

ArcGis- 9

Geodatabase QuickStart Tutorial – 1st part

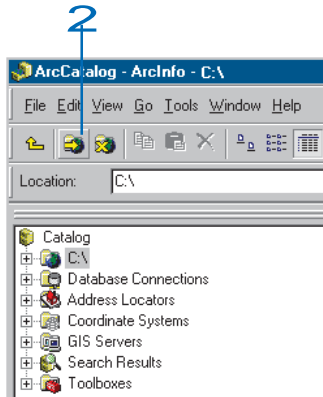
Exploring data in ArcCatalog

Before you begin the tutorial, you must find the data and maps that you will need. You will use ArcCatalog to browse your data in this exercise.

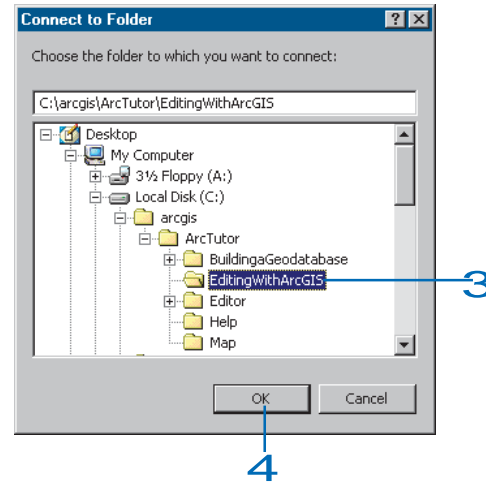
Connecting to data

ArcCatalog lets you organize your local GIS data and maps in folders and easily access them through folder connections. You can access multiuser geodatabases by making database connections. When you look in a folder connection, you can quickly see the folders and data sources it contains. You will begin by creating a folder connection to the quick-start tutorial data.

1. Start ArcCatalog by either double-clicking a shortcut installed on your desktop or using the Programs list in your Start menu.
2. Click the Connect To Folder button.



3. Navigate to the EditingWithArcGIS folder on the local drive where you installed the tutorial data. The default installation path is `C:\arcgis\ArcTutor\EditingWithArcGIS`.



4. Click OK.

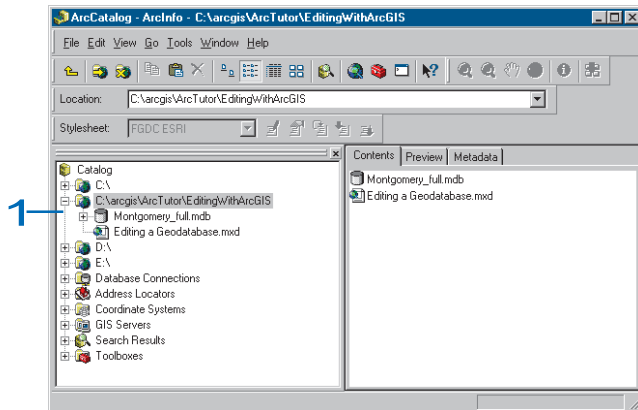
Your new folder connection—

`C:\arcgis\ArcTutor\EditingWithArcGIS`—is now listed in the Catalog tree. You will now be able to access all of the data needed for the quick-start tutorial through this connection.

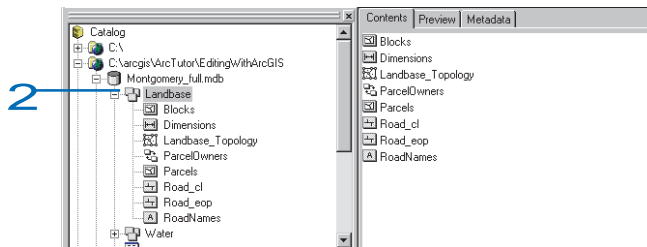
Exploring your data

Before you begin editing the city geodatabase, you will explore the Landbase and Water feature datasets.

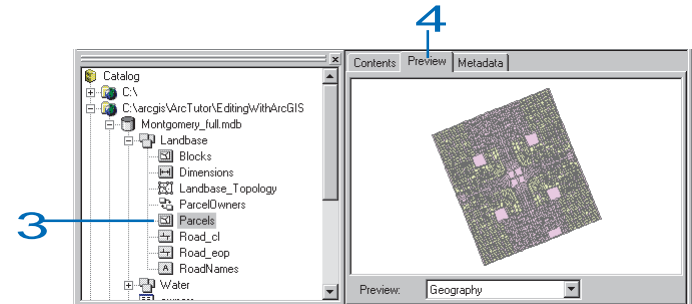
1. Click the plus sign next to the C:\arcgis\ArcTutor\EditingWithArcGIS folder.



2. Double-click the Montgomery_full geodatabase and double-click the Landbase feature dataset to see the feature classes, relationship classes, and topology it contains.



3. Click Parcels feature class.



4. Click the Preview tab to preview the Parcels feature class geometry.

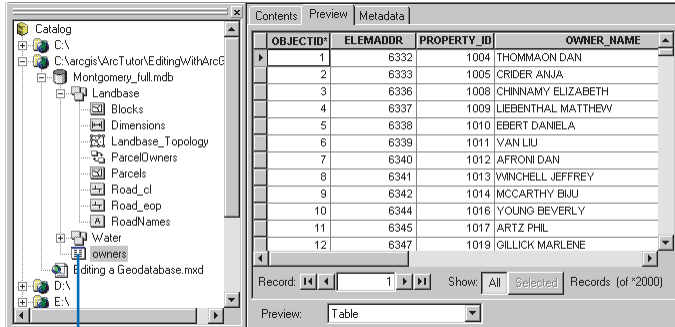
This feature class contains two types of parcel features, residential parcels and nonresidential parcels. They are rendered with different colors in the ArcCatalog Preview tab because they have been defined as separate subtypes in the geodatabase.

Subtypes are used to differentiate groups of features within a feature class that may share many of the same characteristics, yet have important differences in the typical values of some of their attributes or the role they play in the geodatabase. For example, a road feature class could have highway, arterial street, and residential street subtypes. All are types of streets, but highways might typically have four or more lanes and speed limits in the 45–70 mph range, while residential streets might always have two lanes and speed limits in the 15–30 mph range. The subtypes could have default values and range domains that reflect these differences.

Two subtypes within a feature class can have different topology and connectivity rules associated with them and often have different default values for certain attributes. Subtypes, default values, and attribute domains can help you ensure that your geodatabase contains high-quality attribute data. For more information about subtypes, see the ‘Subtypes’ chapter in *Building a Geodatabase*.

In this geodatabase, residential parcels have a default value of Residential for their zoning code, while nonresidential parcels have a default value of Commercial. Nonresidential parcels may be given another zoning code value, but since many of the nonresidential parcels are commercial, the default was set to Commercial as a convenience for the geodatabase editors.

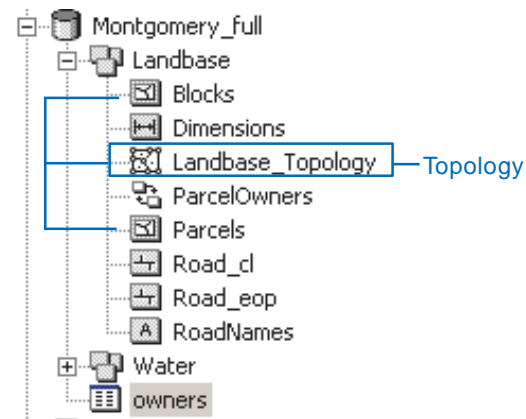
5. Click the Owners table in the geodatabase.



5

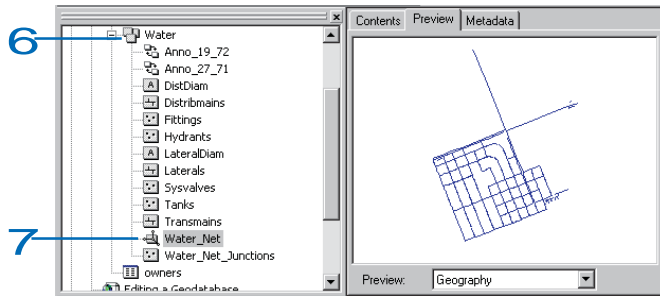
Notice how the Preview type automatically changes to Table and displays the table's records. This table contains the owner information for the Parcels feature class.

ParcelOwners is another type of geodatabase object, a relationship class. Relationship classes store information about how spatial objects, such as feature classes, or nonspatial objects, such as tables, are related to other objects within a geodatabase. ParcelOwners links the Owners table to the Parcels feature class. When you edit the parcels in ArcMap, you can view and edit the related data in the Owners table. For more information about relationship classes, see the ‘Relationship classes’ chapter in *Building a Geodatabase*.



Landbase_Topology is a topology in the dataset. It provides rules that structure how the polygon features in the Parcels feature class can be spatially related to each other and how one subtype of Parcels can be related to one subtype of Blocks. Topologies help you maintain high-quality spatial data in your geodatabase. For more information about topologies, see the ‘Topology’ chapter in *Building a Geodatabase*.

6. Double-click Water.

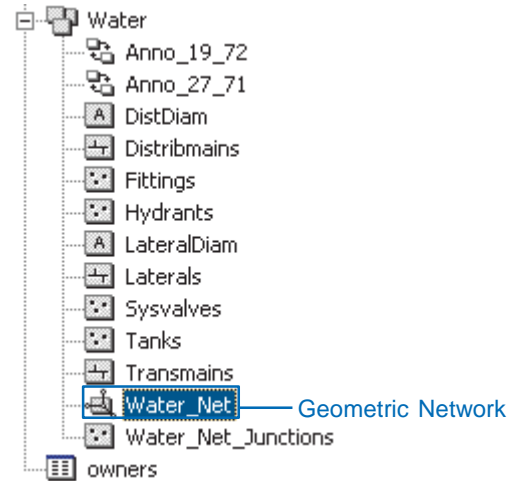


This dataset also contains relationship classes, annotation, and feature classes.

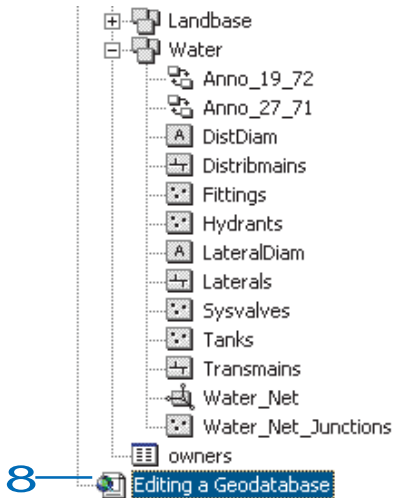
7. Click Water_Net.

Water_Net is a geometric network, another type of topological relationship, between the feature classes in this dataset. Geometric networks allow you to model networks of edges and junctions, such as the pipes and valves in a water system or the wires and switches in an electrical power grid. They let you conduct connectivity traces and flow analyses on the features in the network and provide some special editing functionality that is useful for networks. For more information about geometric networks, see the 'Geometric networks' chapter in *Building a Geodatabase*.

A relationship class, Anno_19_72, links a set of annotation to the Laterals features. If a water lateral is edited, the corresponding piece of annotation will be updated.



8. Click Editing a Geodatabase.mxd.



This is a map that you will use to edit the geodatabase objects you've been exploring. For more information about maps, see *Using ArcMap*.

In this section, you've explored the contents of the EditingWithArcGIS folder. In the next section, you will begin to do some advanced attribute editing on this geodatabase.

Editing attributes of geodatabase features

Imagine you work for the city planning department, and you have been asked to update the attributes of some parcels. You will edit attributes of geodatabase feature classes, edit values in a table connected to a feature class by a relationship class, and change the subtype of a feature.

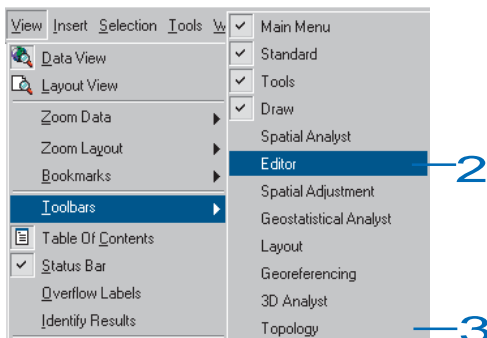
Opening a map and starting to edit

1. Start ArcMap by double-clicking Editing a Geodatabase.mxd.



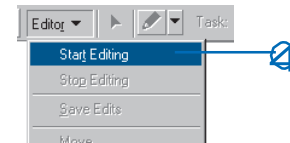
ArcMap starts, and you see a section of the city. You are going to edit some features on this map, so you'll need to add the Editor toolbar and the Topology toolbar to the map.

2. Click View, point to Toolbars, and click Editor.
3. Click View, point to Toolbars, and click Topology to add the Topology toolbar.



The Editor and Topology toolbars appear.

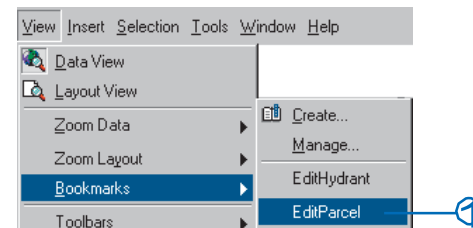
4. On the Editor toolbar, click Editor and click Start Editing.



Visiting a bookmarked area

Now you'll zoom to an area that has been defined by a spatial bookmark in the map and select some features to edit.

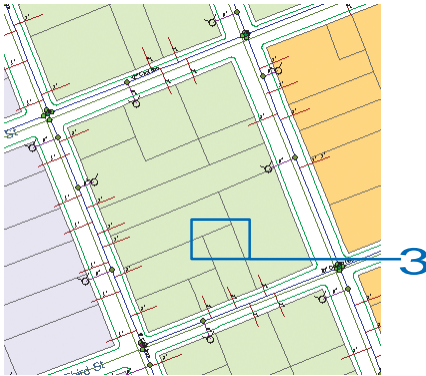
1. Click View, point to Bookmarks, and click EditParcel.



- Click the Select Features tool.



- Select a group of light green office parcels by dragging a box around them.



Viewing and editing values in a related table

Now you'll edit the Owners table, which is related to the Parcels feature class by the Parcel Owners relationship class.

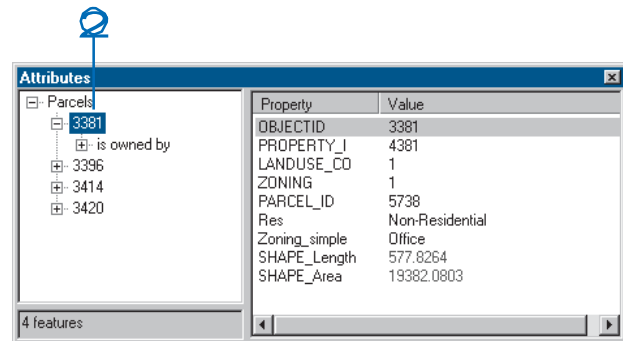
- Click the Attributes button on the Editor toolbar.



The Attributes dialog box now appears with a list of the selected parcels' PROPERTY_ID values. The attribute values of the first selected parcel are displayed on the right panel.

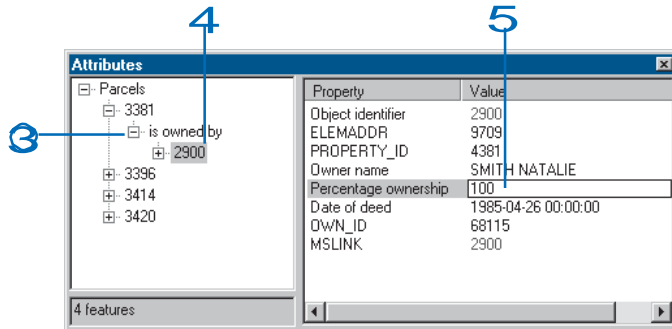
Each parcel has a plus sign next to it. You can navigate to the related row in the Owners table from each parcel.

- Double-click the feature ID of parcel 4381 (it may not be the first in the list).



The database designer decided that a logical label for related fields in the Owners table, when viewed from the Parcels attributes, is 'is owned by'. You can specify such labels when you create a relationship class.

- Click the plus sign next to 'is owned by'.



The identification number of the record in the Owners table that is related to—owns—this parcel is displayed under the 'is owned by' label.

- Click the Owner Object identifier, 2900.

You are now viewing a record in the Owners table in the geodatabase. The attributes of the owner of this parcel are listed on the right panel. Some of the field names that are shown in this window are aliases instead of the true field names. Aliases are created by the geodatabase designer to make the usually short and sometimes cryptic database field names easier to read and understand. In this case, for example, one of the geodatabase fields is called OWNER_PERCENT. The alias 'Percentage ownership' was created to provide a more understandable label for the field in the Attributes window.

You can edit the values for this owner's attributes easily using the Attributes window.

- Click the value for Percentage ownership and type "100".

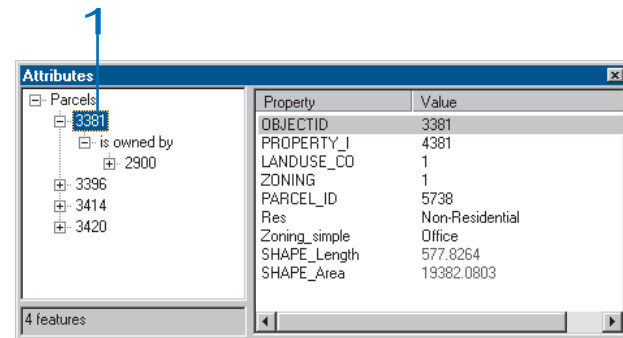
- Press Enter.

You have used the ParcelOwners relationship class to find the owner for a selected parcel feature and to edit that owner record in the related geodatabase table. Relationship classes can also be used to link two features or tables to each other or to link annotation to features. The geodatabase lets you use the relationship class to easily navigate between related objects and to maintain the referential integrity of the database.

Editing the subtype and an attribute of a feature

Now you'll edit the parcels feature class. You will change the subtype of a parcel and also edit an attribute of a parcel.

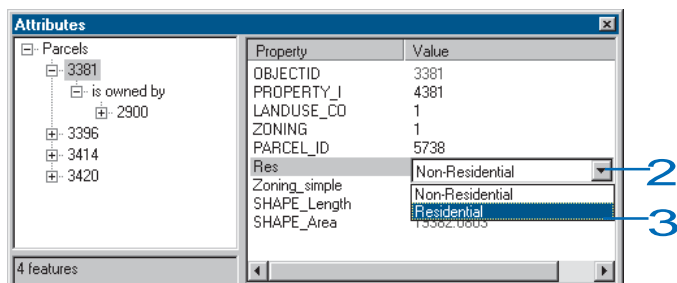
- Click the PROPERTY_ID of parcel 4381 in the Attributes window selection list.



When you first viewed the parcel feature class in ArcCatalog, the features were drawn in two different colors because there are two subtypes of parcel. On this

map the parcels are rendered using their Zoning_simple attribute rather than their subtype. Each parcel subtype has different default values defined for its Zoning_simple field. You will change the subtype of a parcel and see how other fields are updated with a new default value.

- Click Non-Residential in the Value column to the right of the Res attribute.



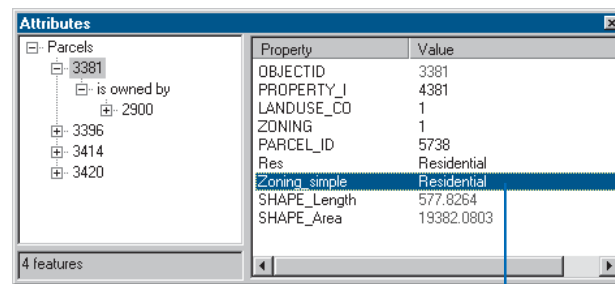
The Attributes window gives you a dropdown list that will let you select one of the two possible values for this field.

- Click Residential in the list of two values.

This field is associated with a coded value *attribute domain* in the geodatabase. Coded value domains allow you to edit more quickly and accurately because you can pick from the list of predefined permissible values. There's no need to type the data into the field, and there's no possibility of entering a typo.

The attribute stored in this field is also the code that identifies which subtype the feature belongs to. Notice that when you changed the parcel's subtype attribute to Residential, the subtype of the parcel immediately changed. The value of the Zoning_simple attribute also

changed, as you can see in the Attributes window and on the map. This is because Residential is the default value for this attribute of parcels of the Residential subtype.

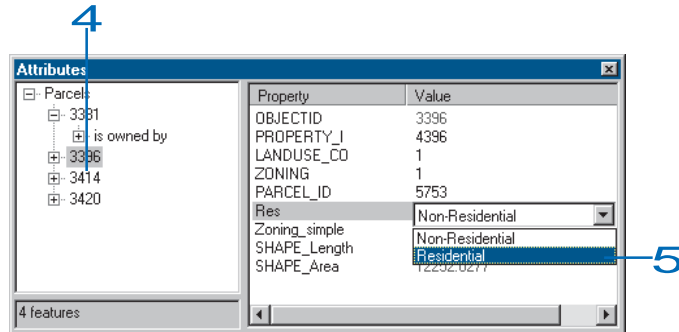


New attribute value from default value of Residential subtype



Next, you'll edit another parcel's subtype and attributes.

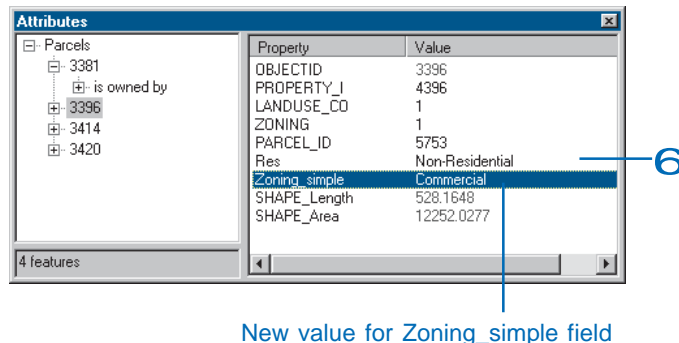
- Click the PROPERTY_ID of parcel 4396 in the Attributes window.



- Click Non-Residential in the Value column to the right of the Res attribute and click Residential.

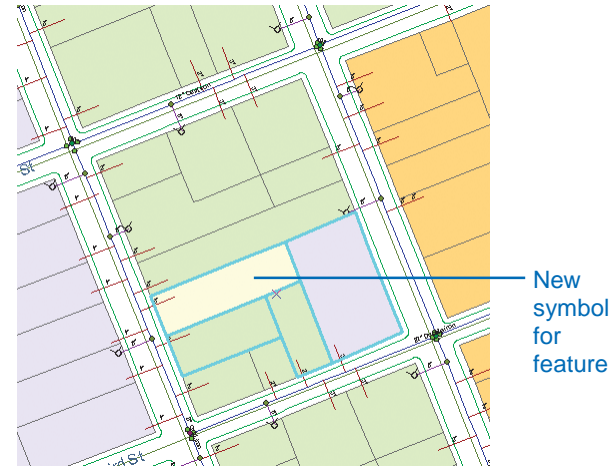
Notice that the Zoning_simple field is again updated with the default value, Residential.

- Click in the Value column for the Res attribute and click Non-Residential to change the parcel's subtype back to Non-Residential.



New value for Zoning_simple field

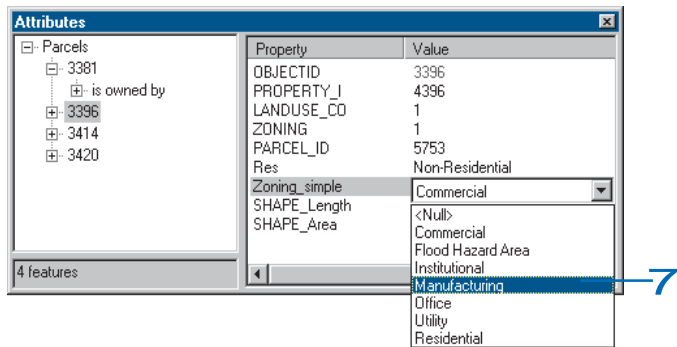
Notice that the Zoning_simple field is updated again, but now it has a new value—Commercial. The feature's symbol on the map is also a new color.



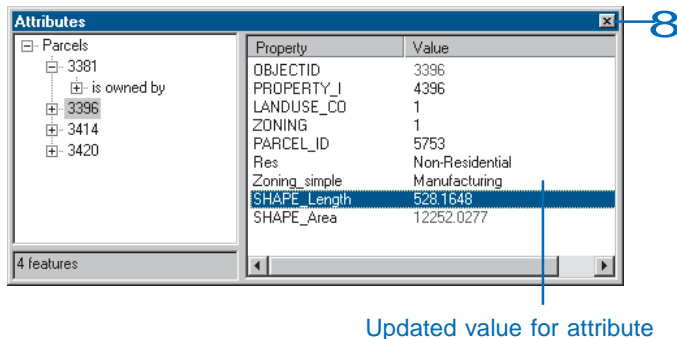
When the geodatabase was designed, it was decided that most new parcel features of the Non-Residential subtype would probably be commercial property, so Commercial was made the default value for nonresidential parcels.

Just because a parcel is nonresidential does not mean that it must have the Zoning_simple code Commercial. This parcel has been reclassified by the planning department as Manufacturing. You will update the Zoning_simple code to its new value.

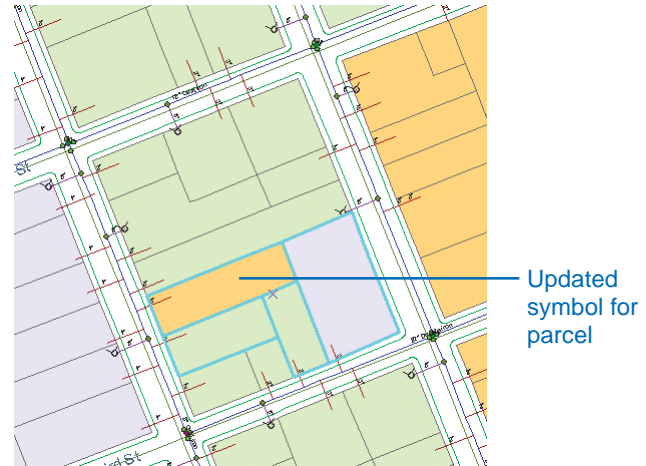
7. Click Commercial in the Zoning_simple Value column and click Manufacturing.



8. Close the Attributes dialog box.



You have updated the parcel's zoning code in the geodatabase and have seen how default values and coded value domains can make editing feature attributes quick and easy.



In the next section you will examine the results of your edits on the feature dataset's topology, Landbase_Topology.

Finding and correcting topology errors

Now you will check the edits you've just made to find out if they violate the topology rules defined for these features.

A geodatabase topology defines a structured set of permissible spatial relationships between features within a subtype or feature class or between features in two subtypes or feature classes. These relationships are specified by topology rules when the topology is created. There are many possible topological relationships that could be important for a geodatabase, so ArcGIS allows you a great deal of flexibility in defining topological relationships. The Topology toolbar provides tools to help you find and correct topology errors and also provides editing tools to help you avoid creating topology errors when editing features in a topology.

Validating topology edits

Although you haven't changed the geometry of any features, you have changed the subtype of a couple of features. If a subtype of a feature class is specified in a topology rule, changing the subtype can create topology errors.

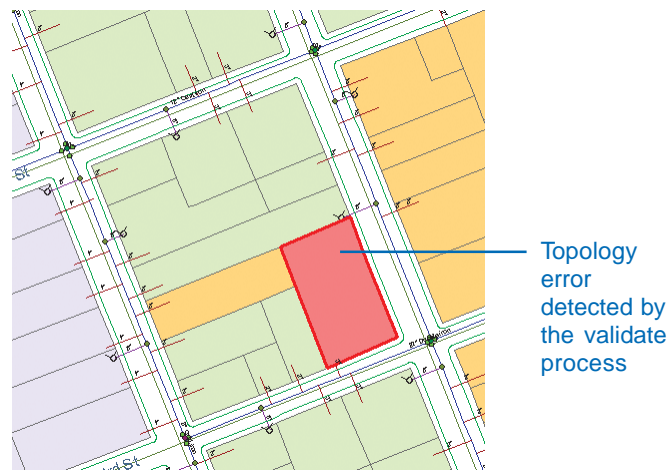
1. On the Topology toolbar, click the Validate Topology In Current Extent button.



The topology is validated within the area that is currently visible on your map.

Validating a topology can sometimes take some time to complete, especially if you have made a large number of edits, you are working on large or complex datasets, or you have many topology rules. Validating the current extent saves time when you are trying to locate errors in a specific area.

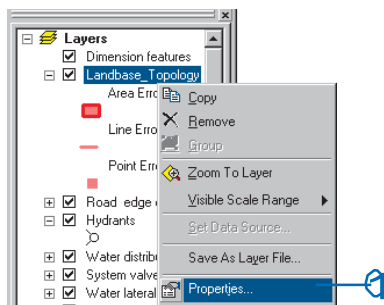
The topology validation process identified an error within the area you've just been editing and marked it with a red error feature. Red is the default color for error features, although you can change the way they are symbolized.



Examining topology properties

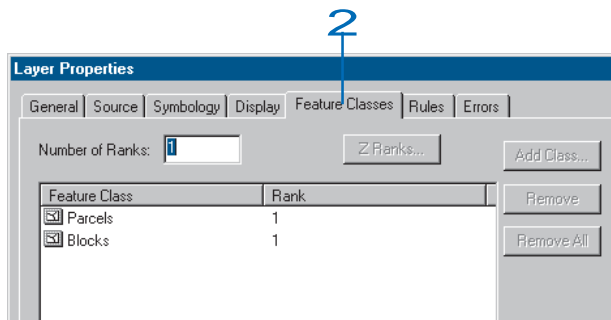
Now you'll investigate the properties of this topology to identify what the problem is. The Topology layer lets you view topology errors, as well as other information about the topology, in ArcMap.

1. In the ArcMap table of contents, right-click the Landbase_Topology layer and click Properties.



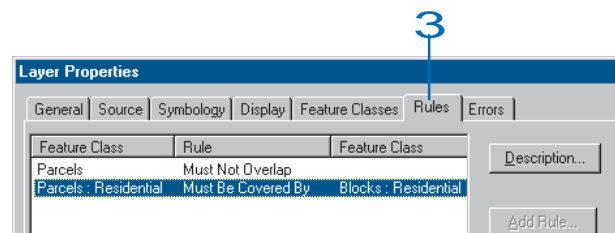
The Layer Properties dialog box for the topology layer opens.

2. Click the Feature Classes tab to see what feature classes in the dataset participate in the topology.



The Parcels feature class that you've just edited is one of two feature classes that participates in the topology, Blocks is the other.

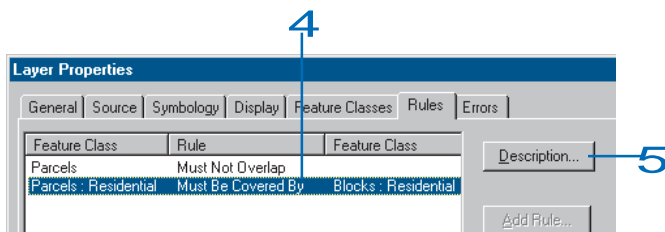
3. Click the Rules tab to see which topology rules may have been violated by your edits.



The rules of the topology are listed here. A topology could be created with no rules or with as many as a dozen, or more, depending on the complexity of your data model. The first rule in the list means that features within the feature class Parcels are bound by the Must Not Overlap rule. Parcels that overlap—for example, because of digitizing errors—will be discovered when the topology is validated. This rule does not involve a second feature class, so the second feature class column is empty.

Since you didn't edit any geometry, you're unlikely to have violated the Parcels Must Not Overlap rule. However, the second rule, Parcels: Residential Must Be Covered By Blocks: Residential involves the Residential subtype of the Parcels feature class, which you did edit. It states that Residential subtype features in Parcels must be covered by Residential subtype features in Blocks.

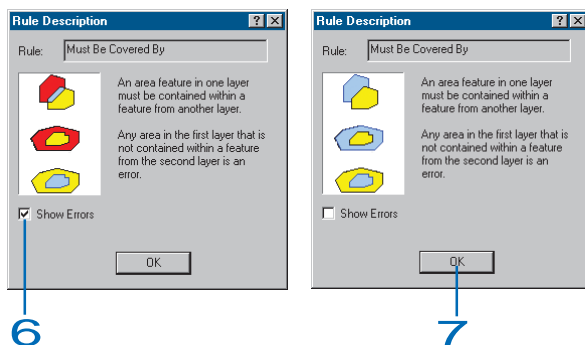
- Click the row for the rule Parcels: Residential Must be Covered By Blocks: Residential.



- Click Description.

A dialog box appears with a brief description of the topology rule.

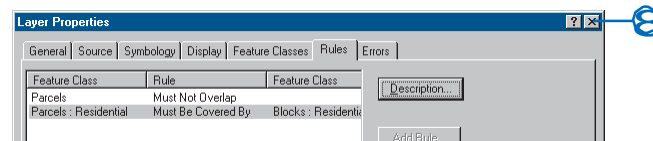
- Uncheck Show Errors.



You can check and uncheck the Show Errors box to compare cartoon examples of features and the topology errors that they would produce. The red parts of the graphic represent error features.

- Click OK.

- Close the Layer Properties dialog box for the topology layers.



Next you'll use another method to explore topology errors.

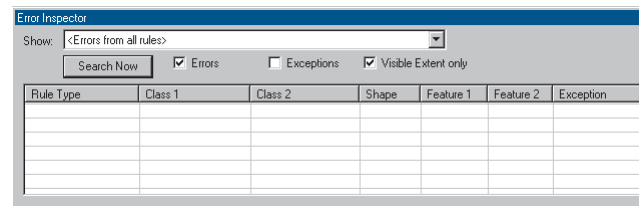
Inspecting topology errors

Now you'll examine the errors in the topology using the Error Inspector.

- Click the Error Inspector button on the Topology toolbar.

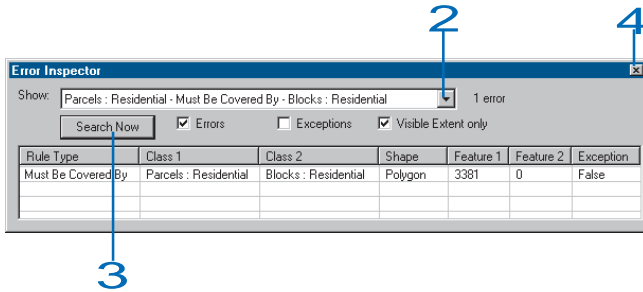


The Error Inspector window appears. You can allow it to float on the map, or you can dock it to the ArcMap application frame.



The Error Inspector will selectively show the errors where this rule is violated.

- Click the Show dropdown list to choose what types of errors to display and click Parcels: Residential - Must Be Covered By - Blocks: Residential.



- Click Search Now.

The Error Inspector shows the error that is visible in the current extent.

You can also use the Error Inspector to find all errors, regardless of their type or whether they are in the visible extent, or you can use it to find exceptions to topology rules. An exception is an error feature that has been marked as representing a valid exception to a topology rule.

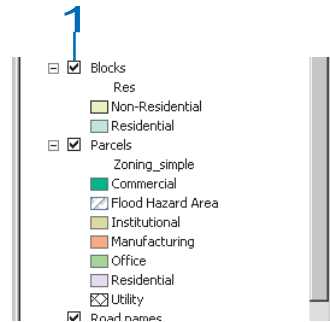
- Close the Error Inspector dialog box.

Fixing topology errors

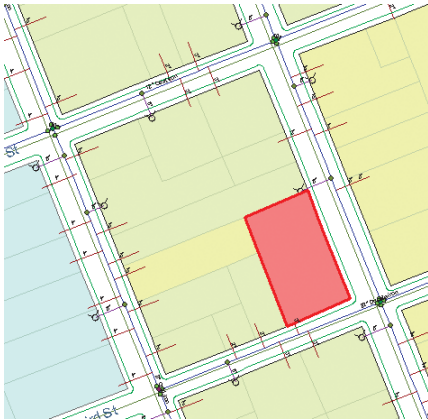
In this feature dataset the Blocks feature class represents city blocks. These features have been created simply for demonstration purposes for this tutorial. Blocks have a subtype field that codes them as either Residential or Non-Residential. The Residential block features could be used by the Planning and Zoning office to track whether a given block has parcels that are used for housing. This information could then be used for business permitting purposes or for consideration in the zoning variance review process.

The topology rule Must Be Covered By ensures that residential parcels must be covered by, or fall within, Block features that are marked as residential. You will turn on the Block layer and look at the situation.

- In the table of contents, check the Blocks layer.



The Blocks layer is partly transparent, so you can see the parcel features through the blocks. The block that contains the error feature is a Non-Residential block. The first Parcel feature that you edited was originally nonresidential. When you edited it, you switched it to the Residential subtype, which triggered this topology error.



There are several possible ways to deal with this topology error. These include:

- Delete the residential parcel feature.
- Create a new block feature that covers just the residential parcel.
- Mark the error as an exception.
- Ignore the error.
- Change the subtype of the Block feature to Residential.
- Change the subtype of the Parcel feature to Non-Residential.

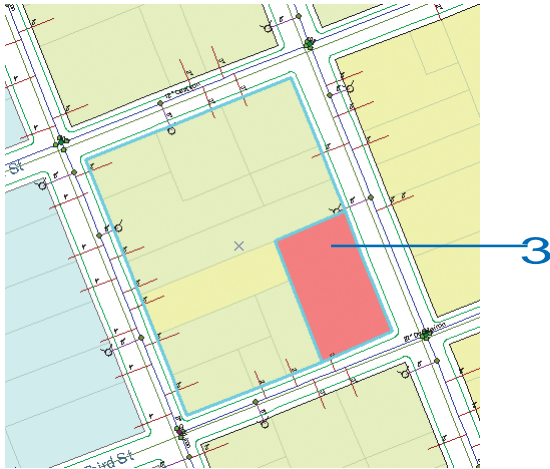
The correct choice would depend on the planning department's strategy for maintaining the Block and Parcel feature classes. Deleting the parcel is, in this case, not an option. Creating a new special Block feature would not be in accordance with the department's system of monitoring blocks with housing, nor would marking the error as an exception or simply ignoring it. The two most viable options are changing the subtype of the block to Residential or returning the subtype of the parcel to Non-Residential.

Let's assume that the original edit was correct and that this parcel really was supposed to be reassigned to the Residential subtype. It follows that the block should be changed to reflect its new status as a block containing a residential parcel.

2. Click the Select Features tool.



- Click the block feature at the error feature.



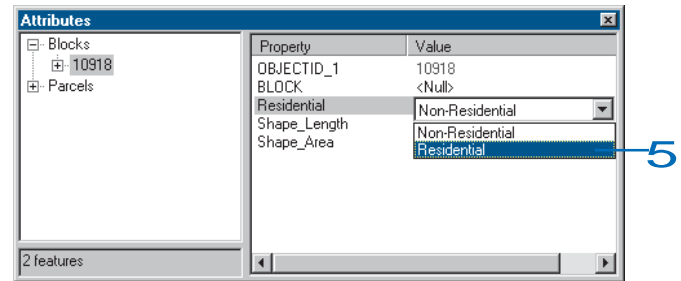
The block is selected.

- Click the Attributes button on the Editor toolbar.

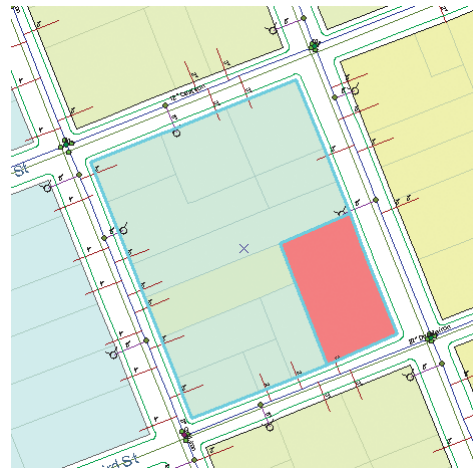


The Attributes window appears.

- Click in the Value column beside Residential and click Residential in the dropdown list.



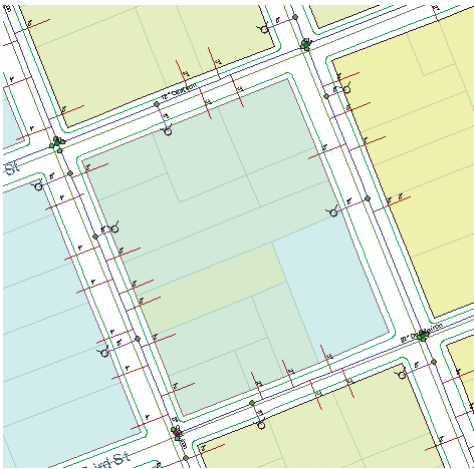
The block changes subtype to Residential, and the symbol for the block is updated on the map.



- Click the Validate Topology In Current Extent button and close the Attributes dialog box.



The part of the topology visible on the map is validated, and since there is no longer a violation of the topology rule, the error is removed.



In this exercise you used the topology to maintain a specific spatial relationship between subtypes of the Parcel and Blocks feature classes. In the next exercise you will use the Topology Edit tool to edit a boundary shared by two features.

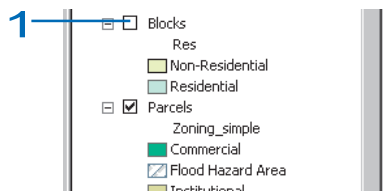
Making topological edits

Imagine you've been asked to move a parcel boundary to update the planning department's database. You will use the Topology Edit tool to edit the two features that share this boundary. The Topology Edit tool works on parts of features, called edges and nodes. Edges are line segments that define part of a line or part of a polygon boundary. Nodes are the endpoints of topology edges, but they can also be introduced along an edge to provide a convenient point to snap to. Edges and nodes may be shared by several features in multiple feature classes. In this exercise you will move an edge that represents the boundary shared by the two parcel features. You will create two temporary topology nodes to make it easier to move the edge to the new location.

Preparing to edit the parcels

First, you'll need to turn off the Blocks layer, so you don't inadvertently edit the Block feature, then zoom in to the area where you'll be editing.

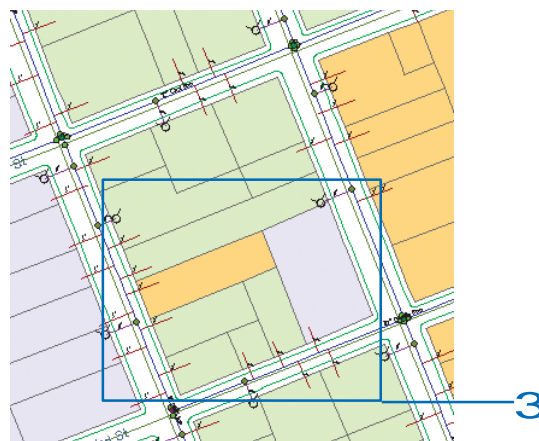
1. Uncheck Blocks.



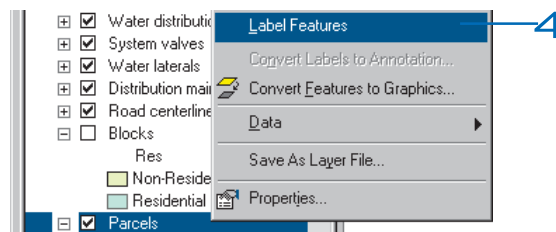
2. Click the Zoom In tool.



3. Click and drag a box around the southern half of the block of parcels that's centered in the display on the map.



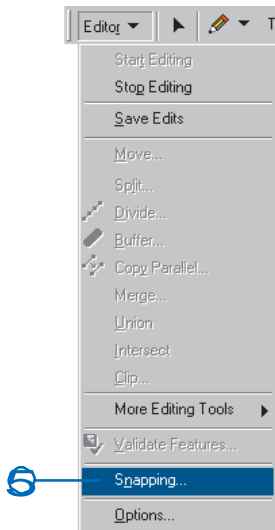
4. Right-click Parcels and click Label Features.





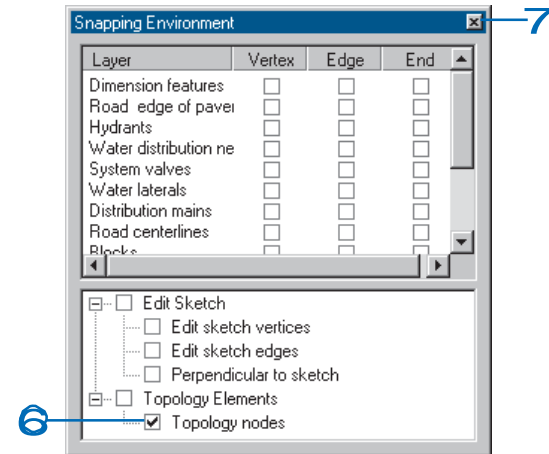
The northern boundary of parcel 4414 needs to be moved 30 feet south of its current position. You will create temporary topology nodes along the parcel's east and west boundaries and snap the north boundary to the new location.

5. Click Editor and click Snapping to set up the snapping environment.



You can snap to different parts of features, the edit sketch, or to topology nodes. You'll set the snapping environment to snap to topology nodes.

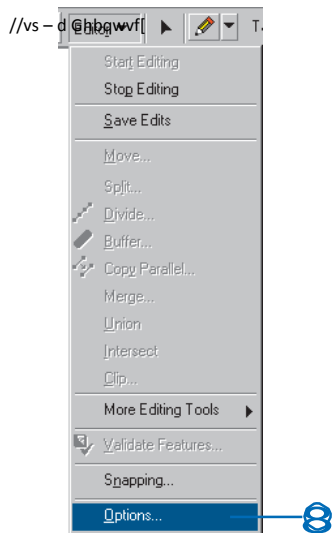
6. Check Topology nodes.



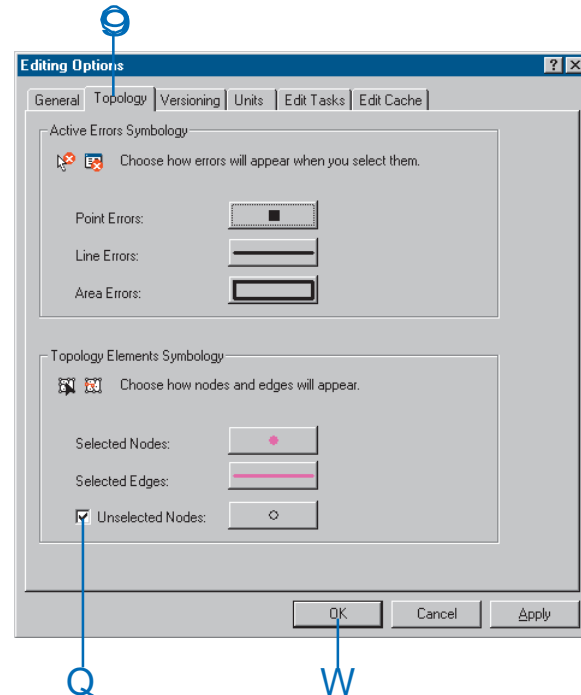
7. Close the Snapping Environment dialog box.

Now you'll change the way the topology nodes are drawn to make editing the parcel boundary easier.

8. Click Editor and click Options.



9. Click the Topology tab.



10. Check Unselected Nodes.

Normally, ArcMap shows the selected topology edges and nodes but not the unselected nodes. Since you will be snapping the edge to unselected nodes, it will be useful to be able to see them.

11. Click OK.

