

## Advantage 7.1 vs. Advantage 8.0 Performance Comparison

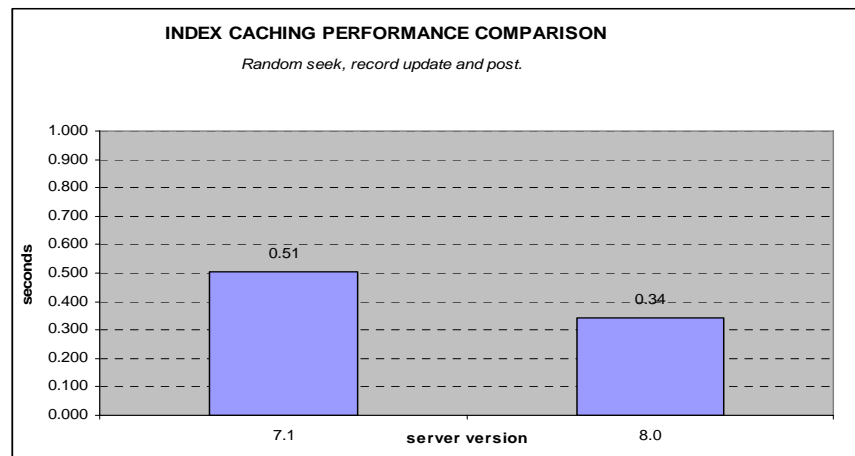
Advantage 8.0 introduces many exciting new capabilities including online backup, replication, SQL scripting, and a newly designed Advantage Data Architect. In addition, Advantage 8.0 includes some major performance benefits compared to Advantage 7.1. While overall application performance will vary based on functionality, overall performance should improve for most customers who upgrade from 7.1 to 8.0. Most performance gains can be realized by simply upgrading the server, with no client source code changes required.

### ***Performance Improvements***

#### **Caching**

A new index file caching mechanism was added to 8.0 for faster index file access. Frequently used index pages are cached for faster seeks and reads. By default, the Advantage Database Server will use no more than half the available system memory (RAM) for caching. This value can be adjusted using the MAX\_CACHE\_MEMORY configuration settings.

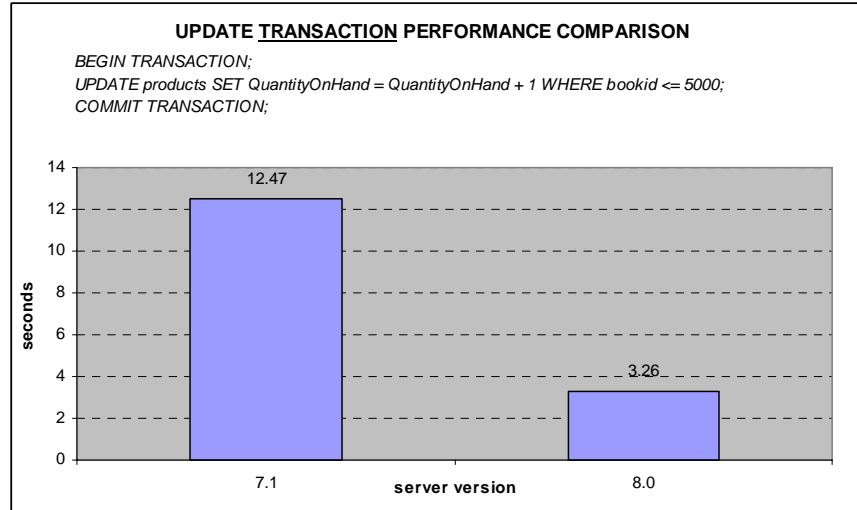
With an internal test application (written in Delphi 7), which performed 100 random seeks, record reads, and field updates, performance improved by 32 percent.



### Transaction Processing

Performance has improved for large transactions. Large transactions include transactions that involve updates, inserts, and deletes to hundreds or thousand of records. As the number of records involved increases, the performance improvement versus the 7.1 server will increase exponentially.

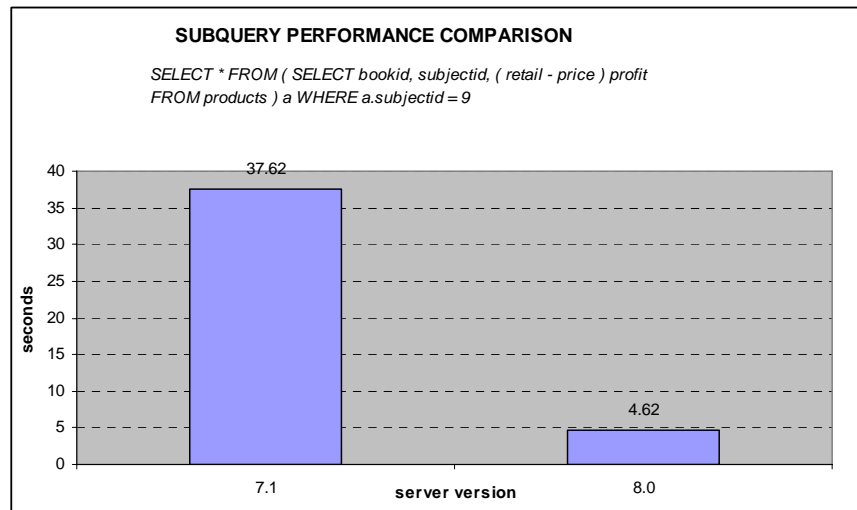
In our testing, the same UPDATE operation was performed as with the previous example, but with the UPDATE wrapped in a transaction. In 8.0, the update was 74 percent faster than 7.1.



### Subqueries and Views

Performance of SQL statements that use views or subqueries in the FROM clause has been improved. The SQL engine now checks to see if restrictions in the parent query may be applied to the child query. The test application executed the following: `SELECT * FROM ( SELECT bookid, subjectid, ( RETAIL - PRICE ) PROFIT FROM PRODUCTS s ) a WHERE a.subjectid = 9`. With 7.1, the server creates an intermediate table with 1 million rows before applying the condition. With 8.0, only an intermediate table with 50 thousand rows is created.

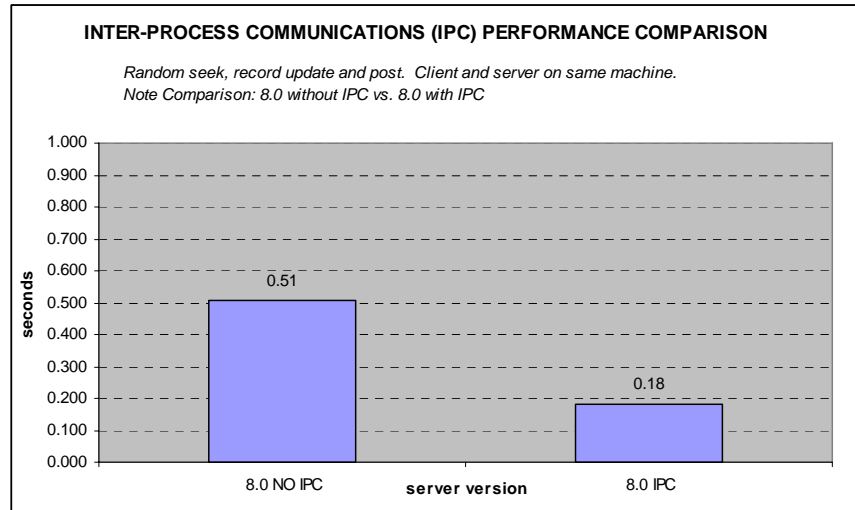
Depending on the query, subquery, and view, performance improved dramatically. With the test query, execution time using 8.0 decreased from 37.62 seconds to 4.62 seconds.



### Inter-Process Communications

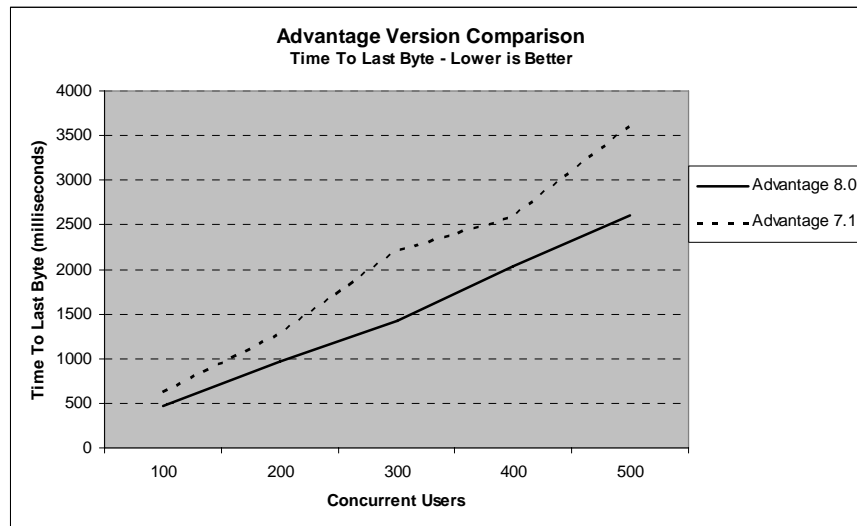
Version 8.0 introduces direct communication between the client and server when the client application resides on the same machine as the server. For this feature, the 8.0 client and server versions must be used. This can dramatically improve the performance of web applications and single-user desktop applications. In prior versions of Advantage, the client communication still utilized the protocol stack for communication, even if both the application and server were on the same machine.

The inter-process communication can boost performance dramatically, especially for applications that generate a lot of communication trips from the client to the server.



### Improved Static Query Performance with Concurrent Users

Web applications will benefit from the improved static query performance with concurrent users. Internal web application testing has shown that Advantage 8.0 outperforms 7.1 as the number of concurrent users increase. Static queries are generated by SQL statements that retrieve results from more than one table or that include aggregate functions. More static query performance improvements will be introduced with 8.1.



## Additional Memory Access

Advantage 8.0 was built with the LARGEADDRESSAWARE option, which allows the Advantage Database Server to use more than 2 GB of virtual memory. By default, 32-bit versions of Windows operating systems provide applications up to 2 GB of virtual memory. However, with the LARGEADDRESSAWARE option, most 32-bit Windows Server operating systems allow applications to use 3 GB of memory by adding a /3 GB parameter to the Boot.ini.

Additionally, 64-bit Windows operating systems will allow Advantage to access the entire 4 GB of virtual address space. Only 8.0 and future versions will be able to utilize this additional memory space, which is one of the biggest benefits of 64-bit systems.

Please refer to the following resources for information about accessing additional memory:

Memory Support and Windows Operating Systems

(<http://www.microsoft.com/whdc/system/platform/server/PAE/PAEmem.msp>)

How to determine the appropriate page file size for 64-bit versions of Windows Server 2003 or Windows XP (<http://support.microsoft.com/default.aspx?scid=889654>)

## Other Performance Improvements

In addition to the above performance enhancements, the following changes may also improve performance depending on the specific functionality implemented by your application:

- Improved SQL parsing:  
When using SQL scripts with many lines, the performance improvement is very significant. Internal testing comparing 7.1 with 8.0 has shown that with an 8 thousand line script, the execution time is reduced from more than 30 minutes to less than 1 minute.
- Improved correlated subquery performance.
- Improved performance with ALTER table statements when tables reside in a data dictionary.

## Conclusion

With each major Advantage Database Server release, most developers can expect a performance boost by upgrading the Advantage Database Server, with no application code changes. Advantage 8.0 is no exception. Improved features include additional caching, improved query performance, faster updates, and optimized transaction processing. Additionally, by upgrading the Advantage client software, developers can benefit from the Inter-Process communications when the client and server reside on the same machine, optimizing stand-alone applications, web services, and web applications. With the improved performance and powerful new features, Advantage 8.0 allows developers to create unparalleled database applications.

**Test Specifications**

<i>Tables</i>	Customer: 50,000 records (16,117 KB) Products: 1,000,000 records (179,690 KB)
<i>Test Machine</i>	4 CPU 1.60GHz Intel Pentium 511 megabytes RAM Windows 2000
<i>Development Tools</i>	Delphi 7 Application Advantage TDataSet Descendant 7.10 and 8.0 Advantage Database Server 7.10 Advantage Database Server 8.0.0.1

**Test Application Notes**

All tests were executed 32 times. The highest and lowest values were excluded and the results were averaged.

SELECT query execution:

1. connect
2. start clock
3. open query
4. loop to end of file
5. stop clock
6. disconnect

UPDATE query execution:

1. connect
2. start clock
3. execute query
4. stop clock
5. disconnect

SEEK and UPDATE:

1. set index
2. open table
3. start clock
4. start 0 to 100 loop
  - a. generate a random number between 1 and 1 million
  - b. execute a findkey for a book ID based on the random number
  - c. read book title into string variable
  - d. edit value
  - e. assign string value back to book title field
  - f. post value
  - g. next loop
5. stop clock
6. close table
7. disconnect

For more information go to [www.AdvantageDatabase.com](http://www.AdvantageDatabase.com).