



# Mobilize Your i

## Adding Mobile Capabilities to IBM i

Presented by :

**Richard Schoen**

Chief Technical Officer  
RJS Software Systems  
[richard@rjssoftware.com](mailto:richard@rjssoftware.com)



- Richard Schoen
- President/CTO of RJS Software Systems, Inc.
- Has developed software for over 25 years
- Started out on the System 34/36 in mid 1980's
- Has been through the pain of learning win/web dev.
- Knows RPG,CL,VB,C,C#,Java,JSP,ASP
- Develops iSeries-System i, Windows and Linux software software for a living
- Quickly learning mobile development technologies
- Cares about iSeries – IBM i Developers future
- RJS provides mobile development services

With over 77% of the world being mobile device users, this session will show you how to utilize your IBM i to leverage the rapidly growing mobile market.

This presentation will provide you with a strategic roadmap and successful examples on how to make information readily and easily available on mobile devices from your iSeries.

The increased availability of phone and tablet devices based on the Android, Apple iOS and the Windows 8 operating system will continue to accelerate. Don't let your IBM i get left behind in the race to mobilize information access.

- Todays mobile landscape
- How are companies utilizing mobile devices
- IBM i development examples in RPG
- What vendor solutions are available ?
- What would Richard recommend ?

- Apple iPhone
- Android
- Blackberry market appears to be shrinking



- Apple iPad
- Android (Acer A500, Motorola Xoom, Galaxy, etc.)
- Blackberry Playbook / HP webOS Tablets  
Enjoying life as cheap remotes and music players



- True Windows Based Tablets
- Windows 7 and Windows 8
- Acer, Dell and Others Offering Windows Tablets



- The underdog
- Windows Mobile
- Nokia banking on Windows Mobile
- Still used heavily on data collection devices



- Email
- Web
- Music
- Pictures
- Videos
- Angry birds



- Twitter
- Facebook
- LinkedIn
- Instant Messaging





- Taking iPads onboard
- Carrying weather charts
- Other flight documentation



- Using iPads / Windows Tablets to take service orders
- Connecting via Citrix terminals
- Service forms



- Check in/check out guests
- Some web based apps
- Some connecting via Citrix terminals
- Dedicated kiosks
- Amenity upselling access



- Filling out work orders
- Capturing proof of delivery/service signatures
- Instant invoicing
- Driver location



- Print tickets
- Scan electronic tickets from smartphone
- Track passenger check-ins and other info
- Manage seating
- Report equipment failures
- Communicate



- Classroom lessons
- Spelling games
- Larger class sizes
- Lakeville, MN school district Rolling out 11,000 iPads
- Our kids are “Digital Natives”



- Mochasoft RDP
- Logmein
- iDisplay - display extender
- Rhapsody music - \$10/month
- Evernote note taking
- Garageband
- Flashlight / iLevel
- Denon Stereo Receiver / Airplay



- Device Specific Apps
- Web Based Apps
- Hybrid Apps – Web Apps Turned to Mobile

- Runs natively on device
- Can store data locally
- Online/offline access
- Smart client
- Web services

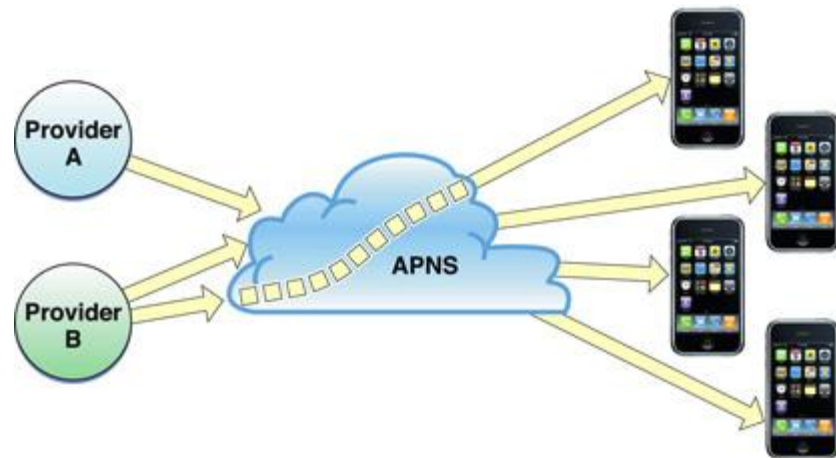
- iPhone / iPad must write in Xcode/Objective C
- Other native development platforms..
- Monotouch - C#
- Titanium / Appcelerator
- NSBasic – VB / Javascript / Phonegap
- iPhone/iPad apps must distribute via app store
- Android apps can distribute via Android market or web download of APK files

- Windows Based Tablets
- Microsoft Visual Studio (C#, VB.Net)
- IBM Client Access/400
- Leverage any other windows based app
- Utilize standard Windows programming skills
- Re-purpose existing desktop applications via RDP, Citrix, Logmein and other desktop sharing
- Utilize regular and mobile web apps

- Can be Written in any language  
ASP.Net, C#, RPG, PHP, Ruby, JSP, Javascript
- Recommended skillsets  
HTML/HTML5/CSS3/Javascript
- Regular web apps can be used
- jQueryMobile or SenchaTouch  
framework recommended for mobile feel
- Can store minimal data locally
- Usually needs full online access

- Write an HTML5 based web application
- PhoneGap / Apache Cordova
- Creates native app that can use device features such as phone, email, camera
- Takes advantage of web development experience
- Can talk to web services to get data
- Can store data locally - SQLite
- Bug in iOS5.1 for storing local data

- Camera Access
- Barcode reading
- Scan document / drivers license
- People photos – guest/id validation, insurance claims
- Merchandise photos – damage inspection
- Location Services – Where AM I
- Siri – Voice Dictation Services
- Push Notifications
- Email
- Web Browser
- App Stores



- Used to propagate messages to devices
- Real-time notifications
- Companies can write notification services
- Not sure benefits over IM or Email yet



- Inquiry / Data List
- Send report generation / information requests
- Data entry – order entry, CRM notes, workflow etc.
- Mapping/location requests
- Repurpose 5250 Screens
- Re-use RPG logic and DB2 databases
- Choice of development language doesn't matter when doing web apps

- <http://www.markus-falk.com/mobile-frameworks-comparison-chart/>

## Mobile Frameworks Comparison Chart

Start Wizard!

Looking for the right mobile framework? Compare all major mobile frameworks and choose the one that fits best.

| Framework                          | Platform (Rendering Engine) |                  |                          |                         |                        |                        |               |               |                |               |         | Target           |          |              |              | Development Languages |      |      |               |    |     |      |     |            |     |                 |
|------------------------------------|-----------------------------|------------------|--------------------------|-------------------------|------------------------|------------------------|---------------|---------------|----------------|---------------|---------|------------------|----------|--------------|--------------|-----------------------|------|------|---------------|----|-----|------|-----|------------|-----|-----------------|
|                                    | iOS (Webkit)                | Android (Webkit) | Windows Mobile (Trident) | Windows Phone (Trident) | Blackberry OS (Webkit) | Symbian (Webkit/Gecko) | MeeGo (Gecko) | Maemo (Gecko) | WebOS (Webkit) | Bada (Webkit) | Java ME | Mobile website ? | WebApp ? | Native app ? | Hybrid app ? | PHP                   | Java | Ruby | Action Script | C# | Lua | HTML | CSS | JavaScript | C++ | Visual Editor ? |
| Appcelerator Titanium Mobile*      | ✓                           | ✓                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✗                | ✗        | ✓            | ✗            | ✓                     | ✗    | ✓    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✗               |
| Adobe Flex*                        | ✓                           | ✓                | ✗                        | ✗                       | ✓                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✓                | ✓        | ✓            | ✗            | ✗                     | ✗    | ✗    | ✓             | ✗  | ✗   | ✗    | ✗   | ✗          | ✓   | ✗               |
| CNET iPhone UI*                    | ✓                           | ✓                | ✗                        | ✗                       | ✓                      | ✗                      | ✓             | ✗             | ✓              | ✓             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✗               |
| Corona*                            | ✓                           | ✓                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✗                | ✗        | ✓            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✓   | ✗    | ✗   | ✗          | ✗   | ✗               |
| GWT mobile webkit + gwt mobile ui* | ✓                           | ✓                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✓              | ✗             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✓    | ✗    | ✗             | ✗  | ✗   | ✗    | ✓   | ✓          | ✗   | ✗               |
| iPhone Universal*                  | ✓                           | ✗                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✗                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✗          | ✗   | ✗               |
| Application Craft                  | ✓                           | ✓                | ✓                        | ✓                       | ✓                      | ✓                      | ✓             | ✓             | ✓              | ✓             | ✗       | ✓                | ✓        | ✗            | ✓            | ✓                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✓               |
| ChocolateChip -UI                  | ✓                           | ✓                | ✗                        | ✗                       | ✓                      | ✓                      | ✗             | ✗             | ✓              | ✗             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✗               |
| DHTMLX Touch                       | ✓                           | ✓                | ✓                        | ✗                       | ✓                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✓               |
| Gideros Studio                     | ✓                           | ✓                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✗                | ✗        | ✓            | ✗            | ✗                     | ✓    | ✗    | ✗             | ✗  | ✓   | ✗    | ✗   | ✗          | ✗   | ✗               |
| IQ Touch*                          | ✓                           | ✓                | ✗                        | ✗                       | ✗                      | ✗                      | ✗             | ✗             | ✗              | ✗             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✗               |
| iQuery Mobile*                     | ✓                           | ✓                | ✓                        | ✓                       | ✓                      | ✓                      | ✓             | ✗             | ✓              | ✓             | ✗       | ✓                | ✓        | ✗            | ✗            | ✗                     | ✗    | ✗    | ✗             | ✗  | ✗   | ✓    | ✓   | ✓          | ✗   | ✗               |

- jQueryMobile  
<http://www.jquerymobile.com>
- Sencha Touch / ExtJS  
<http://www.sencha.com>

- jQuery  
<http://www.jquery.com>
- Sencha Touch  
<http://www.sencha.com>
- Dojo  
<http://www.dojotoolkit.org>
- Comparison of  
[http://en.wikipedia.org/wiki/Comparison\\_of\\_JavaScript\\_frameworks](http://en.wikipedia.org/wiki/Comparison_of_JavaScript_frameworks)

- Re-purpose 5250 to the web
- Generate Apps for IBM i and Other Platforms
- IBM – HATS (5250)
- MRC - mPower
- Artech - Genexus
- Lansa – aXes (5250)
- BCD – Presto (5250)
- Profound Logic – ProfoundUI (5250)
- ASNA – Wings (5250)
- Seagull
- Microfocus
- Looksoftware
- Microsoft Visual Studio
- Zend Studio
- IBM development environment – [www.worklight.com](http://www.worklight.com)

- Mel Rothman - CGIDEV2
- Coraltree Systems - Renaissance Framework
- Henrik Rützou - powerEXT
- CNX - Valence
- Profound Logic – Profound UI (RPGOA)
- Aaron Bartell – openRPGUI
- IceBreak
- RPG Open Access

- PHP - <http://www.phpframeworks.com/>
- Microsoft Visual Studio – <http://www.microsoft.com>
- ASP.NET Web Forms and MVC
- AMF jQueryMobile Framework for ASP.Net
- NS/Basic – <http://www.nsbasic.com>
- EGL
- Sencha Touch
- jQueryMobile

- Data search, list, detail inquiry
- Data search and list
- Information requests
- Minimize data entry
- Focus on read only as much as possible
- Make data entry easy if required

- Work with style
- Login page
- Data list page
- Detail page

Mobile Customer App

User

Password

Login

Mobile Customer App

Filter items...

|               |   |
|---------------|---|
| Henning, G K  | → |
| Jones, B D    | → |
| Vine, S S     | → |
| Johnson, J A  | → |
| Tyron, W E    | → |
| Stevens, K L  | → |
| Alison, J S   | → |
| Doe, J W      | → |
| Thomas, A N   | → |
| Williams, E D | → |
| Lee, F L      | → |

Mobile Customer App

Customer

938472

Last name

Henning

Init

G K

City

Dallas

State

TX

Zipcode

75217

Credit limit

5000

Charge code

3

Balance due

- PowerEXT CGIDEV2 Core framework  
<http://www.powerext.com>
- Extends CGIDEV2
- High level HTML wrapper code
- Simple RPG CGI program
- Uses SQL for DB access
- Uses jQueryMobile framework

```
<!DOCTYPE html>
<html>
  <head>
    <title>My Page</title>
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link rel="stylesheet" href="http://code.jquery.com/mobile/1.1.0/jquery.mobile-1.1.0.min.css" />
    <script src="http://code.jquery.com/jquery-1.7.1.min.js"></script>
    <script src="http://code.jquery.com/mobile/1.1.0/jquery.mobile-1.1.0.min.js"></script>
  </head>
  <body>

    <div data-role="page">

      <div data-role="header">
        <h1>My Title</h1>
      </div><!-- /header -->

      <div data-role="content">
        <p>Hello world</p>
      </div><!-- /content -->

    </div><!-- /page -->

  </body>
</html>
```

## Make a listview

jQuery Mobile includes a diverse set of common [listviews](#) that are coded as lists with a `data-role="listview"` added. Here is a simple linked list that has a role of `listview`. We're going to make this look like an inset module by adding a `data-inset="true"` and add a dynamic search filter with the `data-filter="true"` attributes.

```
<ul data-role="listview" data-inset="true" data-filter="true">
  <li><a href="#">Acura</a></li>
  <li><a href="#">Audi</a></li>
  <li><a href="#">BMW</a></li>
  <li><a href="#">Cadillac</a></li>
  <li><a href="#">Ferrari</a></li>
</ul>
```

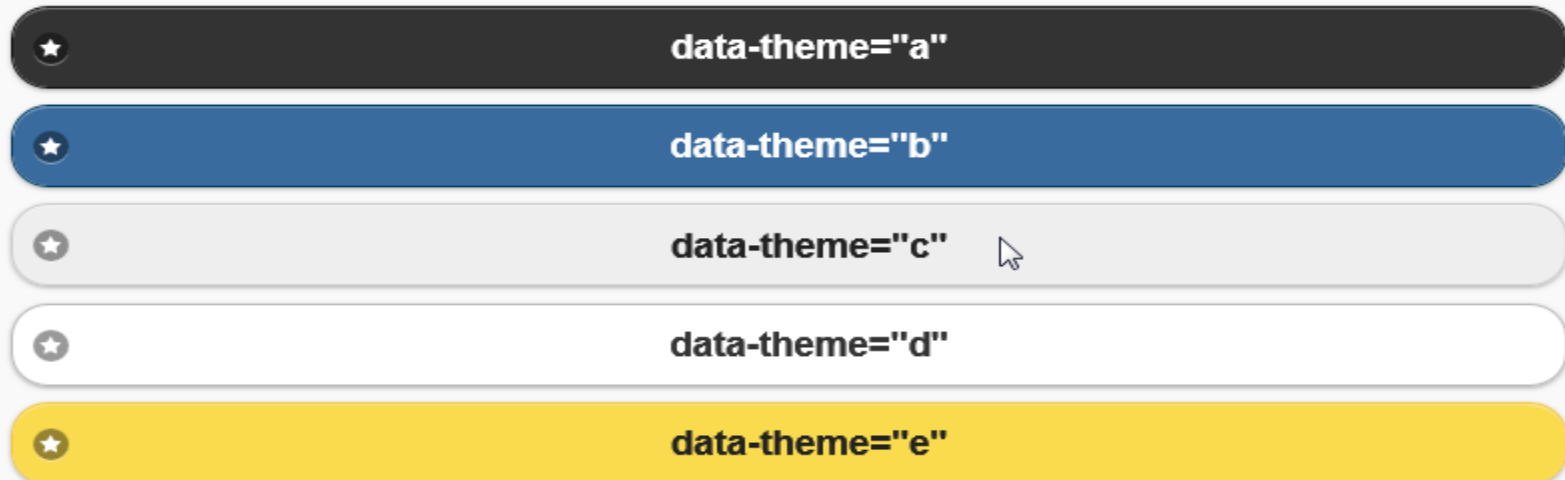


## Play with theme swatches

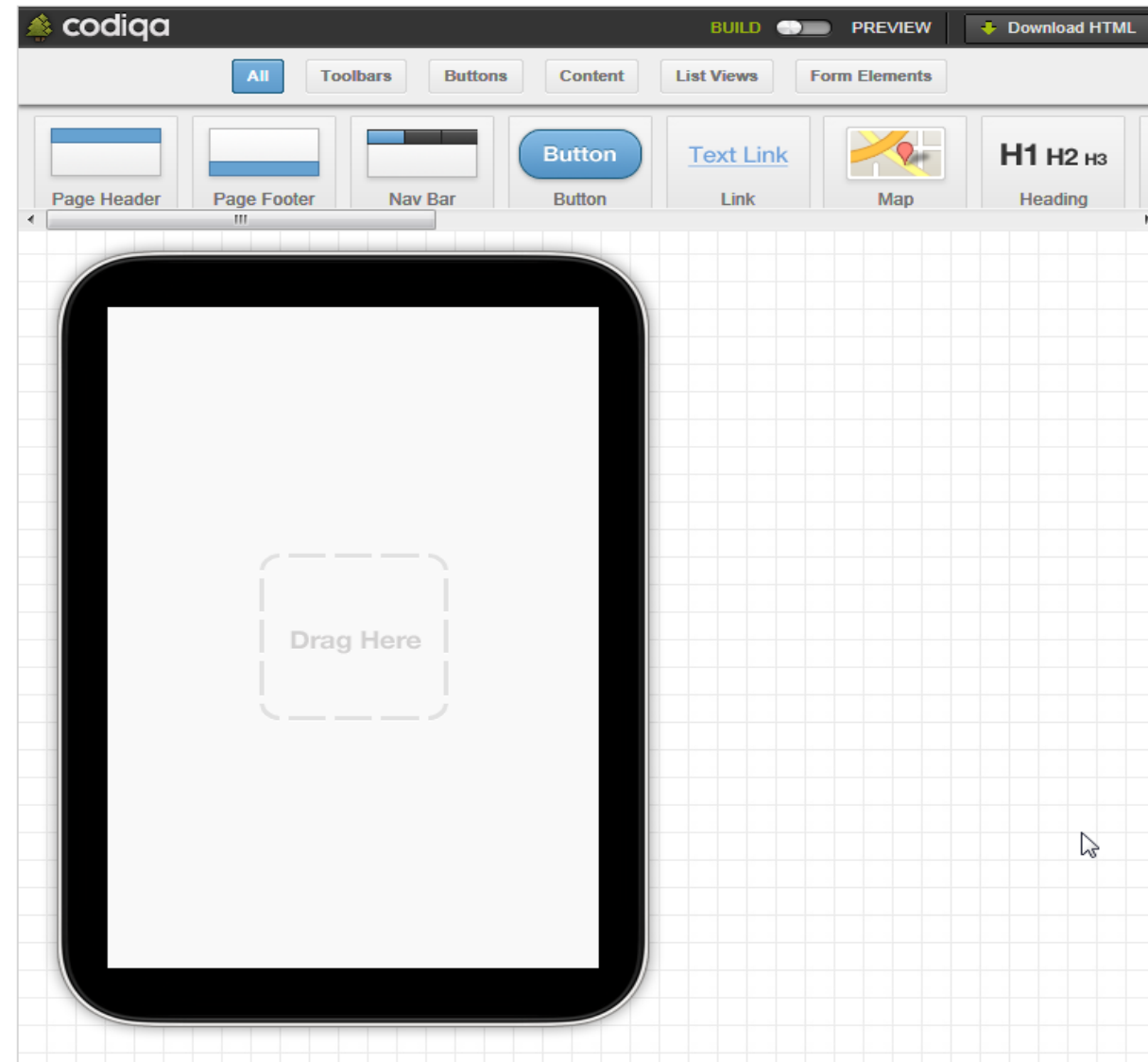
jQuery Mobile has a robust [theme framework](#) that supports up to 26 sets of toolbar, content and button colors, called a "swatch". Just add a `data-theme="e"` attribute to any of the widgets on this page: page, header, list, input for the slider, or button to turn it yellow. Try different swatch letters in default theme from a-e to mix and match swatches.

Cool party trick: add the theme swatch to the page and see how all the widgets inside the content will automatically inherit the theme (headers don't inherit, they default to swatch A).

```
<a href="#" data-role="button" data-icon="star" data-theme="a">Button</a>
```



When you're ready to build a custom theme, use [ThemeRoller](#) to drag and drop, then download a custom theme.



# Customer App Login Page

The image shows a web browser window titled "Mobile Customer App". The address bar displays the URL "http://10.8.2.252:9999/pextCD2lib/jqr". Below the address bar is a navigation bar with a "Back" button, the title "Mobile Customer App", and a "Logout" button. The main content area contains two input fields labeled "User" and "Password", followed by a blue "Login" button. The browser's toolbar includes navigation buttons, a search bar with "Google", and a list of bookmarks: Apple, Yahoo!, Google Maps, Wikipedia, News (68), and Popular.

Mobile Customer App

http://10.8.2.252:9999/pextCD2lib/jqr

Google

Apple Yahoo! Google Maps Wikipedia News (68) Popular

Back Mobile Customer App Logout

User

Password

Login

```
//-----
// Subroutine: LoginPage
// Desc: Login Page Content Div
//-----
begsr LoginPage;

    // Mobile Page Content Div
    htmlNode('div': 'data-role="content" +
              data-theme="' + jqmtheme + '"');

    // Beginning of Data List
    htmlNode('form': 'method="post" action="jqmlist3.pgm" +
              data-ajax="false"');
    htmlNode('label': 'for="IUSER": 'User');
    htmlNode('input': 'type="text" name="IUSER" id="IUSER": ');
    htmlNode('label': 'for="IPASS": 'Password');
    htmlNode('input': 'type="password" name="IPASS" id="IPAS": ');
    htmlNode('input': 'type="submit" name="IACTION" id="IACTION" +
              value="Login": ');
    htmlEndNode(); // End form

    htmlEndNode(); // End Content Div

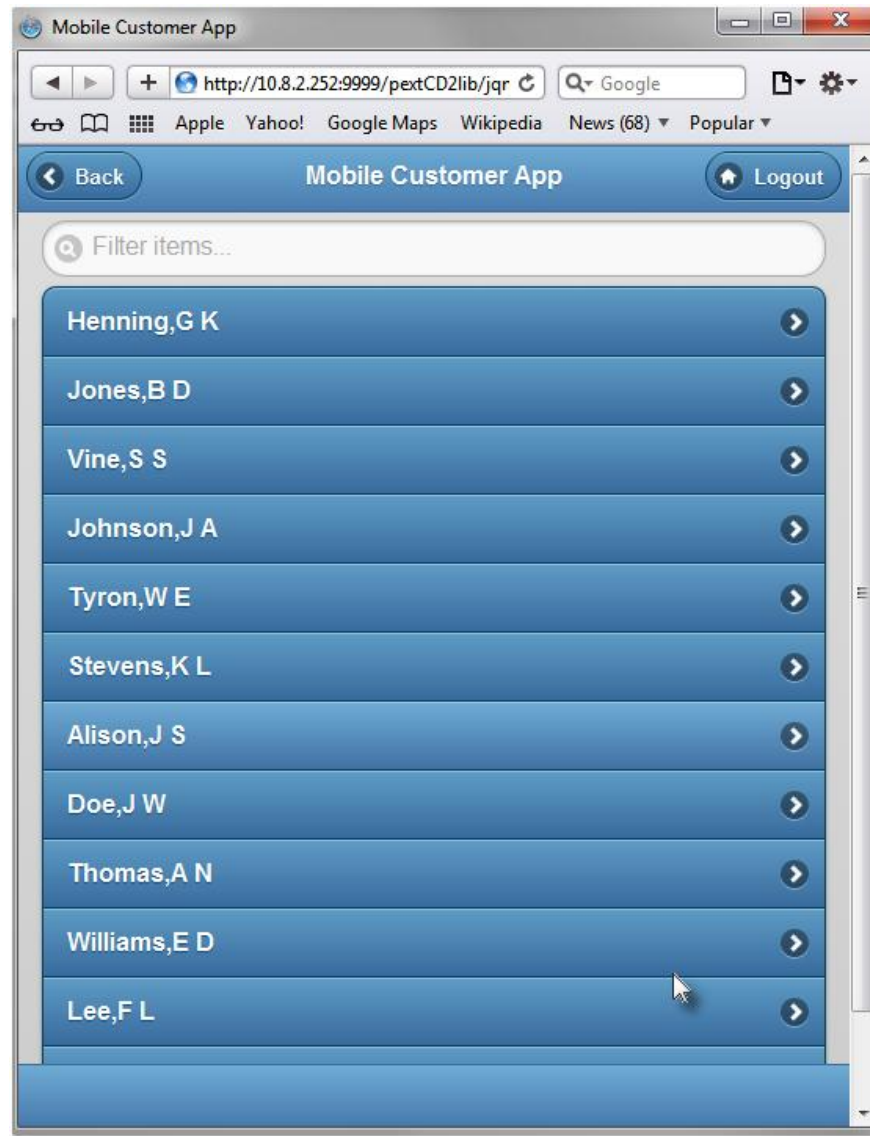
ENDSR;
```

- Login logic should validate user/password
- Login logic can create unique session id in db
- Sessions should time out
- Possibly cache session cookie on device to prevent logging on more than once from device

```
//-----  
// Subroutine: LoginLogic  
// Desc: Login Logic  
//-----  
begsr LoginLogic;  
  
    // If user = demo, login success  
    // Real app would need login table and session management  
    if (IUSER='demo' or IUSER = 'DEMO') and  
        (IPASS='demo' or IPASS = 'DEMO');  
        ILOGGEDIN=1;  
    endif;  
  
endsr;
```



# Customer App Data List Page



```
//-----
// Subroutine: MainListPage
// Desc: Output Main Data List Content Div
//-----
begsr MainListPage;

    // Mobile Page Content Div
    htmlNode('div':'data-role="content" +
              data-theme="' + jqmtheme + '"');

    // Beginning of Data List
    count=0;
    htmlNode('ul':'data-role="listview" data-inset="true" +
              data-filter="true"');
    // Loop through data and build list
    Dou SQLCode <> 0;

        // Fetch next record
        Exec sql FETCH Customers into :dsCus;

        // If errors occur, loop back to start of loop
        if sqlcode <> 0;
            iter;
        endif;

        htmlNode('li:');
        htmlNode('a':'href="' + 'jqm1list3.pgm?IACTION=detail&ICUSNUM=' +
                  %trim(%char(CUSNUM)) + '" :
                  %TRIM(LSTNAM) + ', ' + %TRIM(INIT) );
        htmlEndNode(); // End li div
        count += 1;
    enddo;

    htmlEndNode(); // End ul div

    htmlEndNode(); // End Content Div

ENDSR;
```



The screenshot displays a web browser window titled "Mobile Customer App". The address bar shows the URL "http://10.8.2.252:9999/pextCD2lib/jqr". The browser's search bar contains the word "Google". Below the browser window, the application interface features a blue header bar with a "Back" button on the left, the title "Mobile Customer App" in the center, and a "Logout" button on the right. The main content area is a form with the following fields and values:

| Field Label  | Value   |
|--------------|---------|
| Customer     | 938472  |
| Last name    | Henning |
| Init         | G K     |
| City         | Dallas  |
| State        | TX      |
| Zipcode      | 75217   |
| Credit limit | 5000    |
| Charge code  | 3       |
| Balance due  |         |

```
//-----
// Subroutine: DetailPage
// Desc: Output Detail Page Content Div
//-----
begsr DetailPage;

// Mobile Page Content Div
htmlNode('div': 'data-role="content" +
          data-theme="' + jqmtheme + '");

// Put out detail record

// Fetch record
Exec sql FETCH Customers into :dsCus;

// If errors occur, loop back to start of loop
if sqlcode = 0;
// Beginning of Data List
htmlNode('form': 'method="post" action="jqmlist3.pgm" +
          data-ajax="false");

htmlNode('label': 'for="CUSNUM": 'Customer');
htmlNode('input': 'type="text" name="CUSNUM" id="CUSNUM" +
          value="' + %trim(%char(cusnum)) + '": ');

htmlNode('label': 'for="LSTNAM": 'Last name');
htmlNode('input': 'type="text" name="LSTNAM" id="LSTNAM" +
          value="' + %trim(LSTNAM) + '": ');

htmlNode('label': 'for="INIT": 'Init');
htmlNode('input': 'type="text" name="INIT" id="INIT" +
          value="' + %trim(INIT) + '": ');

htmlNode('label': 'for="CITY": 'City');
htmlNode('input': 'type="text" name="CITY" id="CITY" +
          value="' + %trim(CITY) + '": ');

htmlNode('label': 'for="STATE": 'State');
htmlNode('input': 'type="text" name="STATE" id="STATE" +
```

```
htmlNode('label':'for="ZIPCOD":"' Zipcode');
htmlNode('input':'type="text" name="ZIPCOD" id="ZIPCOD" +
    value="' + %trim(%char(ZIPCOD))+'":');

htmlNode('label':'for="":"' Credit limit');
htmlNode('input':'type="text" name="CDTLMT" id="CDTLMT" +
    value="' + %trim(%char(CDTLMT))+'":');

htmlNode('label':'for="CHGCOD":"' Charge code');
htmlNode('input':'type="text" name="CHGCOD" id="CHGCOD" +
    value="' + %trim(%char(CHGCOD))+'":');

htmlNode('label':'for="BALDUE":"' Balance due');
htmlNode('input':'type="text" name="BALDUE" id="BALDUE" +
    value="' + %trim(%char(BALDUE))+'":');

htmlNode('label':'for="CDTDUE":"' Credit due');
htmlNode('input':'type="text" name="CDTDUE" id="CDTDUE" +
    value="' + %trim(%char(CDTDUE))+'":');

htmlEndNode(); // End form

Else;
    htmlNode('p':'No record found');
endif;

htmlEndNode(); // End Content Div

ENDSR;
```

- TODO items
- Implement security table
- Implement filter page prior to data list page
- Implement data paging to prevent browser overrun in case of large tables
- Implement session management
- Implement data updating

- Start with a simply inquiry app – my sample
- Build a web app first
- jQueryMobile
- HTML5/CSS
- 100% online access
- Start adding offline caching of data if needed
- See what works for you
- Start small and grow incrementally after feedback

- Attend the rest of the mobile sessions at COMMON
- Common development themes you will hear
- HTML5
- CSS3
- Javascript
- jQueryMobile / Sencha Touch
- Consider PhoneGap to create offline apps
- Talk to your users and build a useful app

- Slides and sample app available from COMMON site by Wednesday
- Downloads will also be available at:
- <http://downloads.rjssoftware.com/files/commonclasses/2012/mobilizingibmi.zip>
- Email: [richard@rjssoftware.com](mailto:richard@rjssoftware.com)
- Phone: 888 – RJSSOFT
- Feel free to contact me if you have questions or would like to discuss your development needs.