

# Crystal Reports 9 Performance

## Understanding How User Requests are Managed

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### Overview

The performance of the server software provided in Crystal Reports 9 is influenced by many factors. The purpose of this document is to explain the factors that effect performance of the server technology in Crystal Reports 9 and to provide performance estimates to help you assess what licensing is required to support your user base.

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## Server Technology Defined

“Server technology” refers to the following three components provided in Crystal Reports 9:

- Crystal Enterprise Report Application Server
- Crystal Reports for Visual Studio .NET report engine
- Crystal Reports Report Design Control (RDC)

## How User Requests are Managed

The server technology in Crystal Reports 9 is designed to process simultaneous requests. A request is defined as any user interaction to the server technology such as 1<sup>st</sup> page viewing, printing, drill-down, exporting etc. For each request, the server is only utilized for the time it takes to process the request. As soon as the request has been processed, the server technology is then immediately available to take a new request. This method more accurately reflects the usage of the software and removes the need to monitor how many users are logged into the applications.

The server technology included in Crystal Reports 9 Advanced, Developer and Professional Editions will process three simultaneous requests. Since the time it takes to process a user request can vary from less than a second to minutes, the number of supported users at any given time will vary. When the server technology is processing three at the same time, additional user requests will either be rejected or queued depending on the edition of Crystal Reports purchased as outlined in the next section.

- The **Developer** and **Professional** Editions are designed for creating and testing server or web-based applications. As such, the server technology will process three simultaneous user requests and any additional requests will fail. As no caching is provided in these editions, every request must be run from scratch. For example, if a user clicks to view the first page of a report, any subsequent clicks to export, print, view the 2<sup>nd</sup> page etc. will require the report request to be re-run on the server.
- The **Advanced** Edition, which is specifically designed to support deployment of web and server-based applications, is much more flexible in how it manages user requests. It adds request caching and queuing capabilities to significantly increase performance. If the server is processing three simultaneous requests, each additional user request is simply queued and is automatically processed when the server finishes processing one of the original requests.

Caching capabilities<sup>1</sup> can also substantially reduce the amount of processing time required for subsequent requests to a report. For example, if a user selects to view a report and subsequently requests to view the next page, caching enables the second page to be displayed without re-running the entire report. Without caching, the entire report must be re-run each time a subsequent request is made. When coupled with queuing, this can

significantly increase the throughput and performance of the server technology.

- For additional performance, a **Processor** License is available that is not limited to three simultaneous requests. For more complex reporting requirements, you can also upgrade to Crystal Enterprise Professional, a complete enterprise reporting infrastructure which includes security, system management services, scheduling, load balancing and failover support.

## Factors which Impact System Performance

As with any server-based software product, there are many variables that impact system performance and the actual number of supported users. Every application should be considered with the following factors:

- Report size
- Report complexity
- User interaction
- Load variability
- Hardware

### Report size

Report size directly impacts the time it takes to process a report – from a fraction of a second to minutes or even hours. The size of the report is determined by the number of pages in the report and the corresponding number of records returned from the database query. Hence, reports with larger record sets, for example, tens of thousands of records will occupy the server technology for longer periods of time and thereby directly impact its ability to process other user requests in a timely manner.

### Report complexity

The type of features used in the report determines the complexity of the report. For example, features such as sorting, grouping, and formulas do not significantly affect the complexity of the report and therefore, do not take very long to process. To contrast, features such as cross-tabs, subreports, and OLAP grids add report complexity and thus increase processing time on the server. In addition, the complexity of the actual queries performed on the database server will also influence performance.

### User interaction

The different types of actions a user may conduct will also influence report processing on the server. Basic actions, such as requesting the first page or a drill-down, are generally lightweight operations that do not require significant processing time. Other operations, such as text searching and navigating to the last page of report, are more intensive and will take longer to process. The heaviest actions, such as exporting and printing, require a significant amount of processing power.

## Load variability

The nature of some applications, such as accounting and financial applications, often require that the majority of users be logged on at the same time during the day. Other applications have more consistent user loads throughout the day, i.e. there are no significant peaks and falls in user load. The variability in user load can greatly influence the performance of the Crystal Reports server software.

The new Advanced Edition, which includes request queuing and caching<sup>1</sup> capabilities, is designed to better handle variable user loads with minimal system performance degradation.

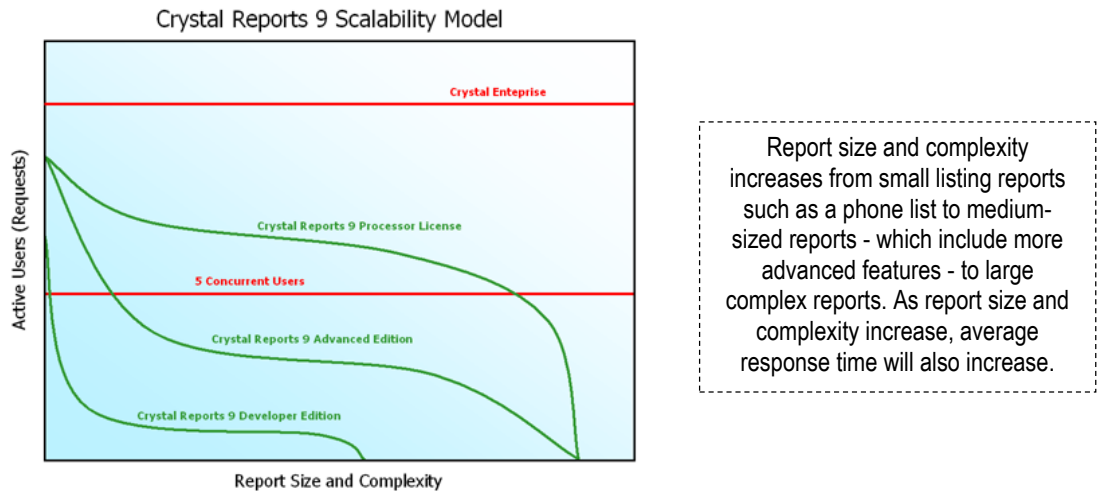
## Hardware

The amount and level of hardware available may play a factor in scalability. Specifically, the speed and number of processors, amount of memory, and number of servers are key factors that impact how many users your application can support. For some customers, hardware is a variable item and can be increased to meet a certain scalability goal. For other customers, a specific existing server environment must be used.

*1 Caching capabilities provided for the Report Application Server only.*

## Summary

In addition to the technology factors outlined in the previous section, Crystal Decisions' different products and editions are designed to provide varying levels of scalability and performance. The conceptual graph below can help illustrate the differences between the various products and editions.



### Crystal Reports 9 Developer Edition

The server technology in Crystal Reports 9 Developer Edition is intended for development and testing and is set to manage three simultaneous requests. After the license limit is exceeded, failures will occur.

### Crystal Reports 9 Advanced Edition

The Crystal Reports 9 Advanced Edition supports a much larger user community than the Developer Edition. The caching and job queuing features, which are ideal for supporting variable user loads in a web environment, achieve this increased scalability.

### Crystal Reports 9 Processor License

For scalability beyond the Advanced Edition, a Processor License can be purchased to completely unlock the power of the Crystal Reports engine. The size of user base supported is then related to your hardware.

### 5 Concurrent Users

The red line represents the 5 Concurrent Access Licenses provided in previous versions of Crystal Reports. Note that the concurrent user model supports a static number of users, regardless of report size and complexity.

### Crystal Enterprise

Crystal Enterprise is a proven managed reporting solution. Features such as scheduling, off-load processing and instance management provide the performance necessary to support the secure, efficient processing of reports in larger user environments. Crystal Enterprise allows for linear scalability as

demonstrated by its flat curve. As machines are added, the level of scalability increases equally.

For more information on Crystal Enterprise, please visit:

<http://www.crystaldecisions.com/products/crystalenterprise>.

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