

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

November 2010

FEATURED COMMAND

ArcGIS Server - Create,
Delete, Transform Features



Application Description

Over the summer of 2009 we discussed the CEDRA tools for ArcGIS Server which provided the user the ability to:

- identify a feature, with or without related data,
- select features within a circular buffer about a point,
- select features within a buffer about a selected feature,
- display and edit the attributes of a feature as per rules defined within the CEDRA-DataEditor's Theme Attribute Data File, and
- display multi-line map tips, respectively,

Continuing with the ArcGIS Server theme, this month we would like to discuss the application of some basic editing functionality. That is, the ability to: (a) define point, line and polygon features, (b) delete one or more selected features and (c) transform one or more selected features.

In addition to this functionality, we will also discuss the ability to select features from a specific layer, as well as the ability to add to the selected set of a layer.

The CEDRA Solution

To address the application described above, The CEDRA Corporation has developed six custom tools:

[AddFeature], , which enables the user to create a point, line or polygon

[Delete Feature],

feature that is stored in the current active layer,

, which enables the user to delete one or more selected features,

[Move Feature],

, which enables the user to transform (move, scale and/or rotate) one or more selected features,

[Properties],

, which enables the user to specify various editing parameter settings.

Command Of The Month bulletin

This month's issue discusses how custom tools which create, delete and transform features can be added to an existing ArcGIS Server Web based application.

[Select Feature],

, which enables the user to select one or more features by defining a rectangle that intersects or encloses one or more features, thereby creating a new selection set, and

[Add to Selected],

, which enables the user add to the current selection set by defining a rectangle that intersects or encloses one or more features.

Like the tools discussed in the **August 2009**, **September 2009** and **October 2009** issues of Command of the Month, the tools mentioned above can be added to any existing Web Application, whose application code is VB.NET based, using the Microsoft Notepad program. In so doing, the user is able to customize a Web Application without having to use an Interactive Development Environment, such as Microsoft Visual Studio.

Modifying the Web Application

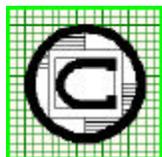
Building upon the application developed in the **October 2009** issue of Command of the Month, we will add the:

[Add Feature], [Delete Feature],
[Move Feature], [Properties],
[Select Feature], [Add to Selected]

tools to the Test4 application.

The same approach discussed in the **October 2009** issue will be used to add the above mentioned tools. That is to say, Notepad will be used to modify two existing files (Default.aspx and Default.aspx.vb), while new files will be added to the App_Code and Images folders. Recapping, the:

- App_Code folder contains the VB.NET code that is employed by the custom tools,
- Images folder contains the icons that are associated with the tools offered by the application,
- Default.aspx file contains the HTML and Javascript code that controls the operation of the application such as the display of the tools, dialog boxes, the code which is invoked by a tool and the like,



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- d. Default.aspx.vb file is the Code-behind page for the Web application. This file contains the VB code that handles the operation of a control within a dialog box. For example, when the user clicks the OK button, the code within this file is executed.

CEDRA Tools Overview

The CEDRA tools developed for ArcGIS Server operate on the premise that the user specifies the current active layer using the [SetActive Layer] tool for which new features are to be added to via the [Add Feature] tool, or from which features will be selected for either deleting or transforming via the [Delete Feature] and [Move Feature] tools, respectively.

The [Select Feature] and [Add to Selected] tools are used to select features, while the [Properties] tool is used to define three editing parameter settings:

1. the type of feature to be created,
2. the type of confirmation to be employed when transforming features and to
3. activate/deactivate point snapping.

Implementing the CEDRA Tools

The steps below incorporate the [Add Feature], [Delete Feature], [Move Feature], [Properties], [Select Feature] and [Add to Selected] tools along with the following tools:

1. [SetActive Layer], 
2. [Identify], 
3. [BufferP], 
4. [BufferF], 
5. [EditFeat], 
6. [Reload], 
7. [MapTips], 

which were discussed in the **August 2009**, **September 2009** and **October 2009** issues of Command of the Month.

In so doing, the user is able to create an ArcGIS Server application that contains

all of the ArcGIS Server based CEDRA custom tools that have been discussed.

Therefore,

1. Copy the following files into the App_Code folder.

```
ActiveLayerPicker.vb
AvenueWraps.vb
CEDRAGEometry.vb
CustomTool.vb
DatAddFeature.vb
DatAddPoint.vb
DatCalcField.vb
DatCalcValue.vb
DatGetDefaultValue.vb
DatLoadAttributes.vb
DatMapTips.vb
DatModAttributes.vb
DatReadFile.vb
DatRemoveDQ.vb
DatStoreFeature.vb
DeleteFeature.vb
MoveFeature.vb
PointBufferTool.vb
PointSnapping.vb
Properties.vb
Utility.vb
```

2. Copy the following files into the Images folder.

```
AVPNTPKK.GIF
DELETE.GIF
MOVE.GIF
PROPS.GIF
AVLAYERS.GIF
IDENTIFY.GIF
BufferP.GIF
BufferF.GIF
DATEDIT1.GIF
DATEDIT2.GIF
MapTip.GIF
SELECT.GIF
SELECT2.GIF
```

Editing the Default.aspx.vb File

The next five steps involve the editing of the Default.aspx.vb file. The text files **a.txt**, **b.txt**, **c.txt** and **d.txt** contain code that will be inserted into specific locations within the Default.aspx.vb file.

3. Modify the Default.aspx.vb file, using Notepad, by inserting the contents of the **a.txt** file below the line:

```
Inherits System.Web.UI.Page
```

This line appears near the very top of the Default.aspx.vb file.

4. Insert the contents of the **b.txt** file above the line:

```
End Sub 'Page_Load
```

This is the last line of the Page_Load subroutine and appears at the top of the Default.aspx.vb file.

5. Insert the contents of the **c.txt** file below the line:

```
End Sub 'Page_Load
```

6. Insert the contents of the **d.txt** file above the line:

```
End Class
```

This is the last line in the Default.aspx.vb file.

7. Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit Notepad.

Editing the Default.aspx File

The next eight steps involve the editing of the Default.aspx file. The text files **e.txt**, **f.txt**, **g.txt**, **h.txt**, **i.txt**, **j.txt** and **k.txt** contain code that will be inserted into specific locations within the Default.aspx file.

8. Insert the contents of the **e.txt** file below the line:

```
</head>
```

This line appears near the very top of the Default.aspx file and above the <body tag. Included in the e.txt file is the <body tag. As such, the user can either:

- (a) delete the second instance of the <body tag or
- (b) modify the second instance of the <body tag by adding the code:

```
onmouseup="stopMoving()"
onload="checkBrowser()"
onkeydown="checkDownKey(event)"
```

before the style= attribute, after which, the first instance of the <body tag (included in the e.txt file) can be deleted. There should not be two <body tags.

9. Insert the contents of the **f.txt** file below the line that begins with:

```
<asp:ScriptManager
ID="ScriptManager1"
```

10. Insert the contents of the **g.txt** file below the line that begins with:

```
<td id="ToolbarCell"
```

11. Insert the contents of the **h.txt** file below the line:

```
<ToolbarItems>
```

Note that this line appears below the <esri:Toolbar ID= line and should not be confused with the comment line that contains the text <ToolbarItems>. That is to say, if a search is being done on the text <ToolbarItems>, use the second search result, not the first.

12. Insert the contents of the **i.txt** file above the line that begins with:

```
<div id="Map_Panel"
```

Included in the i.txt file is the <div id tag. As such, the user can either:

- (a) delete the second instance of the <div id tag or
- (b) modify the second instance of the <div id tag by adding the code:

```
onclick="return Map_Panel onclick()"
onmousemove="return
Map_Panel onmousemove()"
onmouseup="return
Map_Panel onmouseup()"
```

before the > character at the end of the line, after which, the first instance of the <div id tag (included in the i.txt file) can be deleted. There should not be two <div id tags.

13. Insert the contents of the **j.txt** file below the line that begins with:

```
<esri:MapIdentify
ID="MapIdentify1"
```

14. Insert the contents of the **k.txt** file below the line:

```
Sys.Application.add_init(startUp);
```

15. Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit Notepad.

Rebuild the Web Application

The next five steps involve using ArcGIS Server Manager to rebuild the application. After an application has been modified, it is necessary to rebuild the application. As such:

16. Invoke ArcGIS Server Manager and log in.
17. Click on the Applications tab and select the Web Applications menu item. A list of the published Web Applications should appear on the screen.
18. Right-click on the Test4 application and select the Edit menu item from the pop-up menu list.
19. A message box stating that the application has been modified external to Manager will appear. Click the **Yes** button to import the modified Web Application. If all goes well the Edit Web Application dialog box should appear.

If not, an error was detected in the Web Application and a message to that effect will be displayed. At this point exit Manager and check the modifications that were made to the files: Default.aspx and Default.aspx.vb.

20. Click the **Finish** button to rebuild the application. Once the application has been rebuilt it should appear in the Web browser.

Using the Properties Tool

The [Properties] tool enables the user to specify: (a) the type of feature to be created, (b) the type of confirmation to be employed when transforming features and (c) whether point snapping is to be active or not.

To use this tool the user should perform the following:

1. Select the [Properties] tool, .
2. Scroll down in the various drop-down lists and make the desired selections, see Figure 1.
3. Click the OK button to specify the parameter settings, or the Cancel button to abort the operation.

The **Add Feature** parameter offers the following options:

- Point
- Line
- Polyline
- Oval
- Circle

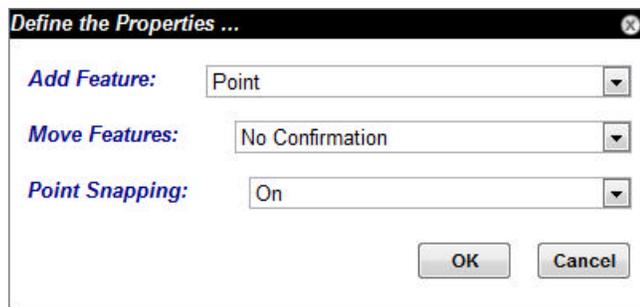


Figure 1 - Properties Tool Dialog Box

Rectangle
Polygon

The Line and Polyline options result in a line feature being created, while the Oval, Circle, Rectangle and Polygon options result in a polygon feature being created. Depending upon the option selected, the mode of feature definition will vary.

In the case of the Point option, the user will make a single click in the map area to define the location of the point.

In the case of the Line option, the user will make a single click in the map area to define the start of the line, after which, the button is held down and dragged to the location of the line's end point.

In the case of the Polyline option, the user will make single clicks in the map area denoting the vertices comprising the polyline, including the start point of the polyline. A double-click is made to denote the end point of the polyline.

In the case of the Oval, Circle and Rectangle options, the user will make a single click in the map area to define the center of the oval or circle, or a corner of the rectangle's diagonal, after which, the button is held down and dragged to the location of a point on the oval or circle's boundary, or the other end point of the rectangle's diagonal.

In the case of the Polygon option, the user will make single clicks in the map area denoting the vertices comprising the polygon, including the start point of the polygon. A double-click is made to denote the termination of the polygon definition.

The **Move Features** parameter offers the following options:

Confirmation
Confirmation with Transformation
No Confirmation

The Confirmation option will result in the [Move Feature] tool displaying a simple Yes/No query regarding the translation of the selected features. The Confirmation with Transformation option results in the

[Move Feature] tool displaying a transformation dialog box when moving selected features, while the No Confirmation option results in the [Move Feature] tool displaying no query.

The **Point Snapping** parameter offers the following options:

Yes
No

The Yes option will result in the [Add Feature] tool employing point snapping when a feature is being defined or moved with the [Move Feature] tool. The No option results in the tools not employing point snapping. Depending upon the performance of the network, enabling point snapping may result in slower performance when creating or moving features.

Using the Add Feature Tool

The [Add Feature] tool operates on the basis that, prior to activating this tool, the user: (a) defines the type of feature to be created and (b) the layer in which the feature is to be added to.

Once the tool has been activated and depending upon the type of feature to be defined, the user makes one or more picks in the map area to establish the geometry of the feature to be created.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the map service and layer from the drop-down lists. The layer that is selected serves as the current active layer.

2. Select the [Properties] tool,  and specify the type of feature to be created using the Add Feature parameter.
3. Select the [Add Feature] tool, .
4. Make the appropriate number of picks in the map area to define the geometry of the feature to be created.
5. Repeat Step 4 or select another tool or command.

Using the Delete Feature Tool

The [Delete Feature] tool enables the user to delete one or more selected features which may reside in different layers but must reside in the same map service. The features that are to be deleted must be selected using the [Select Features] or [Add to Selected] tools.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the appropriate map service and layer from the drop-down lists. The layer that is selected serves as the current active layer.
2. Use the [Select Features] tool,  and/or the [Add to Selected],  tools to select the feature(s) to be deleted.
3. Repeat Steps 1 and/or 2 until all desired features are selected.
4. Select the [Delete Feature] tool, .

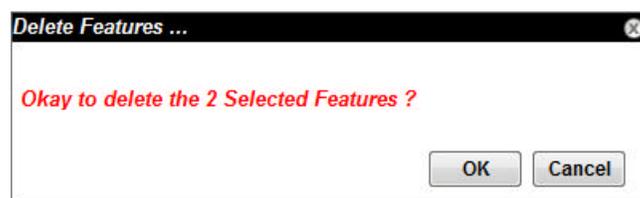


Figure 2 - Delete Feature Tool Confirmation Query Dialog Box



Figure 3 - Move Feature Tool Confirmation Query Dialog Box

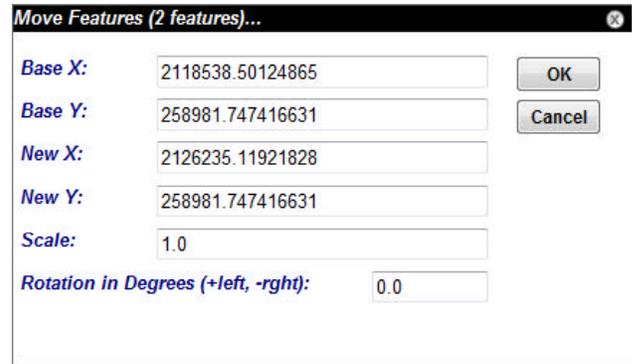


Figure 4 - Move Feature Tool Confirmation with Transformation Query Dialog Box

- Click the OK button to confirm the deletion, or the Cancel button to abort the operation, see Figure 2.

Note, that there is no Undo capability so that once the features are deleted, they can not be retrieved.

Using the Move Feature Tool

The [Move Feature] tool enables the user to move, rotate and/or scale one or more selected features which may reside in different layers but must reside in the same map service. The features that are to be transformed must be selected using the [Select Features] or [Add to Selected] tools.

To use this tool the user should perform the following:

- Select the [Set Active Layer] tool,  and pick the appropriate map service and layer from the drop-down lists. The layer that is selected serves as the current active layer.
- Use the [Select Features] tool,  and/or the [Add to Selected],  tools to select the feature(s) to be transformed.
- Repeat Steps 1 and/or 2 until all desired features are selected.
- Select the [Move Feature] tool, .
- Make a pick in the map area denoting the Base Point.
- Make a pick in the map area denoting the New Point.

Depending upon the mode of operation that has been defined with the Move Features parameter of the [Properties] tool the operation of the tool at this point will vary. As such, under the mode of operation:

No Confirmation

- The features are transformed with no further user interaction.

Confirmation

- Click the OK button to confirm the transformation, or the Cancel button to abort the operation, see Figure 3.

Confirmation with Transformation

- Fill in the appropriate values for the parameters presented in Figure 4. The coordinate values for the Base and New parameters are extracted from the picks made by the user in Steps 5 and 6.
- Click the OK button to confirm the transformation, or the Cancel button to abort the operation.

Using the Select Feature Tool

The [Select Feature] tool enables the user to select one or more features from the current active layer by defining a rectangle in the map area that intersects or encloses the desired feature(s).

When using this tool, the previous selection set for the current active layer is erased and replaced with the selection set found by the current rectangle definition.

To use this tool the user should perform the following:

- Select the [Set Active Layer] tool,  and pick the appropriate map service and layer from the drop-down lists. The layer that is selected serves as the current active layer.
- Make a pick in the map area denoting the corner of an implied rectangle's diagonal. Holding the button down drag the cursor to the other end point of the diagonal at which point release the button.
- Repeat Step 2 or select another tool or command.

Using the Add to Selected Tool

The [Add to Selected] tool enables the user to select one or more features from the current active layer by defining a rectangle in the map area that intersects or encloses the desired feature(s).

The features that are found as a result of this selection are added to the layer's current selection set.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the appropriate map service and layer from the drop-down lists. The layer that is selected serves as the current active layer.
2. Make a pick in the map area denoting the corner of an implied rectangle's diagonal. Holding the button down drag the cursor to the other end point of the diagonal at which point release the button.
3. Repeat Step 2 or select another tool or command.

Therefore, the ability to incorporate custom tools, without having to add staff that is programming knowledgeable, is beneficial. As such, the approach discussed in this month's issue of Command of the Month should be helpful in this regard.

For those who are interested in acquiring the source code for the:

[Add Feature], [Delete Feature],
[Move Feature], [Properties],
[Select Feature], [Add to Selected]

tools, as well as the other tools mentioned in this month's issue, contact: Lisa Stone at lstone@cedra.com.

Notes

- a. Due to the size of the code in the text files **a.txt** through **k.txt** rather than including the text files in this publication, the files are available for download at:

<http://cedra.com/comnov2010/>
- b. The [Identify] tool which was discussed in the **August 2009** issue has been modified to handle multiple map services. Previously, the command only handled one map service in a Web application. The code for this tool appears in the CustomTool.vb file.
- c. The code in the Default.aspx file has been modified to allow the user the ability to drag the dialog boxes. Previously, the dialog box would appear in a fixed location and the user was not able to relocate the dialog box. Now, the user is able to drag a dialog box to a new location by clicking in the title bar area of a dialog box, and while holding the button down, drag the dialog box to a new location where the button is released.

As always, should the reader have any suggestions on functionality that should be featured in Command of the Month, please feel free to forward them on to us.

Summary

As users migrate to Web based applications, the ability to incorporate custom tools becomes more and more important.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.