

# EMBEDDED DATABASE TECHNOLOGY FOR SECURITY SYSTEMS

## ORACLE EMBEDDED

Security systems need database storage just like many other applications. However, the special requirements of the security market mean that vendors must choose their database partner carefully

*Security systems – whether pure software or a combination of hardware and software – must store and manage critical information reliably. Because these systems are a crucial part of the security infrastructure for enterprises, they have unusual requirements not common to many business applications that use database technology. Choosing the right database product can increase reliability, improve performance and enhance the level of security provided by mission-critical deployed systems.*

### Securing Data from Attack

Security infrastructure, just like other applications, operates on data – user passwords, profile and preferences, roles and responsibilities, access logs, configuration settings and more. Unlike many business applications, though, security infrastructure products must be hardened against attack. As a result, the components that make up the security software, including any database system, must be designed for secure deployment.

Security threats can come from a number of implementation choices in software. Especially common, though, are threats due to exposed administrative or user-level interfaces, which allow an attacker to communicate directly with a subsystem in the security product. Many database systems rely on such interfaces in normal operation.

Designers of security infrastructure are often best served by choosing a truly embeddable database management system, rather than a conventional RDBMS designed for business applications, for use in their products. A commercial embedded database can provide all the performance, reliability and recoverability guarantees that applications require, and can also improve overall security by eliminating interfaces that could be used to compromise the system.

Oracle's family of embedded database products, including Oracle Database, Oracle TimesTen In-Memory Database, Oracle Berkeley DB and Oracle Database Lite, was designed for use in applications that need fast, reliable storage services, without requiring a database administrator. These products can be deployed for zero or near-zero administration, so that they are invisible and inaccessible to users and malicious attackers.

### Eliminating Paths of Attack

A common strategy for breaching security is to send bad data to the public interfaces of a system – stolen login information, large strings that overflow buffers, illegal characters or system commands. Rather than validate every single input

The simplest way to secure a system is to eliminate paths that attackers can use to compromise it.

string, a simpler strategy for hardening systems is simply to eliminate those interfaces altogether.

Oracle's embedded database products can have most or all of their administrative functions handled programmatically. This means that the security application, rather than a human being, can take responsibility for tasks like backups, checkpointing, log archival and so on. By removing these operations from the domain of humans, and by handling them inside the hardened systems, the database engine maintains a high degree of overall security.

In addition, Oracle's embedded products may generally be closely coupled with the deployed system. Rather than relying on network-based protocols for communication, these systems can use channels local to a single machine, such as shared memory or even function-call interfaces in a single process, to fetch and store data. This means that attackers cannot use the database engine as a way to gain access to the machine, since there are no network communication channels open from inside the database.

Commercial off-the-shelf database products are generally more reliable, faster and more scalable than home-grown alternatives.

### **Performance, Reliability, Scalability**

Of course, security products are often crucial pieces of infrastructure. As a result, they must be fast, reliable, and able to handle unexpected spikes in demand.

Choosing an embedded database system for storage can help. All of Oracle's database products have a long history of real-world deployment in mission-critical systems. Each delivers high-performance data storage services, and can survive software and hardware failures without losing information.

### **The Right Tool for the Job**

Oracle's product line includes a range of embeddable systems. Developers can choose the database system that best meets the requirements of their application.

#### **Oracle Database**

Oracle Database is the industry's leading enterprise relational database management system and offers a rich feature set supporting Grid Computing, provides highly availability, and extremely reliable database services for transaction processing, data warehousing and many other types of applications. Oracle Database can be packaged along with the application that uses it, installed and configured silently by the application, and administered and managed by the application completely automatically, with no human intervention.

#### **Oracle TimesTen In-Memory Database**

Oracle TimesTen is a high-performance database system designed for applications where performance is absolutely critical. TimesTen guarantees that the entire database resides in memory at all times, and uses a patented storage and search strategy to locate in-memory data quickly. TimesTen is a fully transactional, SQL-based data storage engine, so offers developers familiar interfaces for data access.

#### **Oracle Berkeley DB**

Berkeley DB is Oracle's only non-relational suite of database products. Berkeley DB provides high-performance B-tree, hash, persistent queue and other structures

**WHY EMBED?**

ORACLE DELIVERS A COMPLETE RANGE OF EMBEDDABLE DATABASE PRODUCTS FOR SECURITY APPLICATIONS AND DEVICES

ORACLE EMBEDDED DATABASES:

- Oracle Database 10g
- Oracle TimesTen
- Oracle Berkeley DB
- Oracle Lite

for storing program data in its native format. Berkeley DB links directly into the address space of the application that uses it. As a result, there is no separate server to install or administer.

**Oracle Database Lite**

Oracle Database Lite is the company's embedded database system designed for mobilized applications. Oracle Lite offers disk-based SQL storage services in a small-footprint package. Developers can also use the Synchronization Server to keep a collection of Oracle Lite client databases synchronized with a centralized Oracle Database store.

**Conclusion**

Oracle offers a range of database products to developers building security systems.

Data management is at the core of virtually every computer system, including security systems. The unusual requirements in security, however, mean that designers must carefully consider their options when choosing database technology for deployment. Commercially-available products can provide outstanding performance, reliability and scalability, but unless they are expressly designed for embedded use, may compromise overall system security.

Oracle's family of embeddable database products – Oracle Database, Oracle TimesTen, Oracle Berkeley DB and Oracle Lite – offer a range of storage services, in packages that can be easily deployed in mission-critical security systems. The combination of performance, reliability, scalability and security that Oracle offers is an important advantage to vendors building products in this space.

Learn more about our products at <http://www.oracle.com/goto/embedded>.

Learn more about our partner program at <http://opn.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 is it 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.