|  |
| --- |
| Cireson |
| Barcode Scanner App |
| Enabling mobile asset management |

|  |
| --- |
| Travis Wright  10-16-2013 |

Bar Code Scanner App

# Overview

At various points in the asset management lifecycle as asset managers are handling physical assets, it is useful to scan barcodes on assets to quickly identify an asset. The barcode on an asset provides a unique identity for each asset. Using that unique ID, an asset manager can quickly look up the details of the asset and possibly then update details about that asset.

## Background Information

Historically, organizations have used specialized bar code scanner devices to scan bar codes. These specialized devices oftentimes run on Windows CE, Windows Mobile 6.5, or other specialized operating systems. With the rise of smartphone usage, many people are using the smartphone camera to scan bar codes. Software SDKs are available to quickly add barcode scanning abilities to any application.

# Customer Profile

Customers of the barcode scanning app will always be customers of our Asset Management product. The Cireson Asset Management product will be a prerequisite of the barcode scanning app. Customers will vary in size from the small hundreds of employees up to the 100,000+ employees. Roughly estimating we can plan on their being at least 1 hardware asset per each employee.

Customers will be using this product in many different regions and languages all over the world. In some cases, the cellular data connection may not be particularly good (3G or less). Wi-Fi will often be available when using this app, because the assets will typically be scanned on premise in a customer’s office building, warehouse, or datacenter.

# Customer Requirements

|  |  |
| --- | --- |
| **Priority** | **Requirement** |
| High | Scan bar code and capture unique ID using smartphone camera |
| High | Configurethe app to connect to the web console middle tier APIs: URL, credentials |
| High | Retrieve asset details using the barcode ID as the query criteria |
| High | Update asset details |
| Medium | Scan multiple assets and then change some properties in bulk |
|  |  |

# Use Cases

## Receive Assets

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| When new assets such as an order of laptops arrives at the customer site the asset administrator needs to update the status of the assets. Each individual asset must be accounted for. The asset manager begins by clicking ‘Receive Assets’ on the main menu. He is prompted to provide a purchase order number or to search for a purchase order. After selecting a purchase order, he clicks a “Next” button to begin scanning assets. He then uses the bar code scanner camera interface to scan an asset. When a bar code is scanned an audible and visible confirmation (which does not require acknowledgement) is given. He continues to scan items until he has scanned them all. At that point, he clicks a “Next” button. The app then tries to match the barcodes to existing HW assets related to the purchase order that may already have an asset tag value stored on them. For each item that can be matched a positive indicator is provided. The user can then select additional assets and click the “auto assign” button which will take each of the remaining unused asset tags that were scanned and apply an asset tag to each selected item. Each selected item will then have a positive indicator and the asset tag value will be set. Then the user can click the “Next” button. The next page allows the user to multi-select HW assets (or select all) and click a “bulk update” button. This prompts the user to select a status value, location value, organization value, custodian user, cost center value, received date (defaults to now). When the user is done he clicks OK and then an Upload button is presented. A confirmation dialog is shown. If the user confirms, the data is uploaded to the web service. The results (confirmation or error) are shown to the user. When dismissed the user is redirected back to the home screen of the app. | |

## View/Edit Assets

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| When an asset manager needs to quickly look up or update information about an asset he can simply scan the bar code on the asset to uniquely identify it. To begin with on the home page of the app the user clicks the ‘Lookup/Edit Asset’. He is then shown the barcode scanner camera interface. Once the barcode is scanned, the user receives an audible confirmation and the screen is updated to show the barcode value. The user can scan multiple items or just a single item. When he is done he clicks next. If the user has scanned just a single item he is shown all the details of the HW asset in a read/write form. If the user has scanned multiple items, the user is shown a blank form. The user can change any of the values and the values will be applied to all of the selected objects. The user can change values of the hardware asset and click save to changes to the database. | |

## Dispose Assets

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| When assets are ready to be disposed (recycled, sold, thrown away, etc), the asset manager must account for the assets. On the home page of the app the user can choose ‘Dispose Assets’. He is then prompted to scan the assets via the barcode scanner camera interface. As each unique asset is scanned an audible and visual confirmation is given. When the user is done scanning assets he clicks Next. On the next screen he can change certain properties in bulk:   * Status * Disposal date (defaults to now) * Checkbox to clear the primary user relationship (defaults to yes) * Checkbox to clear the custodian user relationship (defaults to yes) * Disposal reference number   When the user is done providing this information, he is prompted to “save to database”. | |

## Swap Asset

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| The asset administrator selects ‘Swap Asset’ on the main menu. He is prompted to scan the “old” asset. If the asset can be discovered by matching the bar code ID against either the asset tag or serial number ID, then the asset administrator is presented with a form that allows him to change some properties of that asset (see below for details) and then click “OK”. He is then prompted to scan the “new” asset. If the asset can be discovered by matching the serial number or asset tag, the asset administrator is presented with a form that allows him to change some properties of that asset. On OK both the new and old assets are updated accordingly. | |

## Inventory Audit

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| The asset administrator selects ‘Inventory Audit’ from the main menu. He is prompted to search for some assets by fields such as location, cost center, primary user, etc. He then sees a list of assets and he is prompted to start scanning. He scans all the assets that he needs to and then clicks OK. He is shown a list of the HW assets that match the scans that he made (by serial number or asset tag), a list of assets that were returned by the query but were not scanned, and a list of assets that were scanned but not returned by the query. The admin can choose to email a CSV file report to someone. Note: the design here should leave from for other actions that can be taken in the future such as creating a change request work item in Service Manager and attaching the CSV file to it. | |

## Connect to Server

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| When the user first opens the app he is prompted to login by providing a URL, login, and password. Once the user has connected his credentials are remembered. If the user’s credentials ever fail he is prompted to provide the username and password again. | |

## Configure Settings

|  |  |
| --- | --- |
| Priority: High | User: Asset Administrator |
| The user clicks on Settings on the main menu. He is taken to a form that allows him to configure the web service URL, login, and password. He can also specify a comma separated list of prefixes that should be removed from barcodes that are scanned. | |

# User Experience Design

## Loading Screen

The following screen will be displayed during loading.

<Loading Screen>

## Login Screen

The login screen prompts the user for a URL to connect to, login, and password. If the user enters an incorrect password/login or is otherwise unable to connect to the server the error message is displayed below the login prompts. The user can also select a language to display text in.

<Login Screen>

## Home Page

On the home page the user can choose from three different actions:

* Receive Assets
* View/Edit Assets
* Dispose Assets

<Home Page Screen>

## Receive Assets Wizard

### Page 1 – Select Purchase Order

The user can choose to enter a purchase order number to search for or browse a list of all POs with a purchase order date in the last N (user can choose from 7, 14, 30 - default, 60, 90) days sorted by the PO date (descending). The user can also choose to create a *new* purchase order when the data is submitted.

<Receive Assets Wizard Page 1 – Select PO - Initial View>

<Receive Assets Wizard Page 1 – Select PO - View after user chooses to browse POs>

<Receive Assets Wizard Page 1 – Select PO - View after search fails to find a PO by PO number>

### Page 2 – Scan HW Assets to Receive

The next “page” in the wizard prompts the user to use the camera to scan a bar code. As each bar code is scanned an audible and visual signal is given to the user. The bar code ID is added to a list the user can see. He can click an X (or appropriate equivalent depending on the UX framework) to remove a scanned item from the list. The user can click a ‘Next’ button when done.

<Receive Assets Wizard Page 2 – Scan Barcode - Initial View>

<Receive Assets Wizard Page 2 – Scan Barcode – View after the user has scanned several assets>

### Page 3 – Assign Barcodes

On this page of the wizard, the user needs to assign asset tags to HW assets. If scanned barcode matches an asset tag or serial number value on an existing HW asset related to the PO the asset is marked as being “matched” already. The user can then “match” barcodes up to HW assets (drag/drop?) or can click a button to “auto-assign” all of the scanned bar codes to the HW assets.

<Receive Assets Wizard Page 3 – Match Assets – Initial View (show assets w/ existing asset tags)>

<Receive Assets Wizard Page 3 – Match Assets – Showing how to match an asset tag to a HW asset>

When all of the scanned barcodes have been assigned to an asset the “Next” button becomes enabled.

Note: this screen can be skipped if the user is creating a new PO.

### Page 4 – HW Asset Update

On this page of the wizard we present the HW asset form to the user but only display a subset of the possible fields that would be appropriate for the receiving scenario as follows:

* Status (hierarchical drop down)
* Received Date (defaults to now) (date/time)
* Custodian User (P3) (object picker)
* Primary User (P3) (object picker)
* Description (multi-line textbox)
* Asset catalog item (object picker?)
* Manufacturer (textbox)
* Model (textbox)
* Location (object picker?) + option to scan
* Cost center (object picker?) + option to scan
* Organization (object picker?) + option to scan
* Asset Type (hierarchical drop down)

Note: if the user chooses an Asset Catalog item the manufacturer and model field are populated with the asset catalog item manufacturer and model properties and a relationship should be created between the HW asset(s) and the asset catalog item.

<Receive Assets Wizard Page 4 – HW Asset Update – Initial View>

When the user is done filling out the form he can click a ‘Submit’ button. When the user clicks the submit button there is a wait indicator. When the update is successful he sees a confirmation dialog. On OK he is redirected back to the app home page. If there is a failure, the user sees the error message and is returned to the HW asset update page of the wizard.

## View/Edit HW Asset

If the user wants to view the properties of a HW asset he can click ‘View/Edit Assets’ on the home page.

### Page 1 – Scan bar code

The user is then prompted using the same screen as Page 2 of the receiving wizard to scan one or more bar codes. The app should attempt to match the scanned bar code against both the serial number and asset tag properties of HW assets.

If any assets cannot be found for a particular bar code that was scanned, the user is notified of that fact and told that the bar code will be removed from the collection of bar codes. The user is also told that he can use the Receive Asset wizard to associate a bar code with a HW asset.

### Page 2 – HW Asset Update

The user is then prompted with the same form as Page 4 of the receiving wizard. If the user scanned only a single bar code on page 1 then the form is filled out with the values for that particular HW asset. If the user scanned multiple bar codes the form is blank. At the top it says that the selected values will be applied to all of the assets that were scanned.

* Status (hierarchical drop down)
* Custodian User (object picker)
* Primary User (object picker)
* Description (multi-line textbox)
* Manufacturer (textbox)
* Model (textbox)
* Location (object picker?) + option to scan
* Cost center (object picker?) + option to scan
* Organization (object picker?) + option to scan
* Asset Type (hierarchical drop down)

When the user is done he can click the Submit button with an experience similar to the submit experience on the receiving wizard.

On a bulk update the Description is always *added* to whatever value already exists for description.

## Dispose Asset

Dispose asset is the exact same experience as the View/Edit HW Asset experience except that the form is different. It shows:

* Status (defaulted to Disposed)
* Disposal Date (defaulted to Now)
* Disposal Reference
* Description
* Location (object picker ?) + option to scan
* HA

On a bulk update the Description is always *added* to whatever value already exists for description.

## Inventory Audit

In this scenario, the user will click on ‘Inventory Audit’ on the main menu. The user will then be presented with a search form where he can search by any of the following properties/relationships of a HW asset:

* Location (object picker) + option to scan
* Cost center (object picker) + option to scan
* Organization (object picker) + option to scan
* Status (hierarchical drop down with multi-select)
* Custodian User (object picker)
* Primary User (object picker)
* Asset type (hierarchical drop down with multi-select)
* Description (textbox; operator is “contains”)

Note: all criteria are “ANDed” together except for multiple values selected in a multi-select drop down are “ORd” together. For example – (Location = Thailand) AND (Status = Deployed OR Status = In Inventory).

Once the user runs the search by clicking “Search”, the resulting hardware assets are displayed showing the Display Names in a list. The user is prompted to start scanning barcodes. As each barcode is scanned, the app should attempt to match it to a serial number or an asset tag. If there is a match, the HW asset is updated in some way to indicate that there is a match (check mark next to the item or something like that). If there is no match the barcode ID should be added to a “No match” list.

When the user is done scanning items he can click a button called something like “Email Report”. The user provides an email address(es) to send the report to. The email subject should say “Inventory Audit Report”. The email body should include the criteria that was used for the search and attach three CSV files as follows:

MatchedAssets.csv: Assets which were in the search results and were scanned by the user.

AssetsNotScanned.csv: Assets which were in the search results but were not scanned by the user.

UnexpectedAssets.csv: Assets which were scanned but were not in the search results.

Each CSV data file should have the following columns in order:

* HardwareAssetID
* DisplayName
* SerialNumber
* AssetTag
* Manufacturer
* Model
* Description
* HardwareAssetStatus
* HardwareAssetType
* ReceivedDate
* Cost
* Name (“Asset Name”)
* LocationDetails
* ExpectedDate
* MasteContractEndDate
* MasterContractStatus
* LoanedDate
* LoanReturnedDate
* DisposalDate
* DisposalReference
* MasterContractRenewedOn
* MasterContractStartingDate
* ModelEnum
* ManufacturerEnum
* Currency
* AssignedDate
* ObjectStatus
* AssetStatus
* Notes
* Location (relationship)
* CostCenter (relationship)
* Organization (relationship)
* PrimaryUser (relationship)
* CustodianUser (relationship)

The first row in the data set should be the column headers as above.

Note: the UnexpectedAssets.csv file will only have the Asset Tag column filled in with the bar code IDs that were scanned for each unexpected column. The rest of the data column values will be blank.

The relationship columns should contain the key property values of each related object.

Talk to Travis when you get ready to construct the CSV data files.

The Cireson team will create the CSV data mapping XML file necessary to import the data into SCSM.

## Swap Asset

The administrator begins the swap asset process by clicking ‘Swap Asset’ on the main menu. The admin is first prompted to scan the bar code on the “old” asset. Using the ID scanned the app looks for a HW asset with that ID in the serial number or asset tag property. If a match cannot be found an error message is displayed ‘Could not find an asset with ID: <bar code ID>’. If a HW asset can be found then the user is presented with a form that allows him to change any of the following values:

* Status (hierarchical enum picker)
* Location (object picker)
* Organization (object picker)
* Cost Center (object picker)
* LoanReturnedDate (datetime)
* Notes (textbox) – append to existing notes value

When the user clicks next he is prompted to scan the “new” asset. He can then change any of the following property values:

* Status (hierarchical enum picker) – defaults to the “old” asset previous value
* Location (object picker) – defaults to the “old” asset previous value
* Organization (object picker) – defaults to the “old” asset previous value
* Cost Center (object picker) – defaults to the “old” asset previous value
* LoanedDate (datetime) - defaults to today
* Notes (textbox) – append to existing notes value
* Primary user (object picker) – defaults to the “old” asset previous value
* Custodian user (object picker) – defaults to the “old” asset previous value

When the admin clicks Submit the data is updated in the database and a confirmation is given to the user.

# Middle Tier Interfaces

The following interfaces should be provided by the middle tier as web services. Some of these web services may already exist as generic interfaces that can be reused.

* Search Purchase Orders by PO name
* Search HW assets by criteria defined above
* Get Purchase Orders with PO date in the last 90 days
* Get HW assets related to a PO (by PO ID)
* Get HW assets by collection of asset tags or serial numbers
* Update HW assets
* Get Enum values (for the language chosen; if value display name is not present for chosen language, default to English, if no English then default to .Name)
* Get locations, cost centers, organizations (ideally as a hierarchy)

# Localization

## Localizability

All text strings displayed in the application must be pulled from resource files such that we can easily localize to additional languages in the future.

## Initial Languages

The app should be localized in the following languages:

* English (default)
* German
* Swedish
* Spanish
* Portuguese

Cireson will provide the translation. Near the end of the project the list of strings should be provided to Cireson to be handed off to a translation team.

# Licensing

The bar code scanning app will not work without the Cireson asset management MP being imported and licensed because it interfaces with HW assets and purchase orders. The bar code scanning app will be a free app available through the various app stores (iTunes, Google Play, Windows Phone Store).

# Security

Because the user is providing credentials, they must be encrypted and stored in secure memory. The credentials must be disposed of when the app is uninstalled.

If the user provides a https:// URL on the connection dialog SSL must be used to connect to the server.

The user should be able to access the web services over the intranet or the Internet.

# Open Issues

|  |  |
| --- | --- |
| **Issue** | **Decision** |
| Is it acceptable to not prompt for Custodian and Primary User? |  |
|  |  |
|  |  |