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The IBM Cognos platform: Meeting the needs of both business users and IT

Executive summary

For businesses to gain real value from data, they need to get information in a way that is meaningful to them, to improve decision-making and increase business efficiency. The information must be relevant, accurate, consistent, fast, easy to access and easy to manipulate. When these criteria are met, users can get quality information that enhances their decision-making, and thus help organizations realize their objectives as a whole.

The IBM Cognos® platform is an open, enterprise-class platform built on a service-oriented architecture. It capitalizes on your existing infrastructure, adapts easily to change and uses open standards for long-term extensibility, all with the goal of achieving the above-mentioned criteria. As such, the Cognos platform ensures:

- Flexible, optimized access to all the data you need
- A complete, consistent view of information that fosters user confidence and adoption
- Valuable tools to help you deploy, manage and easily upgrade the system
- An open platform to ensure agility, flexibility and scalability



Introduction

Companies today are amassing data in amounts we could previously hardly dream of, with CIOs now talking in terms of petabytes and zettabytes. And yet, even as that valuable data continues to accumulate, people are finding it harder and harder to understand or get at the data they want.

In a recent survey of 225 business leaders worldwide, one in three reported that they were frequently forced make critical decisions without the data they need, while one in two said they didn't have sufficient information from throughout their organization to do their jobs.¹

Many companies today are looking to business analytics solutions to solve this problem. And it's the job of the IT organization to help find the right one. IT executives and managers must find systems that can tap into the power of all this data, cleanly and efficiently. In other words, not only do they have to provide access to the data people want and need to do their jobs, but they must also find a solution that fits their infrastructure, both today and tomorrow.

The IBM Cognos platform: The right architecture

The IBM Cognos platform is an open, enterprise-class platform that delivers complete, consistent and timely information for all user communities, all on an easily scalable infrastructure.

The IBM Cognos platform can access all data wherever it resides, features a flexible architecture and provides all the tools that IT needs to scale as user communities grow. It helps ensure your implementation earns users' confidence, thus improving adoption rates. At the same time, the platform is agile enough to fit in your current infrastructure and adapt to change as requirements evolve.

The Cognos platform provides broad reach, open access to all data sources and an easy modeling environment for building access to all needed information for your users.

Built from the ground up on a service-oriented architecture (SOA), the platform is simple to deploy and adapt, features powerful tools for reducing the cost of system management, and makes it easy to take advantage of technology standards today and as they evolve.

Ensure reliable, timely access to all data sources

The Cognos platform provides complete access to all data sources. Using a universal data access layer and single query service, users can access all their data sources wherever they are stored, internally or externally. Data is accessed with published interfaces to all relational sources, including:

- Operational data stores and data warehouses
- OLAP (online analytic processing) sources such as IBM Cognos TM1®, IBM Cognos PowerCube, SAP® Business Warehouse, Microsoft SSAS and Hyperion Essbase
- Transactional applications such as Siebel, SAP® R/3, PeopleSoft and Salesforce
- Modern and older sources such as XML, IBM Cognos Real-time Monitoring, LDAP and mainframe

¹ Lavalle, Stephen. *Business Analytics and Optimization for the Intelligent Enterprise*, IBM Global Business Services. April 2009.

“IBM Cognos 10 enables people to make better decisions when they are looking for ways to improve operations, cut costs, or increase revenues.”²

—Nucleus Research

Single query service for consistent results

The single query service generates consistent queries that users can learn to trust and rely on. The single query service optimizes access by recognizing and using the source system strengths.

The single query service in the Cognos platform uses a combination of open standards such as SQL99, native SQL and native MDX to optimize data retrieval from different data providers.

The Cognos platform offers enhanced performance for complex heterogeneous data with 64-bit, in-memory optimized query generation with pattern intelligence; in-memory calculations and aggregate operations; and security-aware 64-bit cache facilities.

Open data access with the Cognos platform

- **Broad Information reach.** Gain access to data wherever it is stored, using published interfaces for all transaction systems, warehouses (relational and OLAP), flat, existing, third-party integration tools, single query engine (SQL and MDX) or modern sources.
- **Flexible data sourcing.** Choose from a range of data sourcing strategies: ETL, enterprise information integration (EII) federation and direct sourcing.
- **Data caching.** Optimize performance using EII virtual caching, IBM Cognos OLAP PowerCubes and 64 bit in-memory caching.
- **Single query service.** Ensure consistent and predictable queries for all data sources (OLAP and relational).

² Nucleus Research. “K66 – Research Note: IBM Cognos 10.” November 2010.

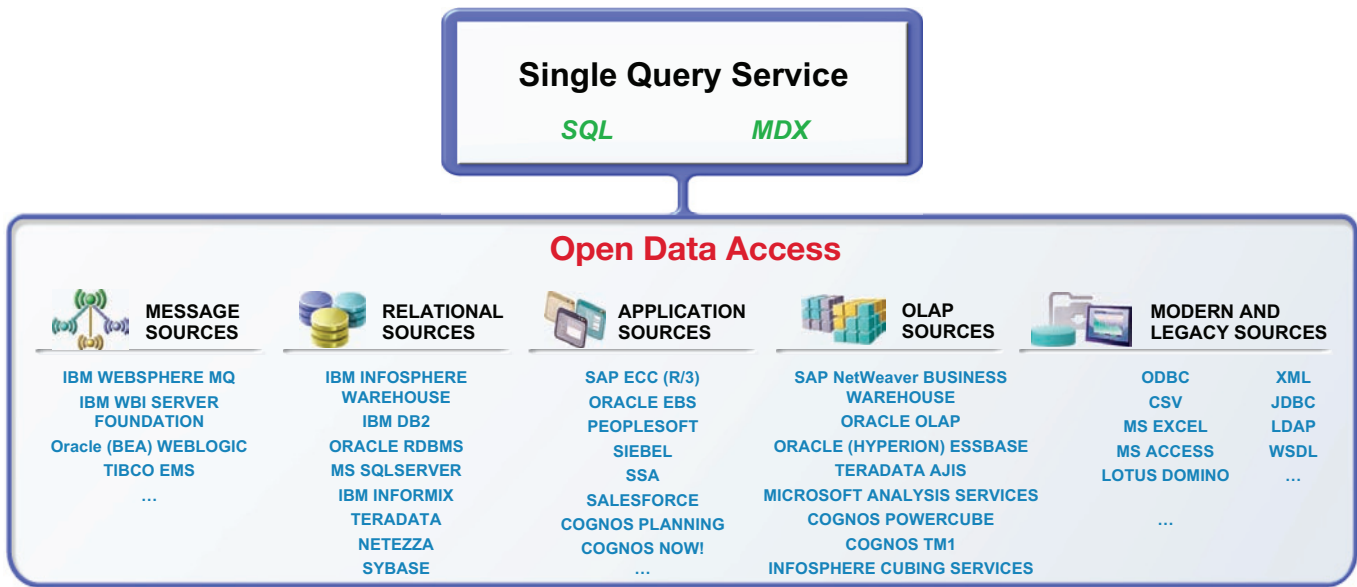


Figure 1. The Cognos platform can access any data no matter where it is stored

Flexible data sourcing to meet demand while maintaining standards

The Cognos platform provides the freedom to choose the best method for sourcing each data set, allowing you to mix and match or to change approaches as business needs change or as new data sources or data views are required.

These flexible sourcing strategies allow IT and data professionals to meet the needs of the business quickly. If, for example, users are looking for historical summaries or a comparison of planned versus actual, you can easily aggregate, calculate and capture the history of the data to quickly supply that information.

Another example might be when the business wants immediate, up-to-date insight into information from one or many operational sources. Flexible sourcing strategies enable users to aggregate data easily on the fly from several different sources.

Flexible data sourcing also lets you satisfy your current processes more easily, such as using standardized data integration technologies for your data warehouses.

Source data in any number of ways

- **Direct sourcing** to provide instant access to a source system or data warehouse
- **Virtual sourcing** to bring together multiple sources on the fly to deliver a combined, high performance view
- **Dimensional ETL** sourcing to conform data and manage complex hierarchies into relational-based formats optimized for reporting and analysis access, including creating data marts with a dimensional framework for the “last mile” from enterprise data warehouse sources
- **Integration** with ETL and data integration technologies such as IBM Information Server (DataStage), IBM InfoSphereChange Data Capture and other vendors to capitalize on existing technologies

Deliver a complete, consistent view of data to users

Widely varying user needs and a broad array of data sources that don't tie together can make life difficult for data modelers. In order to provide a business intelligence system that users will trust and thus embrace, data modelers must ensure consistent, reliable information for the whole business community.

Ideally, a platform can achieve this without requiring data modelers to know SQL, without having to duplicate data for different views or languages, and all—to be expected nowadays—done quickly.

What's more, to keep that all-important trust and engagement in the business analytics system, IT needs to shield users as much as possible from the complexity of the data model.

The foundation for cleaner, consistent information: A common business model

The Cognos platform provides a single, multi-tiered modeling environment that helps data modelers ensure a common business view for the entire organization, with a central metadata repository for the model, business rules, dimensions and calculations.

With the common business view, you can model once and reuse the model in any number of ways. This “single view” of information is provided to all users for all capabilities and ensures a consistent business view of information, regardless of data location, in terms people can understand and become familiar with.

Modelers create one model and publish sections of it to address the specific needs of different user communities. Multilingual capabilities eliminate the need to duplicate the model in different languages and reduce the total number of reports that must be created.

What's more, the metadata model achieves all this without exposing users to the complexity of the underlying sources.

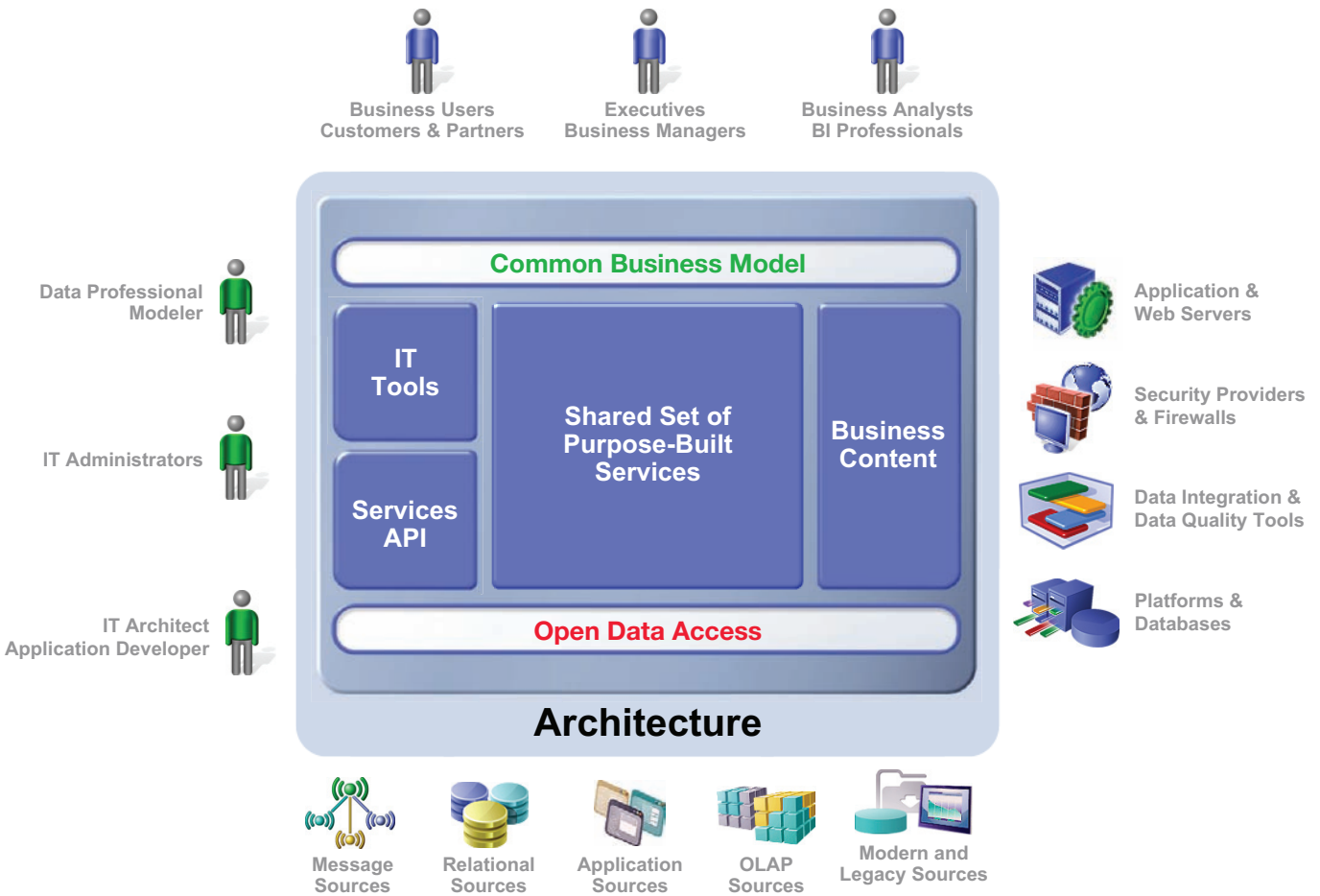


Figure 2. Model once and deploy anywhere for a simplified BI environment

Data security

Data modelers model once and deploy anywhere using the established security levels, so users access only the information that they have permission to and is pertinent to them. The platform lets you establish security at the role level down to the row or column.

This platform feature makes regulations compliance far simpler to manage, because IT can easily meet data governance requirements without the need to generate separate models or reports.

Consistent business information

- **Common business model.** Data modelers provide a single metadata model that can be modeled once and deployed anywhere. Use the model to publish all the information users require for all capabilities.
- **Consistent information.** Apply consistent business rules, dimensions and calculations to data, regardless of its source.
- **Multi-lingual model.** Support multiple languages with one model to avoid duplication of reports.
- **Model once, package for many.** Data modelers build one model and deliver information in digestible-sized subsets for specific user communities. Users receive only the information relevant to them and are not overwhelmed.
- **Data security.** Apply security to users or groups, down to granular row and column security.
- **Multidimensional IBM Cognos PowerCube creation.** Data modelers can model complex dimensional structures and business rules, and apply the security needed by the business.

Flexibility when you need it

IT can quickly respond to one-off business demands by creating a multidimensional IBM Cognos PowerCube to model complex dimensional structures, apply business rules and set security. Create unique combinations of data and publish the cube as part of the enterprise model, to meet quickly business demands for specific views of data without compromising the enterprise data model.

Build a high performing, robust data model

The Cognos platform provides capabilities to help data modelers optimize their models and manage change more effectively.

One small alteration to the model can have a large ripple effect downstream. The Cognos platform provides a multitier model with reusable objects to separate physical models from business models to decrease the downstream effect of changes.

The Cognos platform also provides key tools for managing changes to the model.

The platform tracks changes made to the model, keeping information on who, when and why the model was changed.

Modelers can immediately assess the impact of a change on an existing report using Report Dependencies and Impact Analysis before publishing the change. Impact assessments can also be saved to provide an audit record or to automate update scripts. Model retargeting enables data modelers to modify or replace the physical layer of the model, so IT can move between test and production environments without disrupting users in the logical layers.

Tools highlight: Making key metadata information available

As business users progress in their use of business analytics, they often start requiring more information on the metadata. They want to know more about the data they're using when they're creating reports or queries or performing analysis.

The Cognos platform provides several capabilities for providing this information, including IBM Cognos Business Viewpoint and the Data Lineage feature.

IBM Cognos Business Viewpoint

IBM Cognos Business Viewpoint is a tool for defining, governing and sharing dimensions, hierarchies and attributes to provide a common, sanctioned source for hierarchies and attributes for the business to manage and use.

The easy-to-use interface simplifies such tasks as redefining the sales hierarchy to reflect a recent reorganization or setting up a future cost center hierarchy for next year's planning. See the [website](#) for more information about Cognos Business Viewpoint.

Data Lineage

The Cognos platform offers users the unique ability to trace back to the original source of data. The investigation feature helps ensure data quality by providing greater understanding of the data and where it's coming from.

Users right-click a report table or chart and select **Lineage** to see where the data comes from, how it was derived, how it was changed and the calculations used. The lineage information of a data item traces the metadata of the item back through the report and the report's data sources.

The Lineage view includes both a business-oriented view and a technical view for modelers. For those modelers who want to be able to trace back through any ETL or data quality transformations to the originating data source, the Cognos platform provides a metadata API to allow integration with IBM Metadata Workbench and other third party tools.

Collaborative tools

The Cognos platform enables a team of modelers to work on different segments of the model separately and then bring them together into a single view. Modelers can access any existing metadata with pre-built bridges to other metadata modeling environments using data integration tools such as Informatica; modeling tools such as Erwin and Oracle Designer; and source catalogs such as relational databases and ERP.

The Cognos platform also provides teams of modelers with built-in proven practices to build optimal, multitier models with reusable objects and ensure easier management of changes.

Model Advisor and Model Design Accelerator

Model Advisor provides access to proven practices modeling guidelines to help you identify model inconsistencies and improve the models when they are first created.

Model Design Accelerator is a graphical utility designed to guide both novice and experienced modelers through a simplified modeling process. Novice modelers can easily build powerful models without extensive experience or training while experienced modelers can create models faster.

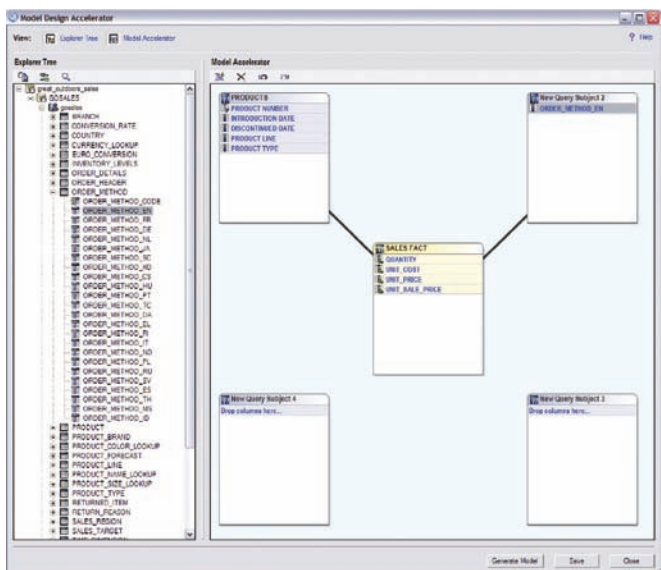


Figure 3. The Model Design Accelerator helps modelers build an optimal model and easily maintain and manage it.

Powerful tools for building the optimal data model

- **Model Design Accelerator.** This graphical utility is designed to guide both novice and experienced modelers through a simplified modeling process.
- **Model Advisor.** Proven practices and modeling guidelines help identify model inconsistencies and improve model quality.
- **Multi-participant modeling.** Teams of modelers can work on different segments of the model and bring the segments together for a single view.
- **Multi-tier modeling.** Separate physical models from business models to decrease the downstream effect of changes.
- **Model retargeting.** Modify or replace the physical layer of the model with no disruption to end users in the logical layers.
- **Impact analysis.** Assess the impact of model changes on users before publishing them and track change details.
- **Model versioning.** Publish multiple versions of a metadata model.
- **Bi-directional third party metadata integration.** Access any metadata with pre-built bridges to other metadata modeling environments such as data integration tools, modeling tools, source catalogues, Teradata, Sybase and export metadata using CWM standards.

Lower the cost of managing and scaling your system

Technology hurdles can dampen business and IT enthusiasm for new applications and solutions such as business analytics: users without access; users accessing the wrong information; poor performance; and random system errors. All of these shake business confidence and reduce the willingness of a user community to adopt the solution.

The Cognos platform helps overcome these technology hurdles with critical tools for administration and management, to optimize performance and accurately assess and predict system requirements.

Peer-to-peer services

First, the Cognos platform offers greater reliability with a set of peer-to-peer services. Peer-to-peer means no service is considered more important than any other, so master services or bottlenecks can occur. Every service is capable of complete fault tolerance because any request can be handled by any service of that type in the configuration.

These peer-to-peer services are also loosely coupled so no service needs to know how the other services do their job, nor what they are doing at any particular time, or even where they reside in the heterogeneous platform environment. This provides tremendous reliability because the configuration has redundancy built in to ensure uninterrupted access. If any service or server happens to fail, the platform can absorb the workload while a service attempts to restart itself.

Tested and proven to scale

The Cognos platform provides a linear scalable solution. Services can scale-up or scale-out to provide predictable linear response to workloads. The Cognos platform is tested every release both internally and externally to ensure linear scalability. The most recent testing performed at IBM labs showed the platform to scale linearly on Microsoft Windows, IBM Power Systems™ and IBM System z®.

Cost-efficient scalability and security

- **Self-aware, peer-to-peer services.** With distributable services that can self-manage, self-spawn, and self-start, deploy services in a configuration that best fits with your environment.
- **Linear scalability.** Services can be scaled-up or scaled-out with predictable linear response to workloads.
- **100 percent Web-based:** There are no client-side installations, downloads, plug-ins or need to change user personal user settings or configurations.
- **Comprehensive security.** Use one or more existing third party or custom security providers to give users single sign-on. Apply access control to capabilities, data-level security, full encryption and application firewall to ensure data can only be accessed by authorized users and systems.

Tested and proven security

Symantec tested and passed the Cognos platform in an independent and detailed security evaluation. According to the report, the overall design of the Cognos platform employs a robust architecture for secure reporting and analysis. The security assessment also confirmed that the Cognos architecture and framework for reporting and analysis applications have sound security practices and surpass industry best practices. The audit concluded that, at the time of the assessment, “none of the capabilities assessed contained high risk instances of common web application vulnerabilities.”

A complete view of system activity

The Cognos platform gives system administrators visibility of system processes and activity and the capabilities that help them proactively manage the deployment more effectively.

Task-oriented system monitoring provides administrators with a consolidated interface organized by administrative tasks, from report activity to specific dispatcher workloads. System administrators can allocate administrative roles based on task, so you don't have to provide every administrator with complete access.

Using the Cognos platform, system administrators can be proactive in their administration, with immediate access to all the metrics and summary views they require to troubleshoot or identify potential issues. They can also set thresholds on hundreds of metrics for notification of potential issues before business users are affected. Administrators can also prevent bottlenecks and reduce the load on the system with the ability to suspend activities and with greater visibility into hourly schedules.

Administrators can set priorities on scheduled reports and change those priorities at any time. With Report Re-run, administrators can resubmit jobs to re-run only failed reports while maintaining all the user credentials and report parameters.

Dynamic Query Analyzer

The IBM Cognos Dynamic Query Analyzer is a new self-service, visualization and dynamic query analysis tool for IT. Query visualization gives administrators greater insight into how the dynamic query was generated and visually displays results flow, making it easier to maintain and troubleshoot.

Tools highlight: IBM Cognos System Management Methodology

The IBM Cognos System Management Methodology is included for all supported customers and is available for download at the IBM Cognos [support site](#). The methodology includes proven practices, enhanced IBM Cognos Framework Manager models, sample reports and SDK tools.

These give you additional insight into the application and audit data, allow you to extend system administration functionality and help you reduce the amount of time spent maintaining the environment.

The Cognos System Management Methodology helps you optimize your system management. It includes a threshold calculation tool built as a software development kit (SDK) application for capturing information—to help you customize and administer the specific thresholds and parameters of your BI solution.

Easily manage applications

- **Task-oriented system monitoring.** Check the status of your system with a consolidated view of all system activity, from scheduled and interactive reports to servers and dispatchers.
- **Proactive administration.** Monitor your system more efficiently and identify anomalies with metrics and the ability to set thresholds. Streamline troubleshooting and identify system trends over time to optimize operations.
- **Integration with third-party enterprise management systems (EMS).** Access metrics from EMS solutions, such as IBM Tivoli® and HP Open View. Manage BI as part of an overall enterprise administration environment.
- **Report rerun.** Rerun failed reports on a user's behalf and restart from the point of failure to help minimize business interruption caused by report issues.
- **Queue prioritization.** Change priorities of scheduled reports at any time. Optimize report delivery based on user requests or business demands.
- **Dynamic Query Analyzer.** Gain greater insight into how a dynamic query was generated with a self-service, visual tool that visually displays results flow.

Streamline upgrades and meet changing business and IT requirements quickly

IBM Cognos Lifecycle Manager is a powerful tool for introducing changes to your IT environment or Cognos software. IT administrators can test the impact of a change and resolve any issues before releasing it.

You can use Cognos Lifecycle Manager for upgrades, to validate report content between two versions of Cognos software. Simply create benchmark projects to compare

reports and you can quickly assess the impact of an upgrade and address any issues.

You can also use it when introducing a change to your IT environment. Compare snapshots with a baseline or compare reports after the installation of a refresh pack or any other upgrade, such as a new database version.

Cognos Lifecycle Manager reduces the effort of validating the impact of any change in your environment and allows you to respond quickly to new business requirements.

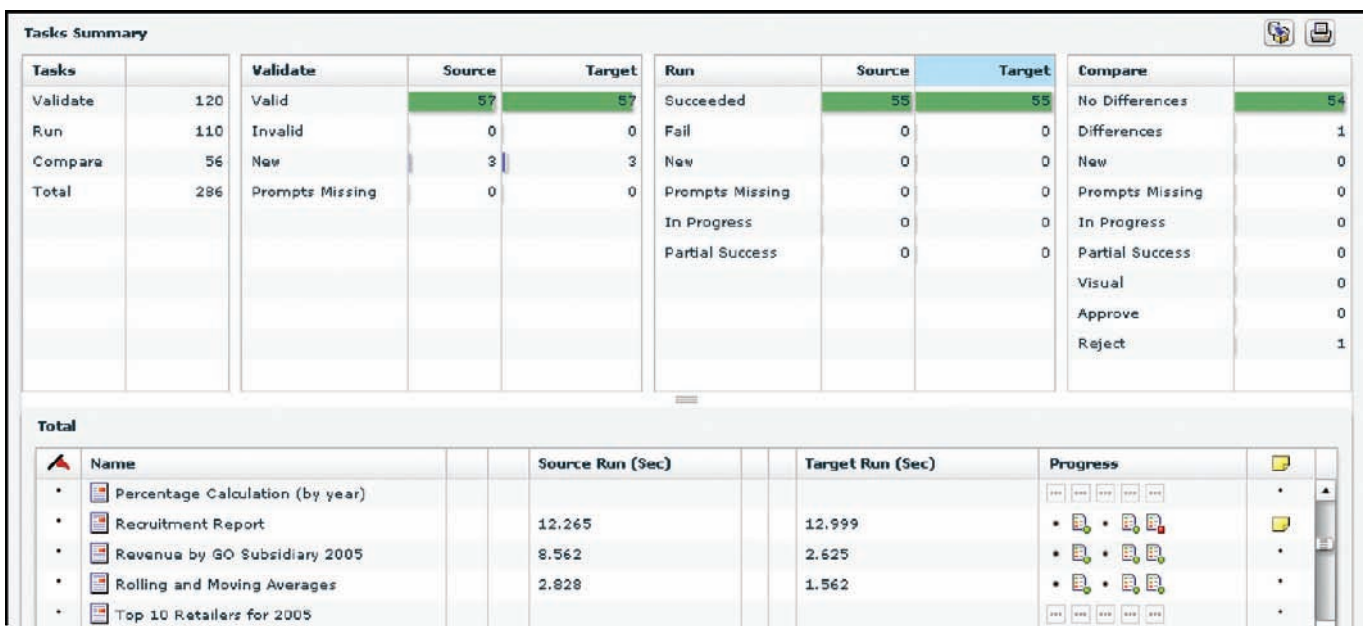


Figure 4. Test, compare, and record results between two versions of IBM Cognos software or when introducing a change to your IT environment.

“I give the Cognos team huge credit for emphasizing and ensuring that migration to Cognos 10 is a seamless ‘push-button’ experience, unlike challenging migrations from earlier versions to version 8.”³

—Forrester Research

Adopt your current infrastructure and quickly adapt to change

IT managers have several objectives to balance when assessing technology requirements:

- They must look for support for broader enterprise standards such as portals, Web, security, operating systems and more.
- They must evaluate fit with the preferred deployment strategy, influencing how and where an application is deployed and the hardware required.
- They must ensure sufficient flexibility to fit future requirements.

With these criteria in mind, IT managers must also ensure that the solutions are simple — both for the users to adopt and for IT to build. For users, the IT manager must think about how to deploy the solution in the world in which users work everyday.

Simplified deployment with true SOA

The Cognos platform was built to be simple to deploy and adapt. Built from the ground up on a modern SOA, the architecture is open and standards-based. It uses Simple Object Access Protocol (SOAP), Web Service Description Language (WSDL) and Web Services for Remote Portlets (WSRP) among others to achieve the ease of implementation and integration promised in an SOA world.

Open, environment-neutral architecture

- **Standards-based.** Modern web services-based protocols and standards fit easily with evolving technology requirements.
- **Environment-neutral.** Use existing heterogeneous platforms, security, portal and web environments. Adopt current infrastructure and adapt as standards evolve.
- **Location transparency.** Deploy any number of services on any server and any number of servers in heterogeneous environments. Services are accessible anywhere.
- **Flexible peer-to-peer services.** Choose to deploy services collocated with other applications or databases to minimize traffic and maximize server usage. Services provide infinitely flexible distribution to fit the chosen infrastructure strategy.
- **Single, open API.** Application developers gain full access to Cognos functionality in an integrated development environment. New capabilities and custom integrations are easy to implement to address unique or new requirements.
- **Purpose-built services.** Continual IBM innovation enhances and adds services, data sources and capabilities. Retain flexibility and keep pace with business demands.
- **Embeddable services.** Embed BI into applications, business process management, enterprise search and other business initiatives.

³ Evelson, Boris. “The Cognos 10 Launch and My Key Takeaways from IBM IOD.” Forrester Research blog. 26 October 2010.

With open standards, organizations can use existing IT environment standards without duplicating functions such as security or dealing with issues associated with proprietary application servers or rich client tools. The Cognos platform is open to run on any web server and complies with existing routers and firewalls.

The Cognos platform is environment neutral. It is not tied to a particular technology stack and can make use of any combination of existing environment standards. Organizations can run the Cognos platform with existing portals, databases and operating systems.

“Nucleus finds that companies can use IBM Cognos 10 to improve productivity, reduce report building costs, improve profitability, and, in some cases, avoid other software and supporting technology costs.”⁴

—Nucleus Research

Adopt your preferred infrastructure strategy

Whether you choose to optimize your hardware environment by installing centrally managed, large, powerful servers, a clustered hardware environment or virtualization, the Cognos platform can adapt to fit.

The Cognos platform can scale up or out throughout heterogeneous environments because it's based on SOA. The platform is location transparent; all services plug into a widely available network using the SOAP and XML Internet protocols. As a result, services do not need to know where other services are located to communicate with them, so IT can capitalize on the available capacity throughout the entire network. The business does not have to concern itself where a particular service is deployed.

Greater flexibility

The loosely coupled, peer-to-peer services discussed earlier in this paper provide another advantage: tremendously flexible configuration. IT can build the business analytics solution to fit the broader deployment strategy already in place.

The Cognos platform features a single, open API founded on modern SOAP and XML protocols that provides a simple means for integration using any Integrated Development Environment (IDE). The API lets the Cognos platform easily integrate with Microsoft Office, business performance management (BPM) solutions, enterprise search capabilities, and other applications. The API also ensures partners and customers can extend Cognos functionality and integrate IT custom solutions, or add business functionality to address specific user requirements.

The purpose-built nature of the Cognos platform services means that new Cognos-based applications can easily capitalize on existing services, such as query or presentation services. Adding new functionality can augment an existing service or provide an additional service that draws on an existing service. Once a new service is introduced to the platform, it is available to all services in the platform. IT doesn't have to make changes in multiple places to ensure all platform capabilities can take advantage of it.

⁴ Nucleus Research. “K66 – Research Note: IBM Cognos 10.” November 2010.

Conclusion

The Cognos platform gives IT professionals the flexibility to optimize performance in their environments without changing backend systems. With collaborative data modeling and built-in best practices, data professionals reduce the time to respond to requests and can consistently deliver all the information users want.

With the Cognos platform, IT can confidently deploy business analytics applications throughout the enterprise with full fault tolerance and comprehensive security. Proactive administration and task-oriented system monitoring help IT manage the system and meet service commitments.

Built on a modern SOA, based on open standards and completely environment neutral, the Cognos platform exploits technology standards today and as they evolve. Organizations can implement the ideal hardware deployment strategy with peer-to-peer services and location transparency to fit any infrastructure and address new and unique business requirements with a single, open API and purpose-built services.

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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To request a call or ask a question, go to www.ibm.com/cognos/contactus. An IBM Cognos representative will respond to your enquiry within two business days.



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