

Cloud ready business intelligence with Oracle Business Intelligence 11g

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Executive Overview

Business Intelligence (BI) on the cloud represents the coming together of two key information technology (IT) trends – evolution of the cloud computing architecture as a cost effective, quick and efficient computing platform and use of business intelligence technology to reduce cost, gain insight and improve the quality and speed of business decisions. Leading analyst firms like Gartner and IDC are predicting high adoption rates for applications deployed on private and public clouds.

Oracle is committed to delivering hardware and software solutions that are complete, open and integrated. Cloud computing is driving a significant part of Oracle's product development plans – from enterprise applications to middleware, business intelligence technology, databases, servers and storage devices, as well as cloud management systems. Taken together, these developments are building off Oracle's decade long leadership in underlying technologies like grid computing, clustering, server virtualization and dynamic provisioning, SOA, identity management and large scale management automation.

Oracle is committed to delivering business intelligence solutions that can be deployed both on the cloud and non-cloud mode. Oracle Business Intelligence 11g, Oracle's market leading BI platform has been architected to support both cloud and non-cloud deployments. A web services based SOA architecture along with full BI functionality and high scalability and manageability makes Oracle BI 11g suitable for cloud type deployment. This whitepaper provides an overview of cloud computing along with Oracle's cloud computing strategy and significant features of Oracle BI 11g that make it well suited for cloud deployments. The whitepaper also presents examples of customers who have deployed Oracle BI on the cloud.

Introduction to Cloud Computing

National Institute of Standards and Technology, an agency of US department of Commerce, defines cloud computing as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

According to NIST, this cloud model promotes availability and is composed of five essential **characteristics**, three **service models**, and four **deployment models**.

Essential Characteristics:

- *On-demand self-service.* A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.
- *Broad network access.* Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs).
- *Resource pooling.* The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.
- *Rapid elasticity.* Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.
- *Measured Service.* Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

Service Models:

- *Cloud Software as a Service (SaaS)*. The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings. Oracle CRM on Demand is an example of this service model.
- *Cloud Platform as a Service (PaaS)*. The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.
- *Cloud Infrastructure as a Service (IaaS)*. The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select *networking components* (e.g., *host firewalls*). Amazon's EC2 and S3 are examples of this service model.

Deployment Models:

- *Private cloud*. The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.
- *Community cloud*. The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.
- *Public cloud*. The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.
- *Hybrid cloud*. The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or

proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

Choosing the right Deployment Model

The choice of the right deployment model is influenced by a number of factors including cost, manageability, integration, security, compliance and quality of service. The following table summarizes how each deployment model compares on the influencing attributes:

Attribute	Deployment Model			
	Private Cloud	Hybrid Cloud / Community Cloud	Public Cloud	Non Cloud
Upfront Costs	High	Medium	Low	High
Ongoing Costs	Low	Medium	High	High
Security	High	Medium	Low	High
Compliance	High	Medium	Low	High
Quality of Service	High	Medium	Low	High
Integration	High	Medium	Low	High
Configurability	Medium	Medium	Low	High

Based on the above it can be inferred that although cloud computing offers compelling benefits in terms of high efficiency, high availability, elastic scalability and fast deployments; serious concerns remain around security, compliance and quality of service. So, depending on the requirement, organizations are most likely to adopt a mix of cloud and non-cloud deployments.

Oracle Cloud Computing Strategy

Oracle's overall corporate strategy is to provide the industry's most complete, open and integrated set of products from applications to disk. For cloud computing, Oracle's strategy is to:

- **Ensure that cloud computing is fully enterprise grade** – Oracle provides enterprise grade technology for high performance, reliability, scalability, availability, security and portability/interoperability (based on standards). Enterprises demand these characteristics before moving important workloads to a public or private cloud.
- **Support both public and private clouds to give customer choice** – Organizations are adopting different deployment models for cloud computing for different applications at

different rates of speed, so Oracle supports customers no matter what type of cloud or non-cloud they choose.

- **Deliver most complete PaaS and IaaS product offerings** – Oracle provides the most complete portfolio of software and hardware products to enable organizations to build, deploy and manage public and private platform as a service (PaaS) and infrastructure as a service (IaaS).
- **Develop and enable rich SaaS offering** – Oracle offers a broad portfolio of horizontal and industry applications that are deployed in either a private shared services environment or in a public SaaS model.

While there is still significant debate on when and how the different dimensions of cloud computing will become viable for different industries and businesses, there is broad agreement that it will have an increasing impact on nearly every IT organization. According to Gartner, 25% of all software will be deployed via the cloud computing model by 2011. Cloud computing is driving a significant part of Oracle's product development plans – from enterprise applications to middleware, databases, servers and storage devices, as well as cloud management systems. Taken together, these developments are building off Oracle's grid computing architecture to create an out-of-the-box solution for cloud computing.

Introduction to Oracle Business Intelligence

Oracle Business Intelligence 11g is a comprehensive business intelligence platform that delivers a full range of capabilities—including interactive dashboards, ad hoc queries, notifications and alerts, enterprise and financial reporting, online analytical processing (OLAP) analysis and presentation, high volume production reporting, scorecard and strategy management, business process invocation, search and collaboration, mobile, integrated systems management and more. OBI 11g is based on a proven Web service-oriented architecture that integrates with an organization's existing information technology (IT) infrastructure for the lowest total cost of ownership (TCO) and highest return on investment (ROI). OBI 11g provides complete, relevant insight to everyone in an organization and that, in turn, results in better decisions, informed actions, and more-efficient business processes.

Complete Business Intelligence Functionality

Oracle Business Intelligence 11g delivers the widest and most robust set of reporting, ad hoc query and analysis, OLAP, dashboard, and scorecard functionality with a rich end user experience that includes visualization, collaboration, alerts and notifications, search and mobile access.

Open Business Intelligence System

Oracle Business Intelligence 11g integrates with any data source, ETL tool, business application, application server, security infrastructure, portal technology as well as any ODBC compliant third party analytical tool. The suite accesses data from multiple heterogeneous sources—including popular relational and multidimensional data sources and major ERP and CRM applications from Oracle and SAP.

Integrated Business Intelligence System

Oracle Business Intelligence 11g is based on an architecturally integrated technology foundation built on an open, standard based service oriented architecture. The suite features a common enterprise information model, common security model and a common configuration, deployment and systems management framework.

Business Intelligence on the Cloud: Considerations

Business Intelligence systems are gaining popularity as more and more organizations realize the benefits of data analytics. Small and large organizations across industry verticals and geographies are benefiting from analyzing data and taking informed business decisions. According to IDC, a leading market research firm, "Preliminary market sizing suggests that the business intelligence tools software market grew 2.6% in 2009 to reach \$8.1 billion. Given the current market assumptions regarding the global economy and demand drivers in the BI tools software market, IDC forecasts this market to grow at a compound annual growth rate of 6.9% through 2014 to \$11.3 billion".

In light of the benefits that BI brings the adoption and growth rate for BI solutions would be much higher if it wasn't for factors like cost and speed of deployment. This is where cloud based BI solutions can help. By deploying the BI solutions on a cloud based computing architecture, organizations can analyze their data and take informed business decisions in a timely and cost effective manner. Both IDC and TDWI are predicting a surge in demand for cloud based BI solutions. However, Wayne Eckerson, the director of research at TDWI, cautions "SaaS BI model addresses bona-fide pain points and offers a lot of promise to reduce costs and speed deployment but only for companies whose requirements are suitable to cloud-based computing". Clearly, cloud computing offers compelling benefits in terms of high efficiency, high availability, elastic scalability and fast deployments but serious concerns remain around security, compliance and quality of service.

Eckerson's remarks bolster Oracle's view that, depending on the requirement, organizations are likely to adopt a mix of cloud and non cloud deployments. This further validates Oracle's strategy of delivering industry's most complete, open and integrated products to meet diverse customer needs.

In the BI world, Oracle offers customers choices by supporting multiple deployment models including public, private cloud and non-cloud deployments.

Oracle BI on Cloud

Cloud based systems are characterized by features like on-demand self service, broad network access, resource pooling, rapid elasticity and measured service. Oracle is a leader in many of the underlying technologies behind cloud computing and cloud computing is driving a significant part of Oracle's product development plans – from enterprise applications to middleware, databases, servers and storage devices, as well as cloud management systems. These developments are building off of Oracle's grid computing architecture to create an out-of-the-box solution for cloud computing.

Oracle recognizes the importance of the business intelligence systems in providing insight and improving the quality of decision making. Business Intelligence remains a key investment area for Oracle and Oracle is investing heavily to bring cloud ready business intelligence software to market. Oracle's product strategy has always been to offer complete, open and integrated solutions. Oracle recognizes business analytics as the key differentiator and is working towards embedding the BI capabilities in transactional applications to deliver real-time in-process analytics. This integrated analytics view has had a material impact on how the Oracle BI platform has been architected and why Oracle BI is easy to deploy on the cloud.

Oracle BI 11g features a web-service based service oriented architecture for easy integration into an organization's existing IT systems. Architected for scalability, manageability and performance Oracle BI 11g features the following capabilities which make it a natural choice for cloud deployments:

- **Oracle BI Server.** A highly scalable, highly efficient query and analysis server that integrates data via sophisticated query federation capabilities from multiple relational, unstructured, OLAP, and pre-packaged application sources, whether Oracle or non-Oracle. It provides common services such as data access; analytic and calculation infrastructure; metadata management; a semantic business model; a security model and user preferences; and administration tools. It is designed to provide mission-critical scalability and performance with data source-specific optimized request generation, optimized data access, advanced calculation, intelligent caching services, and clustering.

Cloud deployments require the system to provide ubiquitous, convenient access to shared pool of computing resources. Oracle BI Server's ability to present a single, integrated, consistent view of the enterprise metadata while enabling federated access to multiple organizational data sources makes it a good fit for cloud deployments.

- **Common Enterprise Information Model.** Ability to create a common enterprise information model, a centralized metadata model spanning multiple organizational data sources including relational, multidimensional, flat file etc. In addition to the typical semantic layer functions of providing end users with simple business terminology and hiding the complexity of queries, it provides powerful federation of multiple data sources into a single model; elegant navigation of aggregates, partitions and other "fragments;" rich dimensional,

multi-pass calculations; and a powerful, shared security model. The common enterprise information model is key to delivering a system that provides consistent, common, integrated access to multiple organizational sources; a key requirement for cloud ready systems.

- **Oracle BI's metadata driven architecture.** Cloud architected systems are characterized by shared access, single instance and multi-tenancy. So, to service a diverse set of users via a single application instance, the system should be highly configurable and flexible. Oracle BI is completely metadata driven. The system stores the definition of reports, queries, prompts, filters and dashboards etc. as metadata objects which can be secured and shared across users. This metadata driven design provides the flexibility and configurability required by cloud deployments.
- **Oracle BI Presentation Services.** The key to serving a diverse set of users with a single system instance is flexibility. Oracle BI's presentation services supports a wide array of delivery channels, so users can receive information in the way that fits how and where they work. Delivery channels like dashboards, reports, ad-hoc analysis, alerts, mobile, web and disconnected provide support for a broad spectrum of end user needs.
- **Industry Standards-based Open systems.** A key requirement for cloud ready deployments is the ability to coexist and integrate with diverse enterprise systems. Because OBI 11g is designed to easily integrate with existing data sources and IT infrastructure, organizations can protect existing IT investments while extending their BI capabilities. OBI 11g integrates with any data source; ETL tool; business application; application server; security infrastructure; portal technology; and other front-end and analytical tools. The suite accesses data from multiple heterogeneous sources—including popular relational and multidimensional data sources and major ERP and CRM applications from Oracle, SAP etc. OBI also integrates with standard portals, Web services, and authentication technologies. This open architecture delivers flexibility and easy integration, two of the key requirements for cloud deployments.
- **Integration.** Integration is a key driver of Oracle's overall product strategy. Oracle is committed to delivering solutions that are complete, open and integrated. Oracle BI 11g has been architected for easy integration into enterprise systems. Oracle BI 11g's web services based service oriented architecture delivers key integration and extensibility capabilities. As a testament to Oracle BI's integration capabilities, Oracle BI has already been integrated into multiple middleware and ERP applications from Oracle and it is the analytics and reporting engine of choice for market leading applications like Oracle ERP, PeopleSoft, Siebel and JD Edwards.
- **Metered Usage.** An important aspect of cloud deployments is metered use for purposes of charge back or customer billing. Oracle BI 11g's usage tracking feature provides insight into BI system usage for purposes of charge back for private clouds and customer billing for public clouds. When usage tracking is enabled, the Oracle BI Server collects usage tracking data for each query and writes statistics to a usage tracking log file or inserts them

directly to a database table. A number of pre build usage tracking reports provide insight into system usage by users for charge back or billing purposes.

- **Cloud ready Oracle BI Infrastructure Services**

- **Clustering.** System uptime and reliability are key requirements for cloud deployments. Oracle BI 11g is designed for high availability and fail over. The ability to distribute Oracle BI components across multiple hardware boxes along with the ability to cluster multiple instances and automatic failover using Oracle Process Monitoring and Notification service (OPMN) make Oracle BI suitable for systems with tight Service Level Agreements (SLA) requirements.

- **Caching.** Performance is a key consideration for cloud deployments. Oracle BI is designed for scalability and performance. Oracle BI's intelligent caching features including disk based caching and multi – level caching including web server, database server and Oracle BI server deliver huge performance improvements in some instances up to 80% for dimensional browsing.

- **Identity Management and Single Sign on.** Oracle BI 11g is designed to support multiple Oracle and non-Oracle identity management and single sign on solutions. Oracle Business Intelligence provides an open interface to enable web integration with Single Sign-On (SSO) products. Any SSO product that complies with industry standard techniques for passing authentication credentials can achieve SSO integration with Oracle BI. An open identity management and SSO platform are key requirements for cloud deployments.

- **Authentication mechanisms.** Oracle BI 11g supports a wide range of authentication platforms including most of the commonly available LDAP providers. Moreover support is available in both Secure Socket Layer (SSL) and regular (non-SSL) modes.

- **Common Systems management.** Oracle BI's systems management capabilities simplify tasks associated with deployment, configuration and management thereby delivering a highly secure, reliable and scalable BI platform. Oracle BI 11g uses Oracle Enterprise Manager (OEM) for all tasks associated with deploying, configuring and managing the BI deployment. Oracle Enterprise Manager is the same tool used to manage multiple Oracle products including database, ERP applications and middleware products. In addition Oracle Enterprise Manager is the tool of choice to manage both cloud based and non-cloud deployments. This centralized, single tool approach to systems management delivers high ROI and low TCO.

Oracle BI on the Cloud – Deployment Examples

A number of customers and SaaS providers have deployed Oracle BI on the cloud. Two examples of such deployment include – Oracle CRM on Demand and Xactly Corp.

Oracle CRM on Demand, Oracle's SaaS based CRM offering is an industry leading SaaS based CRM solution. Oracle CRM on Demand offers the industry's most comprehensive CRM solution by delivering complete, fully interactive analytic capabilities that allow users to gain deep insight into their business. By combining real-time and historical prebuilt and ad hoc reports, Oracle CRM on Demand is the only CRM solution that delivers actionable insight at the speed of business. Incorporating Oracle's industry leading business intelligence capabilities in a SaaS deployment model, Oracle CRM on Demand delivers "analytics everywhere." From the Oracle CRM on Demand home page to dashboards embedded throughout the application, Oracle CRM on Demand makes actionable, up-to-the-moment business intelligence available to employees at all levels. With one click, not only can users drill down into detailed data to gain further insight into their business, but they can also conduct historical and comparative trend analyses to gain insight into emerging opportunities and critical issues. In addition, Oracle CRM on Demand provides conditional formatting capabilities for graphical real-time alerting, enabling users to quickly identify and respond to changes in business trends. Oracle CRM on Demand's integrated use of Oracle BI platform in a SaaS delivery model is a testament to Oracle BI's scalability, configurability and manageability in supporting a cloud based SaaS delivery model.

Xactly Corporation is a leader in SaaS based sales compensation management software. Over 125 companies and thousands of users across the world use Xactly's solutions every day. Xactly is using Oracle Business Intelligence to deploy an analytics solution that helps customers track and analyze what they have sold, to whom, where, through which channels, and at what discounts. The analytics application provides out-of-the-box dashboards for common functions, such as sales incentive analysis, sales performance analysis and product performance analysis reports, and dashboards that work immediately without any customization or configuration. Oracle Business Intelligence helps Xactly deliver advanced reporting capabilities as well as dashboard creation tools that help end users gain value much more quickly.

The ability to scale to a broad user base, intuitive dashboards and reports, metadata based design, multi-tenant support, ability to access multiple data sources via a single, common metadata layer were cited as some of the reasons why Xactly choose Oracle BI to power analytics on its SaaS platform.

Customers and partners have also deployed Oracle BI applications, Oracle's purpose build pre-packaged CRM and ERP analytical applications on the cloud. One such example is the solution offered by Step Ahead Solutions, an Oracle partner. Step Ahead's try-before-you-buy On-demand Lab is a unique offering where prospect clients are able to rent out solutions, run trials, and explore the capabilities of Oracle business intelligence before making a decision to buy.

Conclusion

In conclusion, Oracle BI is a highly scalable, manageable, configurable, extendable and easy to use platform that is well suited for both cloud and non-cloud deployments. Oracle BI's web services based SOA architecture, metadata based design, standards based security integration, common federated access to multiple data sources and common systems management capabilities make it a good fit for both cloud and non cloud type deployments. Organizations must careful evaluate their system requirements before deciding on a cloud or non cloud deployment model but either way Oracle BI's scalable and flexible modern design makes it a good fit for any business intelligence system.



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