression** – Hardware based compression from client to appliance and/or between appliances

Virtualization

- Ability to virtualize message platforms on one appliance with full message isolation.

Integration

- API support for Java, C, .NET
- JMS with integrated JNDI
- Full API interoperability
- Structured data types

Monitoring & Management

- Syslog, SNMP and SEMP for logging and monitoring of messages
- Deep statistics available; layer 1 to layer 7
- SolAdmin GUI –management and monitoring
- 100% hands off management with wake-on LAN

Optional features

- Integrated ITRS plug-in for full Solace monitoring
- Redline Integration with on-board ticker plant in hardware
- SolCache is a last value cache with all request/reply semantics built into the Solace API.
- TS Associates integration for latency monitoring

Conclusion

Solace's message and content routers provide a wide range of middleware capabilities in a high-performance, sharable, easily managed platform. By doing so, Solace accelerates information distribution even in the face of increasing volume and volatility, and reduces the cost and complexity of information distribution infrastructure. To learn more visit Serisys at <http://www.serisys.com> or call +852 2823 9508.