

IMPLEMENTATION OF SQL SERVER BASED ON SQLITE ENGINE ON ANDROID PLATFORM

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Abstract

Android is an open source software assemble of an operating system, middleware and key applications for mobile devices introduced by Google capable of running multiple application programs. It is a complete operating environment based upon the Linux V2.6 kernel. Initially, the deployment target for Android was the mobile-phone arena such as smart phones and low-cost flip-phone devices. Android platform is produced to make new and innovative mobile application program for the developers to make full use of all functions connected to handset internet. As a complete mobile platform, Android provides universal set of powerful Operation System, Comprehensive Library Set, abundant Multimedia User Interface and Phone Application. The data storage burden is eased because the Android platform includes the popular open source SQLite database. SQLite is a software library that implements a SQL engine. It has been used with great success as on-disk file format: allows the developer to handle data in a simple way, but also have the use of database features (such as undo, redo, etc.). In embedded device environment, in which there is low-concurrency and there are little or medium size datasets, SQLite is the right choice. Purposed system gives the Databases created will be accessible by name to any class not only in the application, but also outside the application.

Keywords: Embedded Database, android, android platform, SQLite database

1. INTRODUCTION

Android platform is produced to make new and innovative mobile application program for the developers to make full use of all functions connected to handset internet. As a complete mobile platform, Android provides universal set of powerful Operation System, Comprehensive Library Set, abundant Multimedia User Interface and Phone Application. The data storage burden is eased because the Android platform includes the popular open source SQLite database. SQLite is a software library that implements a SQL engine. It has been used with great success as on-disk file format: allows the developer to handle data in a simple way, but also have the use of database features (such as undo, redo, etc.). In embedded device environment, in which there is low-concurrency and there are little or medium size datasets, SQLite is the right choice. Android is a software stack for mobile devices that includes an operating system, middleware, and key applications. The Android SDK provides the tools and libraries necessary to begin developing applications that run on Android-powered devices. Android provides full support for Sql server databases. Databases created will be accessible by name to any class in the application, but not outside the application. Hence we require Sql server Database. For any software application on any system we require database to store the data. Android platform includes the popular open

source SQLite database which has been used with great success as on-disk file format that allows the developer to handle data in a simple way, but also have the use of database features (such as undo, redo, etc.).

2. EXISTING SYSTEM

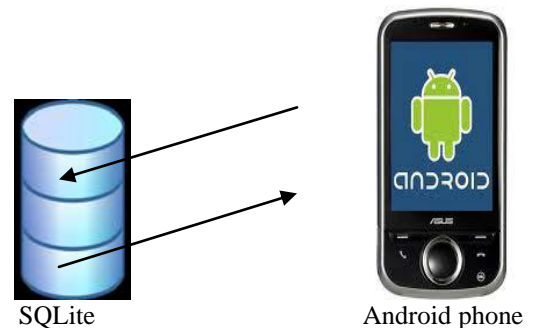


Fig 1.Existing System Architecture

In the current system configuration, data will be stored inside the Mobile phone in SQLite Database (see Figure 1). If we want to save the data in a common place, i.e., Remote Server until now there is no easy mechanism to implement this. The need for storing Information in remote server exists because even if the mobile is lost or stolen you can get Back all the

expenses data stored inside the phone. The idea of storing information in remote server is implemented using Web Services which can save the data in the Remote database like SQL Server.

2.1 Drawbacks

- No full data Access.
- Database not Accessible from outside application.
- Memory Problem.
- Not Secure.
- Not Flexible.

3. PROBLEM STATEMENT

There is acute problem of storing the data in mobile platform now a day the mobile users are increasing day-by-day we need the database for storing the data the database available for the Android mobile phones is SQLite database but with the SQLite database there are many problems such Access to the database, security problem, memory problem, OS support problems come into picture Can this problem be solved? Solution to this problem is SQL database server we are going to resolve the maximum problems that are going to face by SQLite database .we are going to concentrate maximum on the access of database from the application and outside the application. SQL database server give the full and secure access to the database

4. PROPOSED SYSTEM

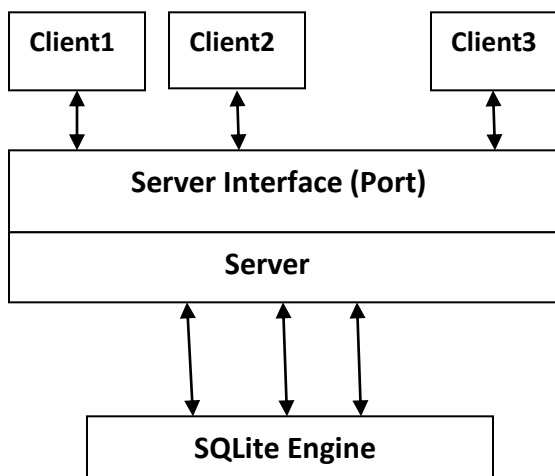


Fig 2 Proposed System Architecture

Our proposed system overcomes the drawbacks of the existing system. It has advance facilities to make it more user friendly. The proposed mobile application is completed based on Service Oriented Architecture (SOA) where we have thin clients like Android Phones, iPhones, etc. Services are self-contained and communicate using messages like xml. They

are cross platform, asynchronous, reliable and secured. SOA is an architectural style for building business applications using loosely coupled services which act like black boxes and can be orchestrated to achieve a specific functionality by linking together which you can see in Figure 1.2. Once we have a web service in remote server with centralized database then we can use the same web service for different clients either it may be Android, iPhone, Blackberry, Windows phone, Bada, Java phones, Symbian phones, etc. Different clients can use the common web service to save or retrieve the data. We can also take backup/restore the database from database end.

4.1 Our Plan and its Advantages:

- For Day to Day Life: Android mobile users directly store the data in the mobile.
- Data Access outside the Application: Android mobile users can easily access the data inside the application as well as outside the application.
- Minimum Memory Requirement: It is a lightweight transactional database engine that occupies a small amount of disk storage and memory.
- Supports Standard Relational Database: Proposed system supports standard Relational database features like SQL syntax, transactions and prepared statements.
- User-Friendly.
- No Database Setup or Administration Required: Using proposed system database in Android does not require any database setup or administration
- Full Android os supported: proposed system gives full support to the android mobile applications.

5. SYSTEM REQUIREMENT

- A) Hardware Components
- B) Software Requirement

Hardware Components:

Table 1: Hardware Components

System	Pentium IV 2.4 GHz & onwards.
Hard Disk	40 GB
Monitor	15 VGA Color
Mouse	USB
RAM	256 MB
Smartphone	with Android 2.0 onwards

Software Requirement:

Table 2: Software Requirements

Operating System	Windows XPSP2 & onwards.
Language	Java (JDK 1.6 & onwards) & Android SDK Tools (Version 22.0.4),eclipse ADT
Emulator	Android Emulator.
SQLite	SQLite Engine.

5.1 Development Tools

Eclipse & Android SDK Tools are an integrated development environment (IDE) for visually designing, constructing, testing, and deploying Web services, portals, and Java (J2EE) applications.

5.1.1 Eclipse

In computer programming Eclipse does a multi-language Integrated development environment (IDE) comprise a base workspace and an extensible plug-in system for customizing the environment. It is written mostly in Java. It can be used to develop applications in Java and, by means of various plug-ins, other programming language including Ada, C, C++, COBOL, Fortran, Haskell, JavaScript, Lasso, Perl, PHP, Python, Ruby, Scala, Clojure, Groovy, Scheme, and Erlang. It can also be used to develop packages for the software Mathematica. Development environments include the Eclipse Java development tools (JDT) for Java and Scala, Eclipse CDT for C/C++ and Eclipse PDT for PHP, among others. The initial codebase originated from IBM VisualAge. The Eclipse software development kit (SDK), which includes the Java development tools, is meant for Java developers. Users can extend its abilities by installing plug-ins written for the Eclipse Platform, such as development toolkits for other programming languages, and can write and contribute their own plug-in modules. Released under the terms of the Eclipse Public License, Eclipse SDK is free and open source software(although it is incompatible with the GNU General Public License). It was one of the first IDEs to run under GNU Class path and it runs without problems under Iced Tea. [16]

5.1.2 Android SDK Tools

The Android software development kit (SDK) includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, Windows XP or later; for the moment one can develop Android software on Android itself by using [AIDE - Android IDE - Java, C++] app and [Android java editor] app.

The officially supported integrated development environment (IDE) is Eclipse using the Android Development Tools (ADT) Plugin, though IntelliJ IDEA IDE (all editions) fully supports Android development out of the box, and NetBeans IDE also supports Android development via a plugin. Additionally, developers may use any text editor to edit Java and XML files, then use command line tools (Java Development Kit and Apache Ant are required) to create, build and debug Android applications as well as control attached Android devices (e.g., triggering a reboot, installing software package(s) remotely). Enhancements to Android's SDK go hand in hand with the overall Android platform development. The SDK also supports older versions of the Android platform in case developers wish to target their applications at older devices. Development tools are downloadable components, so after one has downloaded the latest version and platform, older platforms and tools can also be downloaded for compatibility testing.[17]

Android applications are packaged in .apk format and stored under /data/app folder on the Android OS (the folder is accessible only to the root user for security reasons). APK package contains .dex files (compiled byte code files called Dalvik executable), resource files, etc.

5.2 Design tool – Star UML Software Modeler

StarUML supports most of the diagram types specified in UML 2.0. It is currently missing object, package, timing and interaction overview diagrams (though the first two can be adequately modeled through the class diagram editor). StarUML supports most of the diagram types specified in UML 2.0. It is currently missing object, package, timing and interaction overview diagrams (though the first two can be adequately modeled through the class diagram editor).

6. NON-FUNCTIONAL REQUIREMENTS

- There are requirements that are not functional in nature. Specifically, these are the constraints the system must work within.
- The Database must be compatible with the Android OS based on Smartphone's.

6.1 Performance Requirements

- Clicking any Application the data which is created by application will take less than 1 second
- Immediate accessing of Database services
- Any activity related to Database should take less than 3 second.

6.2 Safety Requirements

- The database should be carefully maintained by the administrator any loss may lead to chaos.
- Control access to Database.

- Prevention of Duplicate Data.

6.3 Security Requirements

- The system should be secure enough to protect against denial-of-service attacks. Administrator password must be highly confidential.
- They should be secure enough to prevent the corruption of data from unauthorized user.
- The users login information should be secure enough so that anyone cannot access data except authorize person.

6.4 Dependability

- Database must be reliable enough so that when different users perform the same task, the expected outcome does not differ.
- The Database must be reliable enough so that when users perform normal functions the system does not fail.

6.5 Usability

- The application must be easy enough to learn so that users know how to use the product entirely on their first try.
- The Database must be more efficient than similar products.

6.6 Flexibility

- The Database must be able to support Android Application.
- The Database must be able to support Android OS.
- The Database must be flexible enough to support users with different power.

7. BASIC CONCEPT

Database is basic concept because to design Application maximum number of times we require Database because every information in which are require are stored in the database. So database is essential part of the computer system .same concept is going to use in the mobile or smart phones also the speed of application is depend on the database also then we are searching for the mobile databases we find that storing the information in the mobile is very difficult because memory problem is big concern with the mobile Databases. So we find the Databases recently used for storing the information .we find that the SQLite Database most popularly used now a days for mobile phones .we find that this Database has many problems we have to resolve that problems .some problems are we can't access Database outside the application. Memory problem, Security problem.so we concentrate on this problem what we have to do is synchronize the maximum data in the less memory then we can resolve the problem of memory. We are going to use the socket programming so that

we are giving full access to all the application and lastly the problem of security can be resolve by giving authentication to the users .we are not use locking and unlocking that are used in the SQLite.

8. LITERATURE SURVEY

8.1 Survey 1

1. **Paper Title:** Creating and Using Databases for Android Applications, June 2012.

8.1.1 Paper Discussion

This paper presents the overview of the Android platform towards software development for mobile and non-mobile applications. Android platform includes the popular open source SQLite database which has been used with great success as on-disk file format that allows the developer to handle data in a simple way, but also have the use of database features (such as undo, redo, etc.).

8.1.2 Advantages

- The Database stored in the SQLite Database instead of folders, other Database.
- Memory requirement is minimum.
- Locking and Unlocking is used for security purpose.

8.1.3 Disadvantages:

- The Database stored in the SQLite Database not accessible outside the application.
- Locking and Unlocking is used that not provide full security.
- Concurrent access to the database not possible.

8.2 Survey 2

1. **Paper Title:** Accessing External Databases from Mobile Applications.

8.2.1 Paper Discussion

In the early years of this decade, we have seen an explosion in the number of mobile devices such as smart phones and tablets from varied manufacturers consisting of varied operating systems. At the same time, the number of mobile applications has exceeded 500,000 across all platforms. One of the characteristics of several of these applications is their use of databases (either local or remote) for accessing data. Accessing data from remote databases in mobile applications is not straightforward. Database queries cannot be invoked on a remote database as done on a local database. In this paper, we will discuss the approach to solve this problem by using MVC (Model-View-Controller) software design pattern. By using this approach, we can enable mobile applications to communicate with remote databases seamlessly. The solution

discussed in this paper is platform agnostic i.e; this solution can be used independent of the platform that is used to develop mobile applications. It can be a native app(iOS, Android), a mobile web app(HTML5, jQuery, jQtouch) or an Hybrid app(Phone gap, Rho Mobile, Titanium).

8.2.2 Advantages:

- Database queries can be invoked on remote Database.
- This solution is platform independent.
- Mobile applications communicate with remote databases seamlessly.

8.2.3 Disadvantages:

- Accessing database from remote database is very difficult.
- Accessing database from remote server is very time consuming.
- Database is depend on the remote server for that we require web connection.

9. OBJECTIVES

The objectives of the SQL server based on SQLite engine can be stated as follows:

1. User can access data very easily
 - The data can be access from database very easily and fast access of the data.
 - Maximum number of queries can be executed by using SQL server.
 - By using queries we can access data without remote server on local server.
2. Development of the logic that would enable-
 - The database can be accessible from the class of the application but also outside the class of application.
 - Concurrent access to the database.
 - Persistency to the database is preserved. Maximum no of data can be stored in less place good memory management.
3. Database stored is much secured hence only authenticated users can access to the database.

10. MOTIVATION

The application under consideration, The SQL database server, is a novel idea which has never been implemented before. This became our source of motivation for going ahead with this project. All the current mobile databases are

- Time consuming.
- Memory required is more.
- Data is not secured in the current mobile databases.
- Data in the current mobile databases are not accessible outside the application.

A different source of motivation behind the development of this application is that of the IOK College, pune. Teachers & Student of this college suffering one problem storing the data in the mobile application they faced the problem in the game when they don't get access to all the databases. We thought; why not develop an Android mobile database. As our gift to the students & teachers of the IOK-COE? This really gave us the passion to go after the completion of this project. This database is given the security, speed, concurrency to the users.

11. SYSTEM IMPLEMENTATION

SQL database system is concurrent database system. Which give support to the database for the android mobile system. It going to support only android OS.database is backend of the mobile application. That is all data required for the mobile application are stored in the in the database. But the mobile memory is problem for the mobile. Hence we are going to the synchronize the database. Hence it take less memory to store the data .for security we are try to give authentication to the users .for accessibility we give the access to the database from inside and outside the mobile application. Like SQL database for pc we can execute maximum query on the SQL mobile database. Queries are processed by using the SQLite database engine. Database stored the database in the persistent way .it follows the rules of relational database. This database is very useful for the Android mobile database system.

12. CONCLUSIONS

- Android is a software stack for mobile devices that includes an operating system, middleware, and key applications. The Android SDK provides the tools and libraries necessary to begin developing applications that run on Android-powered devices. Android should provide full support for SQL database server. Databases created will be accessible by name to any class in the application and outside the application. This application is very simple to use and helpful to store the data quickly and with minimum size for any android application.
- It will also provide a security to all users.

FUTURE SCOPE

The current database SQL Server database can also be replaced by other open Source databases like MySQL, Oracle, Postgre, etc. We can improve the security in database storage which decreases the hacking problems. The current database server also be replace with the database which can store the large amount of data with minimum memory requirement. The current database is replaced with database which can store the data that is not in structure format. The current database SQL Server database can also be replaced by other open source databases like MySQL, Oracle, Postgre, etc.

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