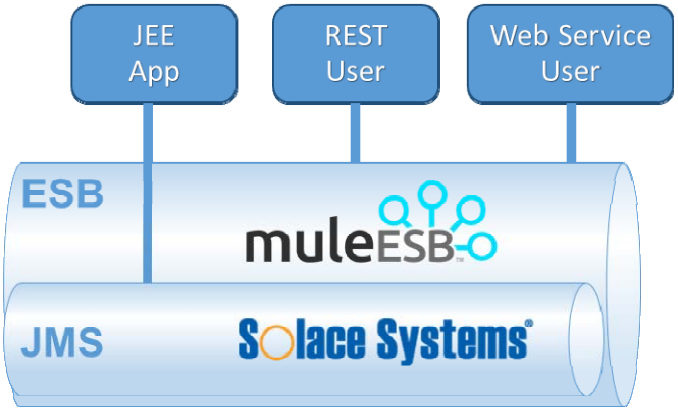
Maximize the Speed and Scalability of Your MuleSoft ESB with Solace

MuleSoft's Mule ESB enterprise service bus software makes information and interactive services accessible to a wide range of applications and users by intelligently routing information, managing permissions and allocating processing resources.

The underlying distribution of data is usually handled by a Java Message Service (JMS) broker that customers select separately based on their unique needs. Software-based JMS brokers can only route a few thousand messages per second, so most companies choosing a software solution need to deploy multiple brokers which throttles performance and makes their infrastructure inherently complex and difficult to manage, monitor, and scale.

MuleSoft and Solace have teamed up to make it easy for customers with high message volumes or performance requirements to maximize the speed and capacity of their Mule ESB by implementing Solace's appliance-based JMS broker as their messaging layer.



With the ability to route over 200,000 guaranteed messages per second, Solace's JMS broker eliminates the complexity of running a multi-broker infrastructure, making it easier and less expensive to deploy, run and grow over time. Increasing throughput by 10-30x enables Mule ESB to meet the needs of the increasing number of companies looking to replace batch processing with event-driven updates so they can upgrade their internal applications and customer-facing services to be "real-time."

This paper summarizes how using Solace appliances as the messaging layer of your enterprise service bus can improve performance and availability, accelerate application development, reduce TCO and enable massive scalability without datacenter sprawl.

To learn more contact your MuleSoft or Solace account executive, or visit http://mulesoft.com or http://solacesystems.com.

MuleSoft™ Solace Systems®

Benefits of Using Solace as Your ESB's Messaging Layer

Improve Performance and Uptime

When it comes to providing real-time information or interactive services, the performance and availability of ESBs directly and immediately affect the customer experience. Not only do slow response times and stalled out applications suspend revenue-generating activity such as orders and purchases, they can quickly drive frustrated customers to explore competitive options that in many cases are just a couple of clicks away.

Solace's integrated hardware-based solution is much more reliable than software messaging products, offering superior and steady performance even during periods of peak volume, through fault conditions and in complex scenarios involving the distribution of data across local and wide area networks.

Streamline Application Development

The complexity and inconsistencies of multi-broker open source messaging platforms frequently force developers to address shortcomings and mitigate problem conditions by coding functionality and workarounds into their applications. This leads to longer, higher risk and more expensive development cycles, as well as bloated applications that are less reliable and harder to scale and maintain than lighter weight applications.

Reduce Operating Expenses

Messaging software is difficult to deploy, monitor, make highly available, capacity plan and manage because message flow often needs to be split up and load balanced across many brokers. Such systems must also be surrounded by and integrated with additional software that adds fault tolerance and disaster recovery features, efficient distribution over wide area networks, and more. The costs of all that software, the servers it runs on, and the manpower it takes to run it all adds up quickly.

Solace's turnkey appliances offer full functionality and all the capacity you need in a simple "rack and run" device that reduces datacenter footprint and is highly available and fault tolerant out of the box. It also includes robust monitoring and management tools that make it easy to keep the system running at peak efficiency and troubleshoot problems anywhere in your applications or network.

Scale without Datacenter Sprawl

To boost the capacity of an ESB or extend its reach across distributed environments, you need to scale the ESB software itself and the underlying messaging platform. With a software-based message bus, this leads to an untenably complex environment where you split traffic across many brokers, and across separate WAN optimization solutions.

Solace's appliance has enough capacity for very high volume applications, and you can add more capacity without increasing the physical footprint or architectural complexity by upgrading to a higher performance card within an existing appliance. Support for virtualization means you can divide each appliance into many discrete virtual message buses so one piece of equipment meets the needs of many different services or departments, the same way many applications can reliably share high-volume IP network equipment.

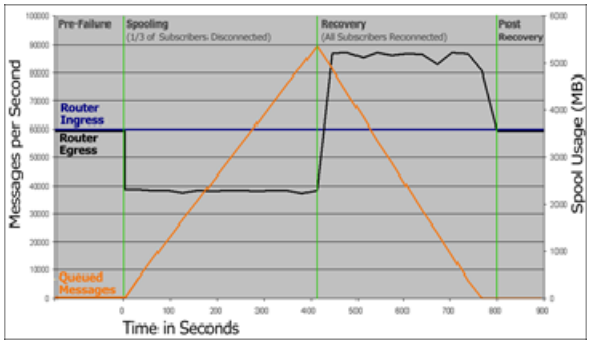
Improve Performance and Uptime

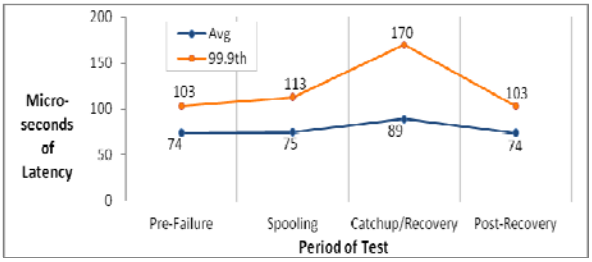
Since so many applications today are “real time”, in that users expect immediate responses to their requests, outages quickly affect user satisfaction and the bottom line by knocking revenue producing services out of commission. As a shared resource that many applications rely on, it’s critical that ESBs be highly available and fault tolerant.

By keeping information flowing through your ESB, Solace keeps services available for customers which protects your bottom line and keeps your customers happy. A more reliable system is easier and less costly to keep running, because you’re not constantly troubleshooting and applying risky fixes on production systems.

- **High Availability and Fault Tolerance:** In addition to redundant components and RAID mirroring of storage, Solace includes high availability facilities like clustering, fencing and failover management, all in hardware so it’s robust, accurate and easy to manage. Solace appliances can complete a failover to their standby in just seconds regardless of how much messaging data is stored. Software systems, on the other hand, must reload all messages and delivery state from disk which is unpredictable and can take ten minutes or longer, thereby increasing the outage window.
- **Guaranteed Delivery:** In situations where messages can’t be lost and must be delivered in sequence, ESBs persist messages to disk – a performance bottleneck that restricts throughput to a few thousand messages per second. Solace uses a patented approach that offers 10-30 times higher throughput with latency measured in microseconds. This releases the limits most architects experience with today’s guaranteed messaging software, enabling faster performance, fewer delays, and application designs not previously possible.
- **Handling of Slow and Disconnected Consumers:** If an application that receives 1,000 messages per second goes offline for five minutes, 300,000 messages will need to be stored and delivered when it comes back online. With a software system limited to a few thousand messages per second, it would take hours to deliver those 300,000 along with the newly arriving messages, resulting in slowed or even interrupted service to other applications during recovery. Solace can deliver 200,000 messages per second so backlogs can be metered into the system with nominal impact.

  The first chart to the right shows what happens when 1/3 of an appliance’s subscribers are disconnected for several minutes. The blue line shows that the ingress rate continues unimpeded while messages build up in the queue, shown by the orange line. The egress rate, represented by the black line, drops because messages are only being delivered to those subscribers still connected. Then, once the subscribers are reconnected, the queue quickly empties as egress exceeds ingress to “catch up” subscribers that have reconnected. The second chart shows that the latency of message delivery to well-behaved subscribers is barely affected by the outage.





- **Easy to Upgrade:** Since Solace’s self-contained appliance doesn’t require a wide variety of software products running on commodity servers with general purpose operating systems, it eliminates the cycle of upgrades that requires patching and regression testing.

Streamline Application Development

There are several ways software-based messaging brokers complicate the architecture of ESB applications. Because messaging software requires you to divide message traffic across multiple brokers, applications need to know which traffic goes where. Many software messaging products also lack functionality and robustness, so developers have to compensate with code that fills in feature gaps and accommodates frequent failures and slowdowns.

By making it easier to build ESB applications, Solace can help you get new services to market much more quickly, reduce the costs and risk associated with complicated architectures, and let your developers focus on creating awesome applications that delight your customers and differentiate you from the competition.

Solace's Advantages

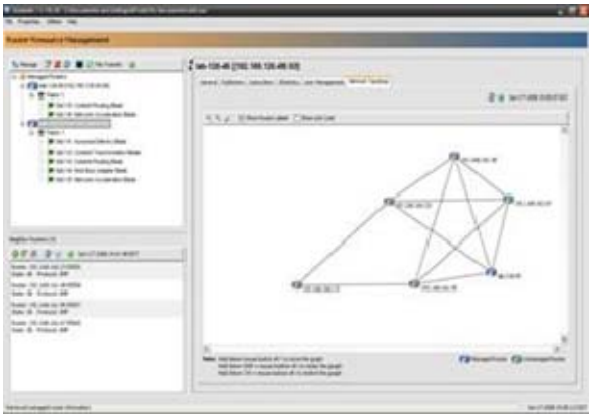
- **Single Broker Architecture:** Since Solace's appliance provides a single seamless messaging foundation for your ESB, with traffic being handled by a single broker, applications can be built lean and lightweight, focused on their core business logic without needing to accommodate a complicated and error-prone messaging environment.
- **Feature Rich Platform:** Solace's appliance is rich with features that developers can use to accelerate their development efforts and reduce the complexity of their applications by delegating such functions to the underlying transport layer. Such features include exclusive/non-exclusive queues, a single queue attracting multiple topics, last-value-queue, congestion controls, all-or-nothing delivery, and consistent delivery order across topics.
- Messaging as a Service: As mentioned above, Solace offers built-in high availability, fault tolerance and disaster recovery that developers can easily tap into, so applications don't need to address ugly "what if" contingencies.
- **Easy Integration with ESBs:** Solace's solution offers plug-and-play integration with leading ESBs, so it's easy to replace an inferior software solution with Solace's high capacity, high performance offering.

Reduce Operating Expenses

Running the messaging software needed to support traffic for a high-volume ESB can be a costly affair. Scaling messaging software entails not just buying, deploying and managing the software licenses, but a myriad of discrete non-integrated components including servers, operating systems, file systems and clustering software. Software-based messaging provides fragmented tools to monitor and manage different areas of the system via dashboards that don't give administrators the visibility they need to efficiently troubleshoot problems.

By making your ESB easier to operate, Solace can significantly reduce the manpower costs associated with deploying and running your ESB, and reduce the risk of experiencing downtime due to fault conditions or during upgrades.

- **"Rack and Run" Deployment:** Solace's appliance is easy to deploy and operate. For starters, Solace's appliance is a self-contained device that's as easy to install as an IP router, with control software delivered as a single, fully integrated bundle. That makes initial installation and upgrades straightforward, and eliminates the costly, time-consuming process of patching and regression testing many inter-related components every time you upgrade any one piece of the puzzle.
- **Architectural Simplicity:** Supporting 10-30 times more message traffic and multiple qualities of services with a single appliance means Solace-powered ESBs are architecturally simple, which inherently makes them easier to operate due to fewer pieces and integration points.
- **Virtualization:** You can virtualize each Solace appliance so many applications can have their own logically separated messaging environment on the same equipment without interfering with each other. This makes it very easy to deploy new applications because they can safely tap into your existing high-capacity messaging infrastructure.
- **Sophisticated Management and Monitoring:** Solace offers a rich monitoring and management GUI and framework that makes it easy for administrators to identify and address problems anywhere in the messaging layer, applications, or physical network. A programmatic management interface makes it easy to integrate Solace appliances into existing monitoring, capacity planning and provisioning systems. It all adds up to a high degree of management visibility that's always available regardless of messaging activity and never impacts messaging performance. You can monitor the health of and troubleshoot applications from this single point – pinpointing the network, server or application as the root cause of problems. Application development is also made faster since fewer management functions need to be built into your applications.



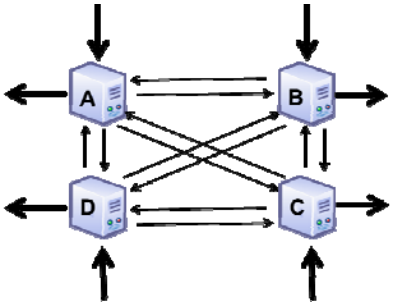
Scale Without Datacenter Sprawl

When increasing the capacity of your ESB you can't just add more ESB software, you also need to scale the underlying messaging platform. Unfortunately adding message brokers to your ESB does not increase capacity linearly because of the complexity associated with integrating, capacity planning, load balancing, etc. So you need to add an inordinately large amount of messaging capacity to scale up your ESB, which entails considerable expense and effort. Many high-volume ESBs are deployed with tens, hundreds and even thousands of underlying messaging servers.

Being able to support a massive amount of information flow within Solace's compact appliance keeps hardware, licensing and maintenance costs to a minimum even as you grow your ESB. The ability to easily increase the capacity and reach of your ESB means you can add new applications and accommodate more volume within that same cost-effective footprint. This allows you to more quickly and easily deploy innovative services that satisfy your customers and extend your competitive advantage.

- **High Capacity:** With support for over 200,000 guaranteed messages a second, each Solace appliance can meet the messaging needs of several high-volume applications, or a large number of low-volume applications that each drive a few thousand messages a second. Solace makes available hardware cards with different levels of capacity, so you can start with the basic card and easily upgrade your appliance to support higher throughput without increasing the footprint or complexity of your system.
- **Virtualization for Elastic Capacity:** Solace's appliances can be partitioned into hundreds of virtual message brokers that can meet the messaging needs of many discrete applications that require logical separation. Each of these brokers can be given access to as much (or little) of the appliance's overall capacity as desired, so different brokers can face their own peaks and valleys of demand without leading to overloaded systems or wasted capacity.

- **Efficient Scaling:** When you add message brokers to support higher throughput, scaling is inefficient because some percentage of each broker's capacity is wasted passing messages back and forth with other brokers. The more brokers you add, the more wasted capacity, which leads to diminishing returns and leads to a complicated and fragile environment where publishers and subscribers need to be clustered together. By handling your ESB's message traffic with a high-capacity appliance, Solace eliminates the inefficiency inherent in multi-broker systems



Conclusion

Solace is the ideal messaging infrastructure for your Mule ESB. Not only does Solace offer higher, more predictable performance than any software broker available, along with much better reliability and fault tolerance, but it costs a lot less and is much easier to deploy, manage and scale. Best of all, plug and play integration makes it easy to swap out your existing messaging infrastructure for Solace.

To learn more contact your MuleSoft or Solace account executive,
or visit http://mulesoft.com or http://solacesystems.com.