

INTERSYSTEMS ENSEMBLE 2009.1 BENCHMARK: HL7 MESSAGING

Abstract

We performed a benchmark test of the HL7 messaging capabilities of InterSystems Ensemble® version 2009.1. Using a workflow that included data transformation and rules-based message routing, Ensemble could sustain a rate of 89 inbound and 356 outbound HL7 v2 messages /second. This combined rate of 16,020,000 messages per a 10-hour day was achieved running on a 4-core Intel® Xeon® 5570 system. Throughout the tests, Ensemble preserved a first-in, first out order of messages, and persisted (saved) the content and status of all inbound and outbound messages, and queues.

These results clearly demonstrate that Ensemble can provide the messaging throughput needed to manage large connected healthcare systems, even when running on relatively inexpensive hardware.

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Introduction

HL7 has emerged as one of the major protocols enabling the sharing of clinical and administrative information between disparate healthcare applications. For healthcare organizations looking to connect their operations, one of the several criteria for choosing an integration platform must be the product's ability to process HL7 messages.

InterSystems Ensemble® is a rapid integration and development platform with built-in capabilities for the high-speed processing of HL7 messages. It has been ranked the #1 interface engine in healthcare three years in a row (2006, 2007, 2008) by KLAS*. Unlike other healthcare interface engines, Ensemble persists (saves) every message that passes through the system, as well as the status of all queues. It provides data protection in the event of a system crash, and full search and resend capabilities for historic messages.

This paper presents the results of a recent performance and scalability benchmark of Ensemble's HL7 processing. It demonstrates that, even when run on fairly inexpensive (commodity) hardware, Ensemble has the capacity and performance to reliably connect large healthcare enterprises.

The Test

We tested Ensemble by simulating various workloads, consisting of HL7v2 Patient Administration (ADT) and Observation Result (ORU) messages. The messages had an average size of 1.2KB and an average of 14 segments. Workloads were increased until the CPU usage of our test system reached 75%, at which point the average throughput (messages/second) was measured.

Three different workloads were used:

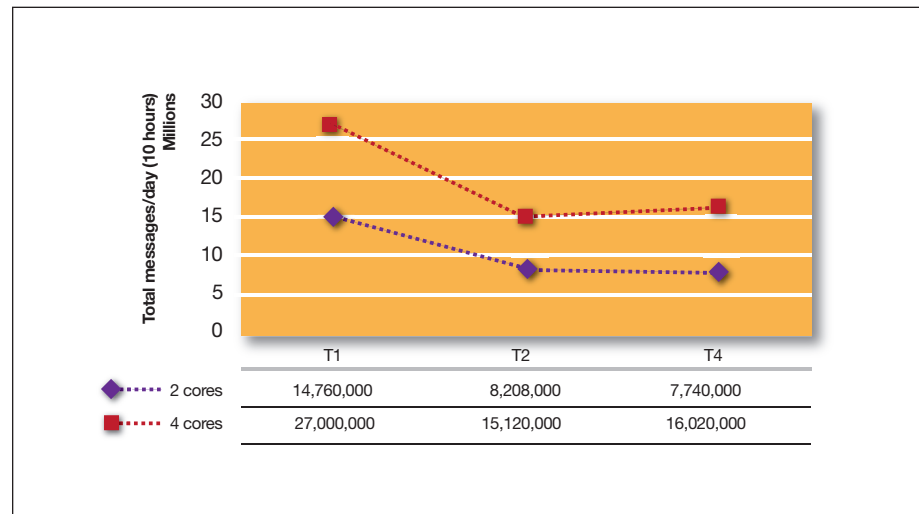
- The T1 workload used simple pass-through of HL7 messages, with one outbound message for each inbound message (no routing, no transformation);
- The T2 workload used a routing engine to modify an average of 4 segments of the inbound message and route it to a single outbound interface (1-to-1 with a transform); and,
- The T4 workload used a routing engine to route separate modified messages to each of four outbound interfaces. On average, 4 segments of the inbound message were modified in each transformation (1-to-4 with 4 transforms).

Throughout these tests, Ensemble was configured to preserve first-in/first-out order, and to fully persist messages and queues for each inbound and outbound message.

The benchmark was run on a server with Intel® Xeon® 5570 processors. Tests were performed using both 2-core, and 4-core configurations. The operating system was Red Hat Enterprise Linux Server release 5.2.**

The Results

The chart below shows the number of HL7 v2 messages (in millions) that Ensemble can process within a 10-hour day for each of the three different workloads.



Even with the most complicated workload (involving data transformation and rules-based routing), Ensemble could handle over 16 million messages per day. It also showed linear scalability between 2 and 4 cores.

Conclusion

Ensemble achieves the messaging throughput needed to connect large healthcare organizations without requiring a lot of expensive hardware. Plus, because it saves all messages and queues, Ensemble provides data protection in the event of a system crash, and full search and resend capabilities for historic messages.

Ensemble is a full-fledged integration platform with excellent HL7 messaging capabilities, making it an ideal choice for healthcare organizations seeking to connect their operations.

** Red Hat Enterprise Linux 5.3 is currently the minimum supported version of Red Hat on the Nehalem processors.

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