

# FINACLE Strengthens Data Security using Oracle Database Vault, Audit Vault And Advanced Security

*White Paper*

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## Executive Overview

Outsourcing IT management, application consolidation, and increasing concerns over insider and outsider threats in Banks have resulted in an almost mandatory requirement for strong controls on access and activity monitoring of sensitive application data. In addition, regulations such as Sarbanes-Oxley (SOX), Payment Card Industry (PCI), BASEL II and Information System audit guidelines from nodal banking agencies require strong internal controls to protect sensitive information such as financial, core banking, and credit cards records.

This paper describes the certification of Oracle Database Vault, Oracle Audit Vault and Oracle Advance Security in FINACLE environment. As with any new technology, using a systematic approach is important. This is especially important when it comes to database security. Infosys and Oracle jointly has created and tested pre-configured, out-of-the-box solutions from Oracle. These solutions from Oracle enable organizations to efficiently implement database security with minimal (almost no) application changes on Finacle.

## Business Challenges for Banks

Given how connected, complex, and continuously converging our world has become, government and business leaders are constantly dealing with new and emerging security risks. Hundreds of security vulnerabilities are introduced each day, exhausting the capacity of security programs. No longer is there a trade-off between performance and security; both are now essential business requirements for Banks.

Today the need for security compliance, strengthening internal controls for regulations, enforcing industry best practices, and guarding against insider threats are just a few of the challenges Banks are facing in today's global economy. While challenges such as the insider threat are certainly not new, the concern over unauthorized access to sensitive information has never been greater. At the same time, to remain competitive in the global economy, Banks require the flexibility to deploy IT systems in a cost effective manner while still adhering to industry best practices like RBI's Information System Audit Guidelines and regulatory mandates such as PCI, Sarbanes-Oxley and Basel II. Modifying existing application can be a time consuming and costly exercise. As a result, Banks would need new security solutions that address the above requirements transparently, without modification of existing banking applications.

To address Banks Information System in India, a committee was formed with representations from RBI, ICAI, and SBI, a Foreign Bank (Citibank) and a Private Bank (ICICI Bank) to lay down a complete checklist for Information System Auditing was created.

## Infosys Value Proposition

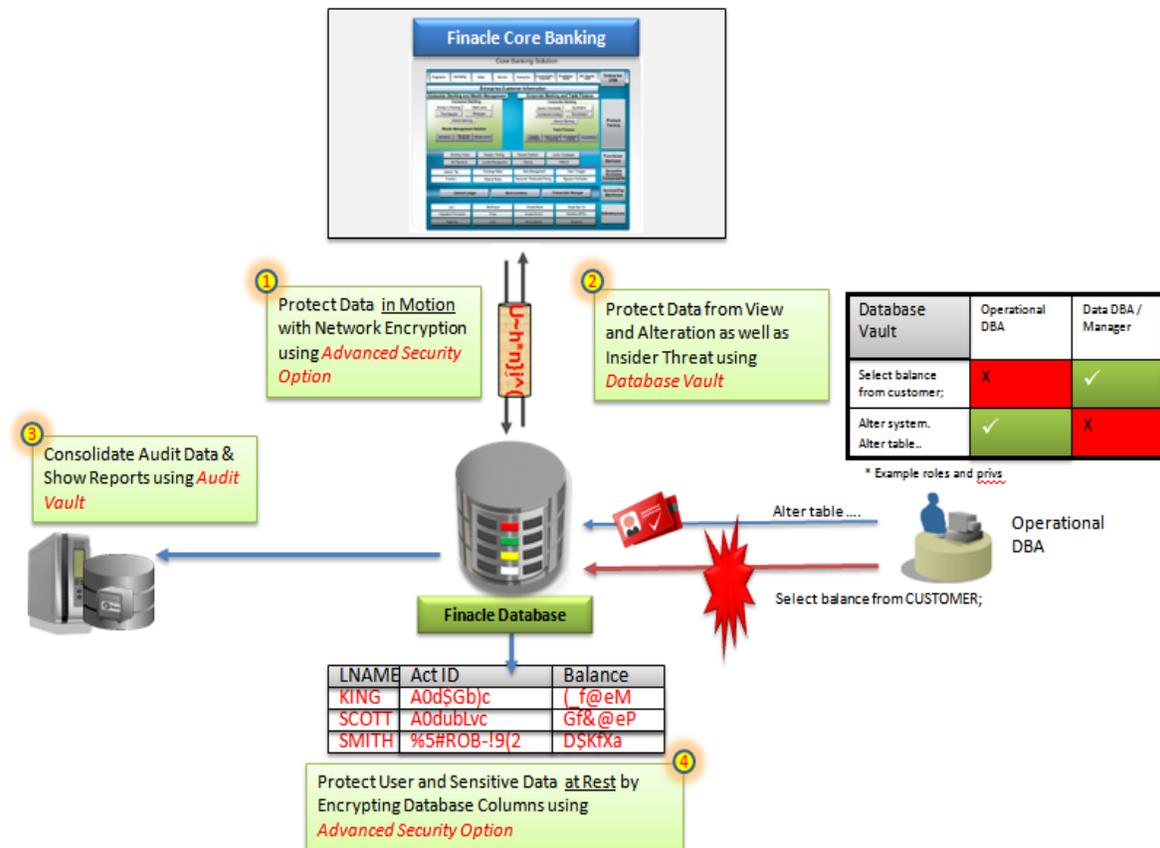
Infosys to ensure the growing data security demand from the Banks jointly initiated a Database Security certification process with Oracle. Oracle Database security services provides preemptive protection against rising security threats and vulnerabilities, resulting in significant cost avoidance, risk reduction, and regulatory compliance for Finacle customers. Our services protect our clients from reputation risk and revenue loss from business disruption.

Finacle's database security solution is built on the Finacle Core Banking System and Oracle's Database Vault, Audit Vault and Advance Security. Security adherence has been done with minimal (almost no) application changes on Finacle. Integration of Finacle with Database Vault, Audit Vault and Advanced Security is bereft of application changes and does not involve any additional application development time. The security compliance options that were tested are as per generic IT audit standards and RBI's IS audit recommendations. **Though this has been tried in Finacle 10.3 release with Oracle Database 11.1.0.7, there are no additional overheads / changes envisaged with lower releases as well.**

## Finacle Data Security Solution

Finacle Data Security Solution comprises of integrated environment between the Finacle Core Banking System and Oracle's data security solutions like –

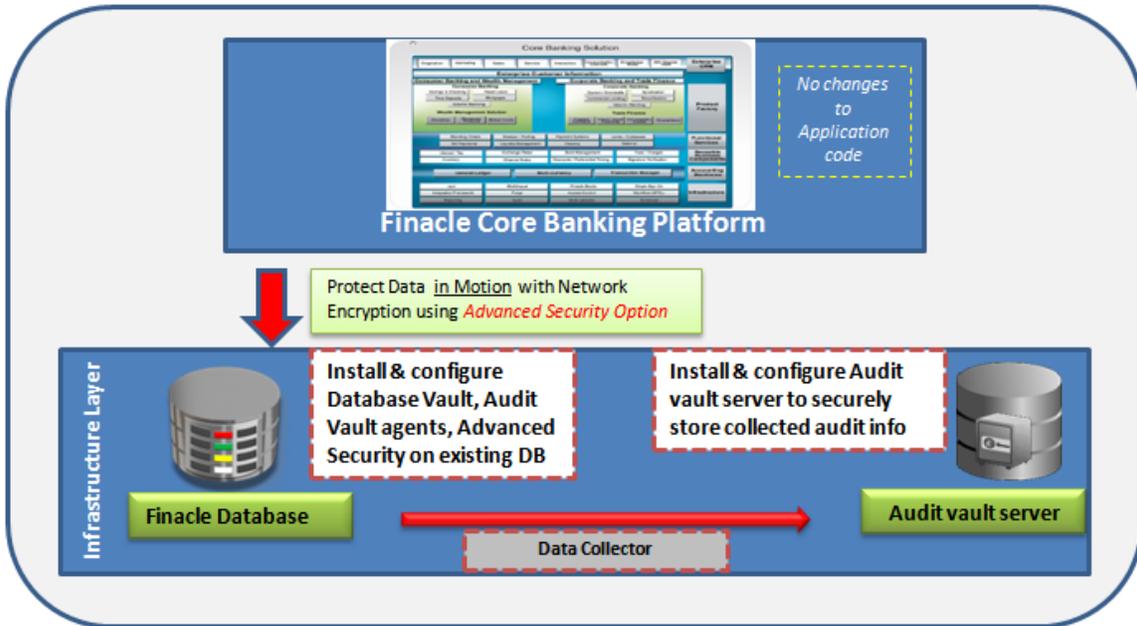
- Database Vault that provides highly privileged user access controls, separation of duty, and the ability to control who, when, where and how Finacle CBS data can be accessed.
- Advanced Security with Transparent Data Encryption (TDE), a simple method to encrypt sensitive data with no changes to the Finacle application code.
- Audit Vault that turns audit data into a key security resource for the Banks, providing consolidation, reporting, proactive alerting and protection of audit data.



**Figure 1 – Finacle Data Security Solution: Functional Architecture**

This solution offers specific database security controls in-line with the generic IT audit standards and Reserve Bank of India's IS audit guidelines as follows:

- Prevent access to sensitive Finacle data by privileged users for strong internal controls
- Control access to the Finacle data with flexible security controls
- Enable and customize separation-of-duty for security and compliance
- Consolidate and secure database activity monitoring for Finacle data
- Built-in and customizable reports/alerts for compliance and monitoring
- Manage audit policies across Finacle data stored in Oracle databases
- Transparently encrypt credit card numbers, social security numbers and other privacy data at rest and on wire
- Encrypt selective Finacle tables that has business sensitive data
- Protect entire database backups with encryption



**Figure 2 – Finacle Data Security Solution: Technical Architecture**

This solution architecture involves Database Vault, Audit Vault Server, Audit Vault Collection Agent and Advance Security. Audit Vault Server is deployed on a separate dedicated server, while Database Vault, Audit Vault Collection Agent and Advance Security are deployed on each existing Database Servers of Finacle CBS.

This additional strengthening of the data security solution with Oracle technologies have led to the certification matrix of Finacle Core Banking System with Database Vault, Audit Vault and Advance Security as illustrated below:

Oracle Technologies	Finacle Core Banking System	
	Yes	No
Database Vault	✓	
Audit Vault	✓	
Advanced Security	✓	

**Certification Matrix**

## Oracle Database Vault

The core services of Oracle Database Vault offering are:

- Prevents privileged database user access to application data
- Enforces real time access controls with multi-factor authorization
- Separation-of-duty controls
- Real Time Access Control checks

Oracle Database Vault Rules and Factors significantly tighten security by limiting who, when, where and how databases, data and an applications can be accessed. Multiple factors such as IP address, time of day and authentication method can be used in a flexible and adaptable manner to enforce access control without making changes to the Finacle application

Oracle Database Vault prevents DBAs, Finacle application owners, and other privileged users from viewing data using their powerful privileges. Database Vault put in place preventive controls,

helping reduce the potential impact when a data breach does occur, and enabling the DBA to perform his or her job more effectively.

## Oracle Audit Vault

Satisfying compliance regulations and reducing the risk of security breaches are among the top security challenges faced by banks/enterprises today. Examination of numerous security incidents has shown that timely examination of audit data could have helped detect unauthorized activity early and reduced the resulting financial impact. Various studies and surveys conducted by government and academic institutions have concluded that a sizeable percentage of data breaches have been perpetrated by insiders, that is, by those authorized at least some level of access to the system and its data. As result governments worldwide have enacted a wide range of regulations.

Well-known regulations such as Sarbanes-Oxley (SOX) combined with industry driven initiatives such as the Payment Card Industry Data Security Standard (PCI-DSS) have resulted in information protection becoming a top-level issue for the enterprise. As security threats become more sophisticated, monitoring is becoming an increasingly important component of the defense-in-depth architecture. Today, the use of audit data as a security resource remains very much a manual process, requiring administrators and audit personnel to manually collect audit data from multiple locations.

Built-in reporting and event alerting help businesses improve their ability to comply with external regulations and internal policies by lessening the time and effort required to detect potential problems and demonstrate that mandated controls are in effect and working. Data security administrators and auditors can manage, compare and provision Oracle database auditing settings across the enterprise directly from the Oracle Audit Vault console, lowering overall maintenance costs.

Oracle Audit Vault protects audit data during transfer over the network and within Oracle Audit Vault. During transfer from the source systems, audit data can be encrypted, preventing anyone from reading or tampering with the data during transmission.

The core services of Oracle Audit Vault offering are:

- Detailed reports of audit trails, logging of user sessions and session auditing
- Separate area earmarked for temporary queries created by power users or database administrator based on specific user request
- Track and report all table create / alter and drop activities with time stamps and can provide alerts for the same

## Oracle Advanced Security

### 1. Oracle Transparent Data Encryption

Transparent Data Encryption provides an easy and effective protection of stored data by transparently encrypting data (using AES with up to 256 bits, or 3DES168) at the column or table space level.

### 2. Oracle Network Encryption

When information travels to and from the Database, Oracle Advanced Security Option provides a high level of security by offering support for the following encryption standards:

- AES (256, 192, and 128 bits)
- 3DES168 (3 and 2 keys)
- DES (56 and 40 bits)
- RC4 (256, 128, 56, and 40 bits)

Oracle Advanced Security also protects the integrity of information, making sure the message hasn't been modified since it left the source by adding an encrypted digest to the message, using either SHA-1 or MD5.

Note: Transparent Data Encryption and Network Encryption configuration needs to be done at Oracle Database level and does not need any changes at Finacle Application level. Any additional computing requirements have to be considered after looking at specific customer environments and this is not tested as part of the current study.

## Conclusion

With the growing need for banks to safeguard their data and ensure regulatory compliance in a cost-efficient and sustainable way, Finacle with Oracle's Database security solution provides comprehensive, unique, powerful, and simple-to-use capabilities for securing core banking data for its customers.

The data security solution from Infosys along with Oracle not only secures the data but does it in a manner that enables Finacle application to maintain scalability, performance, and remain highly available.

## Finacle from Infosys

Finacle from Infosys (NASDAQ: INFY) partners with banks to power-up their innovation agenda, enabling them to differentiate their products and service, enhance customer experience and achieve greater operational efficiency. Finacle solutions address the core banking, wealth management, CRM, Islamic banking and treasury requirements of retail, corporate and universal banks worldwide and provide online marketing tools like Finacle finanz tools. Finacle solutions also empower banks with multiple sales, service and marketing channels including e-banking, mobile banking and call centers. These offerings make Finacle a strong innovation-facilitator enabling banks to accelerate growth, while maximizing value from their large scale business transformation.

## Oracle

Oracle provides the world's most complete, open, and integrated business software and hardware systems to more than 370,000 customers—including 100 of the Fortune 100—that represent a variety of sizes and industries in more than 145 countries around the globe. Throughout its history Oracle has proved it can build for the future on the foundation of its innovations and, its intimate knowledge of customer challenges and successes analyzed by the best technical and business minds in the world. The company has leveraged its immense size and strength to serve its customers, and to implement key technology and business decisions that upend conventional wisdom and take its products and services in new directions.

## References

Infosys Finacle: <http://www.infosys.com/finacle/>

Oracle Database: <http://www.oracle.com/technetwork/database/enterprise-edition/overview/index.html>

Oracle Database Vault:

<http://www.oracle.com/technetwork/database/options/database-vault/index-085211.html>

Oracle Advanced Security:

<http://www.oracle.com/technetwork/database/options/advanced-security/index-082628.html>

Oracle Audit Vault: <http://www.oracle.com/technetwork/database/audit-vault/overview/index.html>

Platforms supported:

Audit Vault Server Certification: Metalink Doc ID: 848408.1

Audit Vault Collection Agent: Metalink Doc ID: 848402.1