Improve the Collection and Distribution of Real-Time Data with Better Middleware

Learn how Solace’s state-of-the-art middleware appliances reduce the cost and complexity of your IT infrastructure while improving its speed, robustness and scalability.
Executive Summary

The Situation

A perfect storm of technology trends is driving information overload.

The proliferation of mobile devices, social networking sites and remote sensors means people and companies are producing and consuming more information every day. That information needs to get where it’s needed without flooding recipients with a deluge of data they can’t handle, whether it’s flowing within datacenters, around the world or via the web and mobile devices.

The Problem

Today’s messaging middleware approaches and infrastructure can’t keep up.

To effectively manage this ever-increasing and often unpredictable amount of information, IT departments need elastic capacity so they can support unexpected traffic spikes without the expense and inefficiency of overbuilding their system. If you try to support the data volumes of tomorrow with yesterday’s technology you’ll find your datacenter growing out of control in terms of rack space, power and complexity.

The Solution

Middleware appliances can route massive amounts of information via corporate networks and the internet.

Middleware, historically delivered as software, lets applications share information with people and other computer systems.

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 still routed in software.

The Results

Cut the cost and complexity of your infrastructure while making it faster, more robust and easier to manage.

- **Simplicity**: The “rack it and run it” operation of an appliance makes it easy to deploy and operate your middleware.
- **Savings**: Solace reduces capital and operating expenses through platform unification and device consolidation.
- **Speed**: Solace offers higher throughput and lower latency for all kinds of messaging.
- **Scalability**: Solace offers linear scalability with an architecture a lot like that of IP routers.
- **Stability**: Solace’s appliances are resilient even under load, and built-in fault tolerance ensures high availability.

The Proof

Successful deployments in the most demanding industries, and growing presence in mainstream markets.

Solace’s technology has been successfully deployed by global leaders in data-driven industries like financial services and telecommunications, and is being adopted by leaders in other spaces such as government, manufacturing, online gaming and transportation.
Products

Solace’s solutions are based on its Unified Messaging Platform, a comprehensive solution that performs many kinds of messaging with a common API and administration framework.

Solace has embedded middleware functionality into purpose-built hardware to increase the speed of application infrastructure while improving manageability and reducing cost and complexity.

Solace’s appliance is available in two form factors:

- The Solace 3260 is 4 rack units high and is available with 8 1GigE ports or 2 10GigE ports. It supports extremely high capacity and is field-upgradeable.

- The Solace 3230 is 2 rack units high and features four 1GigE ports. It is ideal for departmental applications, satellite datacenters and on-customer-premise solutions.

Integrated Monitoring and Management

Solace lets customers manage their messaging system using command line interface or a graphical user interface called SolAdmin, send information to other management systems using Syslog or SNMP, and tie into their existing framework. Best of all, it does all this without hindering performance by intruding on the data path like software-based solutions.

Open Source Friendly

Solace’s platform is open source friendly, with plug and play interoperability for Apache ActiveMQ and other JMS-based middleware. Configuring Solace as the underlying transport for higher level open source frameworks gives developers using Apache Camel, UltraESB, WSO2, Mule and jBoss the ability to boost the performance of their applications and enterprise service busses with Solace’s data distribution capabilities.

Unified API

A unified API makes Solace’s solution a one stop shop for all of your messaging needs. It provides robust and uniform client access to all of Solace’s capabilities.

- **C**: Low-level threadless API with support for any thread model.
- **Java**: 100% pure Java, with support for reliable and guaranteed messaging.
- **JMS**: Supports 1.1 including queues and topics, and provides a console for managing objects accessible via JNDI.
- **.NET**: Simple interface for applications built with .NET languages such as C# and Visual Basic.
- **JavaScript**: Dynamic and downloadable for running in web browsers, mobile devices, or server-side in Node.js.
- **ActionScript**: Enables streaming to applications built with Flash and Flex.
- **Silverlight**: Enables streaming to applications built using Microsoft Silverlight.
- **Node.js**: Lets applications stream data to web and mobile apps using Solace’s appliances.
Business Benefits

Lower TCO and Complexity
Solace’s appliance handle the workload of as many as 30 servers running messaging software, so there are fewer devices to manage and the system requires less rack space, power and cooling. A single device can support many types of messaging, such as reliable, guaranteed and JMS, and thanks to virtualization each device can give many applications their own fully compartmentalized and secure virtual messaging environment.

Easier Administration
Solace’s unified monitoring and management makes it easier to keep your system running at peak efficiency. The use of discrete TCP connections makes it easy to troubleshoot problems with applications, your network or the messaging layer. It’s easy to upgrade the appliances because there are no dependencies between software, utilities, drivers or databases.

Better Corporate Agility
Solace appliances are fast and easy to deploy and scale, and each one can be virtualized to meet the messaging needs of many existing and new applications. So the inability to quickly satisfy new messaging capabilities or capacity requirements won’t hinder the development and introduction of new services.

Technical Advantages

Fast, Predictable Performance
Solace 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.

Greater 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.

Elastic Scalability
Solace’s appliances are based on 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.

Tighter Security
Solace appliances handle data distribution via TCP connections, so the platform can be made more secure than multicast systems. Administrators and applications must be authenticated to gain access to the appliance.

Solace reduces or eliminates expenses in many areas to offer much lower TCO than today’s software-based solutions.

Unlike so-called appliance vendors that pre-configure commodity servers to run their software, Solace has used high-speed components like FPGAs and Network Processors to build custom purpose-specific hardware that enable the high-volume distribution of data.
Unified Management and Monitoring
Solace’s monitoring and management framework makes it easy to keep your messaging system running at peak efficiency, provides per-client statistics without impacting performance, and integrates with monitoring and management tools.

Virtualization for Sharing of Equipment
Solace appliances can give many applications and departments their own fully compartmentalized virtual messaging environment. When these “messaging VPNs” are set up messages never cross between environments, and administrators can fully configure the behavior of, and resources available to each virtual messaging partition.

Support for virtualization reduce TCO and speeds time to market by enabling many applications to tap into the power of a single device.
They can even use this functionality to run several discrete development and test environments in one box.

Designed for Flexibility and Scalability
Solace separates the flow of messages from management functionality with discrete control and data planes, so the OS never interferes with message delivery.

The data plane is made up of PCIe cards (up to 5 in a 3230 and 10 in a 3260) that perform functions such as protocol termination, message routing, and persistence so clients can tailor the appliance to their needs and scale without increasing their system’s footprint.

Solace appliances propagate information about subscriptions and network availability so when new appliances are added to the system messages are automatically routed via the new shortest path. This lets you easily increase a system’s capacity by deploying another appliance.
Enterprise Messaging

Solace transforms the economics and performance of your IT infrastructure by handling all kinds of middleware functions in purpose-built appliances that feature best-of-breed performance in all areas, a common API, and unified administration.

Solace’s hardware-based middleware performs the major kinds of messaging with unprecedented performance, reliability and manageability.

Whether you’re fanning out content to customers, connecting mission-critical applications or helping developers roll out innovative new services, Solace makes it easy to meet all of your company’s messaging needs.

Benefits

- **High Performance**: A hardware datapath enables low, consistent latency even during periods of peak volume and extreme volatility.
- **Low Complexity and TCO**: By enabling many kinds of messaging with one API, Solace appliances keep your architecture simple and cost-effective to deploy, operate and scale.
- **Elastic Scalability**: Modular architecture makes it easy to scale capacity or add functionality over time without increasing your deployment’s footprint.
- **High Availability**: Redundant components provide built-in high-availability, and networked architecture provides fault tolerance and simplifies disaster recovery.
- **Manageability**: Unified administration makes it easy for administrators to monitor and manage their entire system.

Reliable

Solace’s appliance delivers messages with reliable or “best effort” quality of service with low latency even at high volume, and its appliance form factor makes it easy to expand capacity.

Guaranteed

Solace uses the patented approach of queueing messages in high-speed on-board memory instead of disks to offer persistent messaging that’s orders of magnitude faster than software-based alternatives.

JMS Messaging

Solace’s hardware-based JMS broker enables JMS messaging with better performance, robustness and scalability than software-based brokers.

Low Latency

For situations when speed matters more than anything, Solace supports latency under 20 microseconds with consistency that software can’t touch.

IPC Shared Memory

When you’re running multiple applications on a single server, Solace’s IPC-based shared memory messaging offers average latency under 400 nanoseconds.
Streaming Data to Web and Mobile Apps

Two factors are revolutionizing the way people access information on the job and in their personal lives:

• The increasing ubiquity of smartphones and tablets
• New technologies like Flash, HTML5 and Silverlight that enable dynamically updated applications.

Today’s internet infrastructure was designed to serve static web pages and send data “on demand,” so it struggles to support proactive real-time streaming to such a wide range of devices.

Solace helps companies easily deploy Rich Internet Applications with a turnkey middleware appliance that distributes real-time data over the internet.

• Highest message rate; millions of messages a second
• Lowest, most consistent latency
• Lowest TCO thanks to small footprint and simple architecture and operations

Solace offers bi-directional communications with many messaging features such as pub/sub, request/reply, fanout, rate control, filtration, and prioritization.

Spanning Wide Area Networks

Enterprise applications frequently share data across geographically-dispersed sites for disaster recovery, performance, scalability, and separation of concerns.

Several factors come in to play when application traffic flows from a high-speed LAN to a slower, less predictable WAN: bandwidth, latency, and security.

Solace offers unparalleled WAN performance thanks to a number of features and optimizations:

• Temporarily queues messages in hardware so messages can be continuously sent in both directions without always awaiting acknowledgements of receipt.
• Wire-speed compression and decompression of messages, selectable by subscriber or topic.
• One copy of each message is sent over the WAN, then fanned out to multiple subscribers at the other end.

Solace’s appliances act like IP routers in that they automatically propagate availability and subscription information to each other so they can send information via the shortest possible path.
**General Use Cases**

From energy and entertainment to healthcare and high-tech manufacturing, the accessibility, personalization and timeliness of information is becoming increasingly important in virtually every industry.

So while Solace’s initial success came in data-centric industries like financial services, government and telecom, Solace has a clear and compelling value proposition for all kinds of companies.

The simplification of the messaging layer alone yields considerable ROI for many companies. The value Solace offers beyond that depends on their competitive environment, market dynamics, and unique strategy.

Here are just a few of the applications and use cases where virtually any businesses can benefit from Solace:

- **ESB / Enterprise Messaging**
  One platform for reliable and guaranteed messaging, using either JMS or Solace’s own API.

- **Database/Datagrid Synchronization**
  Event-driven synchronization of distributed datastores over local and wide area networks.

- **Sensor Reading Collection & Distribution**
  Collect, filter and send readings to appropriate CEP and decision support systems, data warehouses, etc. across datacenters and organizations.

**In Financial Services**

Solace has delivered value to many of the world’s leading financial institutions including top exchanges, hedge funds, and investment banks.

Here are just some of the ways leading financial services companies have used Solace’s hardware:

- **Market Data Distribution**
  Solace enables fast and efficient data fan-out to any number of applications or users using specialized hardware that eliminates the roadblocks and variables that can impact latency and predictability.

- **Order Execution**
  Solace’s appliances set new standards for performance, reliability and manageability in persistent message delivery, offering 10 to 50 times more throughput and substantially lower, more predictable latency than current solutions.

- **Real-Time Dashboards / Single Dealer Platforms**
  Solace’s middleware appliance is the ideal messaging platform for SDPs, and is in fact the only product that satisfies all the data distribution needs of an SDP.

- **Exchanges and ATSs**
  Solace can handle feed distribution to large numbers of systems and subscribers, and serve as a buffer between real-time and non-real-time elements of system.

- **Algorithmic Trading**
  With enterprise-class appliances that perform the core functions of messaging at very high speed, Solace can help financial institutions dramatically increase the speed and efficiency of their trading environment.
Government

Solace’s hardware intelligently routes massive amounts of real-time data between people, systems and sensors for uses such as emergency response, homeland security and military applications.

The Domestic Nuclear Detection Office of the DHS selected Solace to enhance the threat monitoring and response capabilities of local, state and federal emergency organizations. Harris Corporation is implementing Solace as the data distribution platform for a new weather satellite system being deployed by NASA and NOAA.

• **Inter-Agency Communications**: Solace enables the rapid distribution of information across disparate systems and networks, which is critical when first responders, government agencies and supporting organizations need to stay on top of developing situations.

• **Sensor Reading Distribution**: Solace enables the collection, filtration and routing of data coming in from the large sensor networks common to government applications. For example, monitoring weather conditions, pressure/temperature readings from remote equipment, and the presence of chemical or radioactive materials.

Telecom

The increasing popularity of social networking, user-contributed content, IPTV and VoIP are changing the way people think about information and interactive services.

Today people demand the ability to watch what they want to watch when they want to watch it, and always stay informed about their friends, favorite celebrities, sports teams, stocks, etc.

This requires a much more sophisticated means of collecting and routing real-time information.

• **OSS/BSS Infrastructure**: Solace’s appliance can route high-volume traffic about customer events in context of billing policies and thresholds.

• **Cloud/Grid Computing**: Solace can unlock the value of cloud and grid architectures by filtering and forwarding millions of messages a second.

• **Infrastructure as a Service (IaaS)**: By handling high-speed message routing in a reliable form factor with low TCO and high scalability, Solace enables the cost-effective deployment of IaaS offerings.

Transportation & Logistics

By letting companies track vehicles, passengers, cargo and conditions in real-time, technologies like GIS, RFID and sensor networks improve asset utilization and customer service.

For many companies, these technologies overwhelm aging middleware platforms and flood applications with more data than they can deal with, but Solace efficiently distributes information to appropriate systems and people so they can make optimal use of it.

By optimizing information flow over LANs, WANs and the internet, Solace’s turnkey appliances can help transportation and logistics companies:

• Automatically distribute alerts about exceptional events like mechanical failures and weather systems allowing the faster identification, prevention and resolution of problems before they cause ripple effects.

• Filter millions of sensor readings a second and send applications, CEP engines and people a custom feed of exactly and only the information they need.
Concluding Summary

Technology trends such as mobile computing, social networking and sensor networks are converging to drive an unprecedented flow of information that many companies are struggling to manage and capitalize on.

Solace is revolutionizing enterprise IT with messaging middleware appliances that can help you collect, filter and distribute massive amounts of data far more easily and cost-effectively than software-based solutions.

By handling all kinds of data distribution in purpose-built hardware Solace offers higher performance, simpler operation, greater reliability and lower TCO than today’s software-based solutions.

Leading companies in many industries have successfully solved pressing business challenges and seized new opportunities with the help of Solace’s appliances, and we’d love to talk about how we can help you do the same.

Solace Systems

Solace Systems (www.solacesystems.com) is the leading provider of middleware appliances. Middleware, which has historically been software-based, enables disparate enterprise applications and information systems to share information. By performing this function in purpose-built hardware, Solace products accelerate information flow while reducing the cost and complexity of IT infrastructure. Solace products have been successfully deployed by global leaders in a wide range of industries.

Key Customers

World Headquarters
Ottawa, Ontario
Tel: +1 613 271 1010

New York City
Tel: +1 212 257 6441

London
Tel: +44 (0) 2079 562 054

Singapore
Tel: +65 6534 9135

A full list of worldwide offices is available on our web site.