

# The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

April 2011

FEATURED COMMAND

ArcGIS Server  
Buffering Features



## Application Description

In the September 2009 issue of Command of the Month we discussed buffering either a point or a feature so as to select other features within proximity of the base point or feature.

The buffering about a feature tool, which was discussed in the September issue, pertained to selecting features within the same layer as the feature being buffered. That is, if a feature in layer A was to be buffered, the buffering tool only selected features in layer A.

Obviously, the case of selecting features in a layer other than that of the feature being buffered arises many times.

## The CEDRA Solution

To address this application, The CEDRA Corporation has modified the two custom Buffer tools: [BufferP], , which buffers about a base point, and [BufferF], , which buffers about a base feature. Both tools employ the same code for buffering, so that a change to one effects the other.

Specifically, the [BufferF] tool was modified to allow the user to identify a specific layer to be searched. This layer could be the same layer as the one containing the feature being buffered or it could be a totally different layer.

Additionally, both tools were modified to enable the user the option of specifying whether a report file should be created or not. The report file is an

ASCII based text file containing all of the attributes for the selected features in a comma delineated format. One record for every selected feature appears in the report file with each of the attribute values separated by a comma.

This file can then easily be post-processed by another application. Previously, the report file was always created, the user had no ability to specify whether or not the report file should be created.

## Modifying the Web Application

To incorporate the [BufferP] and [BufferF] tools in an ArcGIS Server application the user will need to copy certain files into specific folders and employ NotePad to modify three existing files (default.aspx, default.aspx.vb and web.config).

### *Command Of The Month bulletin*

*This month's issue discusses the modifications made to the BufferP and BufferF tools for buffering features about a base point or feature in an ArcGIS Server application.*

It should be noted that the CEDRA buffering tools are VB.NET based and as such can only be incorporated into a VB.NET based ArcGIS Server application. A C# version of the tools is currently not available.

## CEDRA Buffer Tools Overview

The custom Buffer tools developed by The CEDRA Corporation operate on the

premise that an active layer must be defined. In the case of the [BufferP] tool, the features which are selected come from the Active Layer, while for the [BufferF] tool, the base feature is selected from the Active Layer. As such, the [Set Active Layer] tool, , must be selected prior to activating either of the Buffer tools. If the Active Layer is not set, an appropriate error message will be displayed.

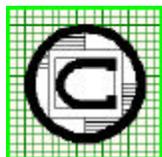
Once the base point or feature has been defined, a multi-input dialog box is presented prompting the user for a buffer distance value. Using this value, the tools determine which feature(s) fall within a buffer polygon that is created about the base point or feature.

In the case of the [BufferF] tool, the user is also prompted for the layer to be searched. A choice list containing the names of all of the layers in the Table of Contents is presented, from which, the user picks the desired layer name.

Both tools present a Yes/No choice list enabling the user to indicate if a report file is to be created or not.

Once the buffering has been completed, the tools will highlight the base point or feature, as well as the selected features and display a graphic denoting the buffer polygon

If a report file was created, the user is presented with a standard Windows download dialog box enabling the user to specify a location and filename for the report file. Depending upon the Web Browser that is being used, the appearance of this dialog box will vary.



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## Implementing the CEDRA Buffer Tools

The following steps describe how the custom Buffer tools can be incorporated into a VB.NET ArcGIS Server Web Application called **Test**.

1. Copy the following files into the App\_Code folder.

```
ActiveLayerPicker.vb
AvenueWraps.vb
PointBufferTool.vb
Utility.vb
```

The `ActiveLayerPicker.vb` file pertains to the [Set Active Layer] tool, while the `PointBufferTool.vb` and `Utility.vb` files pertain to the two buffering tools. The `AvenueWraps.vb` file contains code used by the various files.

2. Copy the following files into the Images folder.

```
AVLAYERS.GIF
BufferP.GIF
BufferF.GIF
```

The above files are the icons for the three tools previously mentioned. As the names indicate, the `avlayers.gif` file is the icon for the [Set Active Layer] tool, the `bufferp.gif` file is the icon for the [BufferP] tool, while the `bufferf.gif` file is the icon for the [BufferF] tool.

3. Modify the `Default.aspx` file, using NotePad, as shown in Code Block A. This involves changing the: **<body** tag.
4. Modify the `Default.aspx` file, using NotePad, as shown in Code Block B. This involves inserting a block of code below the: **<asp:ScriptManager** tag.
5. Modify the `Default.aspx` file, using NotePad, as shown in Code Block C. This involves inserting a block of code below the: **<td** tag.
6. Modify the: **<esri:ToolBar ID="ToolBar1"** tag by changing the `Width` parameter

to be **Width="400px"**. This property controls the width of the toolbar. As tools are added to the toolbar, if the width of the toolbar is not increased, the tools will begin to encroach on each other.

Note, it is possible to control the default active tool on the toolbar via the `CurrentTool` property. For example the default active tool could be changed from `MapPan` to `MapZoomIn`, if so desired. The name that is used in the `CurrentTool` property is derived from the `Name` property that appears within the `<esri:Tool` tag.

7. Modify the `Default.aspx` file, using NotePad, as shown in Code Block D. This involves inserting a block of code below the: **<ToolBarItems>** tag.
8. Modify the `Default.aspx` file, using NotePad, as shown in Code Block E. This involves inserting a block of code below the: **<%-- Map Display --%>** tag.
9. Modify the `Default.aspx` file, using NotePad, as shown in Code Block F. This involves inserting a block of code below the: **<esri:MapIdentify** tag.
10. Modify the `Default.aspx` file, using NotePad, as shown in Code Block G. This involves inserting a block of code below the: **Sys.Application.add\_init(startUp);** statement.
11. Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit NotePad.
12. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block AA. This involves changing the: **Imports** statements at the top of the file. Note that the code shown in Code Block AA is setup for ArcGIS Server Version 10. If Version 9.3 is to be employed, the

9.3 statement which is commented out will need to be un-commented and the 10.0 statement will need to be commented out. By inserting or removing the ' character at the beginning of a statement, the user can create a comment or un-comment a statement.

13. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block BB. This involves inserting a block of code below the: **Inherits System.Web.UI.Page** statement.
14. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block CC. This involves inserting a block of code above the: **End Sub 'Page\_Load** statement.
15. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block DD. This involves inserting a block of code below the: **End Sub 'Page\_Load** statement.
16. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block EE. This involves inserting a block of code above the: **CloseHyperLink.Visible** statement.
17. Modify the `Default.aspx.vb` file, using NotePad, as shown in Code Block FF. This involves inserting a block of code below the: **End Function 'CleanUp** statement.
18. Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit NotePad.
19. Modify the `web.config` file, using NotePad, as shown in Code Block GG. This involves inserting a block of code above the: **</assemblies>** tag.

20. Invoke ArcGIS Server Manager and log in.
  21. Click on the Applications tab and select the Web Applications menu item. A list of the published Web Applications should appear on the screen.
  22. Right-click on the Test application and select the Edit menu item from the pop-up menu list.
  23. 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.
24. Click the **Finish** button to rebuild the application. Once the application has been rebuilt it should appear in the Web browser.



Figure 2  
Set Active Layer Dialog Box with an Active Layer Specified

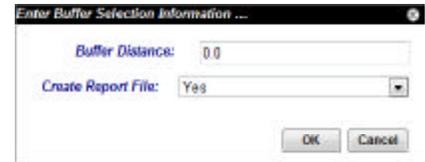


Figure 3  
Buffer Distance Dialog Box

- to define the Active Layer, see Figures 1 and 2.
2. Select the [BufferP] tool, .
3. Make a pick in the map area denoting the center of a circular buffer.

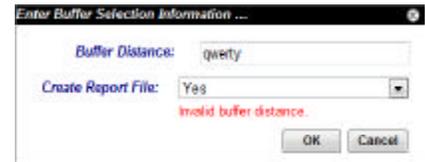


Figure 4  
Invalid Buffer Distance Error Message

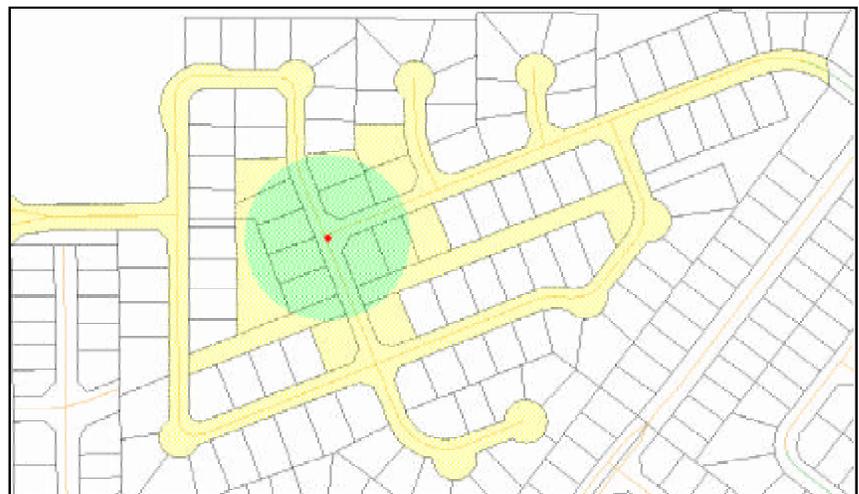


Figure 5 - BufferP Tool Results

### Using the BufferP Tool

This Buffer tool will create a buffer about a point and select the features which intersect a circular buffer polygon. The features which are selected are from the current active layer.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the appropriate service and layer from the drop-down lists

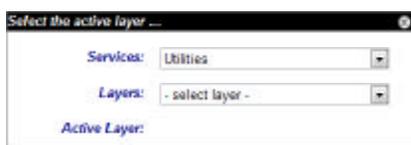


Figure 1  
Set Active Layer Dialog Box with No Active Layer Specified

4. Enter the radius (buffer distance) of the circular buffer, see Figure 3.
5. Select the Yes or No option from the Create Report File drop-down list to indicate if a report file should be created or not and then click the OK button to confirm the entries or the Cancel button to abort the command, see Figure 3.

If the OK button is selected, the tool creates a circular buffer polygon and determines which features in the Active Layer intersect the circular buffer.

If an invalid buffer distance is specified, the error message, shown in red within Figure 4, will appear. At this point another value can be specified after which the OK button can be picked again.

Upon completion of the processing, see Figure 5, the tool:

- a. Highlights the base point or center of the circular buffer,
- b. Displays a graphic representing the circular buffer polygon,
- c. Highlights the selected features and
- d. Displays a dialog box, see Figure 6, which enables the user to down-

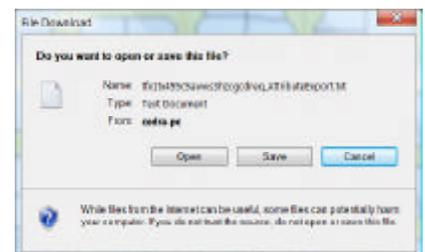


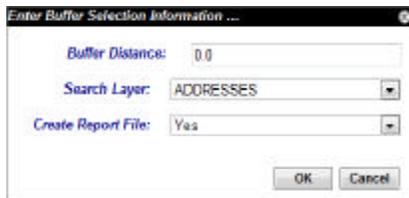
Figure 6  
File Download Dialog Box

```

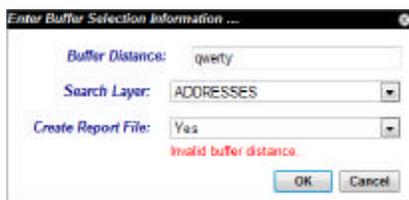
FID,MUNICODE,BLOCK,LOT,QUALIFIER,TAX_MAP,COMMENTS
752,1024,000060002,000240004,00000,1,OLD 00006 0200024 04
753,1024,000060002,000240003,00000,1,OLD 00006 0200024 03
757,1024,000060002,000240002,00000,1,OLD 00006 0200024 02
876,1024,000060002,000240014,00000,1,OLD 00006 0200024 14
878,1024,000060002,000240015,00000,1,OLD 00006 0200024 15
891,1024,000060002,000240017,00000,1,OLD 00006 0200024 17

```

**Figure 7**  
Sample Attribute Text File Created by the Buffer Tools



**Figure 8**  
Buffer Distance Dialog Box



**Figure 9**  
Invalid Buffer Distance  
Error Message

load an ASCII based file that contains the attributes of the selected features in a comma delineated format, see Figure 7.

Depending upon the Web Browser in use, the dialog box shown in Figure 6 will vary. That is to say, each browser displays a different download dialog box.

### Using the BufferF Tool

This Buffer tool will create a buffer about a selected feature and select the features which intersect a buffer polygon which surrounds the selected feature.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the appropriate service and layer from the drop-down

lists to define the Active Layer, see Figures 1 and 2.

2. Select the [BufferF] tool, .
3. Make a pick in the map area such that the base feature can be selected.
4. Enter the buffer distance value, see Figure 8.
5. Select the appropriate layer from the Search Layer drop-down list to indicate the layer that the buffering tool is to search for features which intersect the buffer polygon, see Figure 8.
6. Select the Yes or No option from the Create Report File drop-down list to indicate if a report file should be created or not and then click the OK button to confirm the entries or the Cancel button to abort the command, see Figure 8.

If the OK button is selected, the tool creates a buffer about the selected feature and determines which features in the current active layer intersect the buffer polygon.

If an invalid buffer distance is specified, the error message, shown in red within Figure 9, will appear. At this point another value can be specified after which the OK button can be picked again.

Upon completion of the processing, see Figure 10, the tool:

- a. Highlights the base feature be it a point, line or polygon,
- b. Displays a graphic representing the buffer polygon,
- c. Highlights the selected features and
- d. Displays a dialog box, see Figure 6, which enables the user to download an ASCII based file that contains the attributes of the selected features in a comma delineated format, see Figure 7.

Depending upon the Web Browser in use, the dialog box shown in Figure 6 will vary. That is to say, each browser displays a different download dialog box.



**Figure 10 - BufferF Tool Results**

**Notes**

- a. The base feature that is selected by the [BufferF] tool will be a feature that resides in the Active Layer.
- b. The file CodeBlocks.txt at the link below:  
<http://cedra.com/comapr2011/> contains the code blocks referenced in this publication. That is, code blocks A through G and AA through GG.
- c. At the link below:  
<http://cedra.com/comapr2011/> the files default.aspx, default.aspx.vb and web.config which were used for this publication can be found. These files can be used for reference purposes to review how the modifications appear in an actual ArcGIS Server application. Note that these files are ArcGIS Server Version 10 specific.
- d. At the link below:  
<http://cedra.com/comapr2011/> the folders App\_Code and Images contain the files referenced in this publication. That is, the VB.NET code and .GIF image files.
- e. At the link below:  
<http://cedra.com/comapr2011/> the folder Output is the temporary folder where the report file is written to. The session variable RFpath which is defined in the default.aspx.vb file contains the full pathname for where the report file is to be written to. A different location can easily be specified by the developer.

**Summary**

As users migrate to Web based applications, the ability to incorporate custom tools becomes more and more important. 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 [BufferP] and [BufferF] tools, as well as code blocks A through G and AA through GG, should visit the following site:

<http://cedra.com/comapr2011/>

The code is offered on an "As Is" basis with no support or warranty of use. Should assistance be desired in implementing the tools please contact: Lisa Stone of The CEDRA Corporation by phone or via e-mail at [lstone@cedra.com](mailto:lstone@cedra.com).

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.

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