

TRAINING GUIDE

Tablet Cradle to Mobile Offline

Tablet Cradle to Mobile - Offline

The Android tablet application supports a disconnected mode that allows data to be taken offline, collected and edited, and synced back to the server when a connection is available. Full functionality discussed in this section is only available for customers with Lucity 2014r2 and who are using the latest release of the Android Tablet application.

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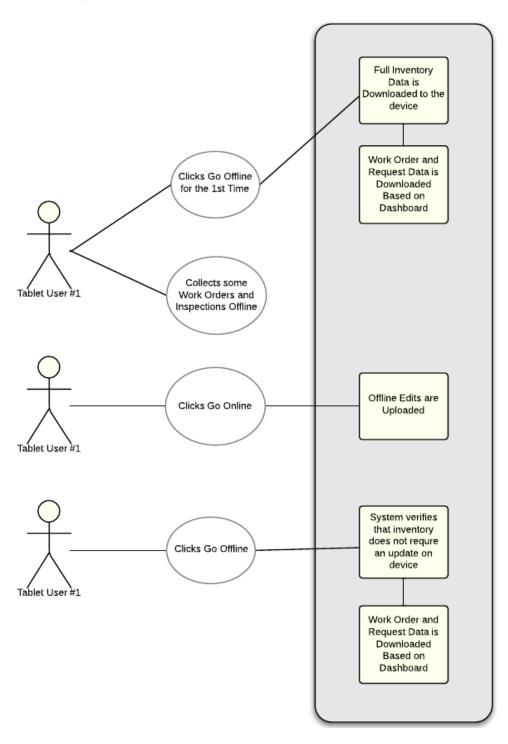
User Interface - Going Disconnected

When a user goes offline, the tablet application downloads a cache of all of the inventory data so that it is available while the user is offline. The tablet application also reviews the user's dashboard for any Work Order or Request data that is marked for offline use and downloads that as well.

Downloading and processing the inventory datasets for offline use can be time consuming depending on the processor on the tablet and therefore is optimized to only download updates when needed. The following diagrams show some example workflows:

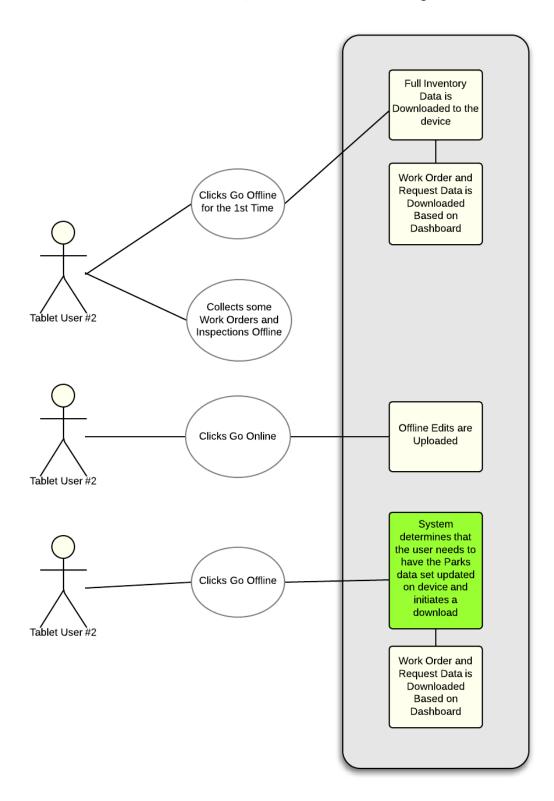
Example 1

Tablet User #1 does not need current inventory data. The data will download the first time and may not download again for a month or 3 months or even a year. The system knows this based on his login. It will check each time he goes offline but if he does not need an update, it will not download an update to the inventory data.



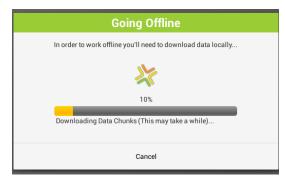
Example 2

Tablet User #2 is working on a project where he needs weekly updates to the Parks dataset on his tablet. All data will download the first time. The system will check each time he goes offline to see if the Parks dataset is older than 1 week. If it is, it will download it when he goes offline.



Going Offline

To go Offline, click the "Go Offline" button on the dashboard. This will start downloading data from the mobile server including a cache of inventory data as well as work order and request data that was marked for offline use on the user's dashboard.



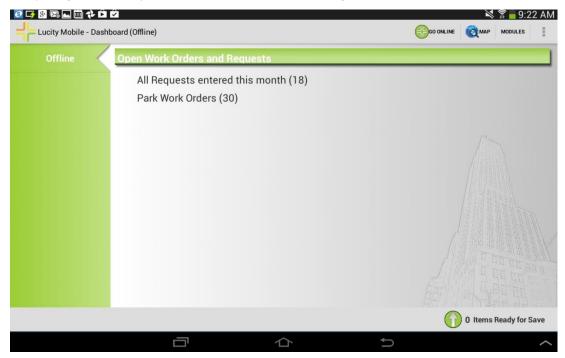


- There are several stages of download, it downloads the Work Order and Request data live from the server
- It persists this to local disk
- It downloads some setup data like the relationships between categories and work flow setup codes
- It downloads cached inventory datasets (these are not live, they are cached at 2a by default). It only downloads these if the setup indicates that they are needed (or that an update is needed) for the current user.
- It clears existing data that should either no longer be accessible or that is being updated.
- It writes the cached inventory datasets locally to disk (this is the most time consuming portion of the sync and the speed of this task is strongly affected by the tablet hardware). The best performing tablets seem to the Nexus tablets.

The data that is downloaded includes views, forms, picklists, work orders, requests, and inventory data. No inspections are downloaded.

It is possible to skip downloads to save time. If the Work item is not allowed to download, it will not update the work views. If there is not an existing set of work view data already downloaded to the device, work orders and requests will be un-useable in the field.

When everything successfully downloads, the dashboard changes to show a "Go Online" button:



Only dashboard items that are marked for mobile offline use will appear in the dashboard. Currently mobile offline dashboard only supports data drills and only for Work Orders and Requests.

Once offline, it is not possible to log out or to change clients. Users can exit the app. Re-opening the app opens it in offline mode and does not require a password. It is recommend that tablets be configured with lock screen passcodes to protect data.

The data that is downloaded as a part of the offline cache can range from 500MB to several GB depending on the size of the data on the server and what programs are configured to download to the device. We recommend allotting at least 1 GB for each primary Lucity system that will be on the device (Sewer, Work, Water, Parks, Streets, Storm, Facitlies/Fleet/Equip, Electric, GIS). These data caches are shared across users on a device. (Note: GIS offline maps are not shared, however GIS Tiled caches can be shared if they are side-loaded).

Work Orders and Requests Offline

Existing work orders and requests are only accessible from the dashboard. It is not possible to access this data from the modules menu. Work Orders and requests can be added through a view launched from a data drill, or from a view launched from the modules menu, or from GIS.

Toolkits and the Create Work Order and Create Request view buttons are not supported offline. Picklists for work order assets in the work order and request and PM forms are also not currently available offline (although the asset data can be manually entered if the user knows the asset id).

Adding new work orders and requests

Adding Work Orders and requests offline is very similar to online. Most of the custom business logic and defaulting does not occur until the data has been saved to the server, however. For example, if a user selects a problem with a default task, that default task will not be automatically populated while offline. The user can either manually select the task or leave it blank and it will populate when the work order is pushed online.

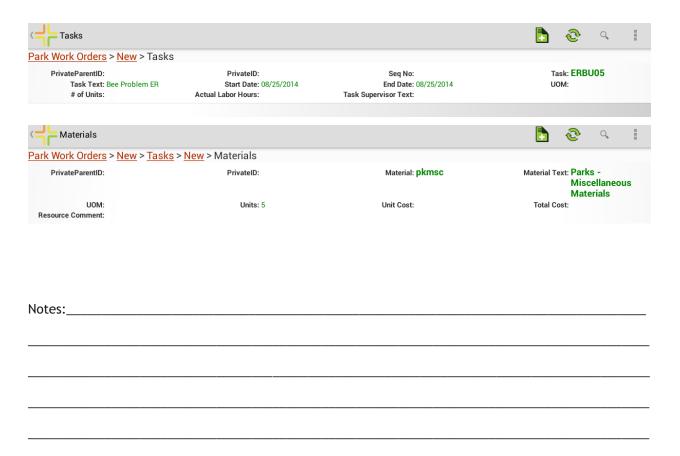
This work order was added offline from the Parks data drill:



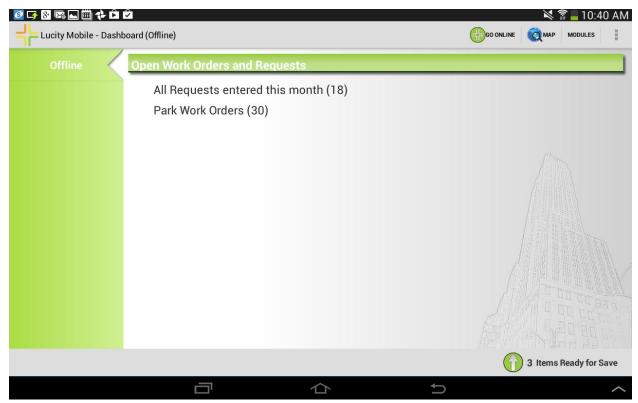
Once added, the work order is automatically added to the Parks data drill (even if it does not meet the criteria for that drill, the offline app does not have enough info to know this). However, the count on the Parks drill is not updated. The count will continue to show the original server side accurate count at the time of download. The work order is also added to the work orders collection accessed from the Modules menu. The new work order will continue to be displayed in the data drill and in the modules menu until the user goes online, then goes offline again. At that point, the work order will no longer appear in the modules menu and will only appear in the data drill if it meets the criteria defined on the server for the data drill.

Notice that the text for records added offline are green.

Continuing on creating this work order, one task and one material were added. The task start and end dates were populated, the resources start and end dates were left blank.



Going back to the dashboard, the dashboard will show how many items are offline and need to be saved to the server due to changes made. In this case, there are 3 (the work order, the task, and the material resource).



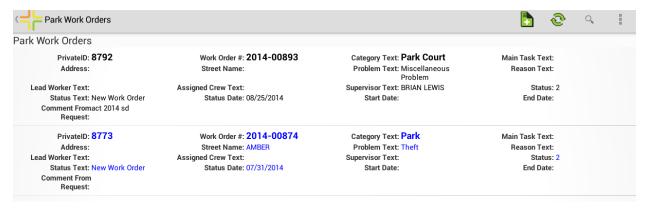
Clicking the "3 Items Ready to Save" button will push these changes to the server (but will not download any new data from the server).

Once the data is pushed to the server, the dates on the material are populated on the server based on the task dates (along with unit of measure and other defaulted values based on the data entered on the forms).

Even if the work order or request does not meet the user's dashboard criteria, the offline work order will remain available to the user since the user has not gone back online.

Editing Data Offline

Editing data offline is very similar. The following work order was edited while offline. The text for work orders with offline edits is blue:



After editing a work order, the dashboard shows 1 item ready to save:



This offline edit can be pushed to the server by clicking this button, or the data will be pushed to the server when the user goes online by clicking the "Go Online" button on the dashboard. Since going back offline again can take a few minutes, the user is warned before going online:



In this case, the user's work orders (and requests) will be pushed online and when the user later goes offline, the requests and work orders will only be available if they meet the criteria in one of the user's data drills.

Parts Inventory Prompting

If adds or edits in materials and fluids require information about where parts should be taken, users will be prompted to select a warehouse when taking records online.



Selecting the material will open the materials form and will display a prompt



So the user can select a part location.

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Error handing and resolution

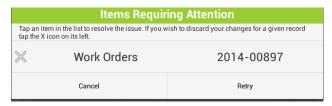
Errors are handled in a similar manner. When a user error is encountered that cannot be caught offline (like breaking a rule with end date and start date), the Requires Attention dialog will include the relevant record. When the user taps on the item it will open the form for the user and show the error:

Cannot save, object is invalid: WorkOrder (2014-00897): WorkOrder Task (BSENG Blue Stake Inquiry from an Engineering Firm): WorkOrder Employee Resource (BRIAN ADKINS Employee): Start date can not be after end date.

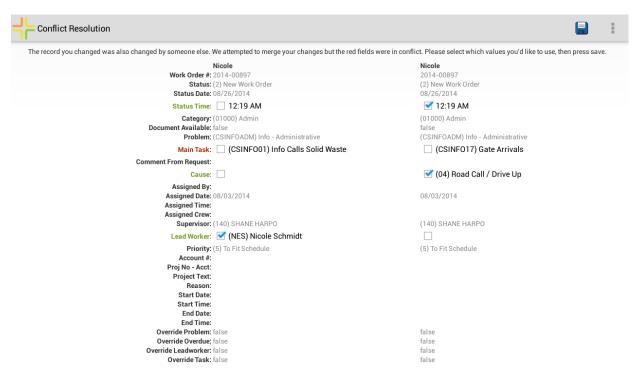
The user can fix the error and click save. To continue reviewing any remaining conflicts, navigate back to the dashboard.

Conflict Resolution

If two users edit the same data on the same record, a conflict can occur. These also appear as items requiring attention during the online push.



A dialog is displayed allowing the user to choose how to handle the conflict:



Place a check next to the value you want to keep and click Save.

Documents while offline

Documents can be attached to new or existing records while offline. Existing documents are not available while offline.

Attaching documents works the same offline as online. Unlike the online version however, documents added offline require a description entered by the user.

Documents added offline are available during the current offline session for all modules.



Pushing the edits to the server will save the documents to the server and will leave the documents on the tablet for use locally while offline. Going online will also save the documents to the server, but when the user goes offline again, the documents will no longer be available. This is true of all modules (including inventory and inspections).

Inventory and Inspections Offline

Inventory data can only be accessed from the modules menu. No inspection data is sent to the field, but inspection data can be collected while out in the field (as can inventory data, if desired, but GIS editing is not available).

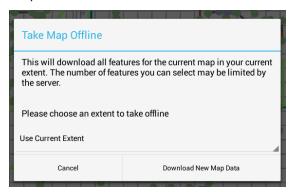
Inspections and inventory are pushed to the server and saved just like requests and work orders. However, inspections and inventory will stay cached offline on the device even after synched to the server until the relevant dataset is scheduled to be updated. For example, a user who is collecting Sign Inspections and has the Street dataset scheduled to update on the tablet monthly will accumulate up to 30 days of offline Sign Inspection data on the tablet. Documents are not kept locally on the device for inspections and inventory once the user goes online, however.

GIS Offline

GIS data is not taken offline during the "Go Offline" process. GIS offline data is managed separately from the Lucity data. When launching the map from an offline dashboard, the system will check to see if there is an available offline map. If there is not one, the user must take a map offline to continue. A network connection is required to take a map offline.

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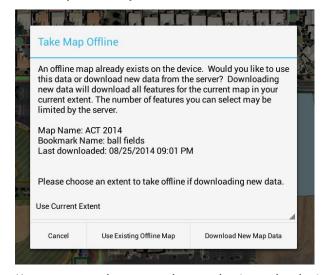
To take a map offline, select "Take Map Offline" from the menu. Select an extent (either the current extent or a bookmarked extent) to take offline. Bookmarked extents are recommended. It is easier to keep track of what extent was downloaded.



The system will download any necessary data (and load any side-loaded tiled maps as needed) and display the offline map to the user. The ArcGIS Server instance will limit how many features are downloaded. This is configured in ArcGIS Server and is limited to 1000 features for the service. There is no control over which 1000 features are returned and if an extent has more than 1000 features there is no notification that not all features were downloaded.

Depending on how the maps and map services are designed in Lucity Administration tools it is theoretically possible for the maps to look different offline than online. Offline maps do not support advanced symbology, data joins, plus other features that online maps can use. You also may make the decision not to include all map services in the offline map.

Once a map is available offline, it can be re-used without downloading again. If a map has already been downloaded for the device, the prompt for taking a map offline will provide information about what map is already available offline and ask the user what should be done:



Maps are stored on a user by user basis on the device.

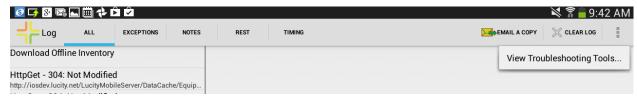
Most features from the online map work the same offline. There are a functionalities not supported offline. Some of these limitations are:

- Offline maps do not support searching for addresses
- Show in map will not show addresses. It will only show XY points and assets.
- Offline maps do not support redlining

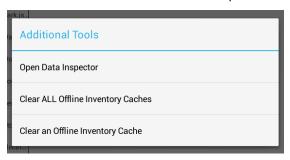
 Offline maps do not currently support the relationships tool (viewing related inspections, viewing related work orders)

Troubleshooting or inspecting offline data status

To get information about the status of offline data (non-GIS) on a tablet, an interface for inspecting the offline metadata is available. To get to this, go to the View Logs on the menu. Once in the Logs view, click the View Troubleshooting Tools Menu

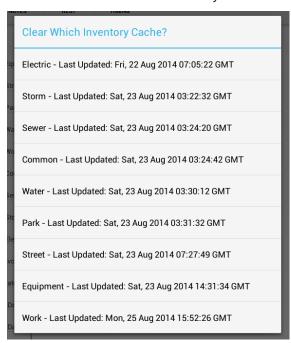


This is available online or offline. It provides 3 options:



The Data Inspector is for Lucity support and development purposes and are not documented for use by end users.

The Clear Offline Inventory Cache options provide metadata about the caches currently stored locally and allows one cache to be forcibly refreshed on the next go offline process.



Configuring for Offline Mobile Use

Views/Data

Starting with Lucity 2014r2, in addition to Work Order data going offline, inventory data can also go offline. Each night the Lucity Services instruct the Lucity Mobile Server to cache inventory data locally on the server. All records in all inventory modules which have views defined are cached to the server. These static cache files are later downloaded, as needed, by tablets when they go offline.

To support this, the Lucity Services Server must be able to make a POST request to the Lucity Mobile Server url configured in System Settings. In DMZ configurations, this may mean modifying firewalls to allow the Services server to make unsolicited requests to the Lucity Mobile Server on the installed port. Lucity Mobile Server does not need to be able to make unsolicited requests to the Lucity Services Machine.

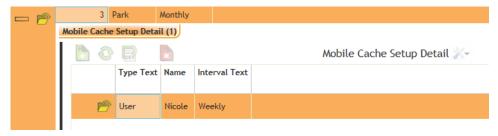
The frequency of tablet downloads is controlled by the Mobile Offline Cache Setup module (under the General menu). This is accessible in Lucity Web, Lucity Mobile, and Lucity Desktop. In order to use this module in Lucity Web and Lucity Mobile a view must be imported or created for the module.



By default all tablets will get all databases monthly. It is important to review and change this to fit the workflows required. Monthly is probably, in many cases, too frequent. Tablets which do not need access to datasets should be configured to not download the datasets.

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To configure what is downloaded on a user or group basis, add an override record to the Mobile Cache Setup Detail child of Mobile Offline Caching Setup. These will override the global parent values. The bottom screen cap, Park is configured to download Monthly for all users except Nicole. Nicole gets the data weekly.



One of the picklist options for Interval is "Never". This allows an administrator to optimize and not send down datasets that a user or group of users will not need. Downloading too many datasets will cause the tablet to take a long time to go offline and will put unnecessary load on the web server.

The performance of the Go Offline process is strongly correlated to the processor and memory available on the tablet. Writing to disk is the most expensive activity during a Go Offline process. Slow or older tablets can take 10 to 20 times longer than newer faster tablets at writing information to disk. Keep this in mind when deciding which tablets will use offline data, how much offline data to push to the tablets, and how often the offline data is updated.

Additional optimizations that can be made include the following (in order of importance):

- Remove views which are not used or un-assign forms and child views from them
- Do not add value lookups to forms unless they are needed. Remove value lookups from inventory and inspection forms that are not used or are not important. The default imported forms for Lucity have many fields which may not be necessary for your workflow.
- Remove fields from forms that are not used.

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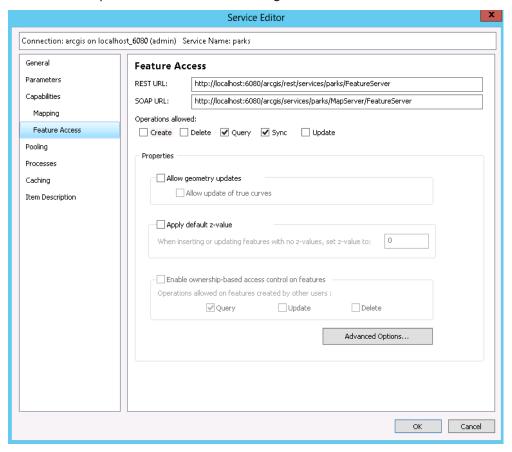


Configuring GIS for use with offline maps requires deploying feature services and raster tile packages (if desired).

Configuring Feature Services

Feature Services have special requirements for offline usage. They must have Sync enabled (note that in many cases it may not be possible to have both Update and Sync enabled, if Update is needed you may need to deploy multiple feature services).

This is an example of a feature service configured for offline use:

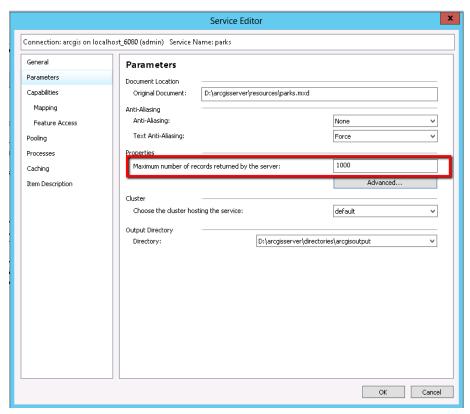


Prior to deploying this feature service:

- Global Ids were added to the datasets
- Data archiving was enabled on the datasets
- Symbology was simplified in the project
- Joins were removed
- Some changes were made to ensure that all layers in the map service were in a consistent state (either all versioned or all un-versioned; in the above example they are all versioned).
- The ArcMap project database connection was switched to a user with edit permissions to the geodatabase
- Switched operational (non-tile cache) services to use the same spatial reference for all operational services

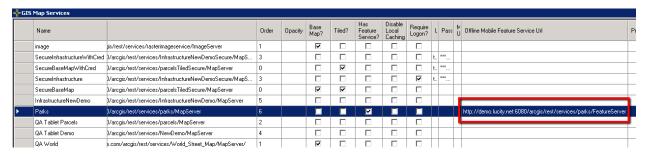
 The analyze tool was run in ArcMap as a part of the map service creation and all issues were resolved that were critical

Another consideration is the map service is the number of features returned. This can be bumped up if desired:



Keep in mind that if the server is returning more features, the offline map process will be slower and will generate more load on the server.

Once a feature service is configured, the map service in Lucity Admin should be configured for the new offline feature service:

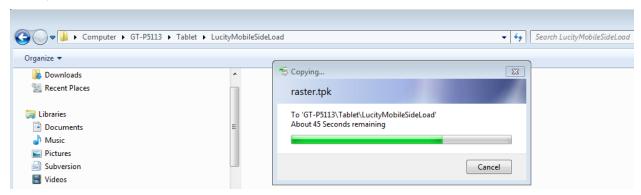


If feature service url is provided, Lucity will assume that the map can be taken offline with the provided feature service url.

Tile Caches

It is possible to side load tile caches on the device to provide a basemap. For details on creating tile cache tpk files, see Esri documentation. Once a tpk is created, it can be copied to the tablet. Create a folder in a consistent hive on the android file system and store the tpk in the same location on each device.

Here the tile cache is being copied to a new folder created on the root of the tablet called "LucityMobileSideLoad".



In Lucity Admin, the tiled service used in the map is updated with the location of this tiled cache stored locally: %root%/LucityMobileSideLoad/raster.tpk

The direction of the slashes in the above relative path are important.



When going offline, the Lucity application will look for side loaded maps and load them for use on the device with an offline map.