Oracle Database Lite to Sybase® SQL Anywhere® Migration Scenarios

TABLE OF CONTENTS

INTRODUCTION

Oracle Database Lite and Sybase SQL Anywhere are both technologies used for bi-directional data synchronization between a backend database running inside the corporate headquarters and multiple mobile databases running inside smartphones or remote branch offices. Although the architecture of both products has many similarities, there's a modest amount of work required to migrate from one solution to the other. This paper outlines the different scenarios that are typically found in an Oracle Database Lite deployment and how they can be migrated to a Sybase SQL Anywhere environment. The intention of this paper is to provide adequate knowledge regarding Sybase and Oracle's equivalent software components so that mobile database application developers and administrators can migrate existing Oracle Database Lite solutions to SQL Anywhere without significant effort.

TERMINOLOGY

The following table lists Oracle Database Lite's terminology and its Sybase SQL Anywhere counterpart.

ORACLE DATABASE LITE	SYBASE SQL ANYWHERE
Lite Client Database	UltraLite® or SQL Anywhere
Mobile Sync Server	MobiLink™ synchronization server
Mobile Sync Client	MobiLink client
Mobile Device Workbench	Sybase Central
Branch Office (multi-user listener)	SQL Anywhere Server
Web-to-Go	Any servlet container

Oracle Database is the central data store running in the corporate headquarters and contains all the mission-critical information required by the mobile or remote workforce. Migrating the mobile solution to SQL Anywhere does not necessitate a change in the backend database, thus allowing companies to preserve their existing Oracle Database investment.

The migration scenarios below provide descriptions of the various SQL Anywhere components and how they differ from Oracle Lite's.

MIGRATION SCENARIOS

Migrating from Oracle Database Lite to SQL Anywhere requires careful planning that depends on how Oracle Lite was originally deployed.

Mobile Devices

At the end-points, the Oracle Lite Client Database runs on the mobile device and can be replaced by either an UltraLite database (for applications running on Windows, Windows Mobile, BlackBerry®, iPhone®/iPad™, or Android) or a SQL Anywhere database (for applications running on Windows or Windows Mobile). UltraLite's footprint is small enough to run on memory-constrained devices such as smartphones. SQL Anywhere requires more memory due to its broad range of features that include stored procedures, triggers and user-defined functions to name a few. The Oracle Lite Client Database's footprint falls in between UltraLite's and SQL Anywhere's.
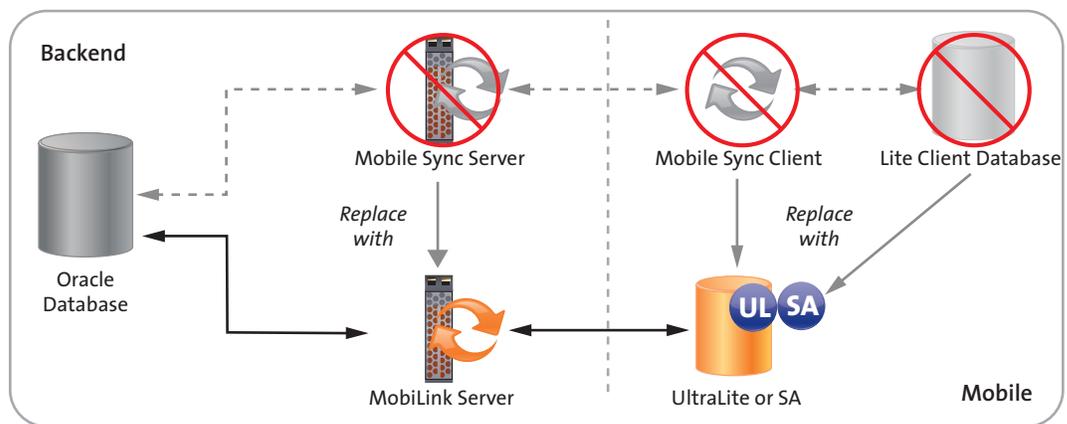
Oracle Lite Client Database, UltraLite, and SQL Anywhere all support standard database connectivity interfaces, such as ODBC, JDBC, and ADO.NET. Migrating existing Oracle Database Lite mobile solutions to SQL Anywhere is straightforward as all that is required are minor changes to the mobile application's database code, such as replacing Oracle's references with UltraLite/SQL Anywhere and minor tweaks (if any) to the SQL statements.

At the middle-tier, the Oracle Mobile Sync Server is replaced with the MobiLink synchronization server. The MobiLink server handles all synchronization requests and has built-in support for conflict detection and resolution. The MobiLink server can synchronize data stored in a variety of backend systems, including Oracle, Sybase, Microsoft SQL Server, MySQL, and IBM DB2. In general, an UltraLite or SQL Anywhere database connects to the MobiLink server to initiate synchronization, although it is also possible to trigger synchronization from the server.

The mobile application's synchronization logic is designed using the graphical tool Sybase Central. Developers and administrators are offered a visual representation of the backend Oracle database schema and use wizard-based dialogs to create a synchronization project that is deployed to mobile devices. Custom synchronization is also available by entering statements written in the native SQL dialect of the backend database, in this case, Oracle SQL (PL-SQL).

At the backend, Oracle Database resides and there is no need to change it.

The following diagram illustrates the components that require migration.

Branch Office

For branch office deployments, the Oracle Lite Client Database can be replaced by SQL Anywhere Server. The SQL Anywhere Server is capable of running on a wide range of operating systems, including Windows, Linux, Unix, Solaris, AIX, HP-UX, and Mac® OSX. SQL Anywhere Server provides functionality that is essential to branch office deployments, including multi-user support, stored procedures, triggers, functions, full-text search, materialized views, full SQL support, events, and scheduling. It also incorporates many self-management features, such as automatic recovery, dynamic memory management and automatic tuning, which eliminate the need to employ experienced database administrators.

Existing Oracle Database Lite branch office applications can be migrated with minimal changes, thus minimizing the impact to the remote workers. Just like in the mobile scenario, all that is required are minor changes to the application's database code, such as replacing Oracle's references with SQL Anywhere and minor tweaks (if any) to the SQL statements.

To replicate the data from the branch office to the Oracle backend, the Mobile Sync Server is replaced with the MobiLink synchronization server. During replication, the MobiLink server connects to the MobiLink client at the branch office who then takes care of ensuring both the Oracle backend and the SQL Anywhere remote database are in sync. This scenario has the added advantage of allowing a mobile device to utilize the replication environment in the branch office to synchronize its database with the Oracle backend.

The following diagram illustrates the components that require migration.
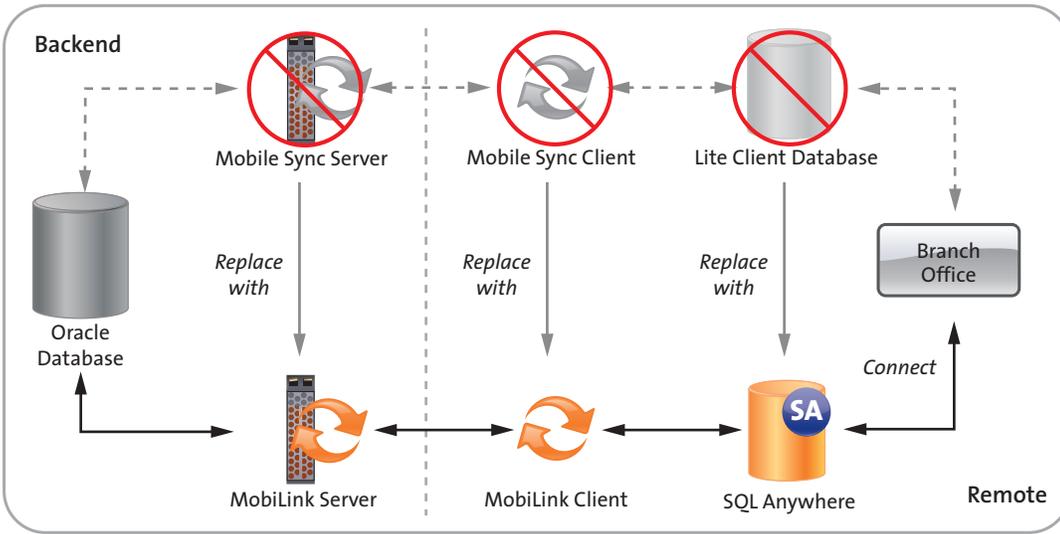
Offline Web Applications (Web-to-Go)

Client Web applications written using Web-to-Go technology can be migrated to SQL Anywhere by replacing the Web-to-Go Web Server with a suitable Java servlet container. Any JSPs or JSFs that require access to the data store can connect to the UltraLite or SQL Anywhere database. Since both UltraLite and SQL Anywhere support JDBC, the database access code can be migrated with minimal changes. There are many open source and commercial servlet containers available, such as JBoss for desktops and Jetty for mobile devices.

Once again, the MobiLink client communicates with the MobiLink server to carry out data synchronization requests. The backend database server remains as Oracle.

The following diagram illustrates the components that require migration.
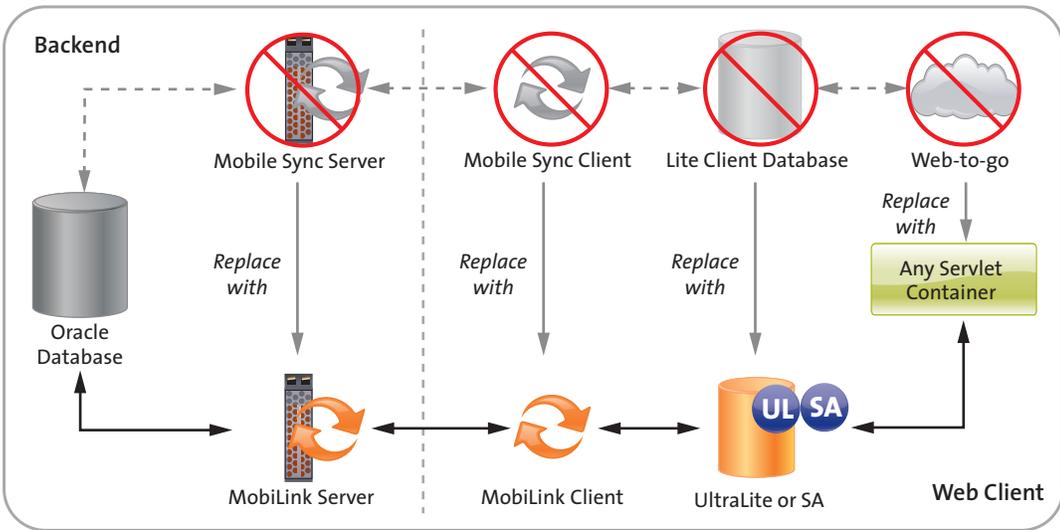
PRODUCT COMPARISON

The following table lists the different features found in Oracle Lite Database Client, UltraLite, and SQL Anywhere. This information is useful to identify the functionality that is affected by the migration path from Oracle to Sybase technology.

	ORACLE LITE CLIENT DATABASE	ULTRALITE	SQL ANYWHERE
Platform Support			
Apple iPhone/iPad	✘	✔	✘
RIM BlackBerry	✘	✔	✘
Google Android	✘	Planned	✘
Windows Mobile	✔	✔	✔
Windows	✔	✔	✔
Linux	✔	✔	✔
Mac OS X	✘	✘	✔
Solaris	✘	✘	✔
IBM AIX	✘	✘	✔
HP-UX	✘	✘	✔
Configuration			
In-process database	✔	✔	✘
Branch office (multi-user)	✔	✔	✔
Web-to-Go (Web client)	✔	Use 3rd party servlet container	
Programming Interfaces			
SQL-92	✔	✔	✔
ADO.NET	✔	✔	✔
ADO.NET (Compact Framework)	✔	✔	✔
ODBC	✔	✔	✔
JDBC	✔	✔	✔
Database Features			
Small footprint (less than 1 MB)	✘	✔	✘
Globalization	✔	✔	✔
Strong data typing	✔	✔	✔
SQL stored procedures and triggers	✘	✘	✔
Java/C++/.NET stored procedures and triggers	✔	✘	✔
Page level locking	✔	✔	✔
Sequences	✔	✘	✔
Security			
Wire encryption	✔	✔	✔
Database encryption	✔	✔	✔
Common Access Card (CAC)	✔	✔	✔
Access control	✔	✔	✔

CONCLUSION

As with any application migration endeavor, there are several factors to consider before undertaking such a task. Due to the architecture similarities between Oracle and Sybase mobile database technologies, migrating a solution from Oracle Database Lite to SQL Anywhere is straightforward and can be accomplished without exerting a significant amount of effort. Whether the deployed solution runs on a mobile device, branch office, or Web client, SQL Anywhere technology can accommodate current production environments and allows companies to preserve existing server-side investments.

For more information about migrating Oracle Database Lite solutions to SQL Anywhere, please visit: www.sybase.com/oraclelitetosqlanywhere.

www.sybase.com

SYBASE®

An SAP Company