SQL Server Versions for Blackbaud CRM

Blackbaud Enterprise Performance Team

Overview

To deploy **Blackbaud CRM 4.0**, you must have **SQL Server 2012** or **2014**. Blackbaud recommends **SQL Server 2014**, so the Enterprise Performance Team measured the performance impact of this choice and compared **SQL Server 2014** to **SQL Server 2008 R2**, which many customers have been using.

The work reported here only applies to the **Blackbaud CRM** transactional database. It does not apply to the Blackbaud Data Warehouse database. In a separate test, we found clear advantages to **SQL Server 2014** with the data warehouse and presented them at the 2014 Blackbaud Conference for Nonprofits.

By default, **Blackbaud CRM** databases retain their prior compatibility mode, which is generally 100 (**SQL Server 2008** compatibility), when you upgrade to **SQL Server 2014**. We used that compatibility setting in the tests described below.

The Experiment

The Enterprise Performance Team created a workload with 135 distinct user activities. We analyzed the **Internet Information Services** (IIS) logs for a large organization that fights hunger and poverty to identify the operations most commonly performed at that site. To represent peak usage time, the workload modeled 162 users performing these activities. The workload ran against a "masked" copy of the customer's actual production database. In other words, the workload ran against real data but with changes to conceal any personally identifying information in the database. The workload used load generator systems to execute work against a set of servers that are configured similarly to how Blackbaud's hosting organization (SDO) or an on-premises customer would configure their servers.

Using a single database server machine, we installed instances of **SQL Server 2008 R2**, **SQL Server 2012**, and **SQL Server 2014**. Then we attached the **Blackbaud CRM** database to each instance (one at a time) and executed test runs. Between runs, we restored the database to its starting state. To check for consistency in the results, we performed three test runs with **SQL Server 2012** and three test runs with **SQL Server 2014**.

The Performance Index chart below illustrates changes in performance from one test run to another. We performed a baseline set of runs with **Blackbaud CRM 4.0** build 4.0.1144, and we measured the response time of each transaction. The Performance Index of any test run is the average response time of transactions in the baseline divided by the average response time of transactions in the test run. So overall, a higher Performance Index means that the test run was faster than the baseline *on average*. The red and green lines on the chart show the statistical variability of the baseline runs. A result outside those bounds is likely to be of interest; a result inside indicates no change from the baseline.

The chart shows no measurable performance change as a result of upgrading to the newer versions of **SQL Server**. In addition, a deeper analysis of the individual transactions in the workload found no transaction gained or lost performance to a statistically significant degree.
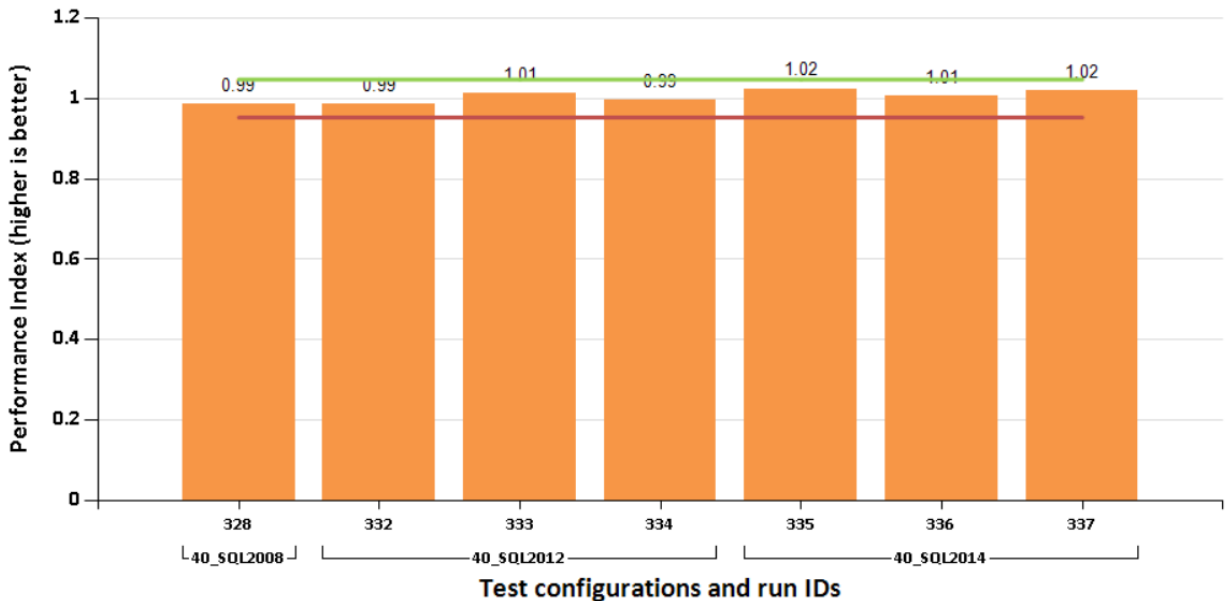
Summary and Discussion

The primary reasons that we recommend **SQL Server 2014** (and require at least **SQL Server 2012**) are:

- To allow Blackbaud to take advantage of newer features of the product
- To keep up with supported versions from Microsoft
- To save customers the effort of upgrading to **SQL Server 2012** and then again to **SQL Server 2014**
- To improve performance of the data warehouse by taking advantage of new features such as columnstore indexes to store and manage data

Our test results indicate that **SQL Server** has maintained its performance as a platform for **Blackbaud CRM**. We found no harm to performance from updating to the latest version, and for the reasons given above, we recommend using **SQL Server 2014** for sites that can reasonably do so.

Our tests with **SQL Server 2014** used the default compatibility setting of 100 (**SQL Server 2008** compatibility), but **SQL Server 2014** also introduces a new compatibility mode value of 120 (**SQL Server 2014** compatibility). Compatibility mode 120 enables an improved cardinality estimator that has the potential to improve query performance. It is described in Optimizing Your Query Plans with the SQL Server 2014 Cardinality Estimator, but the Enterprise Performance Team has not looked deeply at the changes that result from **SQL Server 2014** compatibility. Our initial observations indicate that some queries speed up but others regress, so until we have look into it further, we do not take a position on whether to recommend **SQL Server 2014** compatibility mode.