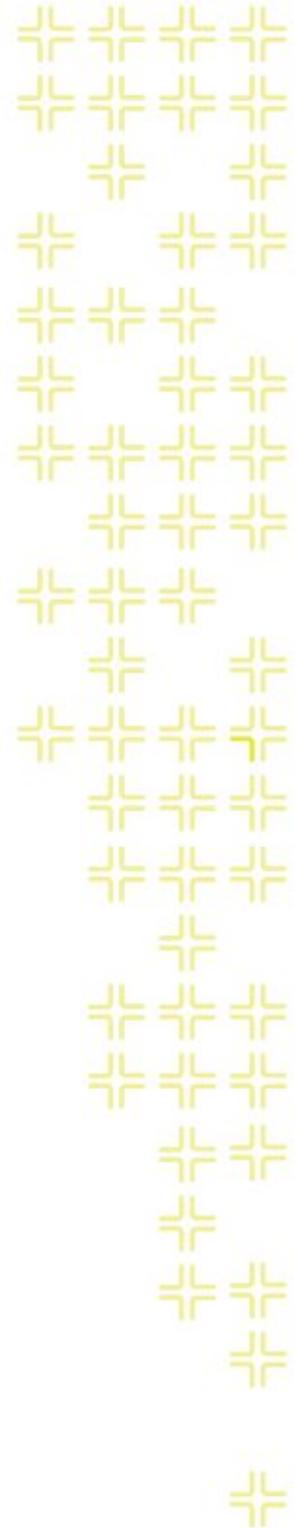




TRAINING GUIDE

GIS Setup and Configuration



GIS Setup and Configuration

In this session, we'll cover the tools necessary to properly configure Lucy to work with your GIS environment. We'll give you information about the synchronization setup, synchronization process and database connection.

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Introduction

Some system configuration and setup is required prior to using any of the Lucity GIS applications. This configuration occurs in the Lucity Administration tool, Lucity desktop application, ArcCatalog, ArcMap, and ArcGIS Server.

Lucity Administration

1. Create geodatabase connection strings
2. Configure system settings

Lucity Desktop application

1. Configure show in map settings

ArcCatalog

1. Using the Geodatabase Configuration tool to map feature classes and fields to Lucity
2. Default fields configuration (optional)

ArcMap

1. Optional .mxd and user specific settings
2. Alias Name import (optional)

ArcGIS Server

1. Install/Enable Lucity Data Update SOE

The following pages describe the above steps in further detail.

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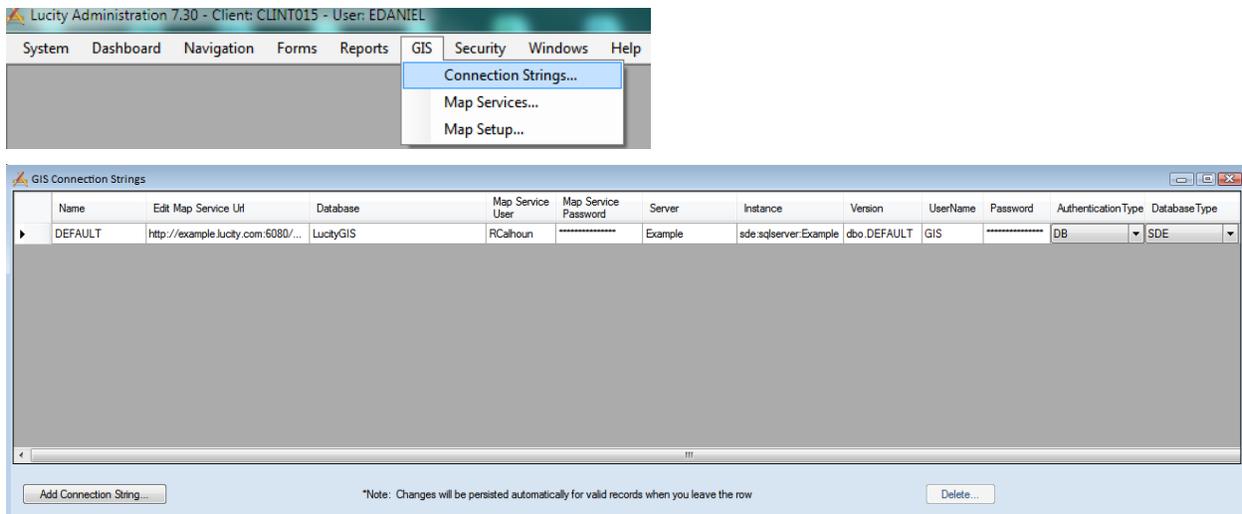
Lucy Administration Tool

The Lucy Administration tool (Lucy.Admin.exe) is used to configure various GIS settings. This .exe can be found in your local workstation \bin directory or can be accessed by the Start>>All Programs>>Lucy>>Lucy Administration Tools

GIS Connection Strings

GIS Connection Strings are created and modified within the Lucy Administration Tool. This is the connection that Lucy will try to use to recognize whether feature classes in ArcMap are configured to update Lucy. If using an enterprise or file geodatabase, Lucy will also use this connection string to connect to and update the geodatabase when changes are made in Lucy. How those updates work are controlled by other system settings.

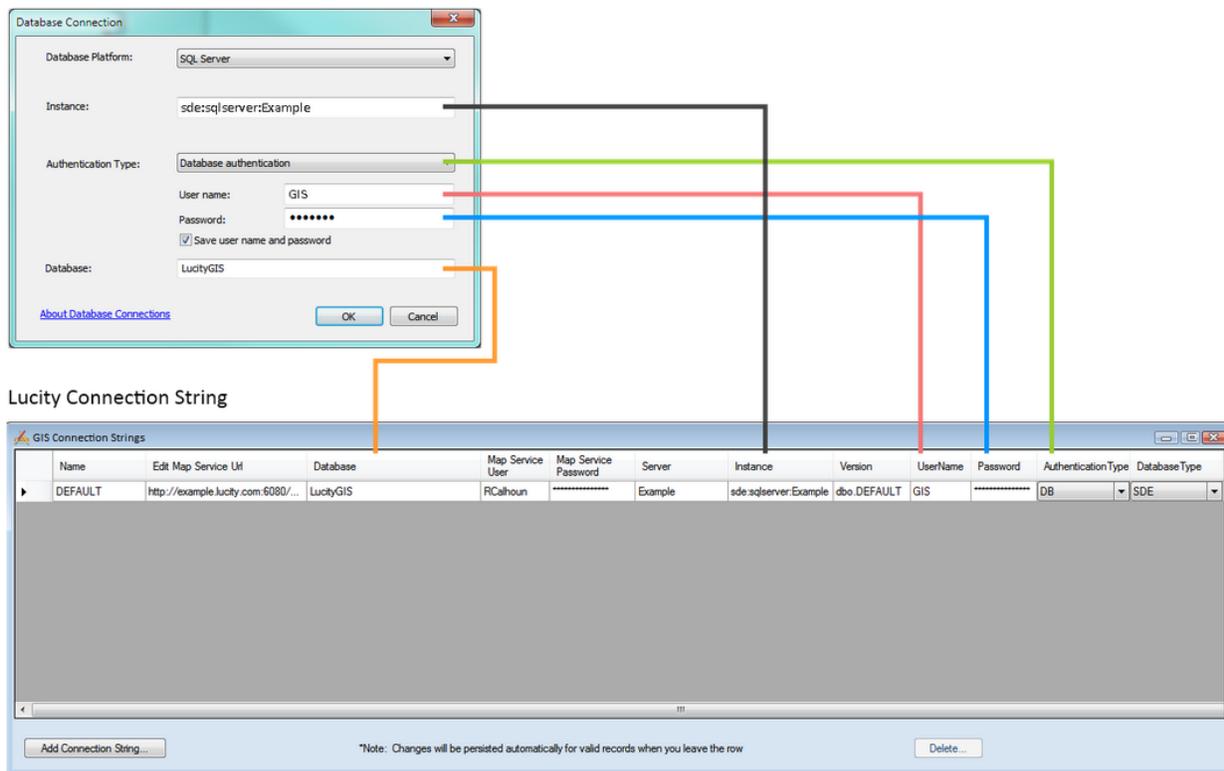
To add a geodatabase connection use the GIS Connection Strings form under the GIS menu.



- **Name:** This is simply a name for the connection. Note: You must have one connection named DEFAULT, so if you only have one geodatabase configured with Lucy, you must name the connection DEFAULT.
- **Map Service URL:** (Optional) This is the URL for a map service that is used by Lucy Desktop or Web to update feature class attributes in the SDE geodatabase.
- **Database:** This must contain the name of your SQL Server geodatabase. The database listed in this field is not the SDE repository database. Instead, it is the geodatabase that contains the infrastructure data that you want to integrate with the desktop. For Oracle geodatabases this must be blank. For Access or File geodatabase this is the path to the .mdb/.gdb.
- **Map Service User:** If the Edit Map Service URL is for a secured map service enter user name that has permissions to access the service.
- **Map Service Password:** Enter the password for the Map Service User.
- **Server:** (For SDE databases only) The name of the server that holds the SDE database
- **Instance:** (For SDE databases only) The name of the instance for the SDE database. This supports either spatial or direct connections.
- **Version:** (For SDE databases only) Designates the name of the geodatabase version that Lucy will use to connect to the geodatabase. For Oracle, the Version is case sensitive.

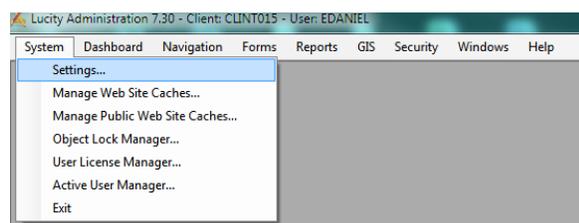
- **UserName:** If using DB authentication type you must specify a user. This database login will be used by Lucy to connect to the geodatabase.
- **Password:** If using DB authentication type you must also specify a password for the user.
- **Authentication type:** How Lucy will connect to the database. The desktop app will attempt to connect to the geodatabase using either Database Authentication or Operating System Authentication. If you specify DB you must also populate the UserName and Password fields.
- **Database Type:** Specify either SDE, Personal, or File.

ArcCatalog/Map Connection String



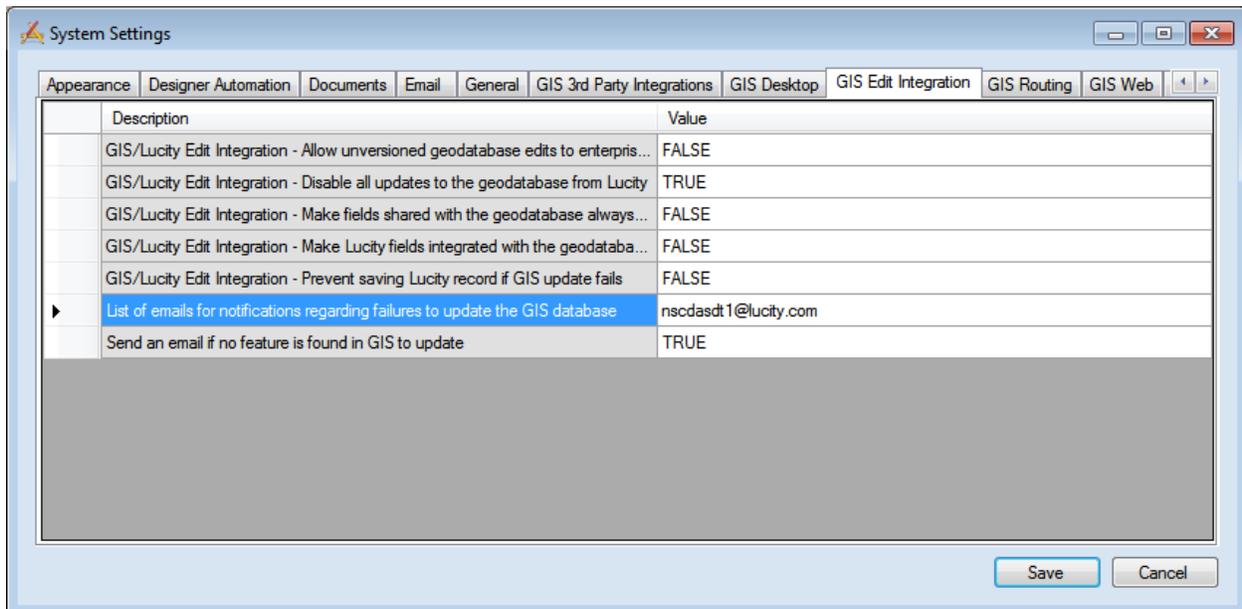
System Settings

There are various settings for Lucy GIS that are maintained under System Settings.



GIS Edit Integration Tab

The GIS Edit Integration tab of system settings contains the options that impact how the Lucity application will update the geodatabase.

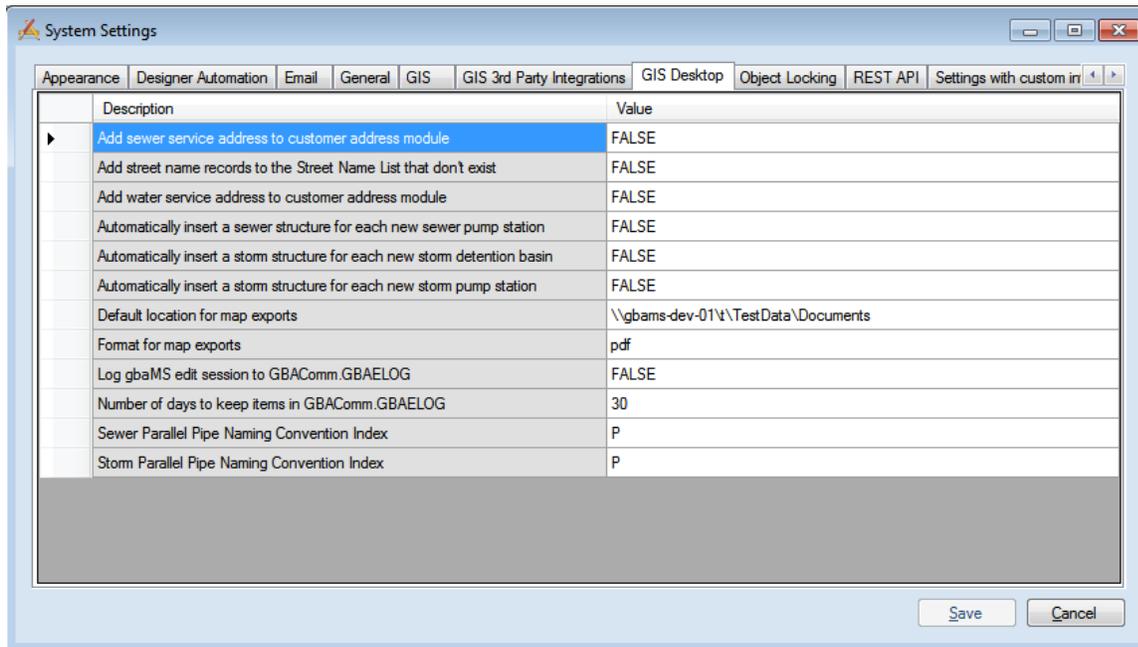


- **GIS/Lucity Edit Integration:** Allow unversioned geodatabase edits to enterprise geodatabase: This allows edits to be made to unversioned geodatabases.
- **GIS/Lucity Edit Integration:** Disable all updates to the geodatabase from Lucity: This prevents the geodatabase from being updated with edits made in Lucity desktop and web.
- **GIS/Lucity Edit Integration:** Make fields shared with the geodatabase always read only. Any field that is shared with the geodatabase will be set as read-only in Lucity desktop and web.
- **GIS/Lucity Edit Integration:** Make Lucity fields integrated with the geodatabase read only if the geodatabase cannot be updated. If a connection to the geodatabase fails when loading a form, all fields integrated with the geodatabase will be read-only.
- **GIS/Lucity Edit Integration:** Prevent saving Lucity record if GIS update fails. This does not apply to the desktop application. If a modification is made to a record in Lucity and the geodatabase fails to get updated this will prevent the record in Lucity from being saved.
- **List of emails for notifications regarding failures to update the GIS database:** Provide a comma delimited list of email addresses that should receive notification if the geodatabase failed to get updated with an edit when using the Lucity Data Update SOE.
- **Send an email if no feature is found in GIS to update:** Sends an email when the Lucity Data Update SOE cannot find a feature in the geodatabase to update. This is sent to the list specified in the "List of emails for notifications regarding failures..." setting.

Notes: _____

GIS Desktop Tab

The GIS Desktop tab of system settings contains many of the editing options for the Lucity GIS tools



- **Add sewer service address to customer address module:** Set this option to true if you want the sewer service address added to the Customer Address module.
- **Add street name records to the Street Name List that don't exist:** Set this option to true if you want street name records that do not exist added to the Street Name List.
- **Add water service address to customer address module:** Set this option to true if you want the water service address added to the Customer Address module.
- **Automatically insert a sewer structure for each new sewer pump station:** Set this option to true is if you want a sewer structure added for each new sewer pump station.
- **Automatically insert a storm structure for each new storm detention basin:** Set this option to true if you want a storm structure added for each new storm detention basin.
- **Automatically insert storm structure for each new storm pump station:** Set this option to true if you want a new storm structure added for each new storm pump station.
- **Default location for map exports:** This option allows you to choose the location that you would like to store the map images you save when creating a new work order, request, etc.
- **Format for map exports:** This option allows you to choose the file type for the map exports.

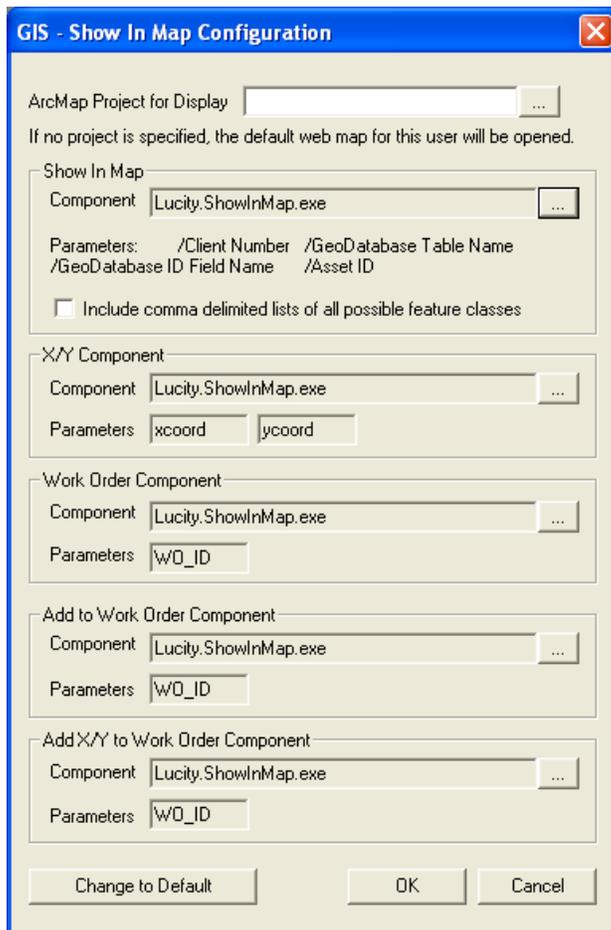
Lucy Desktop

Show in Map Configuration (Single User)

The GIS Show in Map configuration is a user-based setting. This window allows you to choose a custom programmed component for the desktop application to use in place of the default component. You can then select the parameters that the system passes to the component.

Note: Since this window determines what GIS project is displayed, it must be defined before initial use of the Show in Map button.

1. Select *System>>Configuration>>GIS>>Show in Map* to open the configuration window.
2. In the ArcMap Project for Display field, browse to the location of your standard ArcMap project. By default, this map will be displayed whenever you click the Show in Map button in either your desktop version of the desktop application. Note: If you do not have a project set up, the web map will be the default.

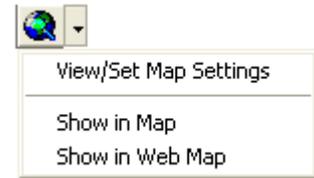


Show in Map Function

The Show in Map function allows you to set the map document to display on a per-module basis. This is useful if you have a separate map document for each asset type. For example, you may have one ArcMap project for sewer features, another for water features, and a third for street features. You can set up the Show in Map function for all *Sewer* modules to open your sewer map, and set up the Show in Map function for all *Water* modules to open your water map. Additionally, you can use the Show in Map function from equipment features that are not in the map if the parent feature is in the map.

To specify a different ArcMap project for each module, complete the following steps:

1. Click the down arrow located to the right of the Show in Map tool in the desired module in the desktop application.
2. A sub-menu will appear; click "View/Set Map Settings"
3. A dialog will appear showing you the currently specified .mxd. If no file is specified then it means that there hasn't been an .mxd associated with this module yet.



4. To associate a new .mxd click the browse button and navigate to the location of the .mxd. Click OK.

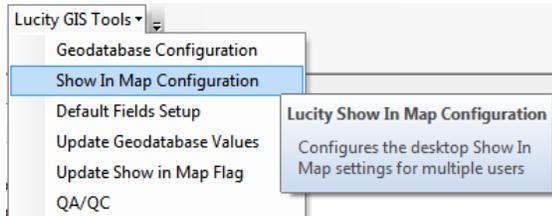
Note: If no special Show in Map project is setup for a module, the system will use the project specified under System>>Configuration>>GIS>>Show in Map (Show in Map Configuration dialog).

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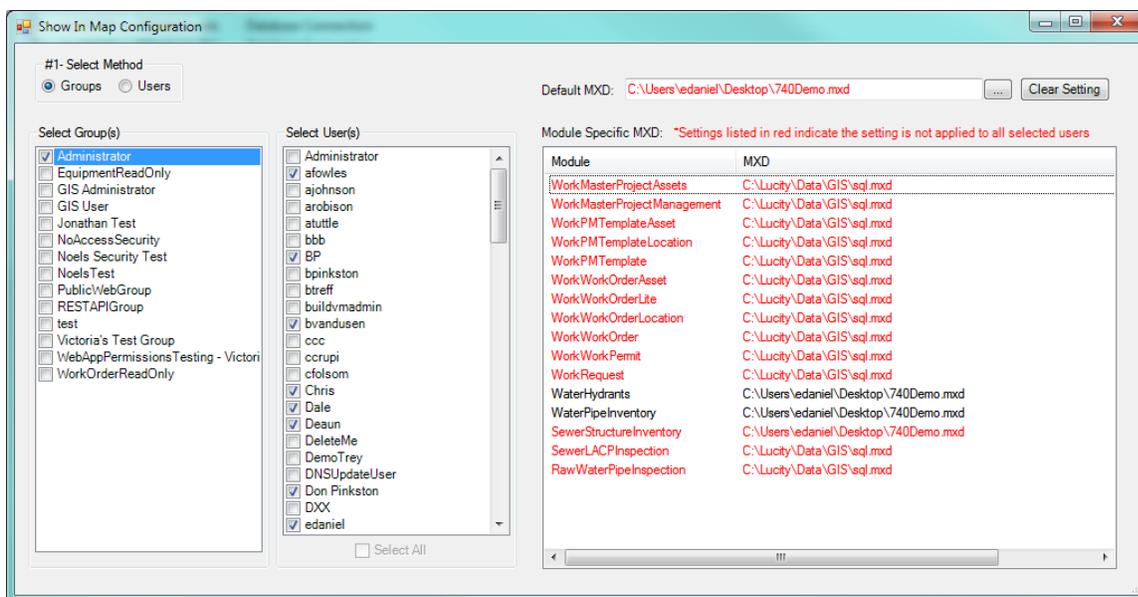
ArcCatalog

Lucy Show in Map Configuration Tool

The Show in Map Configuration tool allows system administrators to set show in map settings for multiple users. This can save a lot of time, especially if they manage which maps their users access, and if a generally used map changes. To access the Show in Map Configuration tool, go into ArcCatalog, click on the Lucy GIS Tools button and select Show in Map Configuration.



The following dialog will appear:



To select a Group(s) to configure:

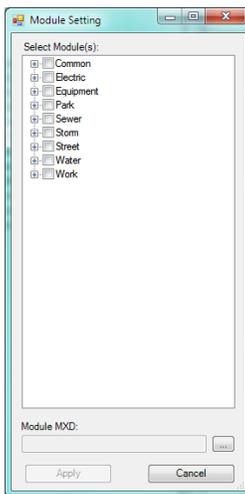
1. Choose the Group Select Method.
 - o The Select Group(s) grid will be activated. (these groups are from the Lucy Security program)
2. Select one or more groups in the grid.
 - o The users in those groups will be checked in the Select User(s) grid, but the selection will be read-only.
 - o The module settings for the selected users are also displayed in the field and grids to the right.

To select a User(s) to configure:

1. Choose the Users select method.
 - o The Select Group(s) Grid will be deactivated. The Select User(s) grid will be editable.
2. Select the user(s) to configure.
 - o The module settings for the selected users are also displayed in the field and grids to the right.

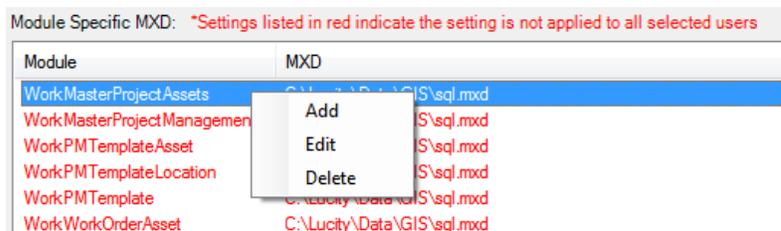
To configure the show in map for selected users:

1. Set the Default MXD for the program. Either enter the path, or click the ... button and navigate to the desire MXD
2. In the Module Specific MXD grid right-click and select Add. The following screen will popup:



3. Select the modules to set a map for. Selecting a program will select all the modules under that (i.e. Selecting Park will select every park module.)
4. Near the bottom of the popup click the ... button to select the .mxd to be used with the show in map for those modules.
5. After selecting the .mxd click Apply.
6. A record will appear in the right hand grid for each module, with the path to the .mxd.

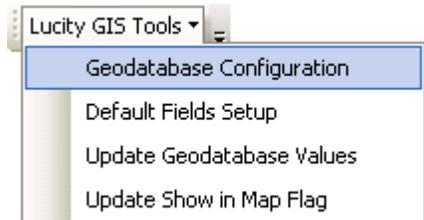
Note: Existing show in map settings can be modified by right-clicking on them and selecting either Edit or Delete from the submenu:



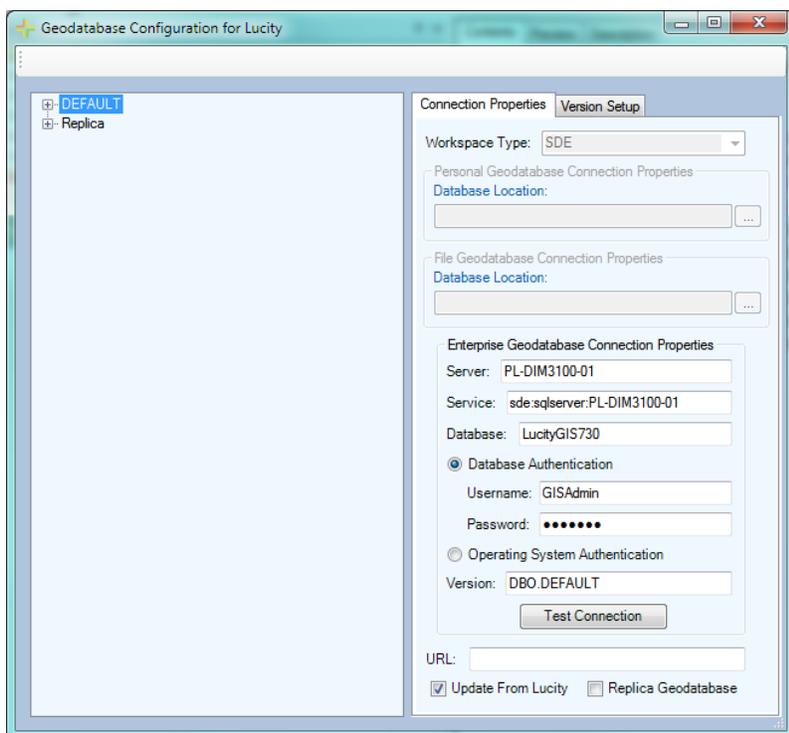
Lucy Geodatabase Configuration Tool

Once you have created the geodatabase connections with the Lucy Administration tool you can use the Lucy Geodatabase Configuration tool in ArcCatalog to perform all other configurations.

In ArcCatalog, Click on Lucy GIS Tools>>Geodatabase Configuration.



The following dialog will appear:



This tool can be used to perform the following activities which are described in detail in the Geodatabase Configuration Overview session:

- Modify and test geodatabase connection properties
- Indicate if geodatabase should be updated from Lucy and if it is a replica
- Specify which versions of the geodatabase should have edits pushed to Lucy
- Add/Modify/Delete feature classes, spatial relationships, number generators
- Add/Modify/Delete feature class field mappings
- Create/Synch feature class domains
- View and configure feature class alias names

Connection Properties

The Connection Properties tab shows you the geodatabase connection information.

- To setup a Personal or File geodatabase browse to the database location.
- ArcSDE setup is as follows:

1. **Server:** This must contain the name of the machine where ArcSDE is installed
2. **Service:** The only thing that will differ between an ArcSDE spatial connection and a direct connection is the information stored in this field.
 - **Spatial Connect:** This field should contain the port where ArcSDE is installed. By default this is typically 5151. Do not include the /tcp identifier; enter only the number for the port.
 - **Direct Connect:** Enter the name of the direct connect driver and the name of the "sde:sqlserver:GIS_SERVER\DATA."
3. **Database:** This must contain the name of your SQL Server geodatabase. The database listed in this field is not the SDE repository database. Instead, it is the geodatabase that contains the infrastructure data that you want to integrate with the desktop. **For Oracle geodatabases this must be blank.**
4. **Authentication type:** Used by Lucy to connect to the geodatabase

- **UserName:** If using DB authentication type you must specify a user. This user must have permission to ALL feature classes linked to Lucy.
 - **Password:** If using DB authentication type you must also specify a password for the user.
5. **Version:** This information is always required; it designates the name of the ArcSDE version that Lucy will use when connecting to the geodatabase. For Oracle, the Version is case sensitive.

The connection properties tab also contains the following fields.



URL:

Update From Lucy Replica Geodatabase

1. **URL:** (Optional) The map service used to push edits to the geodatabase when using the Lucy Data Update SOE
2. **Update From Lucy:** This indicates if the geodatabase should be updated with edits made in the Lucy desktop and web interfaces
3. **Replica Geodatabase:** This indicates if the geodatabase is a replica geodatabase. If this is checked, functionality with the configuration tool will change preventing some actions (such as deleting feature classes) and enable other actions (such as associating feature classes)

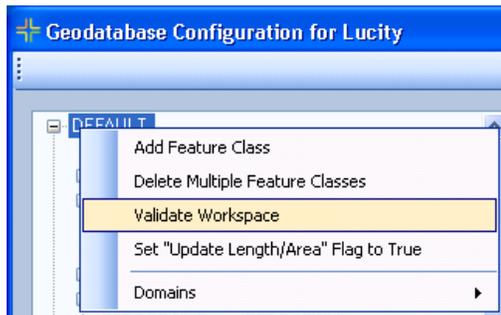
Notes: _____

Validating the Geodatabase Configuration

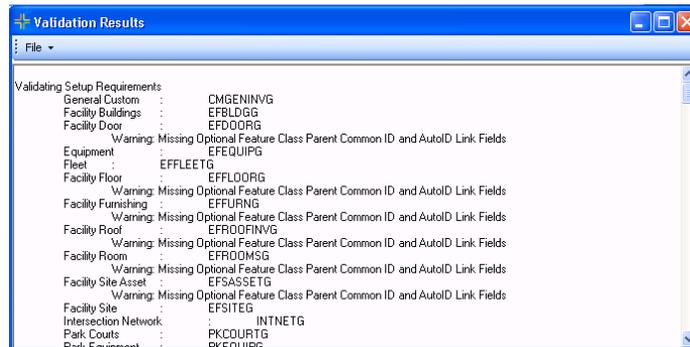
You can validate against the entire geodatabase or individual feature classes. There are two parts to the geodatabase verification: verification of the geodatabase setup based on *Lucity* requirements and business rules, and verification of the custom geodatabase setup against your geodatabase to ensure that the setup is valid based on your data structure. Initially, only the verification of your custom geodatabase setup based on *Lucity* requirements is performed. If no critical errors are encountered during that verification, it will continue the verification and validate against your custom geodatabase to make sure feature class names, field names, and field types are valid based on your setup.

Validating Against Geodatabase

1. Right-Click on the geodatabase node and select Validate.



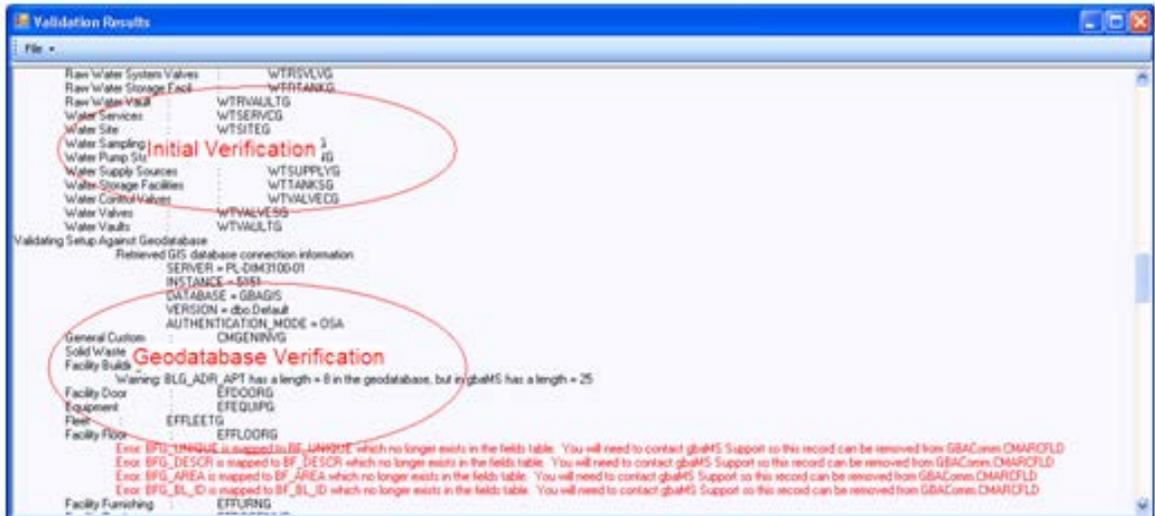
- o Immediately upon clicking this tool, a dialog similar to the one shown below will be displayed with results of the verification. Once it is complete you will be able to scroll down and view any messages resulting from verification.
- o This label displays the current feature class being validated. If any warnings or errors are found relating to the feature class, they will be displayed below the feature class label with "Warning" or "Error." Errors are highlighted in red.



- o Once the initial verification is complete, any errors that are found will prompt the following message and you will be unable to continue the validation until the errors are addressed.

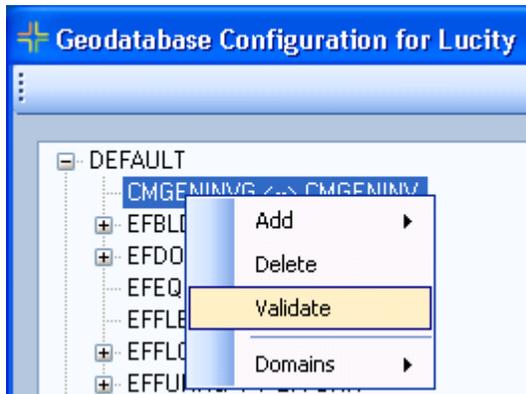


- When the validation is complete, a message box will appear indicating if the validation result was successful or failed. The validation Results window will remain open. Again, any errors found will be highlighted in red. You can copy the results of this dialog into another file, or you can select File>>Save or File>>Print to print the results.



Validating Against a Feature Class

Right-Click on the feature class you want to validate and select Validate.



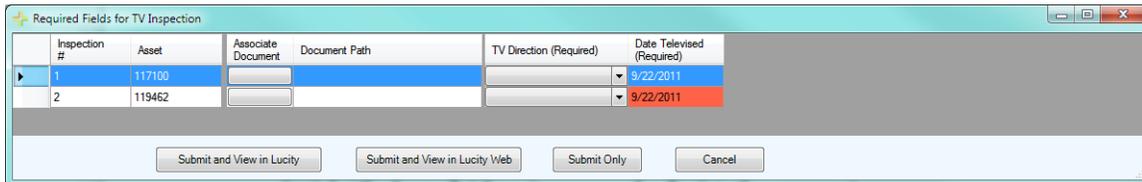
Note: The Process of validation is the same as [validating the geodatabase](#). You will get results that look similar to the validation results for validating against the geodatabase.

Notes: _____

Default Fields Setup

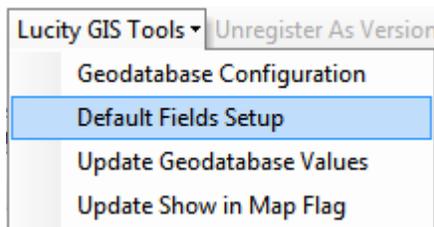
The Default Fields tool allows you to set up additional fields for the editable grids that are displayed with the Lucy Module tool in ArcMap when creating Requests, Work Orders, PM Work/Templates, and Inspections.

These fields will be displayed in the grid in addition to the required fields (both system and user-defined required fields).

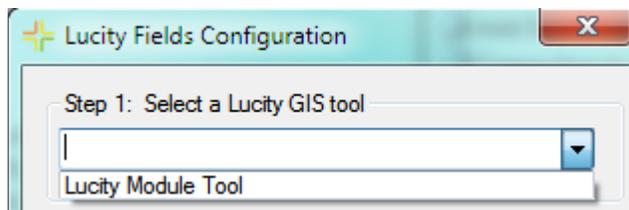


Setting up Default Fields

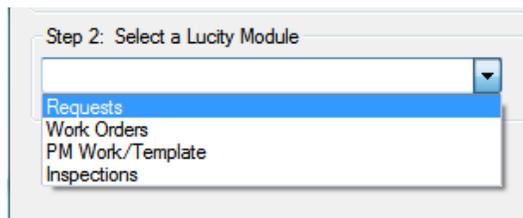
In ArcCatalog, Click on Lucy GIS Tools>>Default Fields Setup.



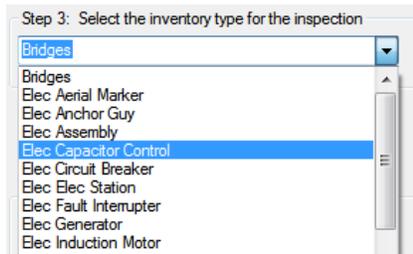
1. After you have logged in to the client, the following dialog will appear. Select the Lucy tool from the drop down menu.



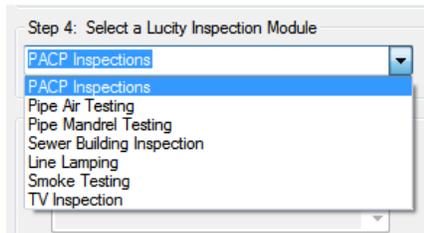
2. After selecting the Lucy tool, the "Select a Lucy Module" option will open up. Select the module for which you are setting up default fields.



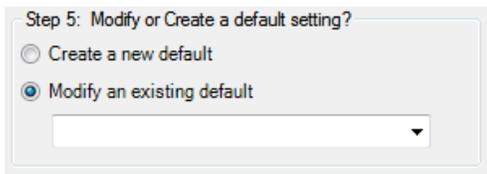
- o If you selected Inspections in Step 2 then you will be prompted to select the inventory type for the inspection:



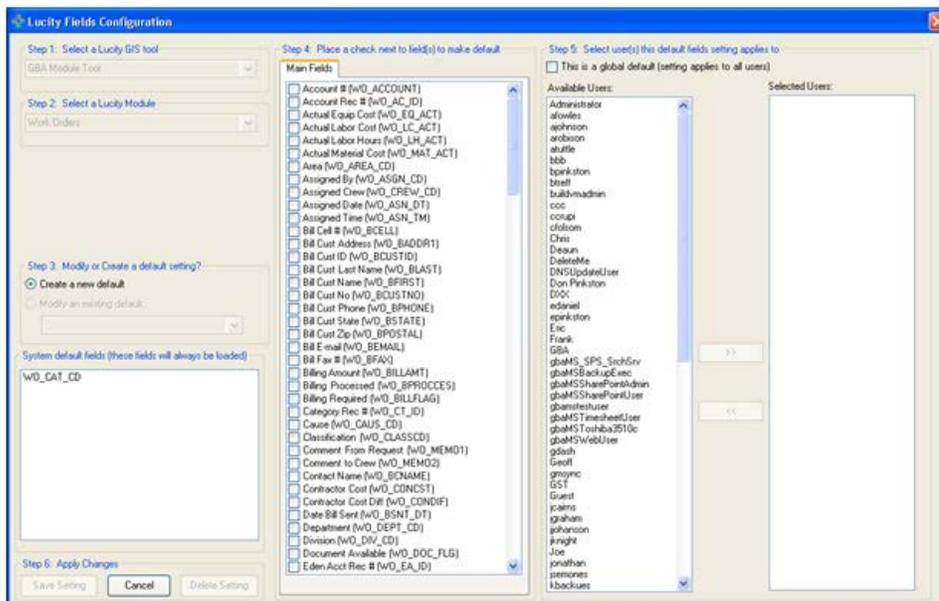
- o Next, select the inspection module.



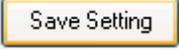
3. After specifying the module you can indicate if you would like to create a new default setting or modify an existing default. Note: If there are no current default settings for the selected module this option will be disabled.



4. After selecting the module and specify the option to create or modify, the following dialog will appear:



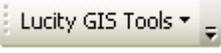
Note: The system default fields grid is not editable. This grid shows the fields that are required by the system and will always appear in the grid.

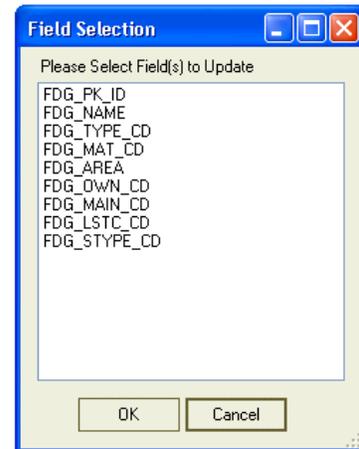
5. Check the fields in the "Main Fields" tab that you would like to make as default.
6. To select the users you would like the default fields to apply to, highlight the user in the "Available Users" grid and click  to move the user to the "Selected Users" grid. Note: If you wish the default field to appear for all users then select the "This is a global default" checkbox.
7. Click  to save the default fields to the module.

Update Geodatabase Value

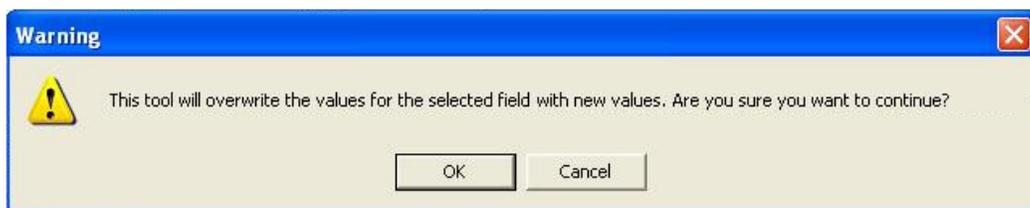
This tool is designed to allow users to rapidly update the values in a feature class with the values from a related Lucity table. You'll use this tool if you've recently added a field to the Lucity database and need it to be added to your map.

To use this tool:

1. Select a feature class in ArcCatalog.
2. Then, click  and select the Update Geodatabase Value tool from the drop down menu. The following window will appear:



3. Select the field you wish to update from the list. Then click *OK*. You'll receive the following warning notifying you that this tool will overwrite the values for the selected field with new values. If you wish to continue, click *OK*.



4. You'll be notified when the process is complete.

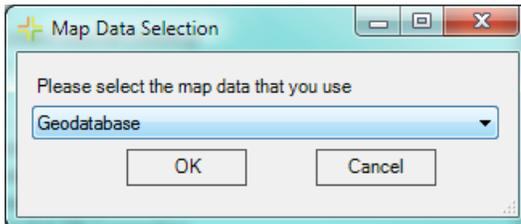


Update Show in Map Flag

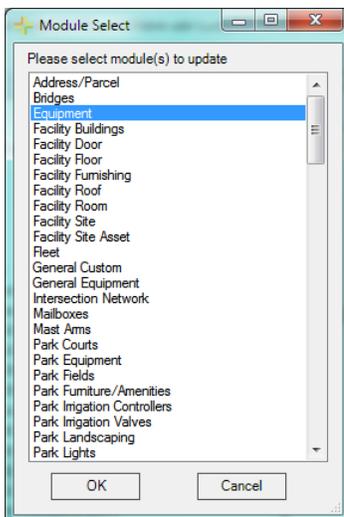
You'll use this tool to run an update query on the show-in-map flag in the *Lucity* inventory modules.

To access the Update Show in Map tool open up ArcCatalog, select *Lucity GIS Tools>>Update Show in Map Flag*.

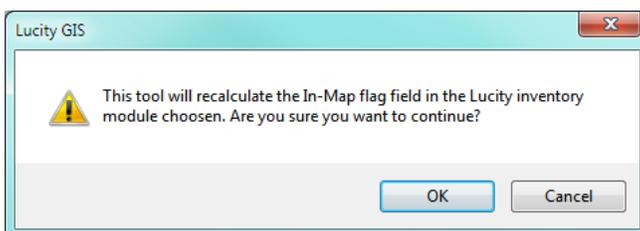
1. Select the type of map data that you use (Geodatabase or Shapefiles).



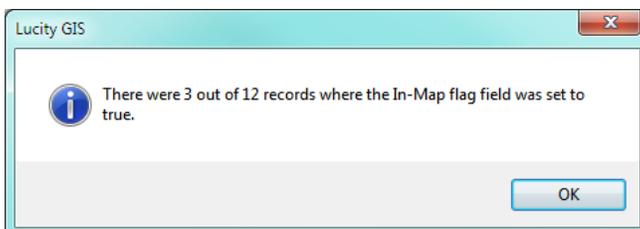
2. After selecting the appropriate map data, the following dialog will appear. Select the module(s) you wish to have updated.



3. The following dialog will appear confirming that you want to continue.



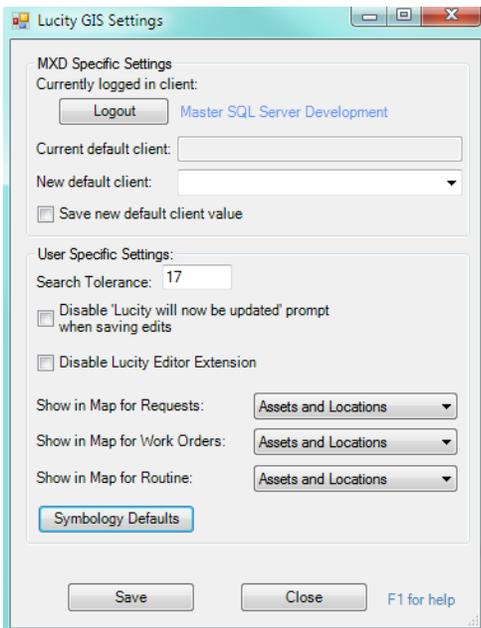
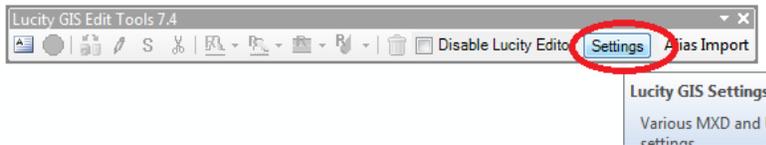
4. Once complete you will receive a dialog indicating the results



ArcMap

Additional settings can be configured to be used with the Lucy GIS tools in ArcMap. Some of these settings are saved with the map document (.mxd) while others are user specific.

These settings can be accessed by the Settings button on the Lucy GIS Edit Tools toolbar.



MXD Specific Settings

Every time a user opens ArcMap and attempts to use a Lucy tool they are prompted for their Lucy login and password and if there is more than one Lucy client, they will be prompted for which client they are logging into. There are two things that can be setup to speed up this process:

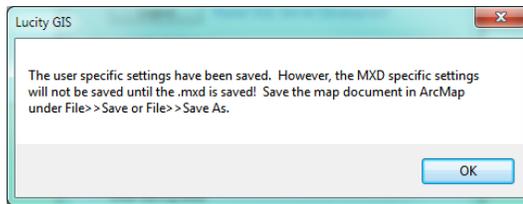
Bypassing Login and password

The Lucy GIS tools support using Lucy Windows Authentication. Upon using a Lucy GIS tool the program checks to see who is logged into the computer and if that user has windows authentication configured. If it finds an associated Lucy account it checks to see if they have permissions to run the Lucy GIS tools. If the correct permissions are present the user is automatically logged in and the Lucy GIS tools are activated. This will stop users from being prompted for their login and password when they try to use the Lucy GIS tools. Lucy Windows Authentication must be setup by an administrator in the Security program.

Setting a Default Client

Part of the login process checks to see what Lucy client the user is logging into. If there is more than one client, the user will be prompted to choose a client every time they start ArcMap and try to use a Lucy GIS tool. To by-pass the client selection dialog, you can specify a default client that should be used for the .mxd.

1. In the settings dialog, select a client from the new default client list
2. Make sure the Save new default client value checkbox is checked
3. Click Save on the Lucy GIS Settings dialog form. A prompt similar to the following will appear:



4. Save the .mxd.

User Specific Settings

There are three user specific settings that can be saved. These settings will be used anytime the user logs into the Lucy GIS extension regardless of the .mxd or machine.

Default Search Tolerance

Users can set a new default search tolerance for Lucy GIS. This is used with all Lucy GIS tools that use a search tolerance. The system default is 7 map units. Alternatively, the search tolerance can be changed on the fly for a specific tool when it is selected by pressing Shift + F7.

Disable "Lucy will now be updated" prompt

Users can disable the editing prompt that lets them know that the Lucy editor extension is going to process the ArcMap edits.

Disable Lucy Editor extension

Users can disable the Lucy editor extension. This is useful if the user never or rarely edits feature classes linked to Lucy. Having this checked will prevent the extension to become active every time they edit the geodatabase linked to Lucy. Alternatively, the editor extension can be disabled directly on the Lucy GIS Editor toolbar; however, that setting only disables the extension for that session of ArcMap.

Show in Map for Requests/Work Orders/Routine

Work Orders, Requests, and PM/Work Templates can be displayed by the Show in Map tool several different ways. They can display the assets and/or the address and XY locations. These settings control how the Show in Map tool should work for the various modules. It will either show Assets, Locations, or both. The default is set to both.

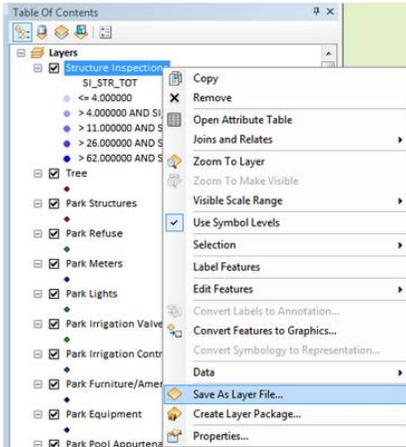
Symbology Defaults

This allows users to specify lyr files as symbology templates for the following set of Lucy GIS tools: Lucy Views, View Work Frequency, View Work Locations and TV Observation tools.

1. In order to set symbology defaults, you first need to run the Lucy GIS tool you wish to have a default symbology template for. (Lucy Views, View Work Frequency, View Work Locations, or TV Observations).
2. Make any desired changes to the properties of the layer the tool generated. These changes can include:
 - o Symbology changes (size, shape, color, etc.)
 - o Symbol levels

- Labeling
- Scale Dependence
- Fields Displayed
- Etc...

1. In the table of contents right-click on the layer and select Create Layer File



2. On the Symbology Settings Form, find the related tool and layer.
3. Click the ... button and navigate to the location of the .lyr file. This must be repeated for each layer.
4. When complete, click Apply Changes.
5. The next time the Lucity GIS tool is ran, the results will use the settings stored in the .lyr file.

Notes: _____

ArcGIS Server

Lucity Desktop and Web use ArcGIS Server and the Lucity SOE to make attribute updates to an SDE geodatabase. This allows users to edit fields in Lucity that are linked to the geodatabase and have the edits persist to the geodatabase.

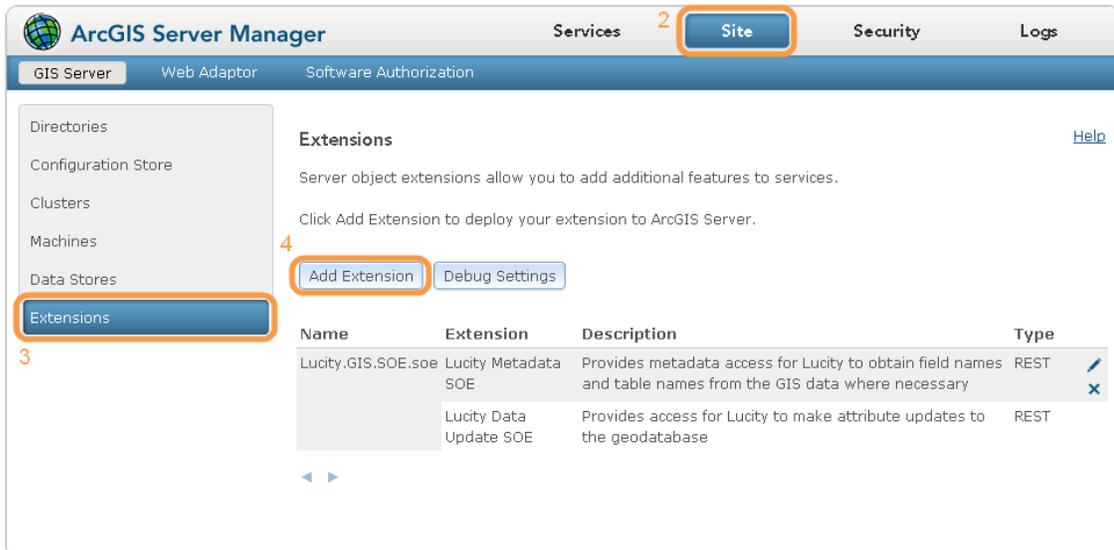
Install the Lucity SOE

The following instructions are for ArcGIS for Server 10.1+. Please refer to the installation instructions provided with your Lucity install media for 10.0 instructions.

1. Log into ArcGIS Server Manager



2. Click on Site at the top of the screen
3. Select Extensions on the left of the screen
4. Select Add Extension. The file selection screen will popup.



5. Click Browse and navigate to the Lucity SOE file downloaded from the Lucity support site.

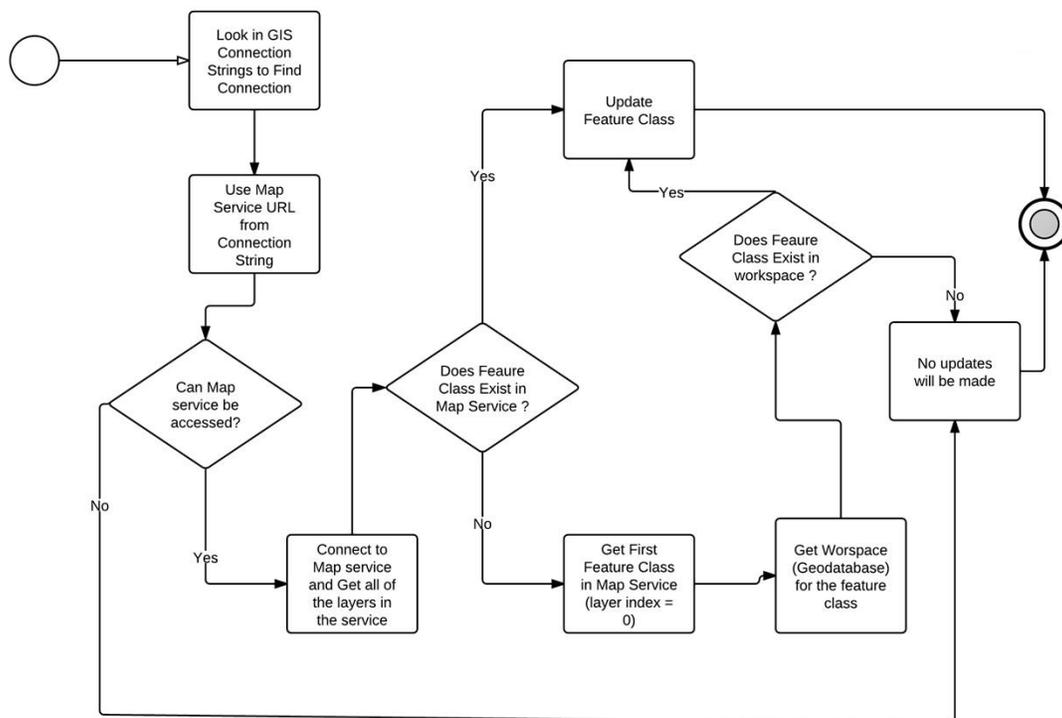
6. Click Add.



7. The SOE is now installed. Make sure that the Lucy extensions are enabled on the desired map services.

Enable the Lucy SOE for a Map Service

When Lucy updates the SDE geodatabase using ArcGIS Server it uses a map service made up of Lucy features and the Lucy SOE to correctly update the geodatabase. The following diagram shows the logic the SOE uses to update the feature class.



Note:

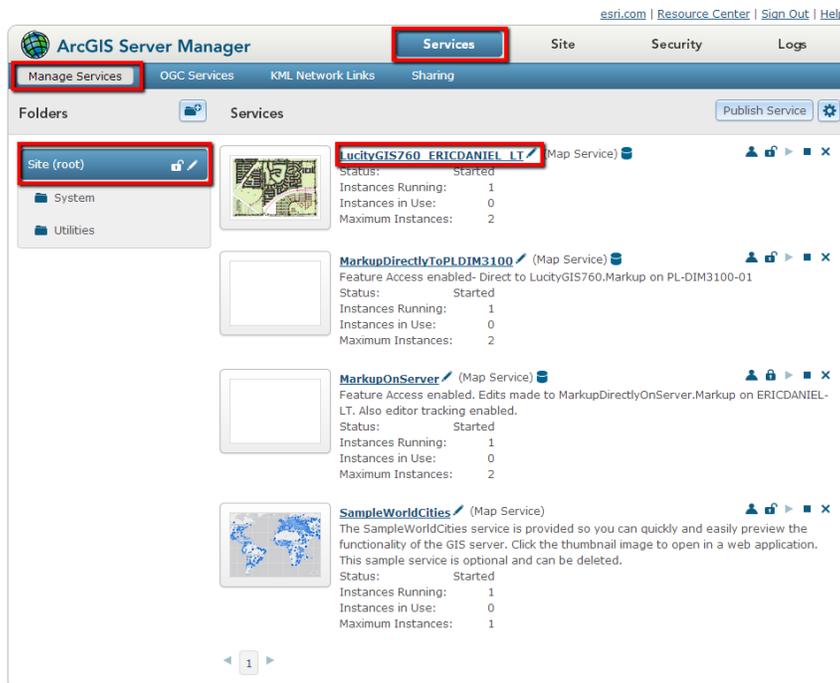
- The map service must contain at least one feature class from the geodatabase that contains the features that Lucy will be updating. It is acceptable for the map service to contain all the feature classes that could be updated but this is not required.
- Map service can be new or existing

- Map service does not need to be included in any web maps
- The feature classes in the map service must be connected using a user account that has edit permissions. Note: If map service isn't going to contain all Lucy linked feature classes then the feature class at layer index = 0 in the map service must be connected using a user account that has edit permissions to ALL Lucy linked feature classes.
- The feature classes in the map service must be pointed to the version that Lucy should update.

1. To enable the Lucy Data Update SOE extension for a map service, Log into ArcGIS Server Manager

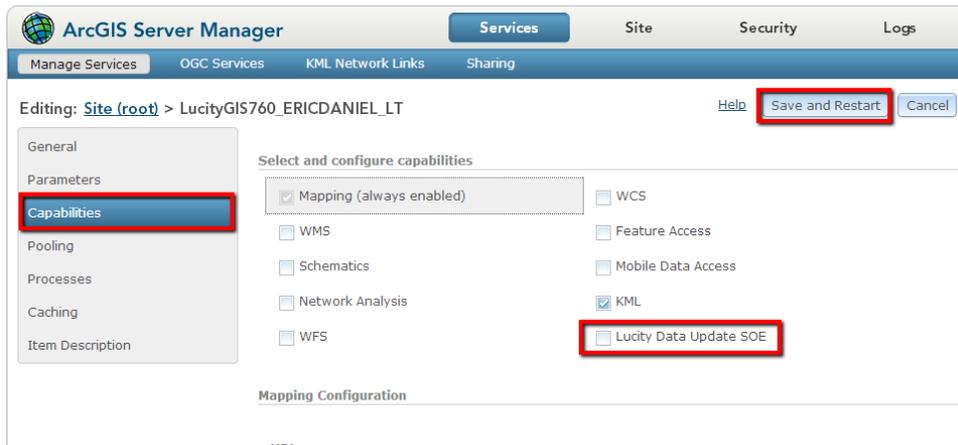


2. Click Services > Manage Services
3. Find the map service to use for the SOE update



4. Click on the map service to see its properties
5. Click on the Capabilities button

6. Check the Lucity Data Update SOE



7. Click Save and Restart

8. If you have more than one geodatabase configured with Lucity, you will need to repeat these steps so that each Lucity linked geodatabase has a map service with the Lucity Data Update SOE enabled.

Notes: _____

Configure SOE settings in Lucity

After publishing the map service and enabling the SOE there are several options that must be reviewed inside the Lucity Administration tool

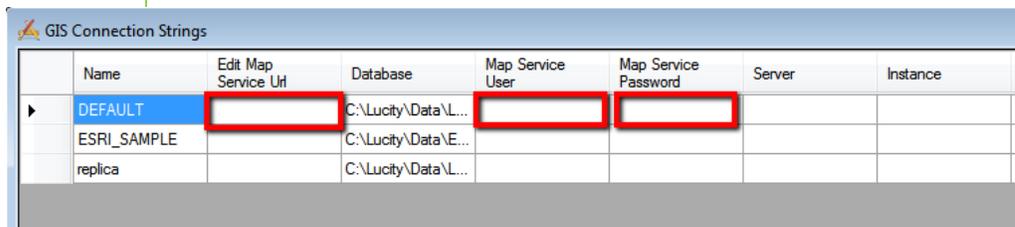
You must know the REST URL of the map service that has the Lucity SOE extension enabled. If you are unsure this information can be obtained in ArcGIS Server Manager on the Capabilities tab of the map service. The REST URL should have a path similar to:

<http://<servername>/ArcGIS/rest/services/<servicename>/MapServer>

Specify Edit Map Service URL

1. In the Lucity Administration Tool go to GIS > Connection Strings
2. Find the record which contains the connection properties for the data within the map service and update the URL field with the REST URL of the map service.

Note: Version 7.6 supports secured map services, so if using a secure map service you must also populate the Map Service User and Map Service Password fields in order for the Lucity SOE to have the ability to update the gdb.



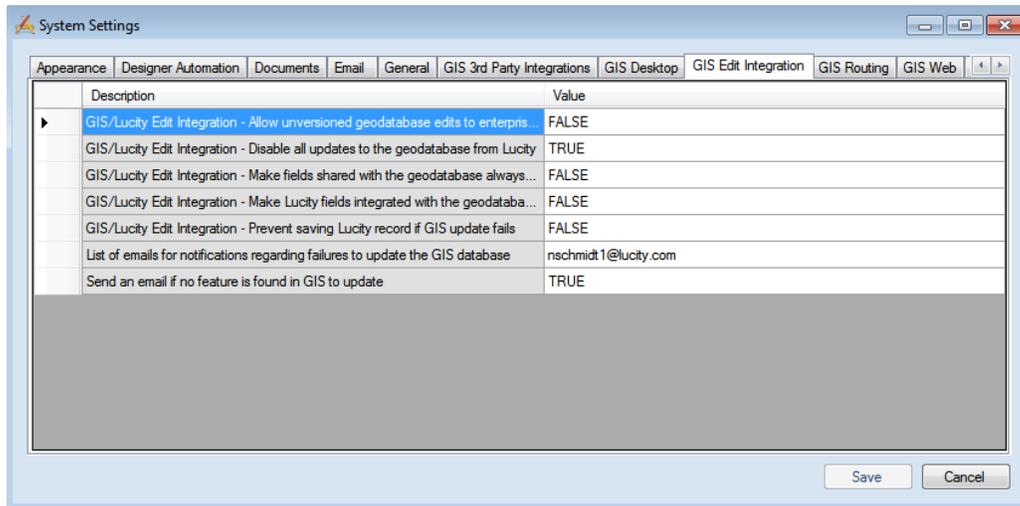
Name	Edit Map Service Url	Database	Map Service User	Map Service Password	Server	Instance
DEFAULT		C:\Lucity\Data\L...				
ESRI_SAMPLE		C:\Lucity\Data\E...				
replica		C:\Lucity\Data\L...				

3. You will need to repeat this process for each geodatabase connection that contains feature classes linked to Lucity

Notes: _____

Configure GIS Edit Integration settings

1. In the Lucity Administration Tool go to GIS > Settings
2. The GIS Edit Integration tab contains all the settings used by the SOE.



- o **Allow unversioned geodatabase edits to enterprise geodatabase:** This allows edits to be made to unversioned geodatabases.
 - o **Disable all updates to the geodatabase from Lucity:** This prevents the geodatabase from being updated with edits made in Lucity desktop and web.
 - o **Make fields shared with the geodatabase always read only:** Any field that is shared with the geodatabase will be set as read-only in Lucity desktop and web.
 - o **Make Lucity fields integrated with the geodatabase read only if the geodatabase cannot be updated:** If a connection to the geodatabase fails when loading a form, all fields integrated with the geodatabase will be read-only.
 - o **Prevent saving Lucity record if GIS update fails: (Web Only)** If a modification is made to a record in Lucity and the geodatabase fails to get updated this will prevent the record in Lucity from being saved.
 - o **List of emails for notifications regarding failures to update the GIS database:** Enter a comma delimited list of email addresses. This list will receive emails when the Lucity Data Update SOE fails to update the geodatabase.
 - o **Send an email if no feature is found in GIS to update:** Sends an email when the Lucity Data Update SOE cannot find a feature in the geodatabase to update. This is sent to the list specified in the "list of emails for notifications regarding failures..." setting.
3. After you are finished reviewing the settings, click Save. You have completed the steps necessary to properly configure the Lucity SOE.