



**Vertafore™**

Unleash your potential

# Vertafore Technical White Paper

**SAGITTA SCALABILITY**

5,000 TO 20,000 CONCURRENT USERS OF SAGITTA

Sagitta Scalability White Paper



## TABLE OF CONTENTS

Introduction .....	3
Executive summary .....	3
Key results .....	4
Transactions per hour .....	4
CPU utilization on the database server .....	4
Server response time .....	5
Test definition .....	5
Detailed results .....	6
Transactions per workflow .....	6
CPU utilization and disk I/O of database server .....	7
CPU utilization and requests per second of web servers .....	8
Passed and failed tests .....	8
Conclusion .....	8
Appendix A: Workflow guidelines .....	8
User profile .....	9
Workflow descriptions .....	9
Appendix B: Methodology .....	12
System configurations .....	12

**Scalability represents the ability of a software application to handle increased processing demand**—more users and/or more transactions. Given the prevalence of consolidation in the insurance industry, independent agencies today need software systems that can adapt quickly to rapid growth. With a 20-year proven track record of successful large agency implementations, the Sagitta agency management system has the scalability to make migrations smooth and fast.

### **Executive Summary**

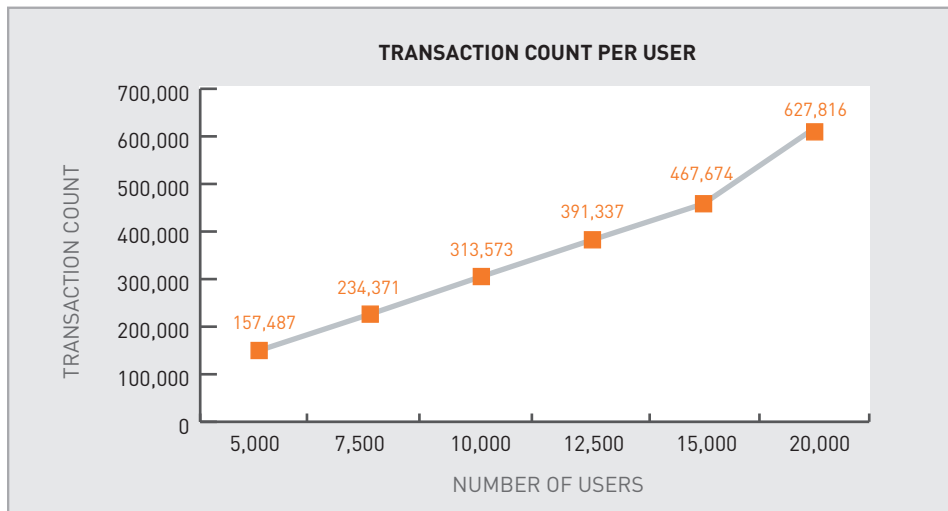
To demonstrate this ability to handle rapid growth, in March 2009 Vertafore conducted scalability testing on Sagitta version 7.5 at the IBM Innovation Center in Waltham, Massachusetts. Tests were performed on a reasonably-sized system using Microsoft Visual Studio Team Systems (VSTS) 2008 Test Edition to simulate the work of actual users. Six tests were conducted—with user counts of 5,000, 7,500, 10,000, 12,500, 15,000 and 20,000—and a proportionate number of transactions for each group.

In the test of 20,000 users, the system processed 627,816 transactions per hour with an average of only 50.6 percent CPU utilization. These dramatic results show that, even with such a large number of users and transactions, Sagitta operates at a very efficient level. This evidence demonstrates that Sagitta is capable of scaling efficiently to meet the needs of independent insurance agencies of any size.

## Key Results

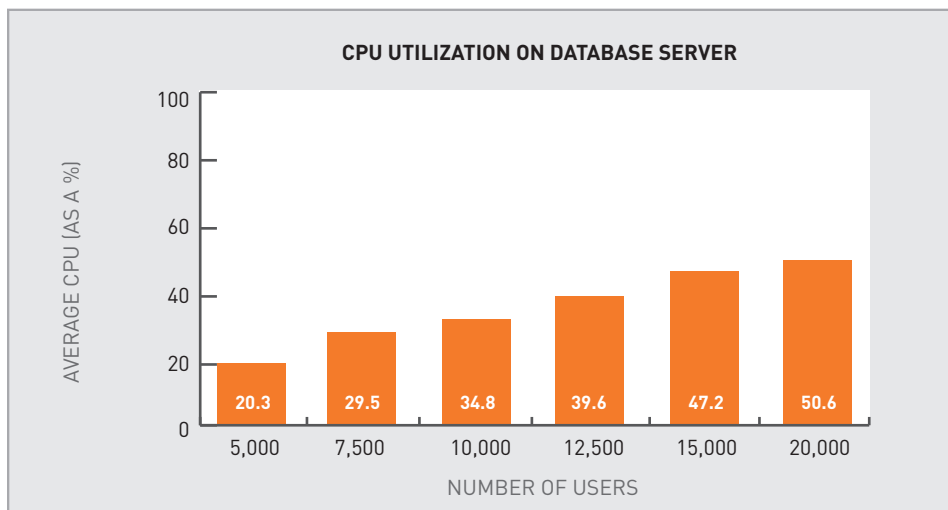
### Transactions per Hour

The chart below illustrates the transaction count for each test conducted. As users were added, the number of transactions per hour increased steadily, a sign of smooth scalability. Note that all tests ran for 60 minutes, except for the 20,000 test, which ran for 70 minutes. This test required additional time for ramp-up and ramp-down because of its increased number of transactions.



### CPU Utilization on the Database Server

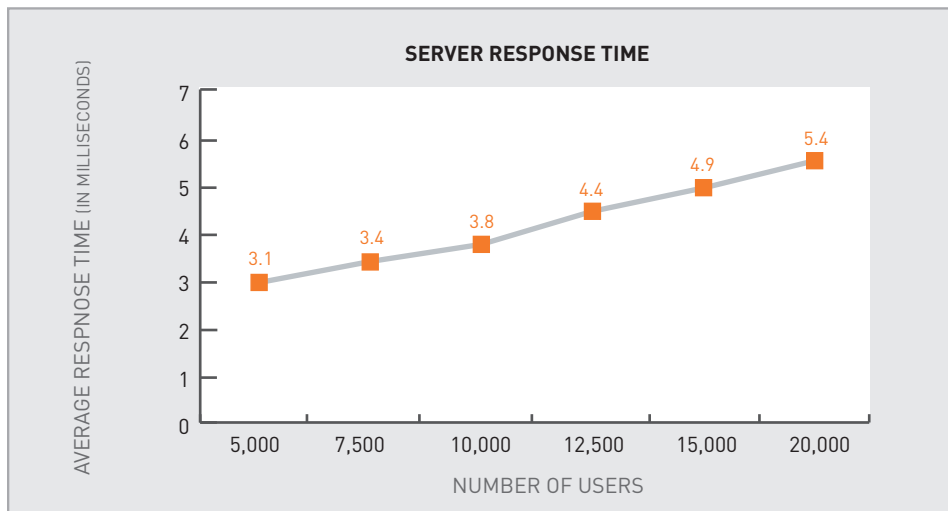
CPU utilization is one of the key indicators of scalability. When a server's CPUs are working at or above 80 percent, applications on the server can become sluggish or stop responding altogether. Sagitta's CPU utilization was extremely low throughout the tests—even at 20,000 users, the average never exceeded 50.6 percent.



## Server Response Time

Server response time measures how long it takes for a database to acknowledge a request from a user's computer. It's similar to how many times a telephone rings before the call is answered. As shown in the chart below, average server request response time remained consistent throughout the tests.

Note that this scalability test did not address Sagitta performance, Internet latency or other factors outside the control of Sagitta. In automated tests like these, measured screen response values do not directly correlate to what a real user would experience, making it impossible to capture end user response times.



## Test Definition

Key components of the system configuration included:

- One database server, on which resided one IBM UniVerse database with approximately 100 GB of data containing 821,000 client records, 4,861,923 policy records and associated policy and accounting detail data
- Ten web servers

We used load testing under both normal and peak load conditions. Load testing is the practice of modeling the expected usage of a software program by simulating multiple users accessing the program concurrently.

## Detailed Results

The following table shows the key performance monitor counter results for the database and web servers for different user loads.

RESULTS ACROSS ALL TESTS						
Number of concurrent users	5,000	7,500	10,000	12,500	15,000	20,000
Web requests per second	2,400	3,378	4,267	5,059	5,754	6,334
Web total requests	9,800,601	14,644,934	19,547,826	24,466,414	29,261,130	39,174,316
Average web bytes received per second	234,213	330,783	420,274	494,231	562,382	759,788
Average web bytes sent per second	1,607,130	2,264,105	2,864,607	3,382,978	3,843,060	4,375,958
Average web CPU	2.1	3.01	3.87	4.65	5.16	5.98
Average response time per test agent (in seconds)	0.0031	0.0034	0.0038	0.0044	0.0049	0.0054
Average database CPU	20.3	29.5	34.8	39.6	47.2	50.6
Maximum database CPU	36.1	41.1	52.5	58.7	65.4	71.8

## Transactions per Workflow

The table below shows the number of transactions generated by each workflow during the test period for two tests—one with the smallest number of users (5,000) and the other with the largest (20,000).

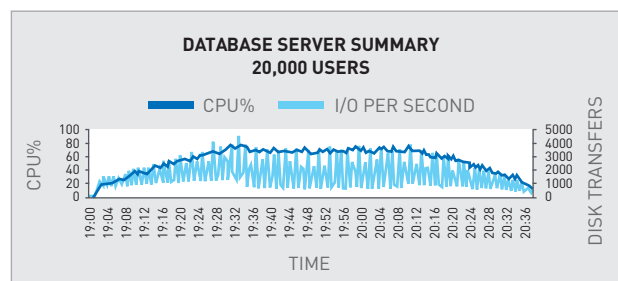
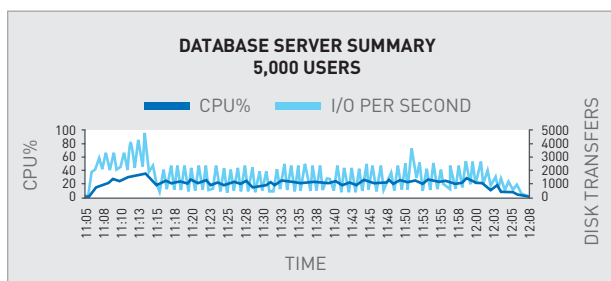
TRANSACTIONS PER WORKFLOW FOR TWO REPRESENTATIVE TESTS			
WORKFLOW	DISTRIBUTION OF USERS (%)	TOTAL TRANSACTIONS 5,000 USERS	TOTAL TRANSACTIONS 20,000 USERS
<b>INQUIRY/NEW BUSINESS</b>			
Create client	1	88	253
Create contact	1	240	528
Add a commercial auto policy	2	84	651
Add a business owner's package policy	2	525	2,730
Add a workers' compensation policy	1	100	800
Add a personal auto policy	2	2,736	10,320
Add a homeowner's policy	2	1,320	6,480
<b>ENDORSEMENTS</b>			
Endorse commercial auto policy	2	1,530	5,610
Endorse business owner's policy	2	2,925	11,115
Endorse workers' compensation policy	1	1,188	6,552
Endorse personal auto policy	5	9,468	38,988
Endorse homeowner's policy	5	8,712	38,340

**TRANSACTIONS PER WORKFLOW FOR TWO REPRESENTATIVE TESTS, CONTINUED**

WORKFLOW	DISTRIBUTION OF USERS (%)	TOTAL TRANSACTIONS 5,000 USERS	TOTAL TRANSACTIONS 20,000 USERS
<b>ACCOUNTING</b>			
Create a cash receipt	1	203	935
Cash receipt update report	<1	1	1
Journal adjustments entry	1	132	594
Create a vendor payables invoice	1	363	1,617
Create policy invoice	2	8,480	44,928
<b>CERTIFICATES</b>			
Add a certificate	3	1,464	5,040
Add a holder	1	1,300	5,434
Attach a holder to an existing certificate	2	3,348	12,960
<b>OTHER WORKFLOWS</b>			
Add and renew a medium personal lines policy	5	21,216	80,160
Add and renew a large commercial lines policy	2	7,395	26,970
Create a binder	1	396	828
Add activity	28	36,504	144,300
Policy grid search	<1	14,880	57,024
Add and remarket a medium commercial package policy and update application	2	4,539	15,096
Add a client-level attachment	17	19,470	73,898
Create a client-level e-mail	8	8,880	35,664

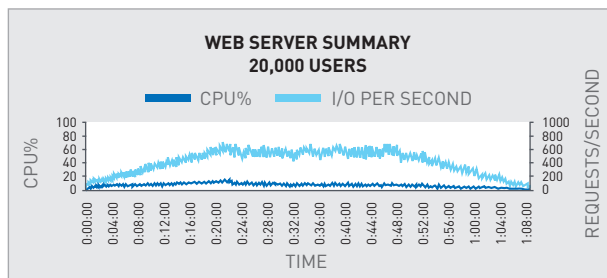
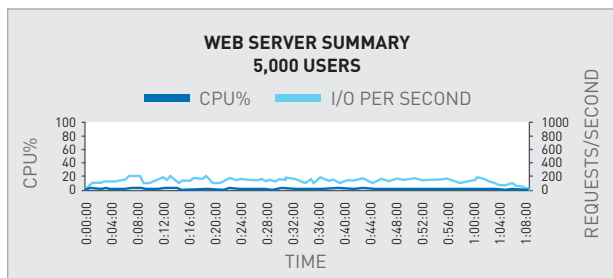
**CPU Utilization and Disk I/O of Database Server**

Across all tests, CPU utilization and Disk I/O metrics were within a desirable range, with peaks when users logged in and logged out and periodic valleys during the testing. The charts below depict a summarization of the CPU utilization and Disk I/O performance in the 5,000-user and 20,000-user tests. The similarity between these charts indicates efficient performance.



## CPU Utilization and Requests per Second of Web Servers

These charts summarize the average CPU utilization and requests per second of the ten web servers when running the 5,000- and 20,000-user tests. As with the database server summaries, the similar pattern between the tests demonstrates efficient performance.



## Passed and Failed Tests

Of the 70,000 simulated users involved in these load tests, only two users experienced a test failure. At the transaction level, this translates to 60 failed transactions out of the 2,192,258 transactions completed during the six tests. The failures occurred only in the 20,000 user test at approximately minute 31:00, when the threshold of 600 requests per second was momentarily exceeded on one of the ten web servers. In this saturation event, two socket timeout exceptions were encountered due to slow response time from one of the web servers, causing two users' tests to fail.

## Conclusion

The results of these tests demonstrate that Sagitta scales efficiently on an appropriately configured tier of application and web servers. In fact, if you use more robust equipment for the database server and/or additional web servers, similar results with even higher user counts would be expected.

As these scalability results indicate, Sagitta is the system of choice for large brokers who are looking for a proven system that will meet all their current needs and grow with them as their business grows. If your agency is expected to gain new business and/or new employees in the future, Sagitta offers the flexibility and power you need to manage growth successfully.

## Appendix A: Workflow Guidelines

We developed a series of scripts to ensure that the work of the virtual users simulated that of real users. This included factoring in think times based on TPC Benchmark™ W (TPC-W), an industry-standard eBusiness benchmark. According to this benchmark, each user action takes an average seven seconds. A load test with multiple users using the same think time could create an unnatural load pattern of synchronized virtual users, so think times were varied on a normal distribution curve, which also complies with TPC-W.

## User Profile

Tasks that users performed were defined and allocated according to commercial and personal lines user distribution for a typical large broker. Based on this distribution, we developed the following user profile for the 7,500 user test. The same percentages were used for all the other tests.

USER PROFILE FOR 7,500 TEST				
BUSINESS FUNCTION	# OF USERS	% OF THE WHOLE	BREAKDOWN BY USER TYPE	
Personal lines	2,550	34%	<ul style="list-style-type: none"> <li>• Servicers</li> <li>• Producers</li> <li>• Account managers</li> </ul>	<ul style="list-style-type: none"> <li>• 65%</li> <li>• 10%</li> <li>• 25%</li> </ul>
Commercial lines	3,825	51%	<ul style="list-style-type: none"> <li>• Services</li> <li>• Producers</li> <li>• Account managers</li> </ul>	<ul style="list-style-type: none"> <li>• 65%</li> <li>• 10%</li> <li>• 25%</li> </ul>
Accounting	1,125	15%	<ul style="list-style-type: none"> <li>• Accounting</li> </ul>	<ul style="list-style-type: none"> <li>• 100%</li> </ul>

## Workflow Descriptions

Many of the workflows included multiple transactions, as identified below.

WORKFLOW DESCRIPTIONS			
WORKFLOW	DESCRIPTION	TRANSACTIONS IN WORKFLOW	TOTAL TRANSACTIONS PER WORKFLOW
<b>INQUIRY/NEW BUSINESS</b>			
Create client	Creates a client	<ul style="list-style-type: none"> <li>• Basic client page</li> </ul>	1
Create contact	Creates a contact for an existing client	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Contacts page</li> </ul>	2
Add a commercial auto policy	Adds a commercial auto policy with a vehicle, standard coverages and underwriting information	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Vehicles page</li> <li>• Coverage page</li> <li>• Underwriting page</li> </ul>	5
Add a business owner's package (BOP) policy	Adds a BOP policy with one location, property and general liability, coverages and underwriting information	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page</li> <li>• GL coverage page</li> <li>• Property coverage page</li> <li>• GL underwriting and rating page</li> <li>• Property underwriting page</li> </ul>	7
Add a workers' compensation policy	Adds a workers' compensation policy with location, coverages and underwriting information	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page</li> <li>• Coverage page</li> <li>• Underwriting and rating page</li> </ul>	5
Add a personal auto policy	Adds a personal auto policy with a driver, vehicle, standard coverage and underwriting pages	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Drivers page</li> <li>• Vehicles page</li> <li>• Coverage page</li> <li>• Underwriting page</li> </ul>	6

### WORKFLOW DESCRIPTIONS, CONTINUED

WORKFLOW	DESCRIPTION	TRANSACTIONS IN WORKFLOW	TOTAL TRANSACTIONS PER WORKFLOW
<b>INQUIRY/NEW BUSINESS, CONTINUED</b>			
Add a homeowner's policy	Adds a homeowner's policy with one location, standard coverage and underwriting pages	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page</li> <li>• Coverage page</li> <li>• Underwriting page</li> </ul>	5
<b>ENDORSEMENTS</b>			
Endorse commercial auto policy	Adds an endorsement to add a vehicle	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Vehicles page</li> </ul>	3
Endorse business owner's policy	Adds an endorsement to add a new coverage	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Coverage page</li> </ul>	3
Endorse workers' compensation policy	Adds an endorsement to add a credit	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Underwriting and rating page</li> </ul>	3
Endorse personal auto policy	Adds an endorsement to add a vehicle	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Vehicles page</li> </ul>	3
Endorse homeowner's policy	Adds an endorsement to add a location	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page</li> </ul>	3
<b>ACCOUNTING</b>			
Create a cash receipt	Creates a cash-on-account-entry	<ul style="list-style-type: none"> <li>• Cash receipts</li> </ul>	1
Cash receipt update report	Creates a cash receipts update report	<ul style="list-style-type: none"> <li>• Cash receipts update report</li> </ul>	1
Journal adjustments entry	Reverses commission posted incorrectly from Div 1 to Div 2	<ul style="list-style-type: none"> <li>• Journal adjustments entry</li> </ul>	1
Create a vendor payables invoice	Creates a payment record for a vendor	<ul style="list-style-type: none"> <li>• Payment record</li> </ul>	1
Create policy invoice	Creates a policy-level invoice with taxes and fees	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Create invoice</li> <li>• Add taxes and fees to invoice</li> </ul>	4
<b>CERTIFICATES</b>			
Add a certificate	Adds a certificate	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Certificates</li> </ul>	2
Add a holder	Adds a holder	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Add a holder</li> </ul>	2
Attach a holder to an existing certificate	Attaches a holder to an existing certificate	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Add a holder</li> <li>• Certificates page</li> </ul>	3

**WORKFLOW DESCRIPTIONS, CONTINUED**

WORKFLOW	DESCRIPTION	TRANSACTIONS IN WORKFLOW	TOTAL TRANSACTIONS PER WORKFLOW
<b>OTHER WORKFLOWS</b>			
Add and renew a medium personal lines package policy (four LOB's)	Adds and renews a medium personal lines package policy	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page (2)</li> <li>• Drivers page</li> <li>• Vehicles page (2)</li> <li>• Personal auto coverage</li> <li>• Homeowner's coverage</li> <li>• Personal umbrella coverage</li> <li>• Watercraft coverage</li> <li>• Personal auto underwriting</li> <li>• Homeowner's underwriting</li> <li>• Personal umbrella underwriting</li> <li>• Watercraft underwriting</li> <li>• Renew policy</li> </ul>	16
Add and renew a large commercial lines package policy (six LOB's)	Adds and renews a large commercial lines package policy	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page</li> <li>• Vehicles page</li> <li>• General liability coverage</li> <li>• Commercial property coverage</li> <li>• Commercial auto coverage</li> <li>• Equipment floater coverage</li> <li>• Accounts receivable/valuable papers coverage</li> <li>• Glass and sign coverage</li> <li>• General liability underwriting</li> <li>• Commercial property underwriting</li> <li>• Commercial auto underwriting</li> <li>• Equipment floater underwriting</li> <li>• Accounts receivable/valuable papers underwriting</li> <li>• Glass and sign underwriting</li> <li>• Renew policy</li> </ul>	29
Add activity	Adds an activity	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Add activity</li> </ul>	2
Add and remarket a medium commercial package policy and update application (four LOB's)	Adds and remarkets a medium commercial package policy and updates the application with changed insurer code	<ul style="list-style-type: none"> <li>• Client search</li> <li>• Basic policy page</li> <li>• Locations page (2)</li> <li>• Vehicles page (2)</li> <li>• General liability coverage</li> <li>• Commercial property coverage (2)</li> <li>• Commercial auto coverage</li> <li>• Equipment floater coverage</li> <li>• General liability underwriting</li> <li>• Commercial property underwriting</li> <li>• Commercial auto underwriting</li> <li>• Equipment floater underwriting</li> <li>• Remarket policy</li> <li>• Generate AL3</li> </ul>	17

WORKFLOW DESCRIPTIONS, CONTINUED			
WORKFLOW	DESCRIPTION	TRANSACTIONS IN WORKFLOW	TOTAL TRANSACTIONS PER WORKFLOW
OTHER WORKFLOWS, CONTINUED			
Create a binder	Creates a binder on an existing policy	<ul style="list-style-type: none"> <li>Client search</li> <li>Basic policy page</li> <li>Add a binder</li> </ul>	3
Policy grid search	Searches existing policies for a client and then selects a policy	<ul style="list-style-type: none"> <li>Client search</li> <li>Grid search</li> </ul>	2
Add a client-level attachment	Adds a client-level attachment	<ul style="list-style-type: none"> <li>Client search</li> <li>Add attachment</li> </ul>	2
Create a client-level e-mail	Creates a client-level e-mail	<ul style="list-style-type: none"> <li>Client search</li> <li>E-mail creation</li> </ul>	2

## Appendix B: Methodology

Vertafore is committed to rigorous testing in order to ensure that our software scales efficiently in any environment. We conducted this testing at the IBM Innovation Center in Waltham, Massachusetts, where we had access to hardware configurations and other system components necessary to evaluate scalability limits.

The IBM labs are isolated from other network traffic during the tests. Both hardware and software are real-world production-available configurations, not one-off test versions used while end-user load is automated. While this kind of setup does not simulate a real-world environment, it does ensure that test results measure and reflect only the intended criteria.

### System Configurations

DATABASE SERVER	
Number of servers	One
Manufacturer	IBM
Model	RS6000 Power 570 LPAR
Operating system	AIX 6.1 TL2 SP2 64-bit
Processor	16-core 4.7 GHz Power6
RAM	128GB RAM (~124GB configured)
Storage	Two RAID 10 arrays with a 4 GB cache, 42 physical drives and 2x2 GB Fiber
Software	UniVerse 10.1.22

WEB SERVERS	
Number of servers	Ten
Manufacturer	IBM
Model	System x3550
Operating system	Windows Server 2003 EE SP2 x32
Processor	Intel Xeon 3.0 GHz Quad Core
RAM	16GB
Storage	2x73GB 10K SAS HDD RAID 1
Software	MS IIS 6.0

**Vertafore is the leading provider of software, services and information** to the insurance distribution channel including independent agents, brokers, MGAs, carriers and reinsurers. Vertafore leverages a unique industry presence to deliver meaningful solutions—powerful technology, critical information and robust insights to help organizations effectively respond to business challenges and capture new opportunities. Vertafore solutions have helped more than 15,000 customers and 200,000 users gain a competitive advantage to accelerate their business performance. To learn more please visit [vertafore.com](http://vertafore.com).