

# JBoss DELIVERS SPEED, SCALE AND INCREASED PERFORMANCE FOR RED HAT'S IT ORGANIZATION

## FAST FACTS

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| Company        | Red Hat  |
| Industry       | Open source software   |
| Geography      | US - Raleigh, NC   |
| Opportunity    | Implement and build a reliable, high-performance platform using SOA to meet growing business and performance demands   |
| Migration Path | Tomcat 5 to JBoss® Enterprise Application Platform, Oracle BPEL, and Mule ESB to JBoss Enterprise SOA  |
| Software       | JBoss Enterprise Application Platform, JBoss Enterprise SOA Platform   |
| Benefits       | Established a reliable platform with zero unplanned downtime, reduced hardware costs by more than 50 percent, increased performance by more than 25 percent, and increased resource efficiency for the IT organization |



## BACKGROUND

Red Hat is the world's leading provider of open source solutions, offering choice to customers building open source IT infrastructures. Its unique business model provides open source subscriptions for its high-quality, affordable technology. Its operating system platform, Red Hat® Enterprise Linux®, together with applications, management and service-oriented architecture solutions, including JBoss Enterprise Middleware, deliver industry-leading value. The company is based in Raleigh, NC and has more than 60 offices around the world. Red Hat's internal IT organization serves more than 2500 global employees with data centers in Phoenix, AZ.

## OPPORTUNITY

In 2007, Red Hat was growing exponentially in employee size, and faced increasing demands on the internal IT systems, thus challenging the existing infrastructure. Red Hat's internal IT organization was faced with increased system integration and support issues, that were consuming considerable time and taking focus away from strategic issues. The IT organization needed an enterprise grade solution that was stable, simple and scalable.

The IT organization was handling internal maintenance and devoting critical resources to solving commodity solutions which reduced cycles available for solving critical business problems.

Red Hat IT devoted resources to developing and building custom solutions for Tomcat including: security solutions to support single-sign-on, a clustering implementation to handle high scalability, a transaction and persistence solution to support functionality similar to the Java Transaction Architecture (JTA) and Enterprise Java Bean (EJB) transaction support, deployment solutions to segment large application deployments into multiple contexts, and scheduling service implementations utilizing Quartz that were non-cluster aware and inefficient.



"We tightly coupled our in-house custom solutions to our internal processes in order to reduce the development effort. As a result there was no ability to upstream our contributions and we took on the burden of maintaining them," said Mathew Hicks, IT manager, Red Hat. "The cost of this effort eventually became high enough to minimize our consumption of community updates and our systems were in danger of becoming dated."

"Our team spent considerable time and resources creating valuable custom solutions to ensure we met the growing demands of our users. But as we grew we encountered server sprawl issues that constrained our resources. First, our custom solutions didn't scale for high availability scenarios and the fragility of the infrastructure increased along with the number of solutions," said Hicks, "We needed a solution that would reduce the burden of custom solution maintenance, eliminate single points-of-failure, and optimize the IT infrastructure for scalability," said Hicks.

## SOLUTION

Red Hat obviously had experience with JBoss Enterprise Middleware products, but the decision to deploy on the JBoss Enterprise Application Platform and SOA Platform for internal systems was a strict business decision that would benefit the technical advances of Red Hat IT and better serve the entire company. Red Hat IT operates with its own performance requirements and those requirements were the drivers for choosing to implement JBoss products internally.

Red Hat IT decided to implement a modular based, service-oriented architecture (SOA) to replace its organization's traditional IT infrastructure. The JBoss Enterprise SOA Platform includes a next-generation ESB (Enterprise Service Bus) for service mediation, jBPM Framework and the JBoss Rule engine for business process automation infrastructure, which enables superior business execution, responsiveness, and flexibility in a cost-effective, open platform. One of the features of an SOA is that it allows companies to build composite services in which business processes can be extended over a number of different applications. The first phase of the migration involved deploying JBoss Enterprise Application Platform and JBoss Enterprise SOA Platform.

Red Hat needed a supportable, enterprise-caliber solution that leveraged commodity solutions, maintained by the community.

## Red Hat IT Required:

- A framework to allow them to identify solutions
- Ability to work more closely with the business to understand future needs
- Better way for teams within IT to collaborate
- Means to scale their efforts and to expand capabilities
- Desire to collaborate with the community inside/outside of Red Hat
- Use products that allow for common system administration capabilities such as configuration management and RPM based packaging

Red Hat IT decided to migrate its customer facing Java application infrastructure, including the including 30 web applications and services, from Tomcat 5 to JBoss Enterprise Application Platform.

By deploying the JBoss Enterprise Application Platform, Red Hat was able to replace a complex clustering solution and utilize the JBoss clustering capabilities to dynamically size the application server cluster to any processing load the organization could encounter. Red Hat IT also replaced their custom single sign-on functionality with a JBossSX-based, cluster aware single sign-on solution.

"By removing the need for a dedicated clustering database, we realized a 4:1 reduction in hardware and the use of JGroups-based clustering yielded increased performance per transaction and higher availability," said Chris Alfonso, enterprise architect, Red Hat. "We are taking full advantage of the high-availability solutions offered by JBoss including in-memory caching, clustering, HA-JNDI, and automatic discovery."

Red Hat's growth as a company and the constant addition of end-users, made dynamic scaling capacity a priority for the IT organization. JBoss Enterprise Application Platform enabled an increase in cluster capacity through the ability to auto-discover additional nodes, and the means to decrease the overall footprint when not in use.

"This gave us the flexibility to not invest in a 'high watermark' infrastructure," said Hicks. "We were able to segment the cluster to manage workloads, with minimal impact to the infrastructure. This resulted in a more efficient use of our resources and ability to scale for future demands."



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"The JBoss Enterprise Middleware portfolio is a cornerstone in our middleware infrastructure and our IT architecture vision. We have laid the groundwork to establish a world class technology stack, largely based on the JBoss Enterprise SOA Platform."

- Lee Congdon, Chief Information Officer, Red Hat  
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Part of the overall initiative was to replace an existing Oracle BPEL and Mule ESB implementation with JBoss Enterprise SOA. It provides a means to integrate vendor systems while transparently mediating their inherent incompatibilities and orchestrating the interactions.

The JBoss Enterprise SOA Platform implementation operates in a clustered environment, interacting with messaging queues backed by both Oracle and MySQL. The MySQL queues utilized database replication to provide database fail-over and high availability across the cluster.

"From a performance perspective, JBoss Enterprise SOA Platform has proven to handle our heaviest workloads. During the peak of our workload, we receive about 7,500 messages an hour, yet the JBoss Enterprise SOA Platform can handle approximately 7000 messages in 15 minutes, on a single node cluster," said Rico Hendriks, manager of Middleware and Services, Red Hat. "This tells us that we have the ability to scale the business from a rate of more than \$650M annually to a rate of more than \$2.5B annually in transaction flow with our existing capital investment."

As early adopters of JBoss Enterprise SOA Platform, Red Hat IT leveraged Red Hat Consulting for the implementation to assist with an aggressive scope and time line to ensure stability, and a seamless, uninterrupted integration.

"The JBoss Enterprise Application Platform provided the features that enabled us to 'right-size' our middleware infrastructure," said Hendriks. "Mainly, with automatic discovery of cluster members and a cluster aware Enterprise Service Bus, we can now monitor utilization of the application server and appropriately resize to any given processing needs."

## BENEFITS

With JBoss Enterprise Middleware, Red Hat IT now focuses on helping users increase productivity and solve strategic business issues. There is also a focus on making the organization as a whole more competitive, rather than handling technical issues. Red Hat was able to reduce hardware costs, increase performance, maximize resources and rely on quality support.

"Red Hat IT made a conscious decision to utilize JBoss Enterprise Middleware, as opposed to JBoss.org Community projects, because it did not want to be in the software integration and support business, but rather focus on business goals. The availability of quality support, with no more than 24-hours before issues were closed, was a major benefit for the company," said Lee Congdon, chief information officer, Red Hat.

Initial measurements of the performance under JBoss Enterprise SOA Platform were significantly improved compared to our existing messaging solution. "In benchmark testing, the results showed a substantial improvement in the response times for almost all transactions represented in the test," said Alfonso. "The maximum time was reduced from 6.2 seconds to 392ms, and the average was reduced from 742ms to 304ms. Resulting in JBoss performance exceeding our existing messaging solution by 25 percent."

Furthermore, "Through implementing JBoss solutions, we were able to reduce the hardware footprint by more than 50 percent, which significantly reduced long term costs on hardware, power and cooling. Additional IT benefits were speed and cost of implementation, including simplicity, openness and cost effectiveness," added Alfonso.

"We depend on JBoss.org Community projects to drive the innovation and JBoss Enterprise Middleware to deliver the stability and support that we need. With all the moving pieces that go into a solution like JBoss, it's very valuable to have a working combination of components so that we can focus on building solutions for our customers," said Congdon.

Whenever new products or refreshed versions of product come out from the engineering groups, Red Hat IT is one of the first groups to evaluate integrating them into the production environment. "As Red Hat continues its investment in management tools such as JBoss Operations Network and oVirt, we envision introducing those solutions, to streamline our processes and better serve our workforce," said Hicks.



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