

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

February 2010

FEATURED COMMAND
Offset Line between
Two Lines



Application Description

Recently an application arose where it was desired to create a line between two existing lines. In this specific case, the two lines represented the banks of a river while the desired line was to denote the centerline of the river.

Unlike a street centerline which is generally parallel to a right-of-way, the banks of a river are rarely parallel. As such, to manually establish a river centerline, or any other offset line from two nonparallel lines, requires a number of trial and errors with each trial involving a number of geometric computations.

Therefore, an automated solution was needed that enabled the user to create an offset line from two nonparallel lines in an interactive environment.

The CEDRA Solution

To address this issue, the [PARL 2LN] tool was added to the CEDRA-Offset-Tools toolbar shown in Figure 1. This new tool is the right-most tool in the CEDRA-Offset-Tools toolbar. Note that this tool has been added within the last few weeks.

Offset from 2 Lines Tool Overview

The [PARL 2LN] tool, , enables the user to create a polyline feature that is offset from two existing line features. The existing line features can be two-point and/or polyline line features and do not have to be parallel.



Figure 1
CEDRA-Offset-Tools Toolbar

In using this tool, the user selects two line features. The first line feature selected will control the positioning of the offset line. Since the existing lines can be nonparallel, the user, rather than specifying an offset value, specifies an offset percent. The zero offset is a point on the first selected line.

Command Of The Month bulletin

This month's issue discusses how to create a polyline that is offset between two existing line/polyline features.

Shown in Figure 2 is an illustration of how the offset value is applied. In Figure 2, the right-most line, Line 1, is selected first. The left-most line, Line 2 is selected second.

The offset line, shown in blue within Figure 2, is created by establishing imaginary points along Lines 1 and 2, after which, an imaginary interpolated point is computed between the points on Lines 1 and 2, using the Line 1 point as the base point and a percent offset. The imaginary interpolated points are then connected to form the resultant offset line.

In Figure 2, the green points represent the imaginary points along Lines 1 and

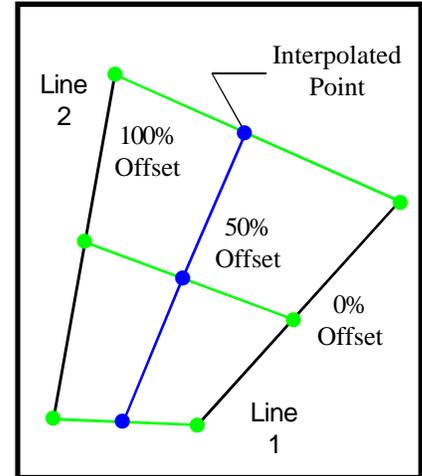


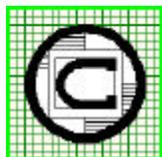
Figure 2
Line Offset from Two Lines

2. The green lines represent the lines that connect the points on Lines 1 and 2. The blue points denote the imaginary interpolated points between the Line 1 and 2 green points. As mentioned previously, the blue line denotes the resultant offset line. As can be seen in Figure 2, a 50% offset results in a point that is halfway between the Line 1 and 2 points. A 25% offset would result in a point being closer to Line 1, while a 75% offset would place the point closer to the Line 2 feature.

In establishing the points along Line 1, the user can specify:

- the number of segments, or
- a segment length.

If a number of segments is specified, the number of points created will be one higher than the number of segments. If a segment length is specified, the tool will determine the number of points that should be created.



The CEDRA Corporation

**Total CADD for Engineers™
Bridging Engineering and GIS™**

Phone: 585-232-6998
Fax: 585-262-2042

151 Sully's Trail - Suite 6
Pittsford, New York 14534

E-mail: cedra@cedra.com
URL: <http://www.cedra.com>

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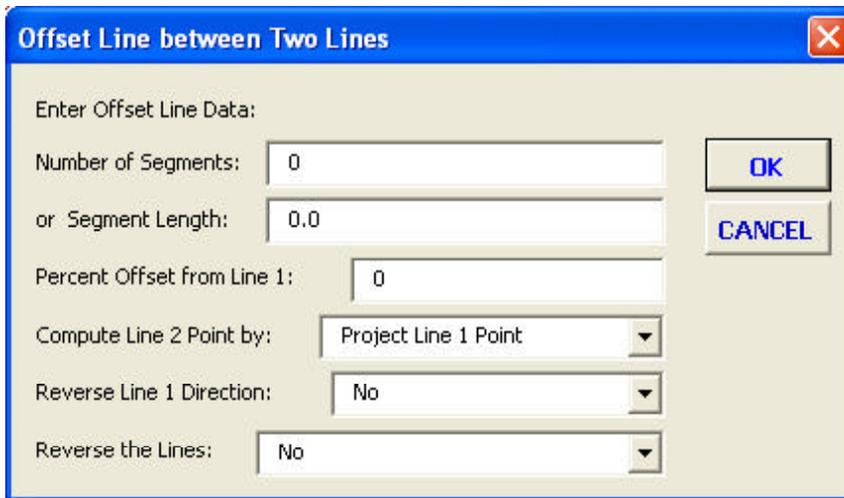


Figure 3
Offset Line between Two Lines Multi-Input Dialog Box

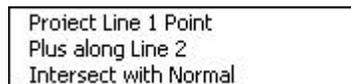


Figure 4
Available Computation Modes

The points along Line 2 can be established using one of three modes of computation. Depending upon the geometry of the selected lines and the mode of computation selected, the resultant offset line will vary in appearance due to the location of the Line 2 points.

In addition to controlling how the imaginary points are established along Lines 1 and 2, as well as the percent offset, the user has the ability to flip or reverse the direction of the first selected line, as well as the order of the selected lines. The direction of the Line 1 feature, as well as the order of the selected features will also effect the resultant offset line.

Offset from 2 Lines Tool Operation

- 1 **Select** the [PARL 2LN] tool, .
- 2 **Make a pick** in the map area to select the Line 1 feature. The traditional feature confirmation query dialog box will appear. **Confirm or reject** the feature that was found.

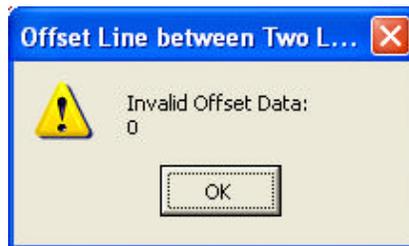


Figure 5
Invalid Data Error Message

- 3 **Make a pick** in the map area to select the Line 2 feature. The traditional feature confirmation query dialog box will appear. **Confirm or reject** the feature that was found.
- 4 **Enter** the appropriate information for the various parameters shown in Figure 3.

In specifying the information requested by the parameters shown in Figure 3, the user should note the following:

- The *Number of Segments*: parameter enables the user to specify the number of segments that are to be computed along Line 1. Note that the number of points that are created will be 1 higher than the number of segments. For example, if the user specifies 5 segments, the tool will actually create 6

imaginary points along Line 1. Furthermore, the imaginary points that are created are not stored as point features and are used only for the internal calculations performed by the tool.

- The *Segment Length*: parameter enables the user to specify the length of a segment along Line 1. Rather than specifying the number of segments, the user has the option to specify the length of a segment. This value is specified in world units. The tool will then determine how many imaginary points along Line 1 should be established.

- The *Percent Offset from Line 1*: parameter denotes the percent offset from the Line 1 feature, see Figure 2. This should be a value between 0 and 100.

- The *Compute Line 2 Point by*: parameter enables the user to control the mode of computation used in establishing the imaginary points along the Line 2 feature.

- The *Reverse Line 1*: parameter enables the user to specify whether or not the direction of the Line 1 feature is to be reversed. For example, if the Line 1 feature proceeds in a North-South direction, selecting the Yes option for this parameter would result in the tool treating the Line 1 feature as if it proceeded in a South-North direction.

- The *Reverse the Lines*: parameter enables the user to specify whether or not the order of the selected lines is to be reversed. That is, Line 1 should be Line 2, and Line 2 should be Line 1. In so doing, the user is able to try different scenarios without having to deactivate and then reactivate the tool, selecting the features in a reverse order.

- **5** Click at the **OK** button to begin the processing,
or
click at the **Cancel** button to abort the command.

If the OK button is selected, the command will first verify that the data was properly entered. If an invalid value was specified, an appropriate error message will be displayed, see Figure 5. At this point, review the error message, click the OK button, after which, the multi-input dialog box shown in Figure 3 will reappear. The user can now enter the appropriate information to correct the error.

Once the entered data has been verified, the tool will begin its computations and display the result, see Figure 6

The blue lines shown in Figure 6 are the imaginary lines that connect the Line 1 and 2 points. The red line is the offset line that connects the interpolated points between the Line 1 and 2 points.

- **6** Click at the **Yes** button to convert the red line into a polyline feature,
or
click at the **No** button to reject the offset line.

If the Yes button is selected, a polyline feature is created and stored in the current active layer.

After the user selects the Yes or No button, the multi-input dialog box shown in Figure 3 will reappear. The user can now create another offset line or specify different values to obtain a different solution.

- **7** Enter the appropriate information for the various parameters shown in Figure 3 and click the **OK** button to create another offset line, or click the **Cancel** button to abort the command.

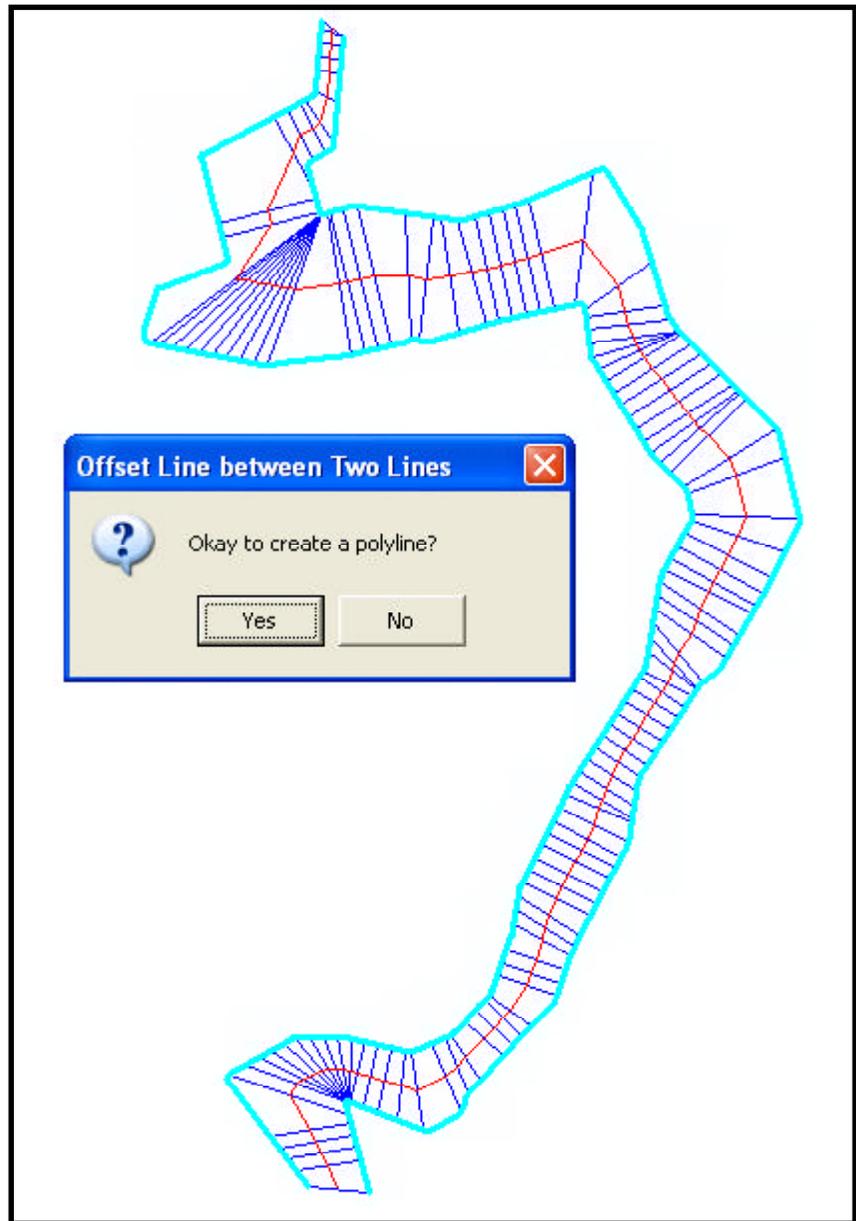


Figure 6
Display of Proposed Solution and Confirmation Query

Notes

- a. The user specifies either the number of segments or the segment length, see Figure 3, not both.
- b. Selecting the Yes option for the *Reverse Line 1*: parameter does not alter the shape or geometry of the Line 1 feature.
- c. A nonzero value must be entered for the *Percent Offset from Line 1*: parameter.
- d. The Project Line 1 Point option for establishing the Line 2 imaginary points results in the tool projecting the midpoint of a segment within Line 1 onto Line 2, see Figure 7(a).
- e. The Plus along Line 2 option denotes that the Line 2 imaginary points are to be established using the same method to establish the Line 1 imaginary points, see Figure 7(b).
- f. The Intersect with Normal option results in the tool creating a normal

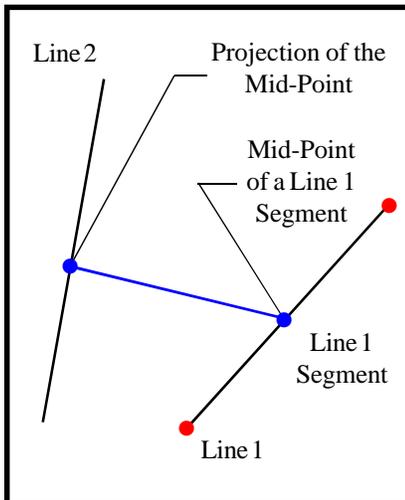


Figure 7(a)
Project Line 1 Point Option

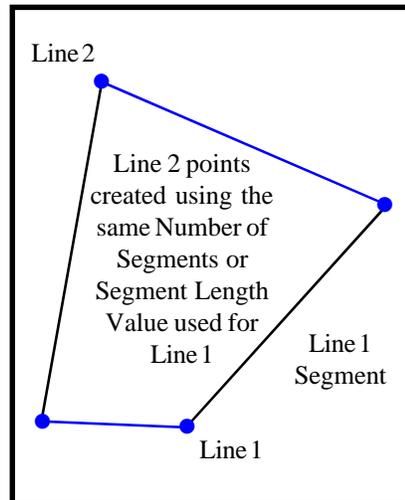


Figure 7(b)
Plus along Line 2 Option

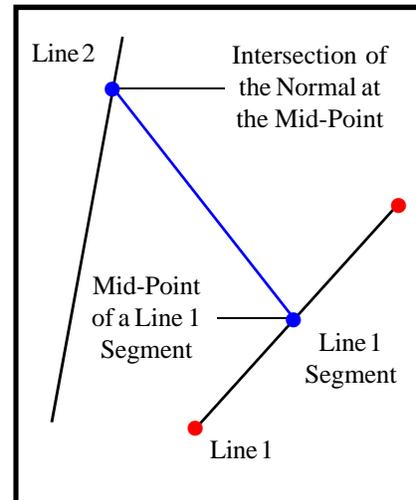


Figure 7(c)
Intersect with Normal Option

line at a segment within Line 1 and intersecting this normal line with Line 2 to create the imaginary Line 2 point, see Figure 7(c).

Summary

Those who have dealt with creating river centerlines or who have a need to create an offset line from two nonparallel lines will find the [PARL 2LN] tool a great help in creating an offset line. Its interactive mode of operation enables the user to try a number of different scenarios easily and quickly.

Users with a software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new file format.

As always, users who have a need for functionality that is not presently available in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestion you may have.

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