Lotus Notes Mobile Application Development Using XPages

For migrating Lotus Notes apps to Web or mobile, XPages is an ideal software development platform, allowing developers to readily tackle testing and deployment challenges.

Executive Summary

The world is becoming more wireless every day and programmers have been forced to respond by developing applications that will work in many wireless scenarios and with a variety of mobile devices.

Many Lotus Notes clients are ready to migrate their client base applications to mobile or Web applications. In the past, it was very difficult to migrate the client application to Web or mobile because of the technology limitation and the effort it takes for migration. But with the launching of XPages by IBM, this scenario has been changed. XPages is a rapid Web and mobile application development platform. Its programming model is based on standards and common Web development skills like JavaScript, Ajax, the Dojo Toolkit, server-side JavaScript and JavaServer Faces.

How to Build the Mobile Application

All the mobile applications developed in Lotus Notes are browser-based applications. This can be classified further into two categories – mobile applications using XPages Mobile Controls, and normal Web-based mobile applications.

- **Mobile application using XPages Mobile Controls:**

  The application, developed using XPages Mobile Controls, is also a browser-based application; however, it offers a very rich native mobile application look. The Mobile Controls come with the XPages Extended Library. It requires Lotus Notes and Domino version 8.5.3 or above. For developing the application using XPages Mobile Controls, go through the IBM tutorial available on the following Web site.

  http://www-10.lotus.com/ldd/ddwiki.nsf/dx/XPages_Mobile_Controls_Tutorial_

  It gives the basic knowledge on how to build a simple XPages mobile application in an existing Domino database. It covers the basic functionalities like display a list of views, display the contents of a view, open a document from that view and then perform all the typical actions like create, read, update and delete on a sample document.

- **Normal Web-based mobile application:**

  Many normal functions of the Web-based (Domino) application work as they do on the mobile devices too. There is no guideline
available indicating which function/code works for mobile and which does not work. However, most of the Web design elements work on the mobile devices. Developers need to consider the following two points while designing the application for mobile.

- **Size:** The mobile and iPad devices come with different screen sizes. So while designing the application developers must test the application on the different devices. Developers also need to make sure that the application is easy to navigate and the user should not have to scroll too much.

- **Speed:** Mobile/iPad devices have slower Internet speeds compared to PCs. So the content should be very concise. For example, avoid creating unnecessary fields in the forms and remove unnecessary columns from the views for mobile.

Another point developers should keep in mind is the login page and authorization. Almost all the companies use a single sign-on for the Internet application. So developers must verify that the single sign-on works on the mobile devices as well.

**Testing**

Testing a mobile application is sometimes a challenge for developers. The primary reasons are unavailability of devices and connectivity. If one or both of these factors is an issue, then developers can use the following methods:

- **Simulators:** Many mobile simulators are available on the Internet. Developers can use the simulator for testing mobile applications. The simulators are not 100% reliable so testing on the actual device is necessary before launching an application into production. However, from the simulators the developers can at least get a good idea of size and alignment. For an iPhone simulator, go to [http://testiphone.com](http://testiphone.com).

- **Device available but connectivity is an issue:** If the development application is within a firewall (as with an intranet), then the developer can request the client to put the development application outside the firewall so that it can be accessed from mobile devices.

- **Web browser:** The developer can even test the application functionality on the system’s Web browser. This, again, is not foolproof, so testing on the actual device is still necessary.

**Deployment of Mobile Application**

In Lotus Notes, most of the applications are hosted on the intranet server. So while converting the Notes application to mobile, the developer has to come up with the deployment plan before starting the designing phase. Most clients do not agree to move the application outside the firewall. So the developer has to decide well in advance how to deploy the application. There are several possible approaches:

- **Move the entire application outside the firewall (DMZ environment):** This opens the application over the Internet; hence, most clients don’t abide this option for security reasons.

- **Access the intranet through VPN:** This is a secured option. The developer just needs to make sure that the client’s mobile devices have VPN connectivity (see Figure 1).

**Access Through VPN**

![Diagram of Domino Server Within Firewall and Access Through VPN](image-url)
• **Domino HTTP Request Proxy:** A Domino HTTP Request Proxy is an architecture that relies on the placement of another Domino server outside the firewall. Users, from Web browsers to mobile devices, communicate directly with said Domino server. The external Domino server then communicates securely via NRPC to the target Domino server where the target Notes database is located. So, ideally, all the CRUD (Create, Read, Update and Delete) operations are consumed by the Domino HTTP Request Proxy app and performed against the target Notes database (see Figure 2). For more information on this, refer to the following website: [http://www.dominoguru.com/pages/mobilexpages_series_architecture.html](http://www.dominoguru.com/pages/mobilexpages_series_architecture.html).

**Key Challenges**

- **New technology:** XPages Mobile Control is a new technology, so very little help is available on the Web.
- **Testing offshore.**
- **Deployment:** Deployment plans must be prepared in advance.

**Case Study: Pre-Trip Approval Application**

- **Application Overview:** The Pre-Trip Application (PTA) is used for getting approvals for a travel trip. If the employee is planning to go for an official trip (either domestic or international) then he/she is required to create a request in this application and secure the necessary approvals. The application has six to seven levels of workflow depending on the employee designation and travel type.

- **Requirement:** The user needs to get the last two or three levels of approval from the higher executives and VPs. The current system was developed only on a Notes client. So it was getting difficult for the higher executives to find time to approve/reject the requests. Hence they come up with the requirements to develop a PTA database for Android, iPhone and iPad. They just want the functionality for approving/rejecting the request through these devices.

- **Technology used:** Lotus Notes XPages.
- **Devices covered:** Android, iPhone and iPad.

- **How we built:** Initially, we tried to use the ready-made mobile control available on the [http://mobilecontrols.openntf.org/](http://mobilecontrols.openntf.org/) site. This control can provide the very rich features to the application similar to the native mobile application. However due to the very complex design – and the fact that the team was very new to XPages technology – we dropped the plan to use this control and decided to build the functionality from scratch.

We created around six or seven XPages; one for the main form, one for the homepage and the remainder for the views. For all three devices, we have used the same design elements.
Offshore testing posed a challenge. So most of the testing was done onsite. Offshore, we used the iPhone simulator that can be found at http://www.testiphone.com/.

- **Deployment:** We kept the application within the intranet. The employees have installed a control in the mobile device to receive intranet connectivity through VPN.

**Conclusion**

It is often difficult for developers to start doing something new. Sometimes they remain stuck in the initial stages. This document can be the starting point for developers who do not have any knowledge about mobile application development and are planning to work on it. The document gives the basic information regarding designing, testing, deployment and handling key challenges for mobile application development.

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**Footnote**


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**About the Author**

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