

RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM AND ORACLE WEBLOGIC SERVER ENTERPRISE EDITION

INTRODUCTION

The technology foundation for both Red Hat® JBoss® Middleware and Oracle Fusion Middleware is the application platform. Red Hat and Oracle offer their application platforms, Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server respectively, as standalone technology. Application platforms are also the basis of other enterprise technologies such as enterprise service bus (ESB), business rules engine, complex events processing (CEP), business process management (BPM), and more.

Both Red Hat and Oracle base their latest application platform offering on Java™ Platform, Enterprise Edition (Java EE) specification v6, which means their offerings share more than 40 major technologies and features. With such common functionality, it may be hard to find appreciable differences between the competing application platforms.

The differences lie in the economics of the competing application platforms, the implementation of the Java EE specification, open standards support, and other non-Java EE specification features. These choices make each application platform unique. Companies evaluating application platforms should weigh the value of each capability carefully before deciding which one to select. For example, some evaluations may conclude that non-Java EE specification features have high-value potential but carry unacceptable application portability risk.¹ In another example, examining use cases may lead to the conclusion that one application platform fits most needs, but another has special capabilities useful to only a small—but important—number of use cases.

Can you use two application platforms or are you looking to select a standard across your company? Some companies adopt a mixed application platform environment to save costs or reduce their reliance on the product plan and strategy of a single technology vendor. Ultimately, there are many factors that influence your selection of an application platform.



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¹ Sometimes referred to as vendor lock-in.

ECONOMICS

There is a significant difference in the total cost of acquisition between Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server Enterprise Edition. Purchasing Oracle WebLogic Server Enterprise Edition means there are two charges in the first year – one for software licensing and another for software update license and support fees². In subsequent years, the Oracle renewal price for software update license and support is based on either fees paid in the prior year increased by the inflationary adjustment rate (IAR) or, for licenses with an active contractual cap rate (CCR), fees increased by the lower of the CCR or IAR.

TABLE A: 2-YEAR PRICE COMPARISON USING 16 CORES

WEBLOGIC SERVER ENTERPRISE EDITION	RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM WITH MANAGEMENT AND PREMIUM SUPPORT
\$200,000 – software license	\$11,250 – annual subscription
\$44,000 – first-year support	
\$44,000 – second-year support	\$22,500 – two-year total
\$288,000 – two-year total	7.81% of the cost of Oracle

With Red Hat JBoss Enterprise Application Platform, you pay one annual subscription fee. You are never charged software licensing fees. Starting a Red Hat JBoss Enterprise Application Platform subscription can be an economical option, especially when compared to Oracle WebLogic Server Enterprise Edition. For example, compare the two-year list-price acquisition costs of Oracle WebLogic Server Enterprise Edition³ to Red Hat JBoss Enterprise Application Platform⁴ deployed on 16 cores of Intel-based servers.

For Oracle pricing, the Intel cores are rated at a core factor of 0.5 per core.⁵ Price comparison is based on two years at current list prices for both Red Hat⁶ and Oracle.⁷ For Oracle, the price list dated Dec. 3, 2012 is used.

² See support renewal section in Oracle Technology Global Price List (PDF) (<http://www.oracle.com/us/corporate/pricing/technology-price-list-070617.pdf>)

³ Oracle Technology Global Price List (PDF), dated Dec. 3, 2012 (<http://www.oracle.com/us/corporate/pricing/technology-price-list-070617.pdf>)

⁴ Red Hat JBoss NA Channel SKUs (http://www.redhat.com/f/html/jboss_channel_skus.html)

⁵ See Oracle Processor Core Factor Table (PDF) (<http://www.oracle.com/us/corporate/contracts/processor-core-factor-table-070634.pdf>)

⁶ Red Hat JBoss NA Channel SKUs (http://www.redhat.com/f/html/jboss_channel_skus.html)

⁷ Oracle Technology Global Price List (PDF) dated Dec. 3, 2012 (<http://www.oracle.com/us/corporate/pricing/technology-price-list-070617.pdf>)

First-year Oracle license costs for each product are calculated by multiplying 16 (cores) X 0.5 (core factor) X [product price]. Second-year Oracle software update license and support fees are calculated at 22% of license cost.⁸ As shown in Table A, Red Hat JBoss Enterprise Application Platform acquisition costs are significantly lower.

Want to run your own total cost of acquisition comparison using metrics appropriate to your company? Take advantage of the online Red Hat JBoss Enterprise Application Platform comparison calculator,⁹ which lets you set values for various parameters that influence a three-year comparative cost calculation for Red Hat JBoss Enterprise Application Platform versus Oracle WebLogic Server Enterprise Edition.

When deploying to a virtualized environment without hardware dedicated to the application platform, you must consider two major virtualization cost considerations:

1. Is the virtualization technology hosting your application platform supported?

Oracle specifies that “every Oracle Fusion Middleware product that is certified on Linux®, Windows, or Oracle Solaris as physical OS is also certified and supported when running as virtual guest on Oracle VM as long as the respective operating system is supported by Oracle VM.”¹⁰ However, Oracle makes no mention of popular virtualization technologies such as Red Hat Enterprise Virtualization, VMware vSphere/ESX, or Microsoft Hyper-V in their Oracle WebLogic Server 12c (12.1.1.x) Certification Matrix. Further, the Oracle Software Technical Support Policies document, dated November 6, 2012,¹¹ states that “Technical support is provided for issues (including problems you create) that are demonstrable in the currently supported release(s) of an Oracle licensed program, running unaltered, and on a certified hardware, database, and operating system configuration, as specified in your order or program documentation.”

Therefore, to secure Oracle technical support, you must ensure your virtualization technology of choice is certified. VMware has published a paper related to this topic that acknowledges that “Oracle will only provide support for issues that either are known to occur on the native OS, or can be demonstrated not to be as a result of running on VMware”.¹² Red Hat supports multiple virtualization technologies, including Red Hat Enterprise Virtualization, Red Hat Enterprise Linux with integrated virtualization, and VMware vSphere.¹³

Is your virtualization technology of choice supported by Oracle?

Can virtual cores counts be used to determine or limit the number of Oracle software licenses required?

⁸ See page 25 of the IBM whitepaper “Comparing IBM WebSphere and Oracle WebLogic” for 22% reference: <ftp://public.dhe.ibm.com/common/ssi/ecm/en/wsw14127usen/WSW14127USEN.PDF>

⁹ Red Hat JBoss Enterprise Application Platform Comparison Calculator http://www.redhat.com/promo/eap_calculator/

¹⁰ See Oracle Fusion Middleware 12c Certifications (12.1.1.x) spreadsheet (XLS), system tab cell A4 <http://www.oracle.com/technetwork/middleware/ias/downloads/wls-1211x-certmatrix-1395408.xls>

¹¹ Oracle Software Technical Support Policies document (PDF), dated November 6, 2012 <http://www.oracle.com/us/support/library/057419.pdf>

¹² Understanding Oracle Certification, Support and Licensing for VMware Environments (PDF) http://www.vmware.com/files/pdf/solutions/oracle/Understanding_Oracle_Certification_Support_Licensing_VMware_environments.pdf

¹³ Oracle Software Technical Support Policies (PDF), document dated November 6, 2012 <http://www.oracle.com/us/support/library/057419.pdf>

2. How do you count the cores that the application platform is deployed on?

With Red Hat, physical and virtual cores are treated equally for a subscription. When deploying any Red Hat JBoss Middleware product directly onto physical servers without virtualization, the total number of CPU cores on those servers is counted. When using virtualization software, typically only the virtual processor cores allocated to the Red Hat JBoss Middleware deployments are counted. In cases where the virtual processor cores allocated to the Red Hat JBoss Middleware deployments exceed the physical cores, the lesser quantity of physical cores is counted. These policies make Red Hat JBoss Middleware virtualization-friendly.

Oracle, by comparison, has very specific rules on how you can partition an environment to determine or limit the number of Oracle software licenses required for any given server.¹⁴ Oracle rules clearly communicate that you can't use soft partitioning virtualization technology (such as VMware vSphere) to determine or limit the number of software licenses required for any given server. Unless you have Oracle-approved hard partitioning technology for non-Oracle Exalogic hardware, you will need to count all physical cores to determine the number of Oracle software licenses required for any given server. The Red Hat advantage here is the greater flexibility when determining the size of your Red Hat JBoss Middleware subscription.

What about total cost of ownership (TCO) and return on investment (ROI) associated with an application platform selection? In December 2010, Red Hat sponsored IDC to study the business value of adopting Red Hat JBoss Enterprise Application Platform. IDC interviewed six large United States-based companies that developed custom applications using Red Hat JBoss Enterprise Application Platform and have been running those applications for at least 12 months. "On average, the companies in the study gained more than \$6 million a year in financial benefits by moving from traditional proprietary application servers to JBoss Enterprise Application Platform."¹⁵ Other conclusions in the Red Hat-sponsored IDC report include that "over a three-year period, companies deploying JBoss generated an ROI of 569% and paid back their initial investment in less than six months after the platform was fully deployed."

What are the opportunity costs of choosing Oracle WebLogic Server Enterprise Edition?

Consider the Red Hat cost advantages already presented. With dramatically lower costs to acquire and use Red Hat JBoss Middleware, how many more projects could you start? How much more focus could you give to innovation? Can you find enough technical advantages in Oracle WebLogic Server Enterprise Edition to justify the added expense?

¹⁴ See Oracle overview of licensing policies for partitioned environments (PDF)
<http://www.oracle.com/us/corporate/pricing/partitioning-070609.pdf>

¹⁵ IDC study: The Business Value of JBoss Enterprise Application Platform
<http://engage.jboss.com/forms/JBoss-eap-business-value>

FEATURES AND FUNCTIONALITY

IMPLEMENTATION OF THE JAVA EE SPECIFICATION

As mentioned earlier, compliance with the Java EE v6 specification means there is also extensive common functionality between the application platforms. The source of this duality is the Java EE specification:

“This specification doesn’t require that a Java EE product be implemented by a single program, a single server, or even a single machine. In general, this specification doesn’t describe the partitioning of services or functions between machines, servers, or processes. As long as the requirements in this specification are met, Java EE Product Providers can partition the functionality however they see fit.”¹⁶

Put simply, implementation of the Java EE specification will vary between vendors that don’t share the same code line. Red Hat JBoss Enterprise Application Platform is implemented using more than 45 different open source projects that anyone can download, examine, and contribute to.¹⁷ Oracle, in comparison, makes extensive use of proprietary code that is unavailable for inspection. Oracle also makes limited use of open source code in Oracle WebLogic Server Enterprise Edition.¹⁸

The Red Hat and Oracle code lines are completely different. This has an impact on how you interact with the platform using the Java EE specification. For example, how do you configure and manage technologies in the Java EE specification using the application platforms? There can be large differences in this area, even for such mundane tasks as deploying applications or making database connections.

Both application platforms provide multiple ways to access management task functionality. You may use monitored directories, command-line tools, an integrated development environment for developers,¹⁹ and a graphical management console. Managed Red Hat JBoss Enterprise Application Platform subscriptions include the Red Hat JBoss Operations Network component. Red Hat JBoss Operations Network provides built-in graphical management and monitoring capabilities to effectively administer all of your Red Hat JBoss Middleware environments. These tools can help you improve operational efficiency, reduce costs, and ensure a positive experience for your end users.

Oracle includes a graphical administration console for management and monitoring with Oracle WebLogic Server Enterprise Edition. Some Oracle WebLogic capabilities are similar to what is found in Red Hat JBoss Operations Network (including how to turn on and off servers in a domain, review individual server parameters in a domain, configure Java database connectivity (JDBC) data sources, and enable Java connector architecture (JCA) adapters).

¹⁶ See section EE.2.9 of the Java Platform, Enterprise Edition (Java EE) Specification, v6
http://www.sws.bfh.ch/~fischli/courses/eadj/ejb/doc/javaee_platform-6_0-fr-spec.pdf

¹⁷ See complete list – <https://access.redhat.com/site/articles/112673>

¹⁸ See, for example, Jersey for JAX-RS (http://docs.oracle.com/cd/E24329_01/web.1211/e24983/overview.htm#sthref6) and OpenJPA (http://docs.oracle.com/cd/E24329_01/web.1211/e24972/using_toplink.htm) in documentation

¹⁹ Oracle WebLogic Server Enterprise Edition 12c is not supported by the latest version of Oracle JDeveloper (11.1.2.3.0):
http://www.oracle.com/technetwork/developer-tools/jdev/jdev11gr2-cert-405181.html#Application_Servers

However, Oracle WebLogic Server Enterprise Edition out-of-the-box administration lacks capabilities found in Red Hat JBoss Operations Network. For example, only Red Hat JBoss Operations Network can graphically manage servers that span domains from a single login. To manage a similar Oracle WebLogic Server Enterprise Edition deployment out of the box, you would need to log in to each domain's management console separately. This adds unnecessary complexity and time to Oracle WebLogic Server Enterprise Edition administration duties.

TABLE B: 2-YEAR ORACLE PRICE CALCULATION USING 16 CORES

	CORES	CORE FACTOR	LIST PRICE	TOTAL
LICENSE FEES				
Oracle Weblogic Enterprise Edition	16	.5	\$25,000	\$200,000
WebLogic Server Management Pack Enterprise Edition for Oracle Enterprise Manager	16	.5	\$12,000	\$96,000
				Total: \$296,000
SOFTWARE UPDATE LICENSE AND SUPPORT FEES				
Oracle Weblogic Enterprise Edition	16	.5	\$5,500	\$44,000
WebLogic Server Management Pack Enterprise Edition for Oracle Enterprise Manager	16		\$2,640	\$21,120
				Annual subtotal \$65,120
				2-year software update license and support fees total \$130,240
				2-year total Oracle cost \$426,240

TABLE C: 2-YEAR RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM SUBSCRIPTION COSTS

	RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM WITH MANAGEMENT, 16 CORE PREMIUM	RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM, 16 CORE PREMIUM
Annual subscription	\$11,250	\$8,000
2-year subscription	\$22,500	\$16,000
Management premium	\$6,500	

You can add the ability to manage multiple Oracle WebLogic Server Enterprise Edition domains from a single console if you license the WebLogic Server Management Pack Enterprise Edition for Oracle Enterprise Manager. This Oracle product is priced at US \$12,000 per processor, plus 22% annual software update and support fees.²⁰ Using the same pricing parameters as earlier in this paper,²¹ pairing Oracle WebLogic Server Enterprise Edition with Oracle WebLogic Enterprise Edition adds an additional 48% (\$138,240) in license fees and two years of annual software update and support costs, as shown in Table B. At list price, the Oracle cost premium²² is \$131,740 more than the analogous \$6,500 Red Hat cost premium for a two-year managed subscription, compared to non-managed subscriptions, as shown in Table C. The Red Hat subscription cost difference is just 4.9% of the Oracle cost increase. Can you find enough technical advantages in the WebLogic Server Management Pack Enterprise Edition for Oracle Enterprise Manager to justify the added expense of that management and monitoring option?

SUPPORT FOR OPEN STANDARDS

There are other technical differences between the application platforms, including non-Java EE features such as support for open standards that meet application needs and business goals. Both application platforms support a wide variety of open standards, including simple object access protocol (SOAP), web services description language (WSDL) and WS-Security, WS-Addressing, security assertion markup language (SAML), and others.

Red Hat JBoss Enterprise Application Platform supports more than 30 different open standards, including OpenID.²³ The popular OpenID standard enables site users to use just one ID to identify themselves.²⁴ Oracle WebLogic Server Enterprise Edition does not include OpenID support. You can implement OpenID yourself, but you will not get technical support from Oracle for your implementation.

²⁰ Oracle Technology Global Price List (PDF), dated Nov, 1, 2012
<http://www.oracle.com/us/corporate/pricing/technology-price-list-070617.pdf>

²¹ 16 cores of Intel-based servers. For Oracle pricing, the Intel cores are rated at a core factor of 0.5 per core. Pricing is based on two years at list prices for both Red Hat and Oracle in effect December 2012.

²² For adding Oracle WebLogic Server Enterprise Edition license fees and two years annual software update and support costs.

²³ Red Hat JBoss Enterprise Application Platform Supported Standards
<https://access.redhat.com/site/articles/113373>

²⁴ Read more about the benefits of using OpenID for authorization at <http://openid.net>

OPERATIONAL FUNCTIONALITY

While both Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server Enterprise Edition²⁵ provide load balancing, clustering, high availability, and server weight management, there are notable differences.

1. Load balancing

HTTP load balancing is commonly used to spread web application load over multiple application platform servers to help maximize performance and minimize response times. Oracle WebLogic Server Enterprise Edition uses proprietary HTTP load balancing with a round-robin algorithm that cycles through a list of WebLogic Server instances in order.²⁶ Red Hat JBoss Enterprise Application Platform provides more intelligent, flexible load balancing. You can choose which server metrics and associated weights are appropriate for your environment. With Red Hat JBoss Enterprise Application Platform, load balancing is based on nine server-side load metrics that you define the importance of.²⁷

2. High availability

To support high availability, application data has to be replicated inside a collection of servers known as a cluster. This ensures that the crash of one server does not result in data loss. Both application platforms provide clustering without the need for additional third-party software and replicate data using caching technology and reliable communications. However, rather than taking advantage of its established Coherence data caching product, Oracle uses a proprietary cache specifically for Oracle WebLogic Server Enterprise Edition that persists data in-memory, on the file system, or via JDBC.²⁸

Red Hat JBoss Enterprise Application Platform uses the same core caching technology that is used by Red Hat JBoss Data Grid. This takes advantage of the performance, scalability, and reliability of the Red Hat JBoss Data Grid platform. Red Hat JBoss Data Grid platform subscriptions can also be used with Red Hat JBoss Enterprise Application Platform to add user-defined data caches to deployed applications.

²⁵ Oracle WebLogic Standard Edition does not provide clustering and other features found in the Enterprise Edition. See http://docs.oracle.com/cd/E23943_01/doc.1111/e14860/products.htm#i1041725

²⁶ See Oracle Fusion Middleware Using Clusters for Oracle WebLogic Server documentation, chapter 5 http://docs.oracle.com/cd/E24329_01/web.1211/e24425/load_balancing.htm#CHDGFIBD

²⁷ Red Hat JBoss Enterprise Application Platform Administration and Configuration Guide https://access.redhat.com/site/documentation/en-US/JBoss_Enterprise_Application_Platform/6/html/Administration_and_Configuration_Guide/Configure_the_mod_cluster_Subsystem.html

²⁸ Configuring Session Persistence documentation http://docs.oracle.com/cd/E24329_01/web.1211/e21049/sessions.htm#i139724

3. Disaster recovery costs

Clustering is different from disaster recovery. Enabling application platform clustering is a technical feature, while disaster recovery is a comprehensive strategy of processes, policies, and procedures. Disaster recovery is not a feature of an application platform. When you consider your disaster recovery strategy, remember to include the Oracle disaster recovery license and support costs. The Oracle technology commercial price list²⁹ provides a long definition of the word “processor” that is relevant to pricing. This definition begins with “shall be defined as all processors where the Oracle programs are installed and/or running.”³⁰ All the processors Oracle software is installed on need to be licensed whether they are being used or not. Red Hat does not require you to count the cold Red Hat JBoss Enterprise Application Platform disaster recovery cores as part of your subscription usage.³¹ When the disaster recovery goes hot, Red Hat subscription cores are transferable, which allows you to use the production system cores in disaster recovery.³²

4. Start-up times

Java application platforms have a reputation for being extensive users of memory with slow start-up times. Both Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server Enterprise Edition offer configuration options to reduce both of these concerns. Red Hat JBoss Enterprise Application Platform offers out-of-the-box start-up times that are measured in seconds—even when using the full Java EE 6 profile.

Oracle WebLogic Server Enterprise Edition offers a start-up mode called WLX that turns off Enterprise JavaBeans (EJB), Java Message Service (JMS), and JCA containers. This leaves only the web container enabled, which can speed start up of the application. However, Oracle did not provide Java EE 6 web profile support in Oracle WebLogic Server Enterprise Edition, but did provide it with GlassFish.³³ The Java EE 6 web profile contains web technologies that are part of the full platform and is designed for developers who do not need the full set of Java EE APIs. Red Hat JBoss Enterprise Application Platform offers both web and full profile support as defined in the Java EE 6 specification.

²⁹ Oracle technology commercial price list

<http://www.oracle.com/us/corporate/pricing/price-lists/index.html>

³⁰ See “Processor” definition on page 10 of Oracle Technology Global Price List (PDF)

(<http://www.oracle.com/us/corporate/pricing/technology-price-list-070617.pdf>), dated Dec. 3, 2012

³¹ Cold disaster recovery refers to systems where a Red Hat JBoss Middleware product may be installed for infrequent (e.g., annual or quarterly) disaster recovery testing, and which is not actively taking on live system traffic.

³² Hot disaster recovery or failover describes an environment that typically mirrors the production environment, and is used to handle or offload system traffic that has been moved over to, or is shared with, the production environment.

³³ Oracle virtual developer day presentation – Exploring Java EE 6 and WebLogic (PDF) (<http://www.oracle.com/technetwork/middleware/weblogic/vdd-weblogic-javaee6-1579342.pdf>) 12c, page 6; GlassFish (<http://www.oracle.com/us/products/middleware/cloud-app-foundation/glassfish-server/overview/index.html>)

Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server Enterprise Edition also take different approaches to modularity, logically grouping classes used for class loading and dependency management. Red Hat JBoss Enterprise Application Platform uses a concept of modules to group classes that are loaded only when required. There are also global modules that every application can depend on to promote re-use of code and corporate standard libraries. The Red Hat JBoss Enterprise Application Platform administrator has control over what classes are available to a given application on an as-needed basis.

Compare this to the Oracle WebLogic Server Enterprise Edition default class and resource loading behavior, which is to search the classloader hierarchy, beginning at the root. As a result, every class or resource loading request is searched in the full system classpath, even if the class or resource belongs to the application. When classes and resources are requested repeatedly by an application at runtime, the CPU and memory overhead associated with repeatedly searching a long system and application classpath can be significant. Missing application classes or resources results in the cost of a full classpath scan plus any repeated requests the application makes. Oracle WebLogic Server Enterprise Edition attempts to solve this problem using a filtering loader mechanism the user can configure to bypass system classpath search when looking for specific application classes and resources that are on the application classpath. The Red Hat JBoss Enterprise Application Platform advantage is significant, allowing explicit control over what classes get loaded, which helps control application bloat and, ultimately, enhances efficiency.

CONCLUSION

This competitive brief has presented a mix of strong similarities and significant differences between Red Hat JBoss Enterprise Application Platform and Oracle WebLogic Server Enterprise Edition. Neither application platform distinguishes itself purely on the basis of technical features and capabilities determined by the Java EE v6 specification. That functionality, with the exception of web profile certification,³⁴ is found in both application platforms. Instead, Red Hat JBoss Enterprise Application Platform distinguishes itself by providing certified, reliable, and scalable implementations of the Java EE specification and commonly required open standards. Configuration and management capabilities, along with useful non-Java EE technology, are also included in Red Hat JBoss Enterprise Application Platform.

Red Hat JBoss Enterprise Application Platform is a formidable competitor to Oracle WebLogic Server Enterprise Edition. Red Hat JBoss Enterprise Application Platform implements the Java EE 6 specification, achieving both full and web profile certification. Multiple open standards are supported and rich configuration and management capabilities are offered via Red Hat JBoss Operations Network.³⁵ Red Hat commercially offers the full functionality of Red Hat JBoss Enterprise Application Platform, including all clustering software, without any associated software license fees. Red Hat customers simply purchase subscriptions for the Red Hat technologies they use. Red Hat JBoss Enterprise Application Platform is available by subscription and is purchased in 16- and 64-core entitlement increments, either annually or in discounted three-year terms. When compared to Oracle WebLogic Server Enterprise Edition and its licenses fees plus software update license and support fees, the Red Hat subscription model offers clear value.

Find out how you can get a Red Hat JBoss Enterprise Application Platform subscription. Contact your Red Hat sales professional for more information.

³⁴ Oracle WebLogic Server Enterprise Edition is not web profile certified.

³⁵ Red Hat JBoss Operations Network is included with a managed Red Hat JBoss Enterprise Application Platform subscription.

ABOUT RED HAT

Red Hat is the world's leading provider of open source solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux, and middleware technologies. Red Hat also offers award-winning support, training, and consulting services. Red Hat is an S&P company with more than 70 offices spanning the globe, empowering its customers' businesses.

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