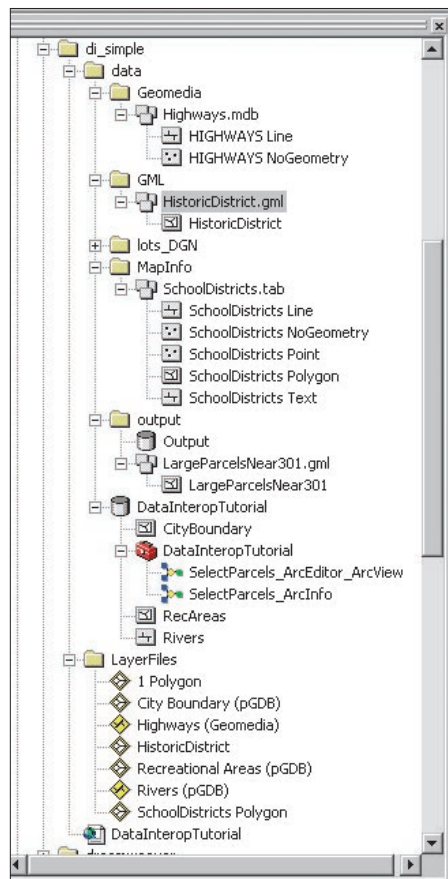


# Leverage Data Investments With ArcGIS Extension

By Katie Clift, ESRI Technical Marketing Specialist

Good spatial data is the foundation of any meaningful geographic analysis. Individual departments in an organization may use GIS software from different vendors but still need to work together and optimize the organization's data investments. Data sharing used to mean spending valuable time converting source datasets across formats to perform data visualization, analysis, or mapping tasks. The ArcGIS Data Interoperability extension has largely eliminated these challenges.

While ArcGIS supports direct read for a variety of data formats, the ArcGIS Data Interoperability extension, based on Safe Software's Feature Manipulation Engine (FME) technology and incorporating Safe Software's extensive knowledge of spatial data formats,



The Formats Gallery, which shows all the data formats supported for direct read and data import

greatly expands support for spatial data formats from many vendors. It adds direct read capability for 70 more spatial formats and the ability to export more than 50 spatial formats. With this extension, many more datasets can easily be added to maps or included in geographic analysis.

## Tutorial Overview

This tutorial introduces the ArcGIS Data Interoperability extension and uses data in five formats. The data will be displayed in ArcMap using direct read capability. By creating an Interoperability Data Connection, a directory of CAD files will be read as one spatial dataset and used as input for a geoprocessing model.

## Setting Up the Project

The ArcGIS Data Interoperability extension should be installed before starting this tutorial. This extension can be purchased and downloaded online. A complete evaluation copy is also available online and can be converted later to a full license.

**1.** Once installed, enable the extension in both ArcMap and ArcCatalog by choosing Tools > Extensions from the menu and checking the box next to Data Interoperability. Unlike many other ArcGIS extensions, the Data Interoperability extension does not have a toolbar but does add the Data Interoperability Toolbox to ArcToolbox.

**2.** Visit the *ArcUser Online* Web site at [www.esri.com/arcuser](http://www.esri.com/arcuser) and download the archive containing the sample dataset. Create a folder for the project called `data_interop` and unzip the archive into it.

## What You Will Need

- ArcGIS 9 with Service Pack 1 (ArcView, ArcEditor, or ArcInfo license)
- ArcGIS Data Interoperability extension, installed
- Sample data downloaded from *ArcUser Online*

**3.** The sample dataset includes a map document called `DataInteropTutorial.mxd`. Start ArcMap and open this document.

**4.** Choose Tools > Options from the main menu and check the Geoprocessing environment. In the Options dialog box, click on the Geoprocessing tab. Under the Display/Temporary Data, make sure the boxes next to Add Results of Geoprocessing Operations to the Display and Results Are Temporary by Default are checked.

## Examining Data Layers

Click on the Source tab in the table of contents in ArcMap. The City Boundary, Rivers, and Recreational Areas data layers are sourced from personal geodatabase feature classes. However, data for the Highways data layer is stored in a Geomedia Access warehouse. If `DataInteropTutorial.mxd` is installed in a different directory than the sample data, a red exclamation mark next to this layer indicates the link to the source data is broken. Steps 1 through 3 will repair the link. If the link is not broken, skip to step 4.

**1.** ESRI personal geodatabases and Geomedia Access warehouses are both stored in Microsoft Access databases. Choose Tools > Options. Select the Data Interoperability tab on the Options dialog box. Make sure the box next to Examine .mdb Files for Geomedia Warehouses is checked. Click OK.

**2.** Right-click on the Highways data layer and choose Properties. In the Properties dialog box, click the Source tab and click the Set Data Source button.

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This tutorial uses data in five formats that will be incorporated in an analysis operation using the ArcGIS Data Interoperability extension. By creating an Interoperability Data Connection, a directory of CAD files will be read as one spatial dataset and used as input for a geoprocessing model.

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**3.** Navigate to the Geomedia Access warehouse. Select the Highways line dataset. Notice that the data type shown is Interoperability Feature Class. Click OK.

**4.** Right-click on the Highways layer and choose Label Features to display labels using attribute table values. Save the map document.

## Directly Use Interoperability Data Sources

With the ArcGIS Data Interoperability extension, ArcGIS can add many non-ArcGIS datasets directly to a map using the same procedure employed when adding native ArcGIS datasets.

**1.** Click the Add Data button, navigate to the HistoricDistrict.gml dataset in the \data\GML folder. Double click to expand this dataset and add the HistoricDistrict Polygon layer from this GML Version 2.x dataset. Click OK to ignore the Missing Projection Information message box.

**2.** Symbolize the HistoricDistrict dataset by importing the HistoricDistrict.lyr file from \LayerFiles\. Right-click on the layer, click on the Display tab, and change the layer transparency to 50 percent. Turn off the HistoricDistrict polygons.

**3.** Click the Add Data button, navigate to the \data\MapInfo\SchoolDistricts.TAB. Expand the SchoolDistricts.tab and add the SchoolDistrict Polygon from the dataset. Again, click OK to ignore the Missing Projection Information message box.

**4.** Symbolize the SchoolDistricts Polygon data by adding the file SchoolDistricts Polygon.lyr file. Turn off the SchoolDistricts Polygon data. Save the map document.

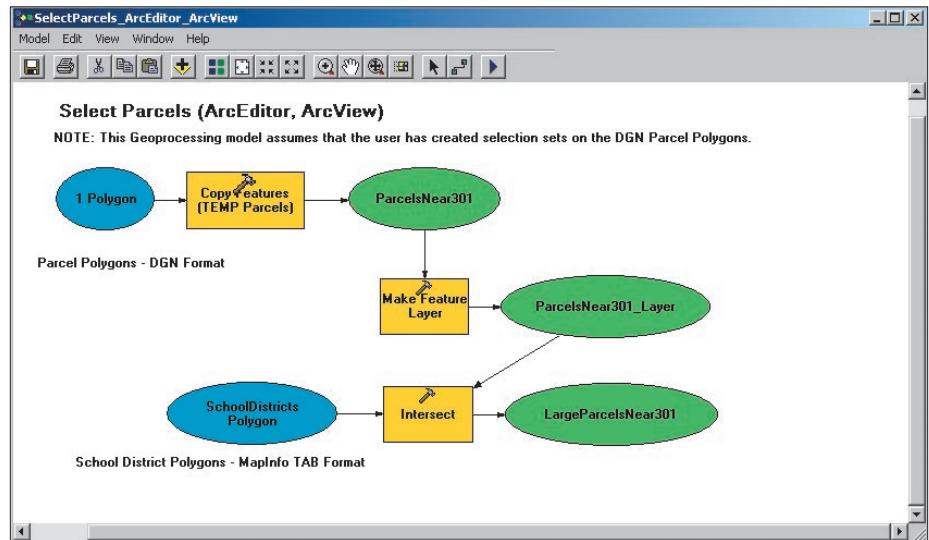
## Configure an Interoperability Connection

In ArcCatalog, Interoperability Connections can be configured to specify connection properties for non-ArcGIS datasets. Configuring a connection can assign spatial reference information so ArcMap can reproject the data on the fly or create a single dataset from a group of tiled CAD files. This section describes the process used for configuring an Interoperability Connection that will read specific CAD file properties for an input dataset.

**1.** Open ArcCatalog. Navigate to lots\_DGN in the Data folder. Preview one of these DGN files in ArcCatalog.

**2.** Scroll down the table of contents and expand the Interoperability Connections node. Double-click on Add Interoperability Connection.

**3.** In the Interoperability Connections dialog box, click the ... button next to the Format drop-down list to display the Formats Gallery, which shows all of the data formats supported for direct read and data import. Many of these formats are also available for data export. Select the MicroStation Design format by double-clicking on it.



*This model in ModelBuilder uses Geomedia Access warehouse, MapInfo TAB files, and MicroStation CAD files as input data for an analysis.*

**4.** Click the ... button next to the Dataset text box. Navigate to lots\_DGN in the Data directory. Hold down the Shift key and click to select all the DGN files as input. Click Open.

**5.** Click the Settings... button to access format specific configuration settings. For this tutorial, accept the default values.

**6.** Click the ... button next to the Coordinate System text box. The standard ArcGIS Spatial Reference dialog box appears. On the Spatial Reference dialog box, click the Import button and navigate to the RecAreas feature class in the DataInteropTutorial.mdb personal geodatabase in the data folder. Assigning the Spatial Reference will allow ArcMap to perform on-the-fly projection on the Interoperability dataset. When finished, click OK twice to exit all dialog boxes.

**7.** To preview the Interoperability Connection in ArcCatalog, expand the new connection and select the 1Polygon feature class. Click on the Preview tab in ArcCatalog's right pane. A window will appear that shows the indexing progress. Features are indexed to a file on disk to free memory and improve performance. A tiled parcels dataset will appear when indexing is complete.

**8.** Choose View > Refresh or press F5 to update the Interoperability Connection information in the ArcCatalog tree. Initially, the Interoperability Connection will show all possible configurations as read from the source dataset. After indexing the features and refreshing the Catalog tree, the Interoperability Connection will only show populated feature classes.

**9.** Click the Add Data button in ArcMap, navigate to the newly configured Interoperability dataset, and click to expand it. Select 1 Polygon and add it to the map. 1 Polygon can also be dragged and dropped from the Interoper-

ability Connection to ArcMap. Save the map document.

## Using Interoperability Datasets in a Model

Integration with the geoprocessing environment is twofold—as non-ArcGIS datasets that are directly read and as data sources that are directly incorporated into geoprocessing models as input feature classes. This functionality allows repeated execution of geoprocessing work flows when updated results are required and/or a non-ArcGIS dataset has changed even if the dataset was edited in its native software package.

In this section, selections will be performed on the Geomedia Access warehouse data (Highways), MapInfo TAB files (SchoolDistricts polygons), and the CAD polygon layers (DGN Lots).

If the ArcToolbox window is not already open, open it. Navigate to data\DataInteropTutorial.mdb and add the DataInteropTutorial toolbox, right-click on ArcToolbox and choose Add Toolbox. This toolbox contains two models, one for users with an ArcEditor or ArcView license and the other for users with an ArcInfo license.

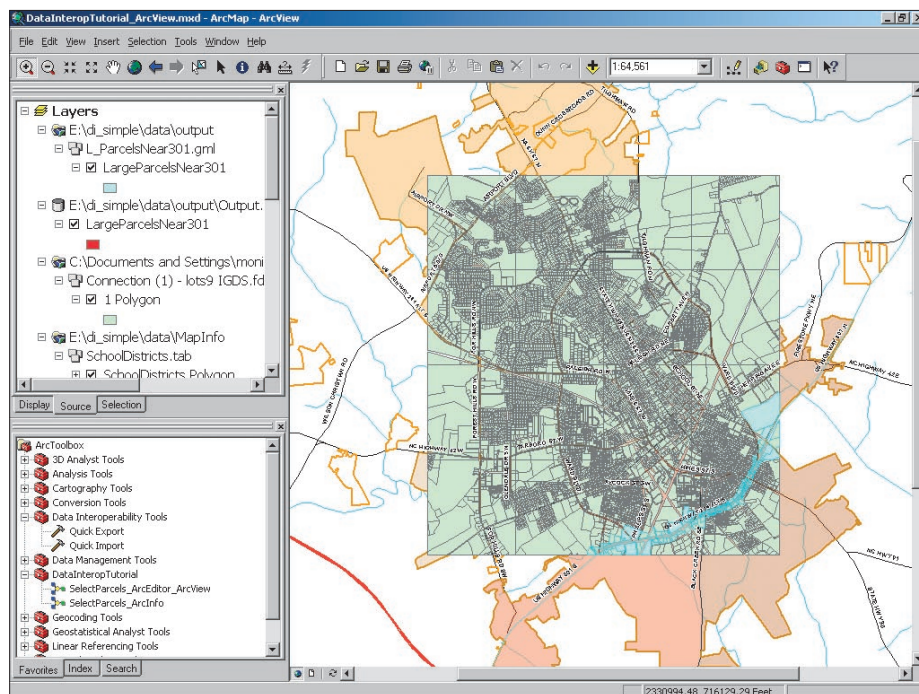
### ArcEditor or ArcView License Users

**1.** Choose Selection > Select by Attributes from the main menu. In the Select by Attributes dialog box, choose Highways (Geomedia) as the layer and create the expression "NAME" = 'US HWY 301'. Click Apply.

**2.** Choose Selection > Select by Location. Check the box next to 1 Polygon and choose Intersect. Select Highway (Geomedia) as the other layer and make sure Use Selected Features and Use a Buffer to the Features of Highways (Geomedia) are checked. Make the buffer 150 feet.

**3.** Expand the DataInteropTutorial toolbox.





Right-click on the SelectParcels\_ArcEditor\_ArcView tool and choose Edit.

4. Run the model by clicking the Play button or selecting Model > Run Entire Model.

#### ArcInfo Users

1. With this license, the selection steps are incorporated into the Geoprocessing model. Ex-

pand the DataInteropTutorial toolbox. Right-click on the SelectParcels\_ArcInfo tool and choose Edit.

2. Click the Play button to run the model or select Model > Run Entire Model from the ModelBuilder menu.

Notice that the results of this simple analysis have been added to ArcMap as a feature class

*The model output was exported to GML using the Quick Export tool and added back to the map.*

called LargeParcelsNear301. These features have been selected from the 1 Polygon parcels (DGN) dataset based on proximity to US Hwy 301 using the Geomedia Highways feature class and SHAPE\_Area > 200,000 ft<sup>2</sup>. The results of this analysis can be exported into non-ArcGIS formats.

#### Export Model Results to Non-ArcGIS Formats

The ArcGIS Data Interoperability extension adds the Data Interoperability Toolbox to the geoprocessing environment. This toolbox contains two tools—Quick Import and Quick Export. These quick tools require limited input from the user to import or export data. More detailed import or export functionality is also available with this extension. The user can create custom import, export, and data transformation tools. In addition, export functionality could be incorporated into a geoprocessing model.

1. In ArcToolbox, expand the Data Interoperability Tools toolbox and double-click the Quick Export tool.

2. In the dialog box, select LargeParcelsNear301 for the input layer.

3. Click the ... button to access the Output Data Destination dialog box. Click the ... button next to the Format text box and select GML Version 2.x from the list.

4. Click the ... button next to the Dataset text box to specify the output destination as \data\output and the file name as LargeParcelsNear301.

5. Add the converted data to ArcMap. While most formats can be read directly without configuring an Interoperability Connection in ArcCatalog, some export formats require an Interoperability Connection.

#### Conclusion

Geographic analysis and mapping are data-dependent activities. Converting data to and from proprietary formats can be repetitive and time consuming, but with the ArcGIS Data Interoperability extension, ArcGIS can directly use data in a wide variety of vector data formats. This extension provides impressive data import and export functionality that can be automated in using the geoprocessing work flow. For information on using this extension to create custom formats and tools, see the accompanying article, "Creating Custom Formats With ArcGIS Data Interoperability Extension." For more information about this extension, visit [www.esri.com/datainteroperability](http://www.esri.com/datainteroperability).

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