

# Oracle BI Suite Enterprise Edition Plus Oracle Database Integration

*An Oracle White Paper  
September 2007*

# Oracle BI Suite Enterprise Edition Plus / Oracle Database Integration

## INTRODUCTION

This paper will articulate the integration points between Oracle BI Suite Enterprise Edition Plus and Oracle Database, as well as the inherent value proposition of the combined solution.

Oracle BI EE Plus is an industry leading BI tool suite and foundational technology stack for BI application development. It is a central pillar in the Oracle Fusion Middleware product line and fully aligned with core Fusion's hot-pluggable and low total cost of ownership tenets. Oracle BI EE Plus is optimized to run on a diverse stack including a wide range of hardware/OS environments, applications servers and data platforms.

Oracle Database is the worldwide leading platform for data warehousing. Many of the world's largest database, most complex customers, and multitudes of independent software vendors have integrated Oracle Database as part of their business intelligence solution.

The reality of the business environment is customers have heterogeneous BI environments with a mix of hardware, applications and databases across vendors. The ability to integrate across various architectures is a requirement to be competitive in the BI space.

Oracle has an extensive technology partner network. Oracle BI EE Plus has integration and optimization to many of Oracle Database's competitors. Likewise, many of Oracle BI EE Plus' pure-play BI competitors have optimized their products and partnered with Oracle Database.

Oracle operational applications, for that matter, can run on non-Oracle platforms and pure-play BI vendors market non-Oracle BI solutions. Furthermore, Oracle BI Applications are hot-pluggable with regard to underlying hardware and database platforms.

This is not to say that there are not distinct advantages to customers who centralize their architecture with Oracle technology and applications. In addition to the benefits of centralized account management, single point for support and all the other advantages customers gain by working with a single vendor, customers realize

actual technical integration value that simply cannot be matched with loosely integrated solutions that are not strategically aligned.

It is important to differentiate loose integration features 3<sup>rd</sup> party products get “for free” by simply plugging into part of the Oracle technology offering, from truly compelling features surfaced through synergies and tight integration that can only be achieved with combined Oracle technologies.

Oracle’s strategy is to demonstrate incremental advantage as customers integrate more and more Oracle technologies in their architecture without sacrificing openness and portability in heterogeneous environments. Integrating Oracle technologies is easier, faster, less resource intensive and more maintainable (lowest total cost of ownership) than integrating various 3<sup>rd</sup> party tools. Oracle has already done work in-house to make this possible.

This paper will outline not simply the “free” value customers gain by deploying Oracle BI EE Plus or Oracle Database, but rather emphasize those unique value points that come from integrating Oracle BI EE Plus and Oracle Database together.

Better Together.

## **ARCHITECTURE**

This first key point is hardware architecture. A quick look at the Support Platforms documents for Oracle BI EE Plus and Oracle Database demonstrates alignment on hardware and operating system platforms, including Oracle Enterprise Linux. This provides the ability for customers to continuously scale and leverage hardware and support resources across the BI solution.

## **SYSTEMS MANAGEMENT**

Oracle Enterprise Manager is the central console for managing and monitoring Oracle technologies. Oracle Enterprise Manager provides a graphical interface for administration of the entire BI stack negating the need to learn or move in and out of various administration applications or command line tools. It is important to note Oracle Enterprise Manager is the same interface used to administer other integrated middleware applications like Oracle Identity Management and SOA.

## **SECURITY**

Few things are more important to Oracle than system security, be it at the application or database levels. Oracle technologies are secured and hardened with the strictest policies in the industry. Integration features are closely tracked specifically for adherence to security requirements.

## **Authentication, Authorization and Single Sign-on**

Oracle BI EE Plus and Oracle Database are easily integrated to leverage the same authentication mechanisms. Oracle BI EE Plus can authenticate against accounts

in the Oracle Database or through centralized directory servers like Oracle Internet Directory.

Authorization, or access control, can be generically managed through Oracle BI EE Plus initialization blocks that query for user/role assignments in a data store like the Oracle Database. Oracle Applications consume content provided by Oracle BI EE Plus. To ensure appropriate user visibility, an Oracle BI EE Plus/Oracle Database solution leverages these user/role assignments in the application and enforces FND security through mechanisms that transparently pass ICX cookies and executes PL/SQL procedures to enforce Oracle Database security.

Single Sign-On solutions, like Oracle Single Sign On, are deployed through configuration setting in Oracle BI EE Plus and respected as queries are carried through to Oracle Database source.

### **Virtual Private Database and Oracle BI EE Plus Query Caching**

Oracle Database has a powerful data access control mechanism, Virtual Private Database (VPD) that allows multiple users to access the same schema, but ensures individual user access to relevant data based on security profiles.

Oracle BI EE Plus has query caching capability that allows the Oracle BI Server to reroute previously executed requests to a set of cached results, improving end-user query performance by negating the need to send another request to the database.

Oracle BI EE Plus is made aware of Virtual Private Databases through its enterprise semantic model. End user queries that access VPD instances are configured to execute database commands on connect to invoke the VPD security profile in the database, ensuring results fetched from the database as fully protected.

Oracle BI EE Plus has functionality similar to VPDs called security filters that are part of the enterprise semantic layer. These security filters are effective in securing result sets that are executed through Oracle BI EE Plus, but are not helpful when other applications bypass Oracle BI EE Plus and query the Oracle Database directly. Fully leveraging VPDs and security profiles built into the Oracle Database can provide the lowest total cost of ownership for Oracle customers with multiple query tools accessing the Oracle Database.

Oracle BI EE Plus further respects the cached result sets from VPD generated queries and ensures that cached/filtered results are only leveraged for users with the same security profile.

### **ANALYSIS, CALCULATION/COMPUTATION AND SQL GENERATION**

Oracle BI EE Plus takes end-user queries based on an enterprise semantic business model, generates optimized physical queries to the appropriate data stores, and returns the result set to the user.

Oracle BI EE Plus supports a universe of calculation capabilities regardless of the physical data source it accesses. The general model is to push down (or “function ship”) query processing into the underlying database and return optimized result sets for further processing on the Oracle BI EE Server. Anything that cannot be pushed down for processing in the physical source is processed on the Oracle BI EE Server tier.

Oracle Database is a very powerful data source, allowing Oracle BI EE Plus to push down processing to a great extent and maximize performance. Oracle BI EE Plus has optimized gateways and SQL generation capabilities to Oracle Database sources. The Oracle BI EE Plus semantic layer further allows the use of HINTS to be embedded in Oracle Database sources to tune performance.

Far beyond generating standard ANSI SQL, Oracle BI EE Plus’ Oracle gateway generates Oracle Database specific SQL syntax, pushes down standard, analytic and multi-grain windowing functions, automatically materializes sub-queries via WITH clauses, leverages inner, outer and full outer joins and much more. It should be noted that Oracle BI EE Plus has developed and is enhancing gateways for other Oracle database platforms like Oracle TimeTen in memory database, Oracle Retail Predictive Application Server and Oracle Hyperion Essbase.

To further exploit Oracle Database, the EVALUATE features in Oracle BI EE Plus allows for infinite extension of the function push down capability. EVALUATE functions allow for the configuration of highly specialized Oracle functions (statistical functions, Oracle OLAP calculations, Oracle Data Mining functions, etc.) or custom PL/SQL functions developed by the customer.

As new features and functions are being developed on the Oracle Database, rapid uptake can be expected by Oracle BI EE Plus.

Oracle Database has extensive performance and scalability features (Real Application Clusters, Partitioning) from which any query tool benefits. Oracle BI EE Plus certainly benefits from these database features and optimizations as well.

Materialized View (MV) and transparent query rewrite capability is a core feature in an Oracle Database deployment. It provides the mechanism to populate and maintain aggregated data stores which the Oracle Database uses as it intercepts incoming queries to rewrite to the aggregated MVs. The release of Oracle Database 11g has extended this MV capability by providing cube oriented materialized views which leverage all the performance capabilities of the Oracle OLAP option.

All query tools on the Oracle Database benefit from a well designed MV deployment; Oracle BI EE Plus is no exception.

Oracle BI EE Plus has a middle tier transparent query rewrite / aggregate navigation capability as well. It is especially effective for customers with multiple, federated data sources as Oracle BI EE Plus can rewrite queries across data sources.

Oracle BI EE Plus has a very extensive enterprise semantic (metadata) model that defines the dimensional model and aggregated sources. One of the benefits of the semantic model is optimized end to end performance.

The key to a good, pervasive aggregation strategy is ensuring that incoming queries are consistently routed to the aggregated data stores. More and better metadata (dimensionality, foreign keys, etc.) available to the rewrite engine, ensures optimal rewrite capability. Without the metadata, rewrites are largely limited to exact query matching where a large, difficult to maintain, number of aggregates is required to support performance requirements. Metadata also allow for the engine to rewrite specialized queries to smaller, interrelated set of aggregate tables that can support a large universe of queries.

The Metadata Exchange feature in Oracle BI EE Plus provides the mechanism to export the dimensional model in the Oracle BI EE Plus enterprise semantic layer into a format consumable by the Oracle Database.

Oracle BI EE Plus can then either do the rewrite at the application layer or the Oracle Database can leverage the dimensionality generated by Oracle BI EE Plus to augment its MV query rewrite capability.

The Metadata Exchange has further benefits beyond straight query rewrite. As dimensional metadata is exposed in the Oracle Database, star joins can be leveraged for huge performance benefits. In addition, the SQL Access Advisor has more information to help generate data model optimization recommendations.

## **ORACLE SPATIAL**

Oracle BI EE Plus integrates well with the Oracle Spatial and Oracle Mapviewer to provide extensive an extensive analytic mapping and visualization solution. Oracle Spatial is an option for the Oracle Database that provides advanced spatial features to support high-end GIS and LBS solutions. Oracle MapViewer is an Oracle Application Server Java component used for map rendering and viewing geospatial data managed by Oracle Spatial. When integrated together, analytic content from Oracle BI EE Plus works dynamically and interactively with the Oracle mapping visualizations components.

## **ORACLE OLAP**

Oracle OLAP is a highly performant and powerful calculation engine accessible by Oracle BI EE Plus. Through straight forward configuration, Oracle BI EE Plus can generate highly specialized SQL pushed down to Oracle OLAP.

Oracle BI EE Plus works well with Oracle OLAP 10g, but with the release of Oracle Database 11g, the capabilities of Oracle OLAP have extended significantly, requiring very simple star schema modeling in Oracle BI EE Plus to generate optimized Oracle OLAP SQL that gets pushed down into the Oracle OLAP engine.

Customers can also easily deploy Oracle OLAP materialized views which Oracle BI EE Plus can leverage as aggregated data sources for optimized performance. Oracle BI EE Plus can exploit the simple cube view definitions automatically generated by Oracle OLAP for further modeling capability.

Oracle BI EE Plus can take advantage of Oracle OLAP for attribute based reporting (not typical for OLAP tools) and dynamically consolidate Oracle OLAP content with other data sources transparent to end users.

## **CONCLUSION**

Oracle BI EE Plus and Oracle Database are both compelling offerings in any BI solution. Their inherent capabilities, openness and portability to heterogeneous environments make them formidable competitors in their respective areas, but coupled together, provide an unbeatable, tightly integrated BI solution.



Oracle Corporation  
World Headquarters  
500 Oracle Parkway  
Redwood Shores, CA 94065  
U.S.A.

Worldwide Inquiries:  
Phone: +1.650.506.7000  
Fax: +1.650.506.7200  
[oracle.com](http://oracle.com)

Copyright © 2007, Oracle. All rights reserved.

This document is provided for information purposes only and the contents hereof are subject to change without notice.

This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission. Oracle, JD Edwards, PeopleSoft, and Siebel are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.