



TECHNICAL SPECIFICATION

SOA Blueprints

Occasionally Connected Profile v0.1

An extension of the SOA Blueprints Reference Example to deal with occasionally connected rich client interfaces

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August 2004

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1 MOBILE EXPENSE REPORTING

Our example enterprise has seen an increasing number of requests from its sale force and other highly mobile employees to facilitate creating expense reports while on the road. These employees would like to record line items as they encounter them and submit their expenses when connectivity is available.

Unfortunately, there is no standardized mobile computing environment for these employees. They have a mixture of PDAs, cell-phones and other sometimes connected devices. The capabilities of these devices vary, but all have some things in common. All the PDAs can run native clients and J2ME, some cell-phones support MIDlets, but all support WML.

The goal of this use-case is to create a heterogeneous environment that supports the majority of employees and provides the basic functionality for mobile expense reporting. To achieve this, a compromise needs to be made between user requirements and the practicality of providing such a service.

1.1 Overall Topology

A possible topology for connecting these disparate devices to the expense reporting mechanism is shown in the following diagram:

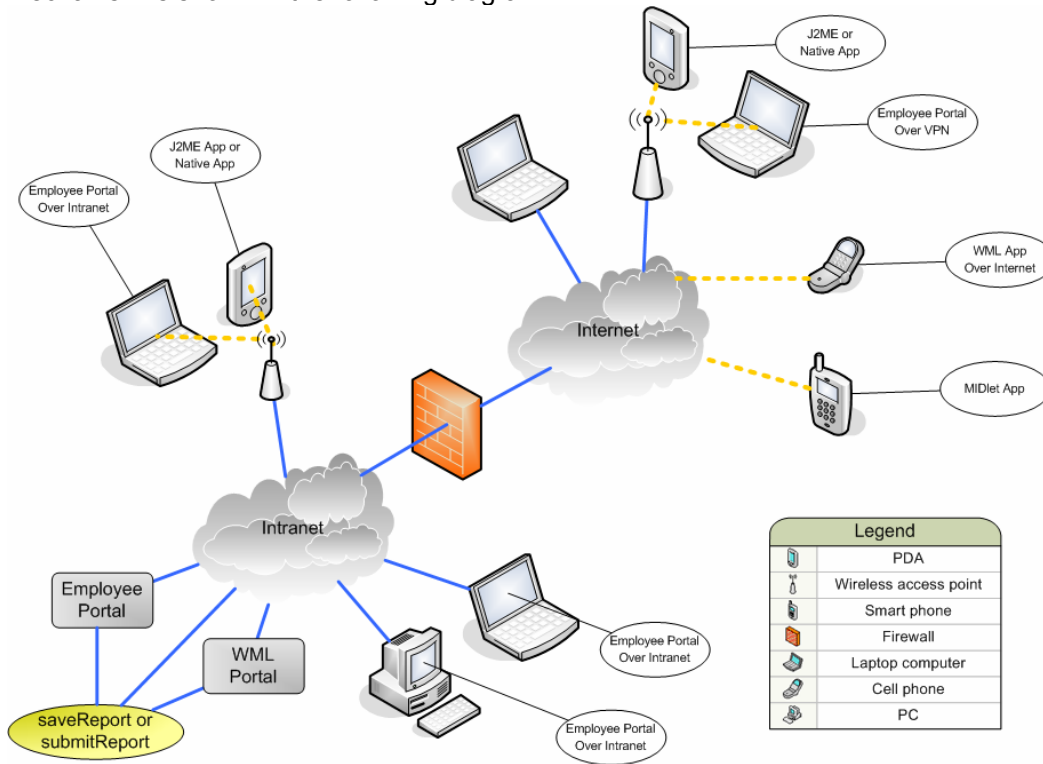


Figure 1 - Possible Expense Reporting Topology

Each of the various mobile options has advantages and disadvantages. Mobile laptops, when online, may connect to the employee portal over a VPN. This option is also possible for PDAs, but would restrict access to online only and may cause difficulties given the smaller form factor of the PDA. Similarly a cell-phone WML portal would also only allow online reporting and providing internet access for cell-phones (through WML or MIDlets), but could introduce security concerns. For the purpose of this specification we are limited mobility to offline and online PDA access as defined in the following section.

1.2 The Chosen Mobile Solution

In order to best serve the majority of its employees, while mitigating security risks introduced through non-VPN access, our enterprise decided to provide the following solution:

1. Provide a client application for PDAs that allows creation of expense reports
2. Provide a micro database on the PDA for storage of reports and line items
3. Allow submission of reports from the PDA when connected to the intranet

The application will not be able to retrieve existing reports, or authorize reports. Nor will it be able to retrieve credit card transactions as can be done in the Employee Portal.

The overall structure of this system is shown in the following diagram:

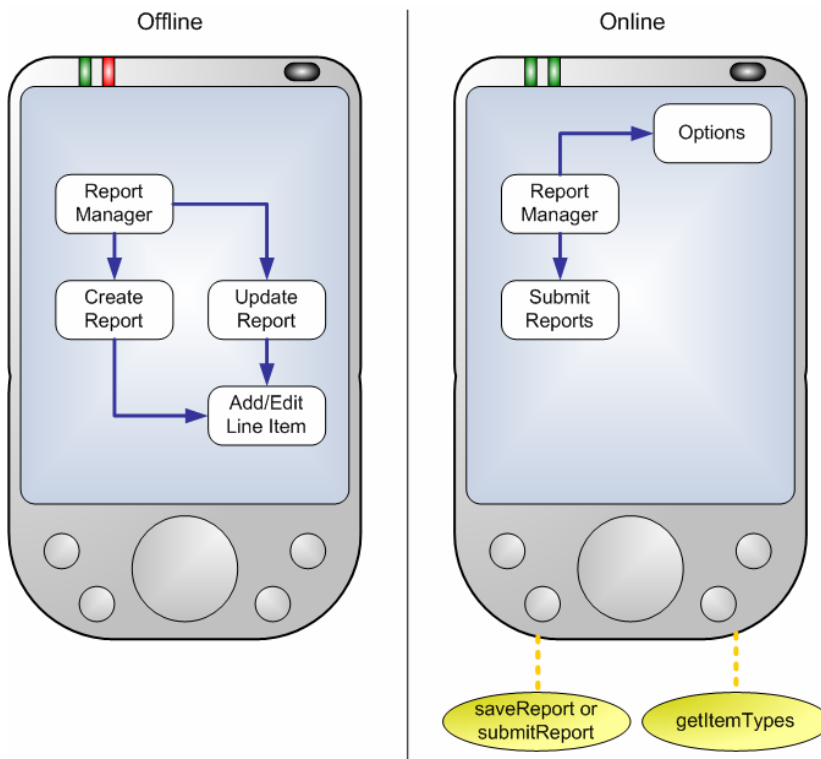


Figure 2 - PDA Based Expense Reporting

While offline the employee should be able to manage offline reports, creating new ones or updating as necessary. The employee should be able to add, delete or modify line items to both new and existing reports. The information should be stored in a micro database on the PDA until the employee can upload.

Once online and connected to the corporate intranet, the employee should be able to submit one or more reports for processing. The employee should be able to choose between saving the reports, or submitting them directly for processing. In either case, upon successful submission, the reports are removed from the local database.

The employee should not have to be at the office to save the reports. A wireless connection over the VPN to the intranet should also be available. The employee is required to be online when first using the application in order that they are authenticated and a list of item types is retrieved through the Options screen.

1.3 Mobile Expense Report Database

The PDA application should retain all information for expense reports on a micro database. This does not contain all the information required by the corporate expense reporting system, since status information and dates are not required for saving or submission.

The structure of the PDA micro database for expense reporting is shown in the following diagram:

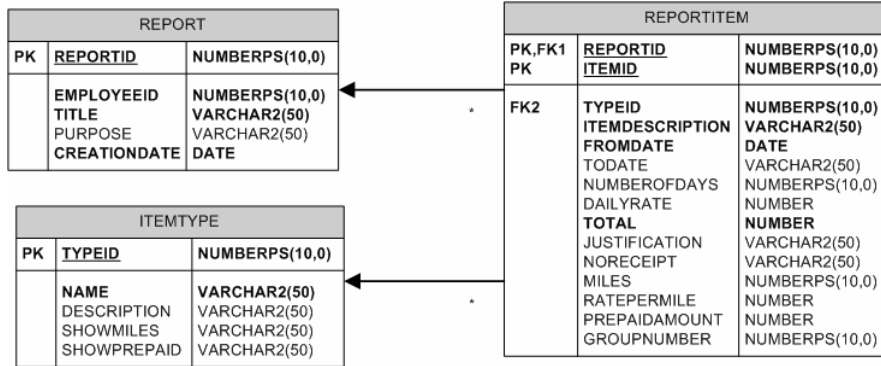
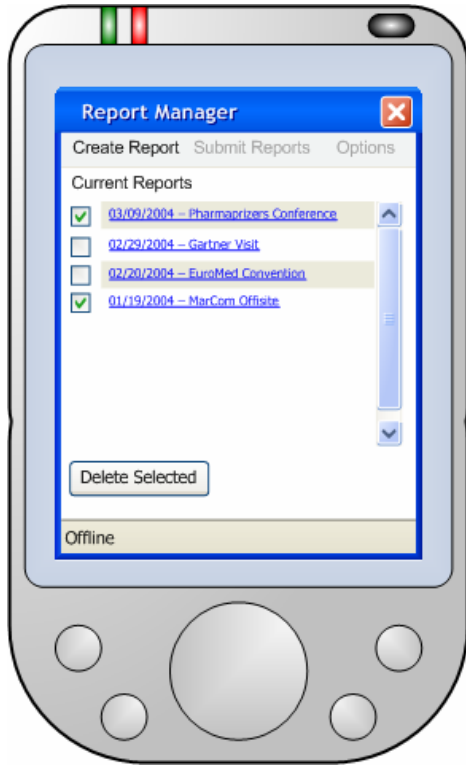


Figure 3 - Mobile Expense Report Database

This specification does not require a particular implementation of this database. The only requirement is that this information is persisted between sessions, even if the PDA is turned off. Any commercial or open-source database is acceptable, even simple file system storage would suffice.

1.4 Screens

1.4.1 Report Manager

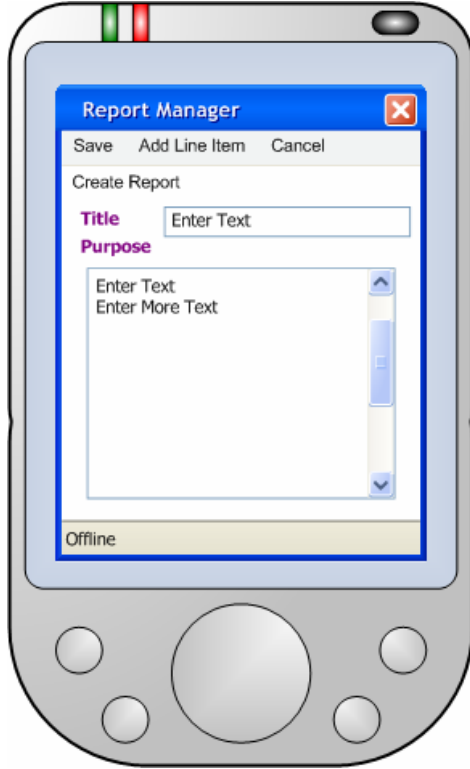


The Report Manager Screen is the initial screen in the application. It should check to see if the PDA is currently connected (online) and that the Expense Reporting services are available (by invoking the getItemTypes service, the results of which should be stored in the ITEMTYPE local table).

If it is the first time the application is used and the PDA is online, the user should be immediately switched to the Options screen so that they can be authenticated. If the PDA is not online, they should be shown a message indicating that they need to be online the first time the application is used.

The Submit Reports and Options menu items should only be available in online mode and when the getItemTypes service is available.

1.4.2 Create Report

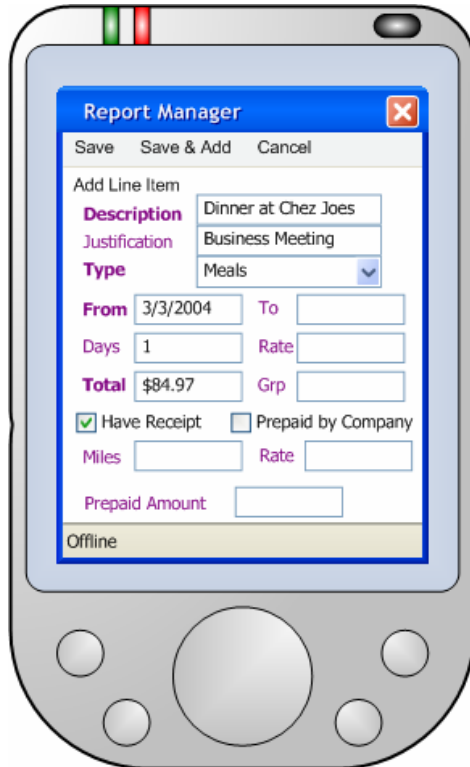


To create a report, the user simply needs to enter the report title and purpose.

Once complete they can choose to save this as an empty report, or continue to adding line items.

Cancel should take the user back to the Report Manager screen.

1.4.3 Add / Update Line Item



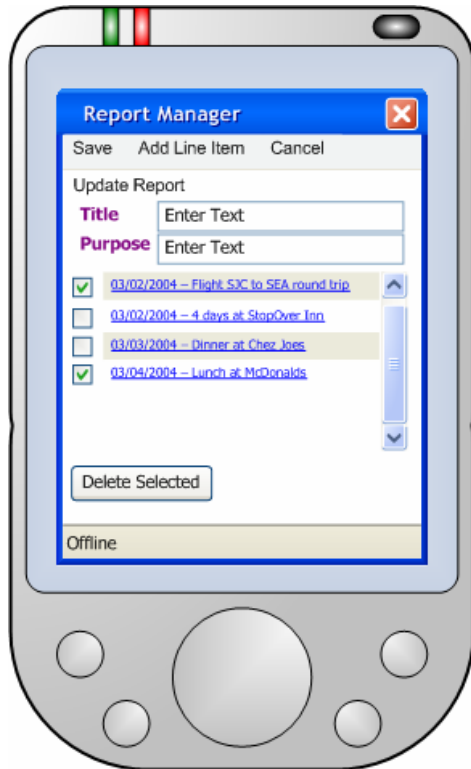
In adding line items, the user is required to enter the fields shown in bold. Other fields are optional. On changing the type the Miles and Prepaid fields should be shown depending on the ShowMiles and ShowPrepaid database fields.

If from and to fields are entered, the number of days should be calculated. If the daily rate is entered the Total should be calculated. If Miles and Rate are entered the Total should be calculated.

Once complete, the user can Save to take them to the Update Report Screen or Save & Add to enter a new line item.

Cancel should take them back to the Update Report Screen (even if they initially came here from Create Report).

1.4.4 Update Report



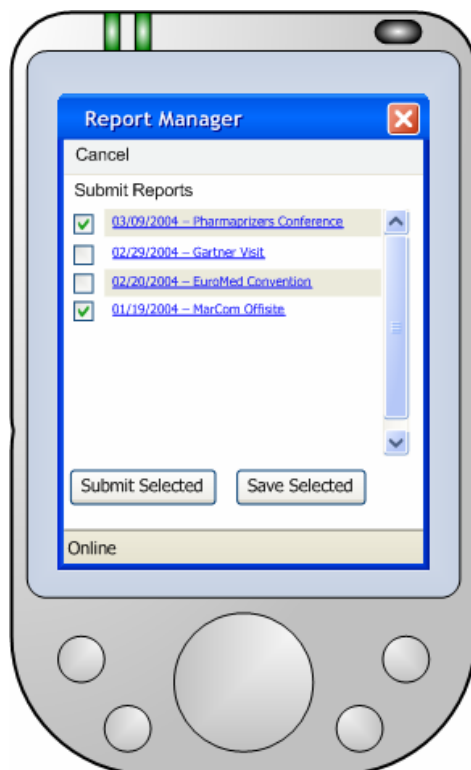
The Update Report screen allows the user to modify the Title and Purpose, add new line items and update or delete existing ones.

Some mechanism should be provided to go from the purpose field to a larger full screen text box.

On selecting an existing line item, the user should be taken to the Add / Update line item screen. Line items can be deleted by selecting the check box next to the item and clicking on the Delete Selected button.

Once complete the user can Save and Return to the report Manager. Cancel should also take them back to the Report Manager.

1.4.5 Submit Reports

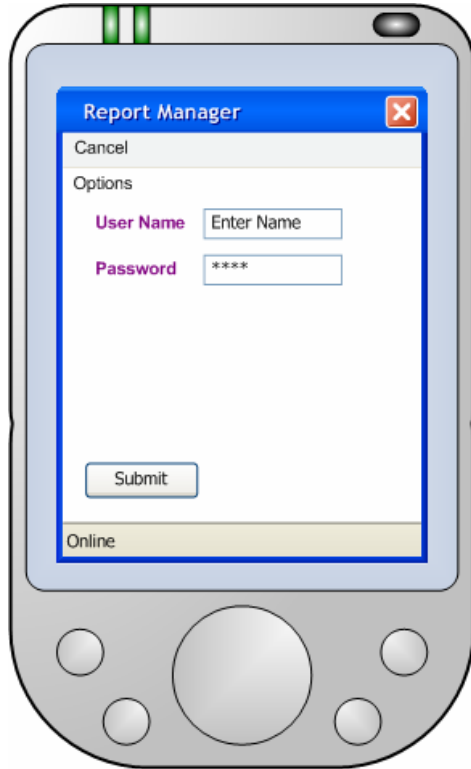


When the PDA is online, the Report Manager should enable the Submit Reports and Options menu items. On selecting Submit Reports they are taken to the Submit Reports screen. The user should have two options for uploading the reports to the enterprise, Save or Submit.

Save report should execute the saveReport service defined in the Expense reporting section 4.5.4.4. If this service returns a saveConfirmation response, the selected report should be removed from the database. If it returns a different response the user should be notified accordingly.

Similarly, Submit report should execute the submitReport service defined in 4.5.4.5. If this service returns a submitConfirmation response, the selected report should be removed from the database. If it returns a different response, the user should be notified accordingly.

1.4.6 Options



The first time the application is used and the PDA is online, or subsequently if the user of the PDA should change, the Options screen enables the user of the PDA to be authenticated.

This should invoke the authenticate security service (see 2.5.3.3) to validate the entered user name and password and retrieve a user id. The user id is used as the employee id in submission of expense reports.

The returned authToken should also be stored in case submit reports is executed. The authenticate service should be called with the entered user name and password every time the application is started and the PDA is online to get a fresh authToken, since submit and save reports are secure services.