White Paper
January 2009

The right architecture for business intelligence

The foundation for effective enterprise BI

Information Management

Cognos software

Contents

Abstract

The IBM Cognos® 8 platform meets all the criteria needed to effectively enable enterprise-scale business intelligence: It considers the diverse information needs of all users; it keeps maintenance costs down, and it leverages existing assets without duplicating existing infrastructure. Backed by an industry leader and featuring an open data strategy, the IBM Cognos 8 platform provides an ideal foundation to easily deploy, use, and integrate a BI solution.

Overview

Business Intelligence (BI) software leverages investments in data and systems to provide easy-to-use information that improves decision-making throughout an organization. The Fortune 1000 and many other organizations use BI as part of a growing move toward integrating organizational processes for higher performance.

This white paper outlines the customer needs that IBM and industry experts have observed as being met by an effective and flexible enterprise BI architecture. It also describes the open, enterprise-class platform that underpins IBM Cognos 8 Business Intelligence, and the value we see it offering our customers and partners.

Business problems

Why architecture is so important

The BI needs of both IT and business are best met with an open platform built on a modern architecture designed for constantly evolving and growing enterprise demands.

For IT, BI software delivers more value when it integrates easily with an organization's infrastructure, supporting today's technology and standards and adjusting readily to those of tomorrow. BI must also be able to consolidate all of the organization's data, scale as user demand grows, and perform reliably. In addition, IT must be able to administer a BI solution without overtaxing budgets and human resources.

For business, BI software must match the many roles, skill sets, and needs of the people who depend on it for information they can trust. It must provide them with information in many different formats, including regular reports, ad hoc queries, scorecards, dashboards, and more. BI must also be easy to use, so that business adopts it willingly and has confidence in the information it provides.

An open platform simplifies IT environments, accelerates business decisions, and provides a competitive advantage by ensuring that an organization's investment can be leveraged today and is ready for tomorrow. Systems built around legacy solutions have less longevity than those built on a modern, purpose-built architecture. If legacy systems do achieve a similar longevity, it comes at the cost of increased efforts for maintenance and adaptation.

Business drivers

What makes an effective enterprise BI architecture?

> *"So, for anyone involved in IT, the issue is not if SOA will have an impact, but when, and how aggressively you should go out to meet the future rather than waiting for it to come to you."*
>
> *Simon Hayward, Gartner Positions 2005: Service-Oriented Architecture Adds Flexibility to Business Processes, February 16, 2005*

An effective business intelligence architecture is designed to meet the demands of enterprise-scale IT environments and the needs of business users. Analyst findings and IBM Cognos experience with Fortune 1000 organizations point to several common characteristics and values of enterprise-scale BI architecture, as discussed below.

Meets the information needs of all users

An effective architecture must provide a full range of business intelligence capabilities to solve real business problems across the organization without creating new ones. This means providing the right kind of information in the right way to different user communities, and providing them with self-serve capabilities so that they do not overburden IT.

Some users will need dashboards to view "at-a-glance" status; for example, a sales manager might view where the sales force is with respect to quotas (who is on track, who is lagging behind, who is ahead of quota), how much budget has been used (training, trade shows, T&L), what new sales opportunities exist and who is driving them. A human resources manager might have an entirely different set of requirements for a dashboard. A CFO may need to track key metrics using a formal scorecarding methodology like the Balanced Scorecard. A CIO might need powerful production reporting and ad hoc capabilities to track and understand IT resource allocation and usage. Finance needs to report against financials and may need to do in-depth analysis. OEM partners want to extend their solution beyond standard delivered reports and provide authoring to a broader audience.

Across this broad range of requirements, it's important that a BI solution deliver a mix of both IT-driven and user-driven BI capabilities to reduce the IT backlog and free up IT resources. What both business users and IT don't need are barriers between themselves and the right information, especially when their decision-making processes span multiple sources of data. The BI architecture mustn't be fragmented – with different tools accessing potentially different metadata repositories. A user should not have to switch from one tool when reviewing a dashboard to another when conducting analysis just because the underlying data structures differ. Such scenarios often arise when a BI system is built as a patchwork of old BI technology components that attempt to deliver complete solutions. A user is most effective, from both an IT and a business perspective, if they can use a single product, with a common user experience, and have broad access to enterprise data across all business intelligence needs.

Finally, the architecture underlying the BI solution must make it possible to deliver information to users where and when they need it, so they can take action quickly to solve problems and take advantage of opportunities. In an increasingly mobile world, this means being able to deliver BI in a broad range of formats on an equally broad range of technologies, including mobile devices.

Broad access to enterprise data

Virtually every organization has a range of different data assets and storage mechanisms for different users and purposes. To deliver flexibility of data integration and data access, architecture must be guided by an open data strategy. ERP systems are broadly deployed, and form the backbone of large organizations. Relational databases – typically more than one, and often from multiple vendors – are in place. Multidimensional sources for analysis and reporting are now broadly deployed, and are considered core processes to managing the business.

Users need confidence in all this data and its consistency across the organization. From an IT point of view, access to this broad range of data sources must leverage all of the built-in power of the underlying systems, and respect whatever data access mechanisms are in place – including native access to heterogeneous in-place data warehouses and marts, or to existing or future OLAP data sources. Enterprise BI must also fully support in-place ETL processes, or provide ETL capabilities if that is required. Additionally, BI solutions must support cases where reporting and analysis requirements span multiple heterogeneous data sources, such as XML, JDBC, and web services, but where no mechanism exists for integrating these sources.

A common business view

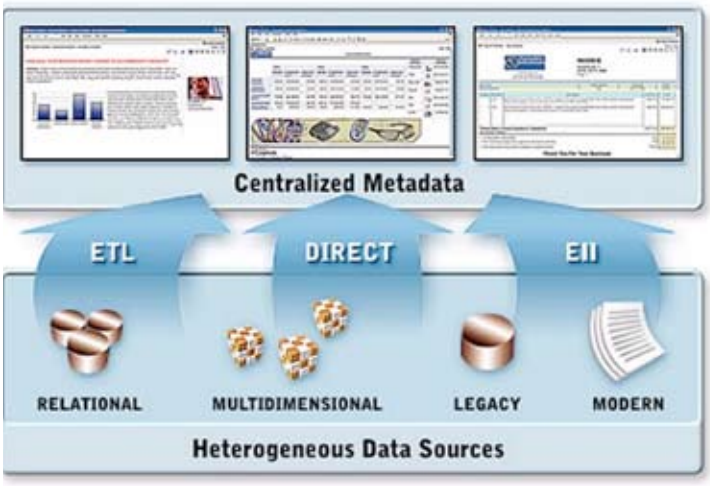
A "single version of the truth" requires that business intelligence software and its architecture draw on common metadata. Users need confidence that reports, charts, dashboards, metrics, and events are all based on the same data regardless of the data sources involved. Data architects and modelers must be able to generate meaningful information for business efficiently, and respond quickly to new and changing information demands.

Easy to deploy and manage

To maximize the benefits of BI, companies require ease of deployment, use, and integration. For OEM partners and customers who have multiple sites, being able to easily and fully automate the installation, configuration and deployment of a solution is also critical.

For IT, it is easier to deploy and administer web-based and zero-footprint capabilities. Eliminating desktop deployments and their maintenance and upgrade cycles lets you deploy applications broadly with a browser. International Unicode support also makes globally deploying applications, especially in a multilingual environment, much easier.

Once the solution is deployed, IT must be able to manage it effectively. This means having visibility into the system to enable IT to manage proactively, identifying potential issues before they become problems and maintaining optimal system performance.



Scalability and reliability

Business intelligence is increasingly being deployed more broadly – beyond a few business analysts or power users, to end users at all levels of the organization, and via extranets to customers, partners, and suppliers.

To meet the needs of these users, a BI architecture must be highly reliable and scalable. The architecture must ensure high levels of performance, and deliver high availability with minimal down time. This is particularly important as BI applications grow in scope and sophistication: as demand for BI grows across an organization, the application must remain responsive.

Leverage existing assets for simplification and ROI

A modern BI architecture that builds on existing infrastructure helps maximize your return on current investments, and is deployable faster. Supporting complex, mixed application environments, and integrating with infrastructure elements such as platforms, databases, OLAP sources, web servers, web application servers, and security providers, minimizes implementation and maintenance costs.

An architecture built on existing infrastructure must also adapt to change; for example, it must leverage existing security, including information like user attributes, even though it may change over time. It also means having the option to use in-house expertise to leverage existing web infrastructure, network resources, operating systems, hardware, and database infrastructure.

Finally – and key to better performance management – a BI architecture should integrate seamlessly with other management systems, such as planning and budgeting.

Single open API for integration and extensibility

An application programming interface (API) lets you integrate business intelligence into other applications and systems, and vice versa. You require a single API, rather than multiple interfaces, covering all BI capabilities. BI OEM partners find this especially important. A single, documented API lets them leverage all BI capabilities, and integrate into custom applications, without compromising application functionality or time to market.

A modern business intelligence API demands the use of open web standards, such as web services, XML, SOAP, and WSDL. Increasingly, these standards are the common language of enterprise application development. They provide an open communications mechanism that IT groups can leverage to build applications faster, with fewer interdependencies among application components, using well understood technologies like JSP™ and ASP. In effect, the use of open standards, and modern service oriented architecture principles elevates application development beyond IT considerations to meet the real needs of the business.

Interoperability of BI capabilities

Business users need to access a single interface for all BI capabilities and IT must be able to enable more or less functionality to fit the need. This single interface lets business users navigate through scorecards, dashboards, or reports to get further detail all in one product, with content automatically maintained as they navigate. In addition, various users may collaborate when producing a report. A business user can author a simple ad hoc report and give it to others for their reference, or to a professional author to be enhanced or edited. The report then returns to the business manager, and they can share the finished report with intended recipients. Integrated security ensures that people can only view information for which they have authorized access.

Modern architecture for long-term enterprise value

Organizations require an architecture that can easily integrate, add, or remove additional services. In the past, organizations simply wrapped existing client server technology in web services. While this can be effective in the short term, client-server architectures are still tightly coupled, so changes or extensions to the client require changes to the server, and vice versa.

In contrast, a modern architecture is based on open standards, which provides greater flexibility. Modern standards are today defined by their design and construction using Services Oriented Architecture (SOA) principles and modern web services technologies. Modern architectures separate applications from the underlying infrastructure. It provides "loosely coupled" services, with clear separation between disparate application elements like data access and presentation.

The solution

Attributes of enterprise-scale BI architecture

These requirements are fundamental to business intelligence systems that will be deployed broadly across the organization, and all of these are delivered largely through the underlying architecture.

Usability	To reach the broadest possible audience, a BI solution has to recognize and accommodate different types of users through a common user experience, across all BI capabilities and on the full range of technology, including mobile devices. It must be highly searchable so that users can leverage BI information that the organization has already created.
Seamless interoperability	Single interface for all BI capabilities. IT can enable more or less functionality to fit the need. Navigate through scorecards, dashboards, or reports all in one product.
Common business view	For organizations with many data assets, applications, and users, it's critical that a BI solution delivers a common view of the business — so managers and knowledge workers never have to worry about the validity of their numbers versus others. The single view must be based on all the data, and the quality of the data must be maintained to ensure user confidence. Data modelers must be able to create an effective business model quickly, and readily modify it as the needs of business change over time.
Agility	If something within the organization changes — like a new business strategy, or a new enterprise application — the BI solution has to adapt accordingly.
Scalability	Enterprise BI deployments have to scale to thousands and tens of thousands of users across a global organization, and they must scale in a linear fashion.
Reliability	For most organizations, business intelligence is core to the running of the business or department. A BI system has to operate on a 24x7 basis, with redundancy for all capabilities and services.
Openness	Businesses intelligence has to be open — in terms of the data you can access, and for integration with existing and new applications, portals, security systems, and more.
Deployability	Deploying the BI system — actually getting information to users — in whatever format it's needed — has to be a simple activity, as does making changes to the way information is deployed.
Manageability	IT must be able to administer efficiently and proactively, ensuring that potential problems are identified early and avoided, and keeping the system operating effectively.
Leverage existing infrastructure	A BI solution has to work within existing environments, and leverage everything those environments have to offer: Web infrastructure, databases and OLAP data sources, security providers, application servers, and more.
Security	A BI solution has to work with existing security providers — often more than one — to ensure that access to both the BI system and the information in that system is always secured as required.

The IBM Cognos 8 BI architecture

The modern IBM Cognos 8 platform was first introduced with IBM Cognos ReportNet, the reporting product launched in 2003. Unlike many BI solutions that simply wrap legacy client-server components from multiple architectures in web services, the modern, open IBM Cognos 8 platform is designed and built a on a services-oriented architecture based on feedback from IBM Cognos enterprise customers and partners. It was built from the ground up to meet the needs of large-scale enterprise business intelligence deployments.

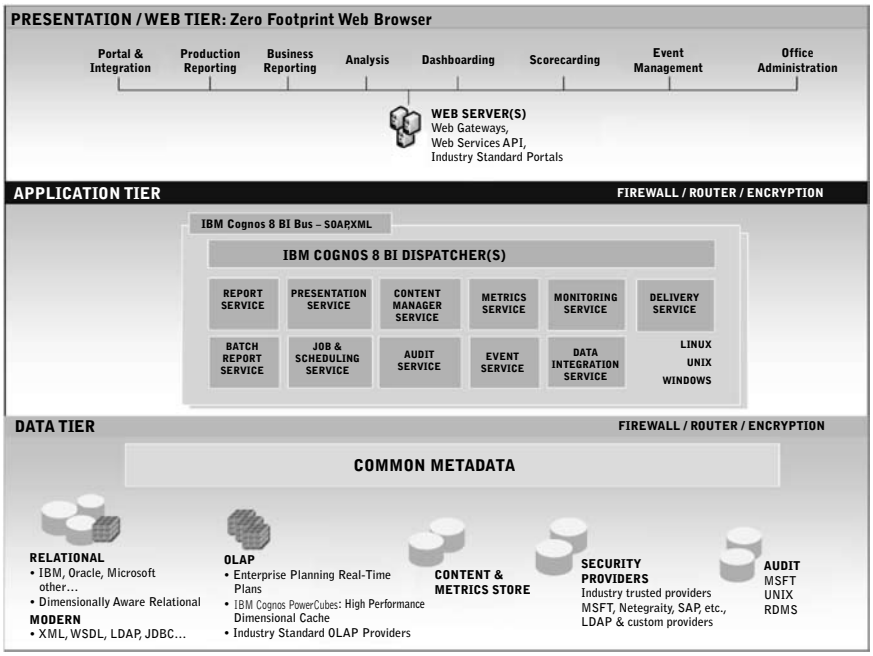
The modern IBM Cognos 8 platform underpins IBM Cognos 8 BI, delivering all BI capabilities on three distinct tiers:

- A presentation tier that handles all user interaction in the web environment.
- An application tier with purpose-built services used to handle all BI processing.
- A data tier that provides access to the widest range of data sources.

Security

The separation of the architectural components into tiers supports the secure deployment strategies demanded by large organizations whose data and infrastructure are secured and closely guarded by firewalls. This multi-tier approach also ensures that when a request is submitted to an IBM Cognos 8 BI installation, the right processing happens at the right level and in an optimal way to serve the broad range of business users. Processing on the presentation tier, for example, can mesh with existing load balancing routers, ensuring that as requests come in they are distributed appropriately.

The IBM Cognos 8 platform is built with web services to deliver BI from a single extensible and flexible platform. Everything is zero-footprint and web-based.



IBM Cognos 8 BI: all BI capabilities on a common modern architecture

The presentation tier

Deployability
Usability
Maintainability

Zero-footprint for broad adoption and deployment

The IBM Cognos 8 platform delivers all business intelligence capabilities in a zero-footprint, pure web browser-based user interface. BI users, BI authors, and BI administrators need nothing more than a web browser to perform tasks ranging from the simple consumption of reports to the creation of ad hoc queries and the authoring of more complex BI capabilities like dashboards.

Every capability is delivered via the browser, and unlike many other BI tools, there are no applets to download and no plug-ins to install or maintain. The IBM Cognos 8 platform delivers BI via a common user interface that uses simple web gestures to build and access a broad range of BI content. The result is high productivity across the board – from report authors, through to business managers and information consumers. BI is available across a range of technologies – in the traditional desktop environment, within applications such as Microsoft® Office, and on handheld mobile devices – and includes advanced search capabilities.

The administration of IBM Cognos 8 BI is also browser-based. Administrators can manage and tune servers. They can manage security – adding groups and users, and granting privileges to secured business intelligence content – again using only a browser. For large organizations, which are often geographically dispersed, this means administration can be distributed, allowing local or regional administrators to handle updates for users and roles while managing overall security centrally.

To ensure efficient system administration, IBM Cognos 8 BI has a single, intuitive IBM Cognos Administration interface that provides IT with visibility into all BI system activity and gives them the flexibility and control needed to manage the system proactively. Intuitive, at-a-glance metrics, role-based capabilities, queue prioritization, and resubmission features help ensure that IT can keep their BI system functioning optimally.

IBM Cognos 8 BI supports:

Infrastructure components	**IBM Cognos 8 BI Benefit**
Web Server	Use any popular Web Server, including Microsoft IIS, IBM WebSphere®, or Apache. The IBM Cognos 8 platform fits into this environment, with lightweight web gateways that forward incoming requests from the web browser through to the application tier.
Application Server	Leverage the power of in-place application servers, including BEA WebLogic, IBM WebSphere, SAP Netweaver Application Server, Oracle Application Server 10G.
Routers	Mesh cleanly with in-place load balancing mechanisms, ensuring optimal usage of hardware resources.
Portals	Integrate cleanly with widely used portal environments, like IBM WebSphere, Microsoft Sharepoint®, SAP Netweaver, and BEA Plumtree. In fact, the IBM Cognos 8 platform was built to integrate with portal environments that comply with the emerging Web Services for Remote Portlets (WSRP) standard. As a result, organizations will be able to integrate the IBM Cognos 8 platform into their enterprise portals — today, and in the future.

Leverage existing infrastructure

Lower costs by leveraging existing web infrastructure

Every organization has an in-place web infrastructure – and BI has to fit with that infrastructure. By working in whatever web environment is currently in place – and thereby leveraging existing skills and assets – the IBM Cognos 8 platform can reduce the effort and costs associated with getting an enterprise solution up and running.

Openness

Integrate business intelligence with existing applications

While business intelligence has become truly strategic in many organizations, it has to fit within a framework of existing business applications. Via a fully open and documented application programming interface (API), the IBM Cognos 8 platform provides an unmatched level of openness. You can integrate the full range of business intelligence capabilities into any existing system and choose from widely-used programming languages, such as Java®, C+, C++, Microsoft Visual Basic®, and others.

The IBM Cognos 8 Software Development Kit (SDK) exposes the same web services API used to build IBM Cognos 8 BI. The API is also accessible via Web Services Definition Language (WSDL), and can be consumed by any programming language that understands SOAP. All of the BI content in an IBM Cognos 8 platform configuration can be integrated with Java-based JSP applications, or within the Microsoft .Net® framework.

Leverage Microsoft Office expertise and more with IBM Cognos 8 Go! Office
Increasingly, BI must be delivered to users in different ways – wherever and whenever they need it. IBM Cognos 8 Go! consumer modes leverage the IBM Cognos 8 platform to provide business users access to mission-critical business intelligence using mobile devices, in search engines, and in familiar software applications such as Microsoft Office.

Business professionals in many organizations use Microsoft Office and other tools for viewing and manipulating data – most notably Microsoft Excel® and Microsoft PowerPoint®. IBM Cognos 8 Go! Consumer modes allow users to leverage existing skills while interacting with a corporate business intelligence system. They gain all the benefits of Microsoft Office tools in terms of interaction, formatting, and productivity, while remaining connected to the "common version of the truth" in the BI system. Perhaps most significantly – all of the most critical aspects of the BI system, like the security applied to published reports and analyses, as well as the organization of content for easy access by end users, is fully utilized in the Excel environment.

Web-based deployment and administration

Reporting on the IBM Cognos 8 platform uses a zero-footprint, web-based deployment model. This helps reduce the administrative burden on IT while improving user adoption. With pure web-based deployment and administration, IT does not have to install and manage client desktop software, minimizing deployment and maintenance costs. Designed for enterprise-level deployment, the IBM Cognos 8 platform offers proven scalability to hundreds of thousands of users through a multi-tiered, multi-server, multithreaded architecture. This design provides full failover recovery and dynamic load balancing. The single IBM Cognos Administration interface ensures that administering the BI solution is straightforward, efficient, and keeps the solution running optimally.

The application tier

The application tier is the mission control center of the IBM Cognos 8 platform — managing all incoming requests, both interactive and batch. The application tier automatically distributes requests in an optimal way, and provides a single set of standard-based services — such as a common query engine, scheduling, monitoring, auditing, and presentation.

Leverage existing infrastructure

Self-registering, self-starting servers

When configuring an enterprise scale system, it's important that the solution maintains the best possible level of service. For this to happen, incoming requests should automatically find their way to the appropriate server for best throughput.

In the IBM Cognos 8 platform, the optimal routing of requests in the application tier is the job of the dispatcher. This approach — dispatchers routing requests to purpose-built, distributed servers — is based on long-standing and fully-proven IBM Cognos experience with IBM Cognos PowerPlay.

The dispatcher is a multithreaded application that runs on whatever web application server or servlet container is in use in an organization. These include Apache, BEA WebLogic, IBM WebSphere, SAP Netweaver Application Server, and Oracle Application Server 10G — so you can integrate it into whatever current application server environment is in place at your organization.

The dispatcher's primary function is to manage the services on an IBM Cognos 8 server, and to route requests received from the gateways, forwarding them to the appropriate service to handle the request. In the IBM Cognos 8 platform, each dispatcher in a distributed system is self-registering. When you install the IBM Cognos 8 platform on a server, the dispatcher simply registers itself within that configuration, starts the services on that server, and lets the configuration know what services are available. This vastly simplifies the installation and configuration of a BI system, and it allows the system to scale easily across multiple servers.

Performance

Intelligent, configurable load balancing

Enterprise scale BI systems have to handle the high volumes of incoming user requests typical in large organizations. Whenever a request comes in — to run a report, to display a dashboard, to burst a scheduled report across a wide number of users, it's critical that the system handle it in a way that ensures optimal performance.

In the IBM Cognos 8 platform, requests are dispatched with load balancing built into the system. As requests come in, they are automatically routed to servers within the system in a weighted round robin fashion, based on defined server capacity. Requests are also routed based on the request's "affinity" level, which the dispatcher uses to decide whether the request should go to a specific server, or to any server in the configuration. This affinity can be derived from the actual nature of the request, or from the group or user role of the individual submitting the request — enabling servers to be dedicated to specific groups or users.

The capacity definition for any given server is completely flexible — if one server has twice the "power" of another in terms of memory and CPU speed, then it will automatically have twice as many requests dispatched to it. Additionally, every server in an IBM Cognos configuration can be tuned to adjust specific performance parameters — like the number of active request threads for any given service, timeout parameters, and the level of auditing applied to any given business intelligence activity.

Scalability
Reliability

Purpose-built, peer-to-peer services for reliability and Scalability

The services offered by the IBM Cognos 8 platform are the backbone of the system. Regardless of what kind of request is made – a simple report run, an analytical comparison across business dimensions, or the scheduled running of a business intelligence agent that detects key data events – the system has to provide services smoothly.

Every service in the IBM Cognos 8 platform application tier operates on a peer-to-peer basis. This means that no service needs to know any of the details about what any other service does, or is doing at any given point in time. Any service, on any machine, can service any incoming request. It also means linear performance characteristics, unlike other SOAs using a services 'hub'.

The nature of these services is such that there is complete separation of elements that should not be tightly bound – like presentation and data. The former are handled by a presentation service, while the latter are handled by the query service, based on the built-in business rules in metadata, and in defined security.

The result is complete fault tolerance and service redundancy – any request can be routed to and handled by any server in the system. If any server in a configuration fails, incoming requests are automatically routed to redundant servers thereby avoiding service interruptions. The services are also scalable, with the ability to add servers and enable or disable services based on demand. For example, it's a simple matter to dedicate a specific server in an IBM Cognos 8 BI configuration to report execution by disabling the other services on that particular server.

IBM Cognos 8 Bus

The open API for integrating the IBM Cognos 8 platform into other systems is used by all of the components and services. All the communication between the services in the IBM Cognos 8 platform configuration takes place on the IBM Cognos 8 Bus – which means that all services plug into a 'network'.

As a result, services are completely transparent in terms of location. Services communicate with one another using common messaging that leverage open web standards: SOAP, XML, and WSDL. The intra-service communication is coarse-grained in nature. This means each request typically handles a significant block of work. As a result, intra-service communications is optional. Additionally, intra-service calls can be encrypted, ensuring security in the application tier.

Common business view

One query engine and common metadata for consistent results

The importance of having a single query engine that delivers results based on common metadata – regardless of where or how that data is stored – is fundamental to a successful enterprise BI solution. If a solution has no common understanding of the data, and employs multiple query engines – for example, one access mechanism for production reporting, a second query engine for multidimensional reporting, and possibly a third for ad hoc query capabilities – then the very real possibility exists for inconsistencies across these various BI activities.

The IBM Cognos 8 platform employs a single query engine across all data sources, regardless of whether they are relational sources or dimensional sources. In conjunction with common metadata (discussed later in this paper), this means users can have confidence that the numbers in their reports will match those from other departments. Regardless of whether a user is accessing a relational data warehouse or a multidimensional data cube, the query engine will leverage defined metadata and generate underlying queries that return consistent results. Additionally, the single IBM Cognos query engine leverages modern data access standards, with queries that leverage the SQL 99 standard, MDX, and BAPI. The query engine leverages all of the strengths of the underlying data sources – including dimensionality.

Leverage existing infrastructure

Platform independence for flexibility

Another key element of the IBM Cognos 8 platform is environment independence. In terms of operating system, you can leverage your existing infrastructure, and install the IBM Cognos 8 platform on Microsoft Windows®, UNIX®, or Linux®.

This provides complete flexibility in terms of environment. And if you have multiple operating systems – for example Windows and Linux – you can configure your BI system across these heterogeneous environments.

The data tier

Openness

Large organizations typically have multiple data sources. At a departmental level, there may be a huge proliferation of data sources that make the delivery of business intelligence on an enterprise scale difficult. Most organizations have both relational data and multidimensional data. They may already have significant investments made in metadata. Even organizations that have managed to standardize their data strategy are potentially subject to multiple data sources as soon as they merge with another organization, or choose to grow through acquisition.

The IBM Cognos open data strategy

Many BI systems provide access to some of these sources. But only IBM offers access to all of them along with the ability to deliver a full range of business intelligence capabilities built on an open, enterprise-class platform.

IBM delivers a truly open data strategy, with the ability to access any data source or combination of data sources, develop common metadata across them for a common business view, and then leverage that common business view to deliver any business intelligence capability to any user.

The IBM Cognos open data strategy is founded on the fact that companies typically have the following approaches to data:

Most organizations access data directly, using native access to derive information from their systems. While the widespread application of BI against operational systems is not a recommended approach due to likely performance issues, there are times when direct access is required and can be used effectively.

- Most large-scale organizations likewise have significant resources invested in Extract, Transform, and Load (ETL) technologies to build data warehouses and data marts based on data from heterogeneous systems.
- For organizations where it does not make sense to replicate or transform data, or where such transformation is not possible, an Enterprise Information Integration (EII) approach can provide virtual, federated views across heterogeneous systems without moving the data in those systems. The IBM Cognos 8 platform includes EII capabilities out-of-the-box, via the Composite Information Server. Additionally, the IBM Cognos 8 platform can leverage EII capabilities from trusted partners like IBM, via IBM WebSphere Information Integrator.

By delivering data access capabilities within the framework of any approach — Direct, ETL, or EII — IBM makes it possible to deliver information using:

- All of the data sources at your disposal.
- Federated views of your multiple data sources.
- Existing enterprise data warehouses or data marts, with the ability to create new ones

Security
Leverage existing infrastructure

Centralized, maintainable, secured BI content

The assets managed by a business intelligence application are critical to the organization's business infrastructure – just as important as the underlying data assets in ERP systems, in relational databases, and in modern data sources like XML streams or web services. As with other critical assets that are used to manage the business, there can never be a loss of BI content under any circumstances.

In the IBM Cognos 8 platform, all business intelligence content is stored and maintained in one location – the Content Store. As with virtually all critical information assets, the best place to store business intelligence – including reports, metadata packages, configuration information, user and group preferences, and key metrics – is in a relational database management system. All of the value of a relational system – including performance tuning, security, backup and recovery, and global accessibility – can then be brought to bear on business intelligence applications.

The IBM Cognos 8 platform employs widely used relational databases as the storage mechanism for all BI content. Depending on your needs, BI content can be stored in IBM DB2® UDB, in Oracle, in Microsoft SQL Server®, in Derby, or in Sybase. And, as with all BI services in an IBM Cognos 8 platform configuration, redundancy is built into the system, with multiple instances of the Content Store for failover and reliability.

Common business view

Common metadata for a common view of the business

With so many data assets to manage, organizations are often plagued by inconsistencies. Many tools today can access a broad range of data, and deliver it to users as business intelligence in one form or another. It's of questionable value, however, if that business intelligence is not based on a common understanding of the business. If the marketing manager's pipeline report contains numbers that conflict with the numbers that the sales manager uses, there's an automatic conflict – and an automatic loss of credibility across the board.

The IBM Cognos 8 platform provides a common metadata view across the organization. With powerful metadata modeling capabilities delivered as part of the system, IT groups can build enterprise-scale metadata models that span the broadest BI requirements. IT can use Framework Manager to build comprehensive data models that span a huge range of data assets and deliver information from them in a consistent, enterprise-wide version of the truth that crosses relational and dimensional data sources. A single metadata model can be built on metadata derived from diverse data sources, like Oracle, Microsoft SQL Server, and a modern source like XML or JDBC via the Composite Information Server. Teams of modelers can work independently, on different parts of a model, and combine their work. They can also use a single model to deliver different packages of information to different types of users.

It's important to note that when importing metadata from various sources, Framework Manager leverages everything it can from the data source in terms of metadata, including joins, cardinality, dimensions, hierarchies, attributes, and measures. For example, when importing from IBM DB2 Cube Views, virtually all of the dimensional information inherent in that system is brought into Framework Manager – making the journey to metadata-driven business intelligence a fast process.

The IBM Cognos 8 platform can also leverage existing metadata assets from a wide variety of sources, like ErWin. In fact, you can import metadata as XML from sources that are Common Warehouse Model (CWM) compliant.

Deployability

Powerful multilingual capabilities and UNICODE for global deployments

A core design principle of the IBM Cognos 8 platform is global deployability.

Security
Leverage existing infrastructure

Support for global deployments is built into the metadata layer. With no coding whatsoever, metadata models can drive multilingual deployments. Business intelligence deliverables – reports, in-depth analyses, dashboards, and scorecards – can be delivered in any language or locale from one UNICODE server. At runtime, the local settings in a user's browser directs IBM Cognos 8 BI to render results in the appropriate language, using appropriate locale settings for variables like currency and the formatting of monetary values.

Security

Leverage in-place security assets

Every business intelligence application of any scale has to be secured. Regardless of how data is being delivered – as managed or production reports, as ad hoc queries, as analyses, as dashboards or scorecards, or as agents that drive information to users – that information has to be seen only by those authorized to see it. Moreover, where the security of information over the web is a concern, information has to be encrypted to a level that assures the organization that its data assets won't fall into the wrong hands.

The IBM Cognos 8 platform leverages the widest range of in-place security assets, in three critical areas:

- **Authentication:** The IBM Cognos 8 platform uses whatever authentication mechanism or provider is in place, regardless of how users in your organization log on to the system. It supports Microsoft Active Directory®, Windows NTLM, Netegrity SiteMinder, LDAP, existing IBM Cognos namespaces, or combinations of these where multiple security providers are in play.
- **Authorization.** Within the IBM Cognos 8 platform, security can be applied at virtually any level – starting with secured access in the metadata model to query subjects, to rows, to columns, or to entire published business intelligence packages. Additionally, within the common portal environment, security can be applied to specific objects and capabilities – like reports, analysis, dashboards and scorecards, and agents. It can also be applied to folders that contain any combination of these objects.

- **Encryption.** In many business intelligence environments, encryption is a basic requirement. The IBM Cognos 8 platform provides cryptographic services that apply to all information, including transient communications between services and static or temporary data artifacts generated by the system. The standard cryptographic provider employs SSL, and includes trusted communications with digital signing of SOAP-based messages on the IBM Cognos 8 Bus. Strong encryption of up to 168 bits is available via enhanced cryptographic providers.

An important distinction with the IBM Cognos 8 platform cryptographic services are the "across-the-board" encryption capabilities. If required, all inter-service communication between services in the application tier can be fully encrypted.

When a company is sharing information, legal and regulatory compliance may include a requirement to secure information; for example, to ensure the accuracy of financial reporting in the case of SOX compliance, or for protecting the privacy of health information in the case of HIPAA.

Comprehensive auditing

Logging is fundamental to many BI applications – for example, to meet SOX reporting requirements and for audits. Charge-back requirements often mean you need to know who is hitting what system, when, and for how long.

In the IBM Cognos 8 platform, comprehensive auditing is provided across services and audit results can be centralized. All logging from all servers can be directed to one location if desired. Auditing levels are adjustable and can be set or directed to a location of your choice – 3rd party databases, UNIX System Log, or Windows Event Viewer. The auditing model and sample associated reports are based on published schema and provided out of the box.

Conclusion

A modern and innovative architecture demands a whole product solution – one that can be supported and expanded going forward. It requires backing by a vendor with a solid reputation for high quality and high-value innovation. A modern architecture must be built on a solid foundation, demands confidence in your choice of vendor, and necessitates a partnership-style commitment to customer success by an industry leader that understands the enterprise.

Built by an industry leader, the IBM Cognos 8 platform meets all the criteria needed to effectively enable enterprise-scale business intelligence: considering diverse information needs of all users; providing long-term value; keeping maintenance costs down; and leveraging existing assets without duplicating existing infrastructure. Guided by an open data strategy and backed by an industry leader, the open, enterprise-class IBM Cognos 8 platform provides the best foundation to easily deploy, use, and integrate a BI solution.

The IBM Cognos 8 platform was built with your present and future needs in mind. A solid foundation for enterprise BI, it reduces IT workload, improves productivity, and makes better use of IT budget. It enables a single version of the truth and improved business decision-making across the enterprise.

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About IBM Cognos BI and Performance Management

IBM Cognos business intelligence (BI) and performance management solutions deliver world-leading enterprise planning, consolidation and BI software, support and services to help companies plan, understand and manage financial and operational performance. IBM Cognos solutions bring together technology, analytical applications, best practices, and a broad network of partners to give customers an open, adaptive and complete performance solution. Over 23,000 customers in more than 135 countries around the world choose IBM Cognos solutions.

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