

Introduction

A majority of businesses today need to be agile in response to changes either in their own environment, their partners' or in market conditions. A key enabler of agility is having access to the appropriate information at any time, anywhere and the ability to take actions accordingly. An important media for such access is the Mobile phone.

Traditionally, mobile phones have been used as medium for personal interactions (Voice and SMS) and utility devices incorporating Personal Information Management (Contact, Calendars etc.), Entertainment (Music, Video, Games), Email access, Internet browsing and more recently Collaboration tools. Any access to corporate systems (apart from email, contacts and calendars) was developed specifically for a particular business function and (most of the time) for a particular mobile phone model. This was due to various challenges in developing applications for mobile phones. Some of these being:

- Each major handset manufacturer has its own Operating Systems, SDK and implementation making it difficult to build applications for use across all mobile handsets
- Variable screen sizes and layouts for different handsets
- Security considerations and tying them to corporate security policies
- Mobile functionality provided by packaged applications are generally not easy to extend and not open to incorporate functionalities from other systems

These challenges make deploying Mobile Applications expensive and time consuming and are often difficult to support. Though there is a growing desire in organizations to perform more of their business functions using mobile phones, these factors limit them from making them a reality.

This paper addresses the main factors to be considered for building and deploying Enterprise Business Mobile Applications.

Approach

In order for organizations to embark on Enterprise Mobile Applications, it is important for them to develop a set of prototypes quickly and easily to get validation from the business and the user community. Some of the key components to be addressed are:

- **Security:** This is an important aspect of the overall architecture and needs to be addressed in the core. Security in the Mobile context needs to be addressed at various levels including:
 - o **Local authentication** – This is required in case the application works in an offline mode. Apart from the user / password, the login can be tied down to other information e.g. IMEI number.
 - o **Server side access** – Ensure that the connection request is originated from a valid source and has valid credentials.
 - o **Using SSL/TSL** for encrypting confidential information during connections.

Security policies need to be in-line with enterprise security policies, especially when accessing enterprise systems like Oracle eBusiness, SAP etc (for example, roles and responsibilities can be matched to various mobile applications that a user has access to). Further, it is important to maintain the Enterprise System's security rules while developing mobile applications, i.e. which user has access to which part of the data (e.g. a specific list of customers)

It is also important to include mobile applications in the user management procedures particularly when an employee joins or leaves the organization.

- **Local persistence:** This feature is required when the mobile application needs to work in the absence of a connection or when it is necessary to store information locally before sending it across to the server. As an example, a field survey engineer working in a tunnel may have limited or no connection available. In order for him to record his observations, he will require ways to store information on the mobile phone and transmit it across when the connection becomes available.

There are various light weight databases available for mobile phones. It is important to choose a database which is robust and which can be bi-directionally synchronized with an enterprise database server.

- **Connectivity:** Availability of connectivity and bandwidth used plays a major role while designing mobile applications. The application should be able to work in an offline or partially connected mode.

Also, it is desirable to reduce traffic between the mobile device and server. Further, each opening and closing of a connection has its own overhead which may result in increased latency. This may be a key factor when deciding whether to use an HTML or WML based application (which relies on the server passing data along with the presentation elements, thus resulting in more network traffic) or to use an application running on the mobile phone which renders the data passed on by the server (which typically reduces network traffic).

- **User Interface:** Due to diverse mobile platforms and display sizes, implementing User Interface (UI) for mobile applications is often challenging. This is compounded by the requirement that the mobile UI needs to provide maximum information / functionality with minimum navigation. It is important to

use the maximum available space for display and use of Soft Keys wherever possible while designing the UI.

There are various options for building a client side mobile application:

- **Using mobile OS specific SDK.** This is generally deployed in native platform (e.g. C++, Windows Mobile etc). This type of UI can generally use the maximum number of functionalities supported by a mobile phone and also integrates very well with the base operating system. However, this is generally the least portable way of developing applications (especially across other mobile vendors).
 - **Using Flash Lite.** Flash Lite is built along with Adobe's Flash technology which can be used to feature rich UI relatively quickly which may be good for developing prototypes. However, its support for external mobile databases is limited and is still not available on some of the major mobile platforms (e.g. Blackberry). Further, as Flash was originally developed for building media applications, using it to develop business applications is not intuitive and it does not provide access to some mobile phone functionalities.
 - **Using Java ME.** This is the most portable platform for developing a mobile client application as it is supported by most of the mobile vendors. Though there may be certain differences in the implementation of the application itself, by and large the application can be ported without much change (and no change in many cases). Apart from providing a basic local persistence feature, it can connect to virtually all mobile databases using JDBC. It is often a lengthy process to develop libraries for building the UI components; however there are many open source libraries available which can be used to build a professional looking Java ME application quickly.
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- **Administration:** As the mobile user base increases, ease in administration becomes an important factor. Hence it should be planned from the beginning. Many industrial strength mobile databases have the server side providing some of the administration functionalities, e.g. mobile phone inventory, user management etc. Apart from that, many personalization features can be controlled via this layer. However these features generally come at a steep price and should be evaluated against building these features as part of the platform.
 - **Integration:** Integration with the Enterprise application is another key architecture component. This layer should allow communication between the mobile middleware and the enterprise system in a standard and flexible manner. Web service based integration is generally a good way as that allows other systems to be added in the future using WS layer. Apart from data integration, it is important to avoid duplicating business rules in the mobile middleware which are already defined in the Enterprise Systems (including data security).

Conclusion

Mobile phones are getting more powerful and are being built with more functionality that was until recently only available with laptops and desktops. Most of the organizations still use only part of the mobile functionality for their business use. They are now looking at using mobile phones as a supplementary way of providing enterprise information to their employees and carrying out certain business functionality (e.g. access to critical information, recording a simple transaction, approving a workflow etc).

With the technology now available and some planning, making functionality available via a mobile device no longer need be an expensive and time consuming exercise. With the core framework in place, an application can be deployed very quickly, which can significantly reduce the overall processing time.

Moreover, functionality can be added in a phased manner as and when the business feels the need for the functionality to be made available to the mobile user. Using mobile phones as an alternative media for carrying out business functions can only improve the efficiency and effectiveness of an organization.

About Author

Diwakar Kaiwar is founder of Pravaa InfoSolutions (www.pravaa.com) and has around 20 years experience in providing solutions around ERP, Oracle, Java and Mobile platforms.

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