



MULE PERFORMANCE TEST RESULTS

July, 2008

Mule is a highly flexible, powerful, and high-performing integration platform. Recently, a competing ESB included Mule in a performance test that yielded unexpected results. MuleSource ran the same tests but made corrections to some errors in configuration and methodology that were employed in the competitor's test. The results were that Mule clearly outperformed the competitor's product. This paper describes the performance testing and benchmarks that were used to compare the products.

1 Setup

The original test was done by WSO2 to compare WSO2 ESB to Mule and other competing products. You can find the test at <http://wso2.org/library/3740>. MuleSource used a very similar setup to the WSO2 test, with the following corrections and changes:

- Two dual-processor 2GHz Athlon computers running Java 1.6. The request generator JavaBench was installed on the first computer. Mule 2.0.2 and WSO2 ESB 1.7 were installed along with the Echo service on the second computer. This is a slight difference from the WSO2 test, which used three computers and separated the Echo service from the ESB. Additionally, the WSO2 test used an older version of Mule.
- All tests were at least 15 seconds long to give an accurate view into system performance. Many of the WSO2 tests were just one second long—which is not long enough to give a proper performance value.
- We used identical XSLTs for both WSO2 ESB and Mule. In the original WSO2 test, the Mule XSLTs had indentation enabled, resulting in a larger message size, whereas the WSO2 XSLTs had indentation disabled, giving WSO2 an artificial advantage in the tests.
- We used the Jetty HTTP transport on the server side instead of the plain HTTP transport, which is based on Mule's TCP transport. The Jetty HTTP transport is able to handle much more load and process HTTP requests more efficiently due to its NIO support.
- We set `tcpNoDelay` to true on the Mule HTTP transport on the client side. This affects performance on Linux based systems significantly for many of the tests—up to 200-300% differences were noted. For more information, see <http://www.ibm.com/developerworks/linux/library/l-hisock.html>.

2 Test Cases

We ran three test cases to compare Mule and WSO2 ESB. These were exactly the same tests WSO2 ran in their performance test.

2.1 Direct Proxy

This case creates a proxy service that passes messages directly to the Echo service. This case tests the ability for an ESB to efficiently proxy HTTP requests. Because very little processing should be done by an ESB for a direct proxy of an HTTP service, the performance numbers will show the raw overhead of the ESB.

We configured the Jetty thread pool so there were a maximum of 255 threads and a minimum of 25.

2.2 Content Based Routing

This case evaluates XPath expressions in the message payload before routing them to the service component. For this test, we used the Mule SXC XPath router. SXC (<http://sxc.codehaus.org>) is a new type of XPath expression evaluation engine. It allows listening for XPath expressions as the document is being parsed. As soon as an expression is found, an event is fired, and parsing is stopped. This allows for much more efficient XPath evaluation. XPath evaluators such as Jaxen work with a DOM model, so even when working with lazy-loading DOMs, such as AXIOM, there is more overhead than in just reading directly off the XML stream.

While not demonstrated in the benchmark, SXC can yield even further performance results which will differentiate it from traditional XPath frameworks. If you are listening for multiple XPath expressions, SXC can listen for every one during a single document scan, whereas Jaxen would require one scan per XPath expression.

2.3 XSLT

This case tests an ESB's ability to transform request and response messages using XSLT-based transformations. With a proper configuration, Mule is able to stream XML transformations directly from a request to the response, yielding very high performance.

For the test, we ensured that the XSLTs were exactly the same for both products, as mentioned in the setup section above.

3 Results

As shown in the following graphs, **Mule was able to process many more transactions per second than WSO2 in all three test cases at almost every load level.** Mule was on average **28% faster** for direct proxy scenarios, **77% faster** for content based routing, and **286% faster** for transformations. The only tests where Mule did not exceed WSO2 were with small XML messages and very light loads. Here the difference was less than 2% and is not statistically significant.

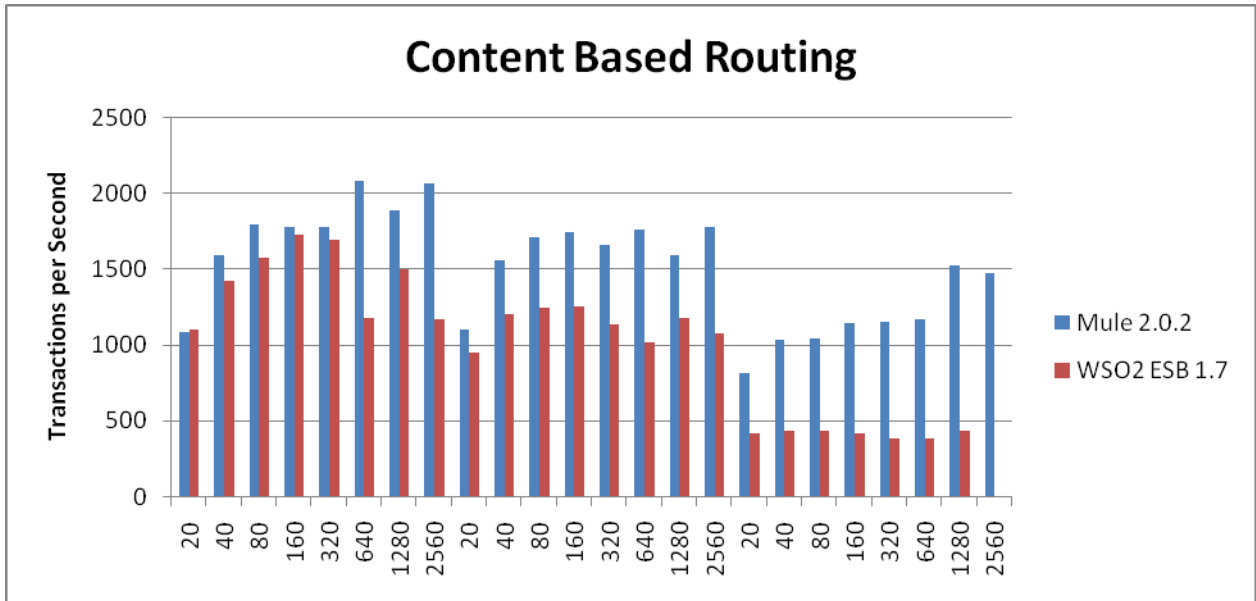


Figure 1. Test Results - Content Based Routing

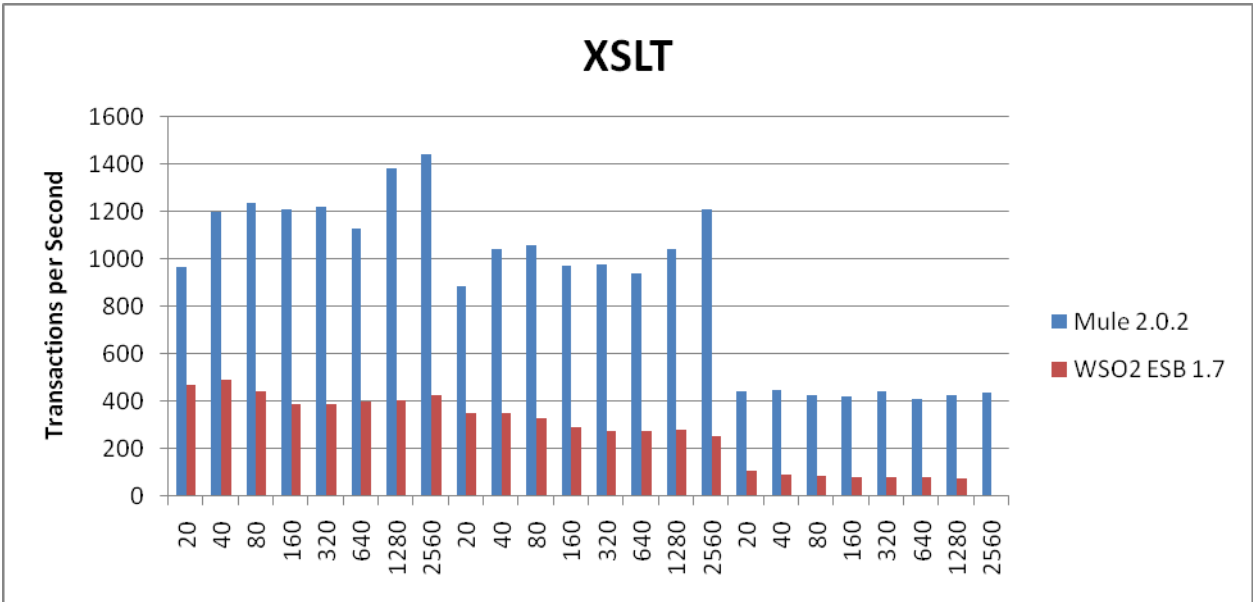


Figure 2. Test Results – XSLT

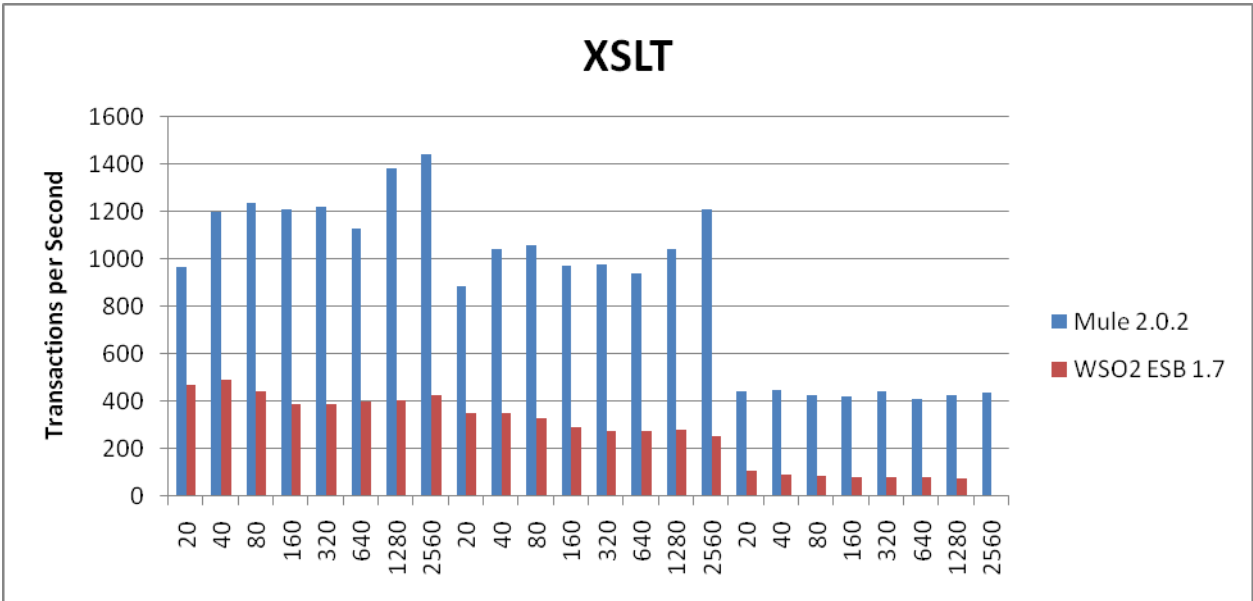


Figure 3. Test Results - XSLT

There was one other notable finding about the WSO2 ESB. While WSO2 ESB was able to handle all the test cases in their own test, we noticed that it could not handle as high a load as Mule in our test given a more constrained set of resources (two servers instead of three). Many connections were dropped for the tests which involved 5K messages and 2560 users, so those numbers were removed from the above graphs for the WSO2 ESB.

In summary, these performance tests demonstrate that Mule is the clear choice for any enterprise requiring a flexible, scalable, high-performing integration solution.

The benchmark configurations and scripts that were used are available at:

<http://www.mulesoft.com/downloads/mule-benchmark.zip>

About MuleSoft

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