Solving Mobile App Development Challenges

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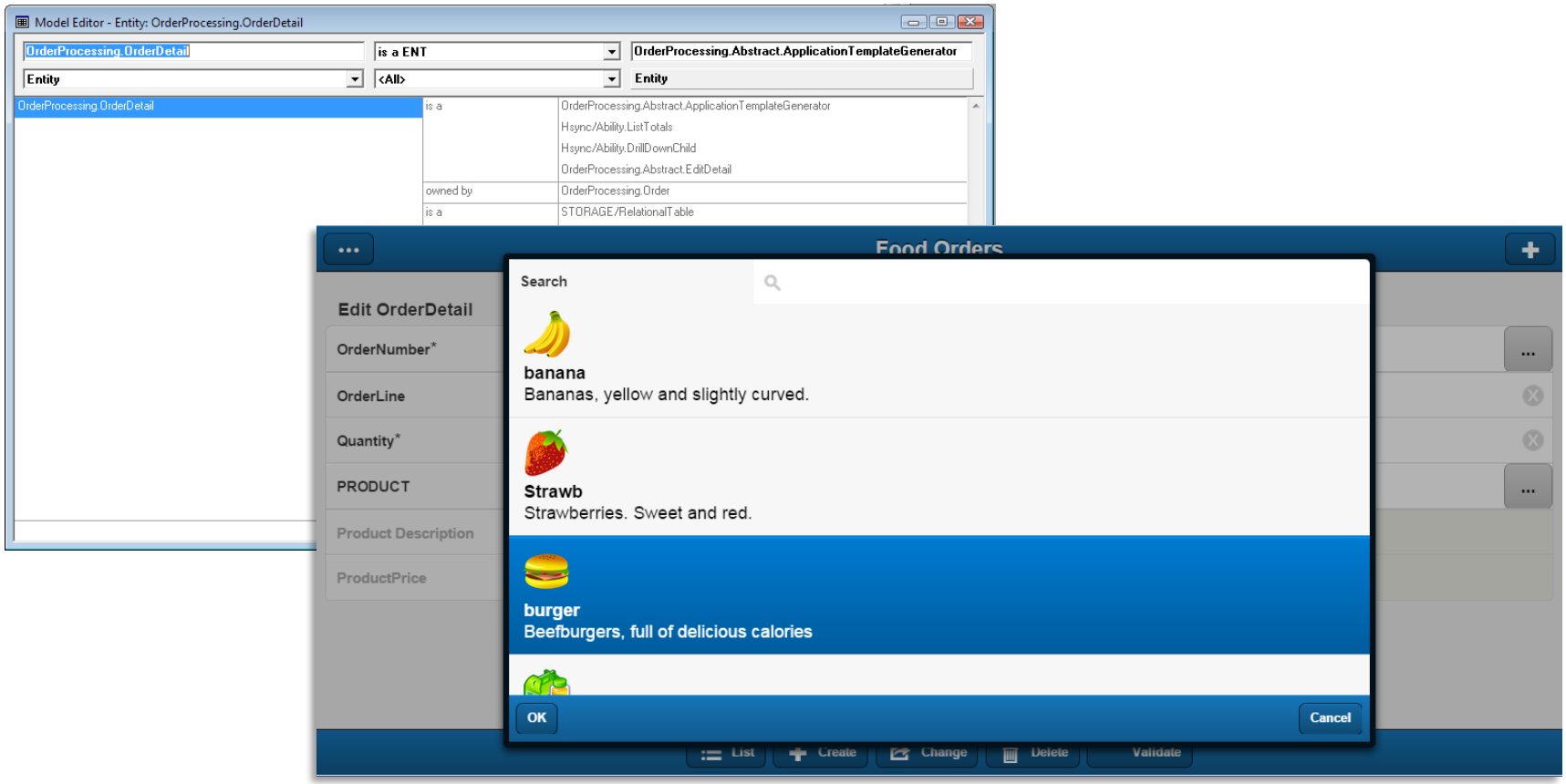
CM First

CM First WebClient Solutions

- CM WebClient
  - Full desktop experience in browser
- CM WebClient Mobile
  - Online mobile solution, direct access to CA Plex code and database
- CM WebClient HSync
  - Offline mobile solution, record data anytime and synchronize when online

CM WebClient HSync

- An offline mobile application solution for CA Plex



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Why do we need an offline mobile app?

- 100% availability
  - Can’t guarantee an internet connection
- Need to record information in remote locations, e.g.
  - Building Sites
  - Farms
  - Traveling Salespersons
  - Equipment Inspectors

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Requirements for an offline mobile app

- Must run on all popular mobile devices
- Must provide good performance
- Must store persistent data on the device
- Must have ability to use device features if required
- Must allow data entry consistent with CA Plex model definitions
- Must be customizable
- Must be able to fetch and update data using CA Plex

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How do we create an offline mobile app?

- Sencha Touch JavaScript framework
  - Designed for mobile applications
  - Can be integrated with Cordova/Phonegap
  - Runs on all platforms
- Templates
  - Maximum flexibility
- Meta-code
  - Retrieve values from CA Plex model to populate templates
- Web Services
  - Provides ability to call CA Plex functions when online

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HSync Offline Mobile Application

- Default App for HSync
- Sencha Touch application
- iOS, Android, Windows +
- Allows basic data entry
- Validates data based on Plex Model
  - Same functionality as EditDialog
- Data stored on device
- Synchronize data via Plex functions – when online
- Customized navigation

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HSync Components

- HSync group model
- Your CA Plex model
- Template files
- HSyncServices Servlet
- Eclipse Workspace

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HSync Group Model

-  HSync/OfflineApplication
-  HSync/TemplateGeneratorEntity
-  HSync/Ability
-  HSync/Generator Utilities

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Setting up your CA Plex model

- Designed for minimum impact
- Create an Application Entity to inherit from the OfflineApplication entity
- Inherit from TemplateGeneratorEntity for each entity you want to include
- Add Application ENT comprises ENT triples
- Inherit from Ability entities to control behavior

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Setting up your CA Plex model

- Set configuration to generate for Java Client
- Generate TemplateGeneration function for each entity being used
- Uses meta-code to query model details
- Creates a UI function to control application generation

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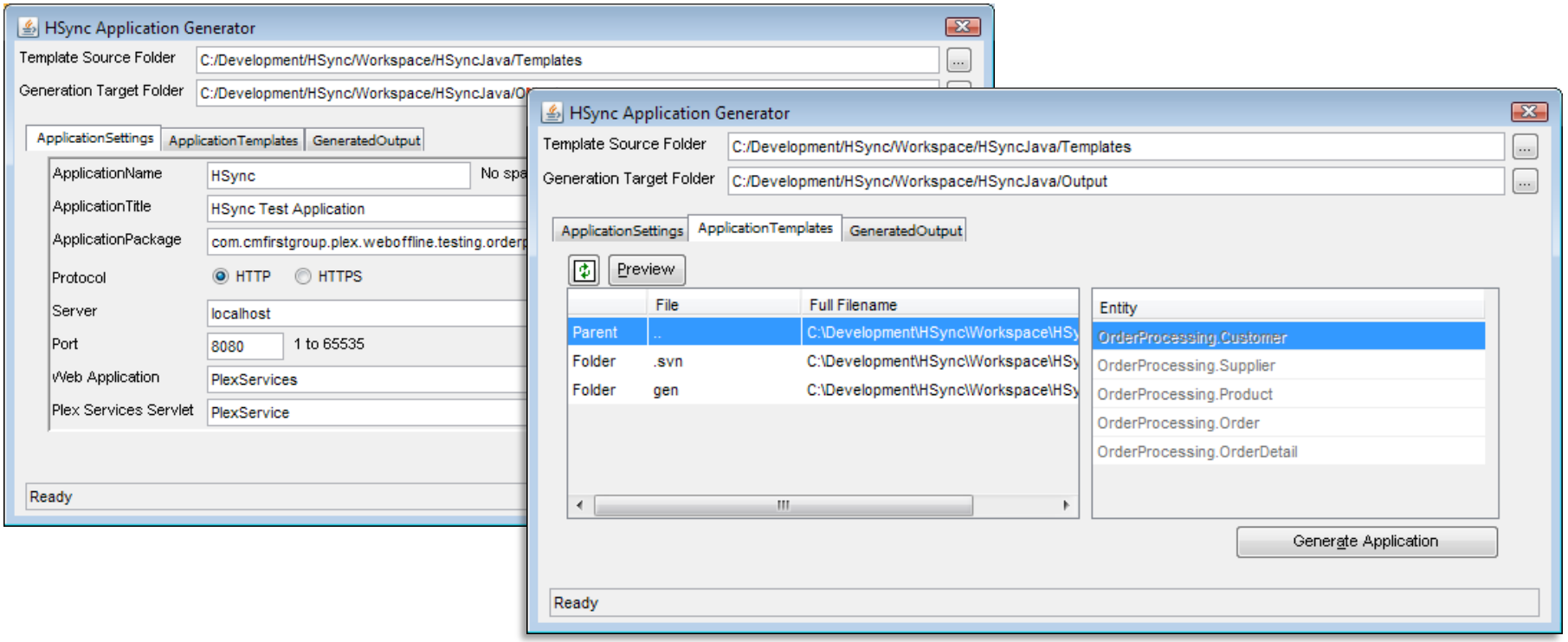
Generator UI

- Set properties for generation
- Start generation process



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Application Generation

- Reads HSync Templates
  - Contains special tags
- Inserts values from Plex model
  - Information from triples, labels and message objects
- Creates output files
  - Typically JavaScript, flexible enough to generate HTML, XML, JSON, text and other types

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HSync Templates

- Use tags to control how output is generated
  - Attributes, e.g. /(entity.name)
  - Loops, e.g. /(foreach.application.entity)
  - Conditions, e.g. /(if:/(attribute.length)>=32)
  - Modifiers, e.g. /(entity.name:upper)

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HSync Templates

Template

```
setRestriction: function() {
    var restrict = this.getFormView().getRestrictor();
    /(foreach.view.key.attribute:Fetch)
        /(if:/(attribute.issuperkey)==Y)
            this.get/(attribute.implname:varname)().setValue(restrict./(attribute.implname:varname));
            this.get/(attribute.implname:varname)().setReadOnly(true);
        /(end.if)
    /(end.view.key.attribute)
    this.completeInit();
},
```

Output

```
setRestriction: function() {
    var restrict = this.getFormView().getRestrictor();
    this.getUserID().setValue(restrict.UserID);
    this.getUserID().setReadOnly(true);
    this.getDeliveryID().setValue(restrict.DeliveryID);
    this.getDeliveryID().setReadOnly(true);
    this.completeInit();
},
```

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Abilities

- Control behavior with Abilities
- Inherit from Ability entities & fields, e.g. Ability.Delete, Ability.ReadOnly
- Can add your own Abilities
- Templates conditionally generate code based on inheritance

```
/(if:/(entity.inherits:Ability.Delete)==Y){
    xtype: 'button',
    text: 'Delete',
    iconCls: 'trash',
    id: '/(entity.name:camel)DeleteBtn'
},/(end.if)
```

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HSync Templates

- Simple constructs allow for advanced features
  - Mandatory field validation
  - Default values
  - Referential integrity
  - Virtual Attributes
  - Selector panels
  - Restricted parent/child
  - Menus
  - Edit Grids
  - Filtered Grids
  - Grid formatting
  - Data Synchronization
  - Add Custom JavaScript
  - more to come…

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Sencha Touch

- JavaScript framework designed to work with touch screens
- Based on Ext JS library
- Build panels from Components
- Uses MVC structure
- Can be packaged as mobile app with Cordova/Phonegap

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Sencha Touch

- HSync creates complete Sencha Touch application
- Sencha Cmd Tool
  - ‘Compiles’ JavaScript for performance
  - Apply themes for mobile platforms
  - Native packaging
  - Upgrade Sencha Framework

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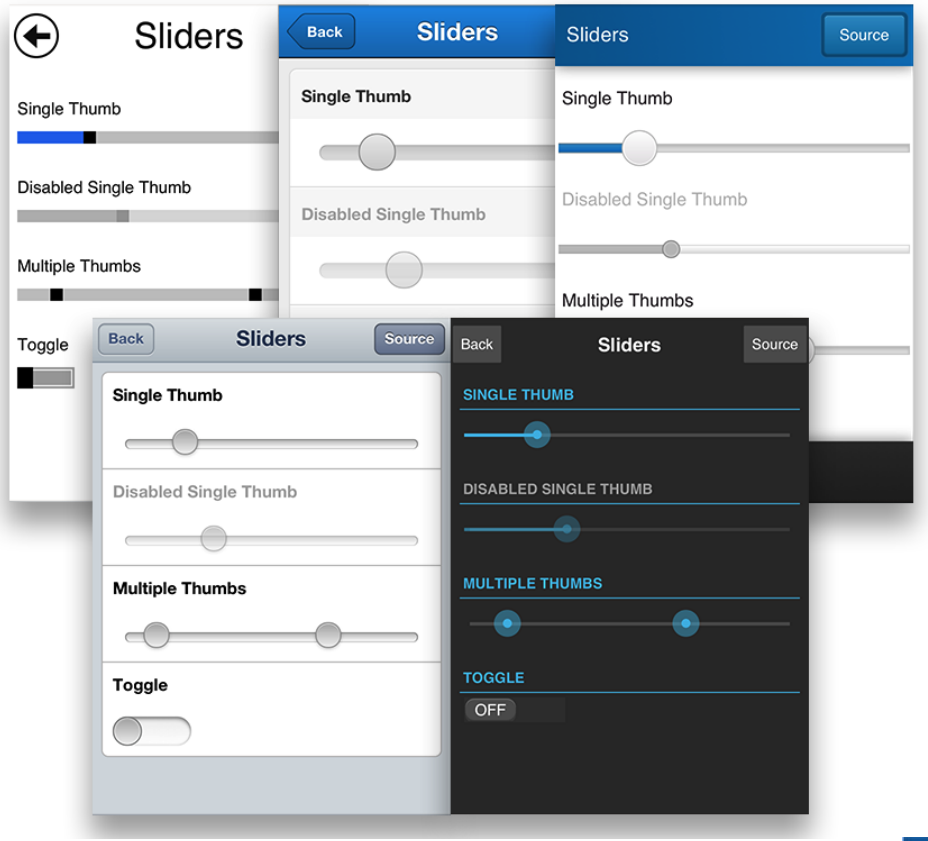
Sencha Touch

- Themes



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HSync Services

- Provides ability to call Plex functions over HTTP/HTTPS
- Can be called from JavaScript app using AJAX
- Uses CA Plex runtime
- Function interfaces available via templates
- Allows Fetch & Update functions to be called
- Used for Synchronization process
- Can use action diagram validation and processing
- Ensure data fits business rules

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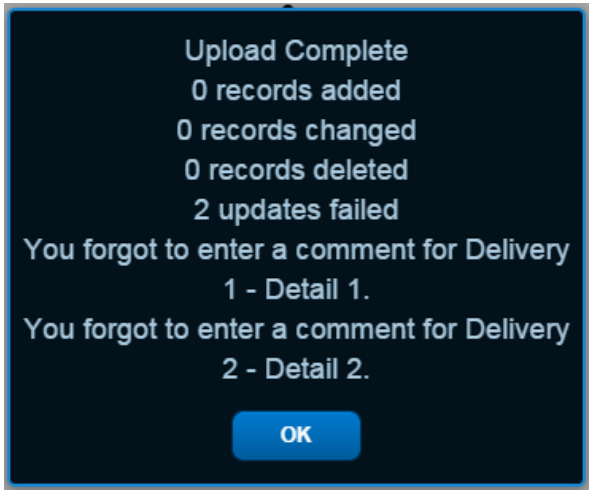
HSync Services

- Using Action Diagram to validate

```
Function  Delivery Detail.TemplateGeneration.CalledFunctions.Validate
    Post Point  Validate Update
        If  UpdateData<Delivered?> == <Delivered?.Yes> AND UpdateData<Delivery Comment> == <Delivery Comment.*Blank>
            Format Message  Message: Must leave a comment, Environment<*Message text>
                You forgot to enter a comment for Delivery &(1:) - Detail &(2:).

            Go Sub  Send message
            Set  Environment<*Returning status> = <*Returning status.*Error>
```



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CM WebClient HSync

Demonstration

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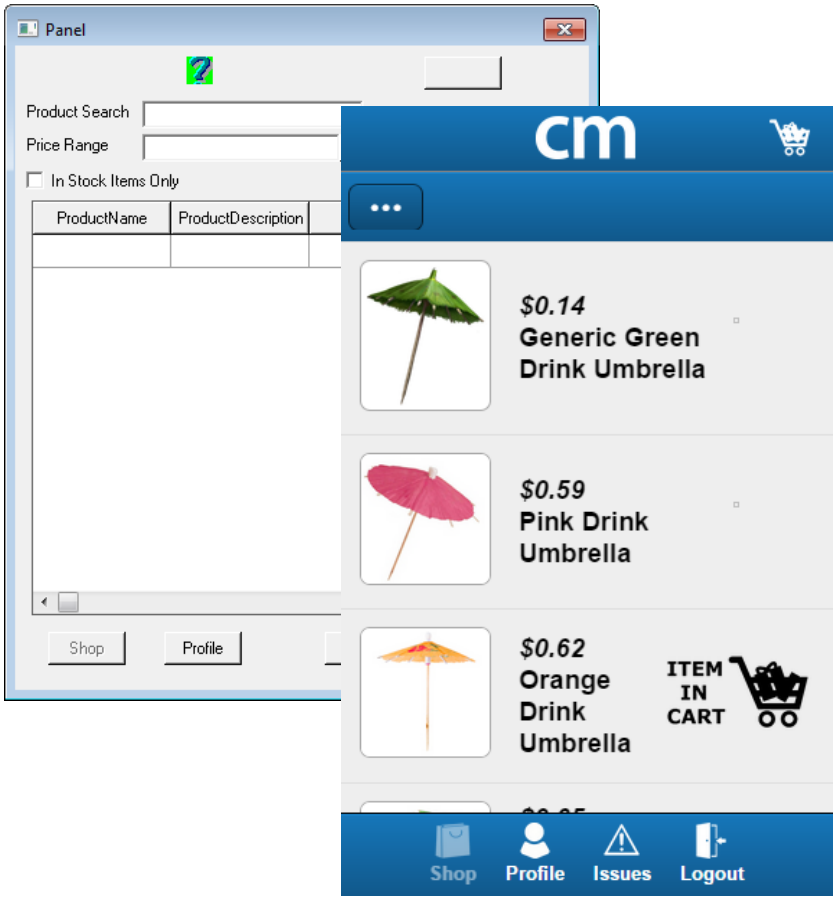
CM WebClient Mobile

- A multiplatform mobile solution for CA Plex



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CM WebClient Mobile

- Built using Sencha Touch
- Mimics native mobile functionality using JavaScript
- Allows you to deploy the same application on multiple platforms
- CM WebClient Mobile applications run as web applications out of the box
- Deployed as a WAR file to a Web Server

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Developing CM WebClient Mobile

- Mobile environment's limited screen size creates some screen layout challenges
- Need to consider what kind of device you are developing for (Phone, Tablet, either?)
- Reorganize and rethink panels to make them more effective for mobile users
- CA Plex inheritance can make rethinking existing functionality for mobile much easier

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Apache Cordova/PhoneGap

- Mobile development framework that allows for JavaScript applications to be deployed on mobile devices
- Supports iOS, Android, Windows Phone, etc.
- Allows you to wrap your web application for the mobile device stores
- Wrapped applications can access device specific functionality (Cameras, GPS, Device Storage, etc.)
- Large community developing new plug-ins

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Using Cordova with CM WebClient Mobile

- Developing templates is the same as developing normal WebClient control and page templates
- Uses the same syntax and mark-up language as normal WebClient
- Functions that use Cordova functionality will need to reference the cordova.js file
- The Android/iOS/Windows application will be its own Project separate from your other projects.
- Install plug-ins for each Cordova feature that want to access

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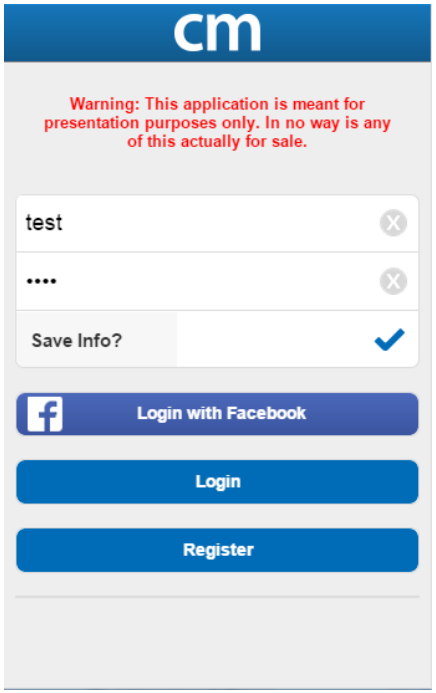
Specific Examples: Social Network Authentication

- Using a Cordova plug-in, we are able validate user sign-on using their Facebook account (https://github.com/Wizcorp/phonegap-facebook-plugin.git)
- Requires the setup of a Facebook application. This can be done at https://developers.facebook.com/
- The WebClient Template contains all the JavaScript needed to use this plug-in.



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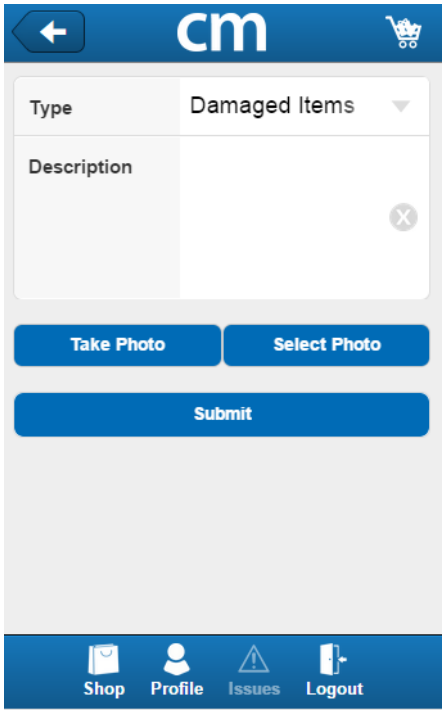
Specific Examples: Camera and Photo Upload

- Using several Cordova plug-ins, we are able access the device's camera, saved photos, and upload the picture from the device to our web server.
- Install the necessary plug-ins to your Cordova project.
- Reference the necessary JavaScript in your WebClient Template
- Once upload is complete, any other processing is handled in the CA Plex Action Diagram



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Deploying Changes: Update App, or Update WAR?

- Changes that affect the Cordova application requires the App to be redeployed to the App Stores
  - Changing Plug-ins
  - Changing Permissions
  - Changing Web Server address
- Changes to the Plex Model or WebClient Templates requires a new WAR file to be deployed to the web server
  - No changes needed in the deployed app

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