

# The IBM Cognos Platform for Enterprise Business Intelligence



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## Highlights

- Optimize performance with in-memory processing and architecture enhancements
  - Maximize the benefits of deploying business analytics while minimizing the costs
  - Perform ad hoc business analysis with dynamic query
  - Increase query performance and reuse caching with smart caching
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Today's organizations need more agile and responsive decision-making processes to respond effectively to market opportunities and challenges. IBM Cognos® Business Intelligence version 10.1 helps organizations do just that—by delivering a revolutionary experience and expanding traditional business intelligence (BI) with planning, scenario modeling, real-time monitoring and predictive analytics. All of this is possible through a proven technology platform that is designed to upgrade seamlessly and to cost-effectively scale for the broadest of deployments.

IBM Cognos 10 delivers new platform advances that allow IT departments to optimize performance with in-memory processing and enhancements to the architecture that speed report run time. With IBM Cognos Business Intelligence, organizations can maximize the benefits while minimizing the costs when deploying analytics.

## Customer-driven continuous improvement

IBM continues to partner with customers to provide solutions to real-world business problems in a way that maximizes speed to success while keeping the overall cost of ownership down. In line with this practice, Cognos software continues to improve performance and scalability without compromising the robust features of its BI applications or the deployment flexibility inherent in the industry leading IBM Cognos platform. In developing Cognos Business Intelligence version 10.1, IBM Development continued the practice of bringing real customer applications in-house for evaluating possible avenues of improvement for performance and scalability.

The result of IBM's commitment to customer success is Cognos Business Intelligence version 10.1—the biggest leap forward in features, performance and scalability since the introduction of Cognos 8 Business Intelligence in 2005.



### **Leveraging the existing industry leading platform**

Cognos Business Intelligence delivers an industry-leading range of business intelligence capabilities on an open, enterprise-class platform. It is built on a web-based service-oriented architecture (SOA) designed for scalability, availability and openness.

Reliability and scalability were key considerations in the design of the Cognos Platform from the start. Services in the application tier operate on a peer-to-peer basis, which means that no service is more important than any other, and there are loose service linkages. Any service of the same type, on any machine in an IBM Cognos Platform configuration, can satisfy an incoming request, which results in complete fault tolerance. The dispatching (or routing) of requests is optimized, with automatic load balancing built into the system.

The Cognos Platform provides access to all data sources, including relational data sources and online analytical processing (OLAP), with a single query service. In addition, this query service understands and takes advantage of the data source strength by using a combination of open standards such as SQL99, native SQL and native MDX to optimize retrieval for all these different data providers.

### **Optimizing performance with in-memory processing**

Organizations are forced to meet challenging performance expectations because of today's complex business requirements. The query service of the Cognos Platform provides new in-memory processing with dynamic query capabilities and 64-bit system support to address these challenges.

#### **Dynamic query**

The dynamic query capabilities bring optimized query generation with pattern intelligence and security-aware caching. The platform enables report authors and advanced business users to perform ad hoc business analysis leading to better and more timely business decisions.

Dynamic query uses an enhanced Java™-based interface that addresses query complexity, data volumes and performance with new capabilities:

- In-memory calculations and aggregate operations
- Smart query processing capable of combining multi-dimensional and relational concepts to improve performance

#### **Intelligent caching**

Any distributed server architecture may be affected by request latency when the environment is under increased load.

Limiting excess communications and further distributing certain types of data and processing can help reduce latency.

In Cognos Business Intelligence, in-memory processing on 64-bit systems delivers optimized query generation with pattern intelligence, security-aware caching for query plan and query, and on-demand data and metadata caching for executed reports. These features help to deliver faster results and increase the satisfaction of business users. The 64-bit security-aware smart caching uses in-memory optimizations to increase query performance and data cache reuse. The system is self managed; it monitors the most frequently used data and responds accordingly.

Smart caching includes the following features:

- Scheduled and automatic management of the cache to ensure that cache contents remain relevant and timely, reducing the repetitive query load on the data source. This cache management allows the use of the existing infrastructure and improves the user experience for business analytics.
- Smart load controls to maximize the availability of memory for the most frequently accessed data, ensuring consistently faster performance.
- Cache management facilities to leverage existing event scheduling infrastructure to enable the automatic management of the cache, which ensures that the content remains relevant.

### **Cognos Business Intelligence version 10.1: Performance impact**

The following sections show a sampling of the results of performance testing for some of the improvements built into Cognos Business Intelligence version 10.1. These tests have been built using real-world use cases. Application performance, however, depends upon the customer application, usage characteristics and data source performance.

(Results shown in this document cannot be used for capacity planning purposes.) Cognos Business Intelligence version 10.1 has been observed to provide an overall average improvement in query performance of three times better.

**Cognos TM1 as a data source**

Cognos Business Intelligence version 10.1 has significantly improved performance of report execution on Cognos TM1® as a data source. Figure 1 shows an example of the performance improvement in processing complex Master Detail reports against Cognos TM1 as a data source under a large concurrent request load.

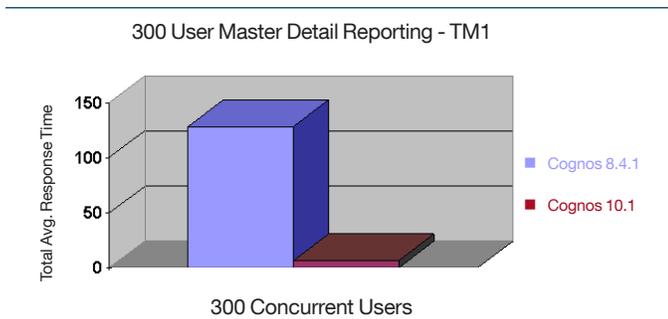


Figure 1: Sample of load test results for processing master detail reports against Cognos TM1

**PDF report generation**

Generating reports in PDF format is both CPU and memory intensive. Test results (Figure 2) show that it benefits from the performance improvements in the Cognos Business Intelligence version 10.1 in-memory cache.

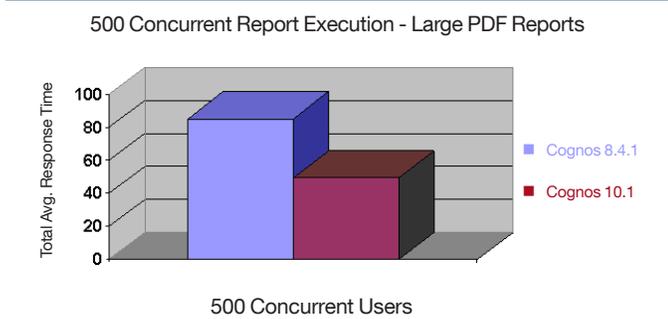


Figure 2: Sample of test results for PDF output under load

**Dynamic query mode performance for OLAP data sources**

The following charts (Figure 3) summarize the performance benefits of dynamic query mode in Cognos Business Intelligence version 10.1 when used with Cognos TM1, SAP® NetWeaver® Business Warehouse and Oracle Essbase data sources. Use of dynamic query mode has been observed to improve overall performance for reporting against supported OLAP data sources, on average, by 80% for Cognos TM1, by 55% for SAP NetWeaver Business Warehouse and by 70% for Oracle Essbase.

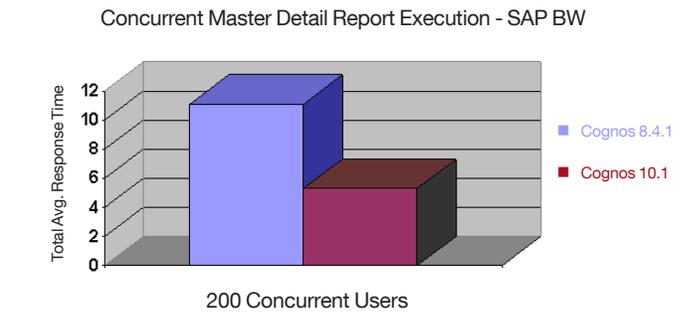
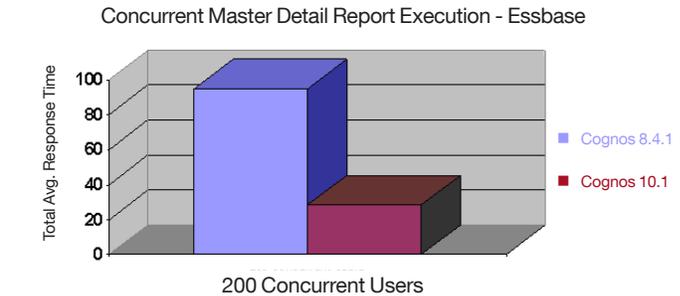
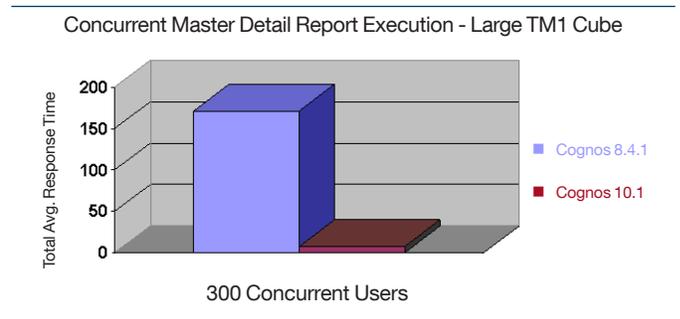


Figure 3: Sample of load test results for dynamic query mode

### Analysis and exploration against an IBM Cognos PowerPlay cube

Cognos Business Intelligence version 10.1 includes improvements to cache usage and query performance for Cognos PowerPlay cubes. Figure 4 shows a sample of performance improvements related to the exploration of a PowerPlay cube.

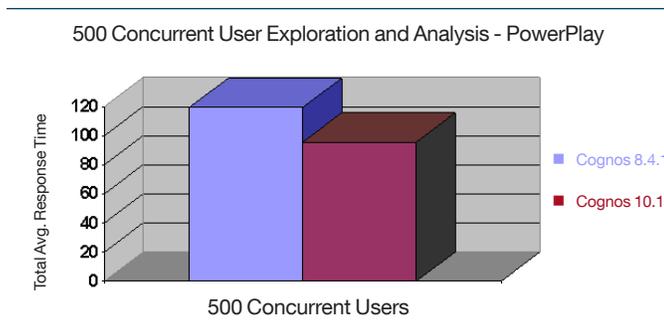


Figure 4: Sample of load test results for Cognos PowerPlay exploration

### Transformer cube build performance

Improvements have been made to allow the read portion of the Transformer cube build process to be separated into two threads that can be executed simultaneously. Multi-threading has been implemented for transformer sorting activities. Overall Transformer I/O throughput has also been improved. Figure 5 shows a sample of transformer performance improvements.

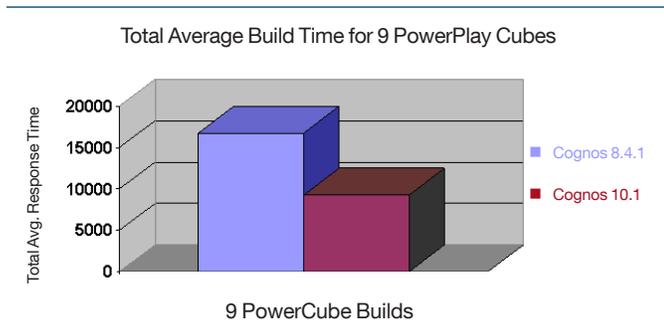


Figure 5: Sample of load test results for Transformer cube builds

### Impact of distributed in-memory caching

Tests involving the execution of reports with charts and graphs and PDF-rendered reports at higher loads demonstrate significantly reduced Content Manager server CPU utilization (Figure 6). The request cache, combined with the local report server caching, can reduce CPU utilization on the Content Manager server by up to 85 percent.

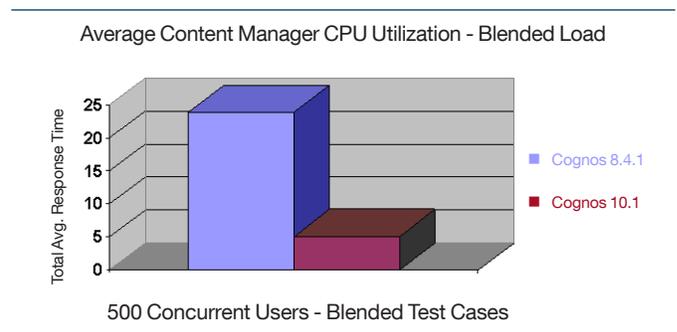


Figure 6: Sample of test results showing reduction in Content Manager CPU utilization

### Summary

Cognos Business Intelligence version 10.1 represents the biggest leap forward in enterprise-level business intelligence since the introduction of Cognos 8 Business Intelligence in 2005. Through working directly with customers to solve real-world performance problems and building upon the industry-leading Cognos Platform, Cognos 10 Business Intelligence provides unmatched enterprise-level performance and scalability for business intelligence applications.

### About IBM Business Analytics

IBM Business Analytics software delivers complete, consistent and accurate information that decision-makers trust to improve business performance. A comprehensive portfolio of business intelligence, advanced analytics, financial performance and strategy management and analytic applications gives you clear, immediate and actionable insights into current performance and the ability to predict future outcomes.

Combined with rich industry solutions, proven practices and professional services, organizations of every size can drive the highest IT productivity and deliver better results.



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