

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

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FEATURED COMMAND

Gridding or Subdividing
a Quadrilateral (Polygon)



Application Description

Not that long ago we were asked if we had a tool that subdivided or split a polygon feature into a number of rows or columns. We were pleased to say, yes, yes we do! In fact, we have a couple of tools that can perform this task.

For those involved with quarter-quarter sections or Aliquot parts the task of locating a parcel, which is specified in terms of an Aliquot description, can sometimes be challenging. Especially when you see a description such as:

SESWSW in Section 1, and SWSES2 in Section 1, and NWNEE2 in Section 12, and NENWNW in Section 12, and NWNENEE2 in Section 12.

Initially, we thought the [Aliquot Polygon] command within the {CEDRA-Aliquot-Tools} toolbar was the solution. However, as we asked a few more questions, we realized that what was actually desired was to take a polygon and divide it up into either rows or columns using a vertical or horizontal split line.

The CEDRA Solution

To address the application described above, the CEDRA-Polygon-Tools-2 toolbar, see Figure 1, can be employed. As can be seen from the figure, the toolbar offers six tools providing various types of functionality.

The last tool in the toolbar, **Perform a Topological Operation** tool,  was discussed in the July 2005 issue of Command of the Month. This month we will



Figure 1
CEDRA-Polygon-Tools-2 Toolbar

be discussing the fourth tool from the left, or more specifically, the **Grid-A-Quadrilateral** tool . Although, this tool is not used a lot, it does offer the exact functionality that is needed to address this application.

Grid-A-Quadrilateral - Overview

The **Grid-A-Quadrilateral** tool enables the user to select one or more polygon or polyline features, which form a closed figure, and divide them into a user specified number of columns and rows. The result of which, is a number of cells or grids within the boundary of the feature(s).

Command Of The Month bulletin

This month's issue discusses the tool for subdividing or splitting a quadrilateral feature into a certain number of rows and columns.

There is no limit to the number of cells that can be created. If only rows are desired then the number of columns specified by the user should be 1. Likewise, if only columns are desired, the number of rows should be 1.

Additionally, the user has the option of

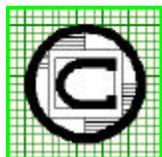
creating, for each of the selected features, any or all of the following:

- two-point line features that delineate the columns and rows,
- point features at the intersection of each column and row delimiter,
- polyline features, each forming a closed figure circumscribing each cell defined by the specified columns and rows, and/or
- polygon features, which circumscribe each cell.

If more than one feature has been selected for processing, the features do not need to be located in the same layer. The features to be processed can reside in various active visible layers. Note that as a result of the processing by this tool, the selected feature or features are not altered. The new features which are created are stored in the current active layer. The [Set Active Layer] command can be used to control the current active layer.

Although this tool may be used on most any polygon or closed polyline, its intended use is to divide a section, as per the US Department of the Interior Bureau of Land Management (BLM), into aliquots. As such, it is assumed that the feature to be so divided would look fairly much like a BLM section, that is, a four-sided figure (quadrilateral). Regarding aliquots, reference is made to the August 2007 and July 2008 issues of Command of the Month.

In dividing a quadrilateral, the program can operate in one of two modes. The **first** divides each of the two sides that



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lie fairly much in a west to east direction into the number of user specified columns, and each of the other two sides that lie fairly much in a south to north direction into the number of user specified rows. The corresponding points are then joined to create the user specified cell or grid.

The **second** mode enables the user to divide a polygon feature or a polyline feature which forms a closed figure using purely horizontal and vertical lines to create the appropriate number of rows and columns. This mode of operation differs from the first mode in that the first mode honors the direction of the south-north and west-east sides of the feature being subdivided, while the second mode use purely horizontal and vertical split lines, thereby ignoring the slopes of the four sides.

The selection of the feature or features, to be processed, may be made before, or after the activation of the subject tool. However, if the features to be processed are not contiguous, that is to say, they can not be selected by clicking and dragging the mouse to select the features in one operation. The features, in this case, must be selected prior to the activation of said tool. Note that, even if the features are continuous, or if only one feature is to be divided, the selection can still be made prior to the activation of said tool, if so desired.

Grid-A-Quadrilateral - Operation

To use the Grid-A-Quadrilateral tool , the user should:

- **1** Click in the Table of Contents at each of the layers that contains a feature to be subdivided. Features not residing in a visible active layer are not processed.
- **2** Use conventional ArcMap functionality, or the  *Select Features from Active Layers* tool to select the feature or features. This step may be omitted if only one

feature, or if contiguous features are to be selected.

- **3** Click at the Grid-A-Quadrilateral tool  at which point a message in the status bar area will appear.

Note that if a feature or features:

- **Have been selected** in Step 2 above, the standard feature selection confirmation dialog box is displayed, in which case **branch to Step 5** below.
- **Have not been selected** in Step 2 above, continue with the next step.
- **4** Click at the feature to be subdivided,

or **click and drag** the mouse to form a rectangle that encompasses at least a part of each feature to be subdivided, and when the selection has been completed, **release the mouse**.

After the feature selection has been made:

- The conventional CEDRA feature selection confirmation query box is displayed (provided a feature has been found), in which case branch to **Step 5**. The same occurs when more than one feature has been selected.
- In the case where no feature can be found, the program displays the message prompting the user to select a feature for processing, at which point, repeat **this step**.

- **5** **Confirm, or not** the selection by selecting the appropriate button.

Having confirmed the selection, by selecting the Yes button, and if a valid polygon, or polyline feature:

- **Has not** been selected (that is the selected feature is not a proper polygon or polyline), a warning message is displayed informing the user of the fact, in which case click at the *OK* button to acknowledge, and then repeat the above process from **Step 4**.
- **Has** been selected, the multi-input dialog box of Figure 2 is displayed.

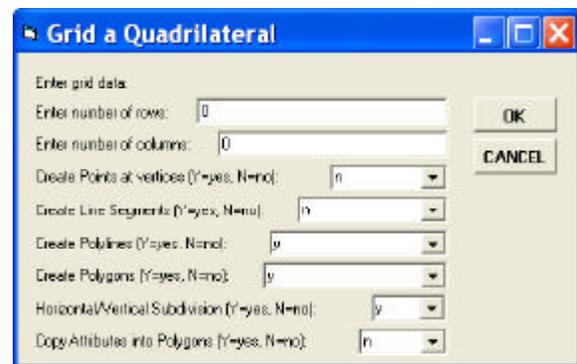


Figure 2
Grid a Quadrilateral Dialog Box

- **6** Enter in the *Enter number of rows:* data field the number of rows to be generated.
- **7** Enter in the *Enter number of columns:* data field the number of columns to be generated.
- **8** Scroll down in the *Create Points at vertices (Y=yes, N=no):* data field, and **select**:
 - The **Yes** option to create point features at the intersection of each column with each row (see Figure 3), or
 - The **No** option to not do so.

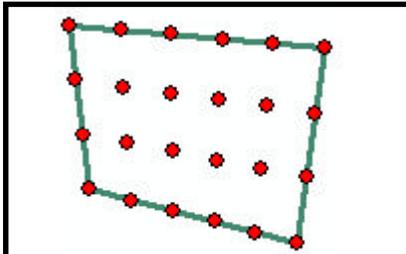


Figure 3
Quadrilateral Subdivided with the Create Point at Vertices Option Set to Yes

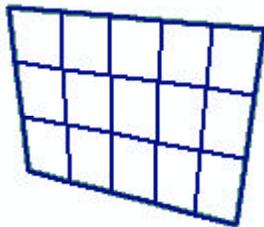


Figure 4
Quadrilateral Subdivided with the Create Line Segments Option Set to Yes

- **9** Scroll down in the *Create Line Segments (Y=yes, N=No)*: data field, and **select**:
 - The **Yes** option to create line features delineating the columns and rows (see Figure 4), or
 - The **No** option to not do so.

- **10** Scroll down in the *Create Polylines (Y=yes, N=No)*: data field, and **select** the:
 - **Yes** option to create polyline features circumscribing each

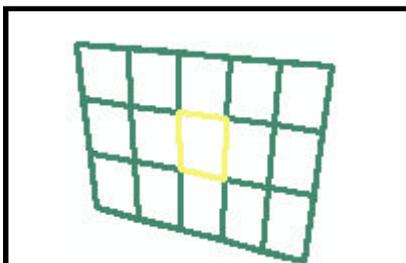


Figure 5
Quadrilateral Subdivided with the Create Polylines Option Set to Yes

- cell created by the columns and rows (see Figure 5), or
- **No** option to not do so.

- **11** Scroll down in the *Create Polygons (Y=yes, N=No)*: data field, and **select** the:
 - **Yes** option to create polygon features circumscribing each cell created by the columns and rows (see Figure 6), or
 - **No** option to not do so.

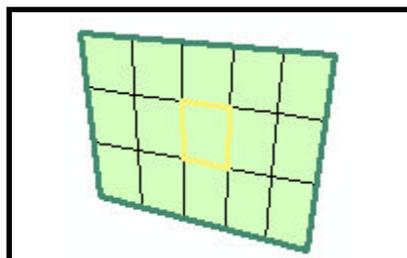


Figure 6
Quadrilateral Subdivided with the Create Polygons Option Set to Yes

- **12** Scroll down in the *Horizontal/Vertical Subdivision (Y=yes, N=No)*: data field, and **select** the:
 - **Yes** option to create the above specified features by:
 - (a) creating an imaginary enclosing quadrilateral polygon passing through the most extreme north, south, east and west vertices of the base polygon feature, and then
 - (b) dividing the vertical sides of the enclosing polygon into the number of specified rows, and then the horizontal lines into the number of specified columns (see Figure 7, in which a four and a five sided polygon have been divided into 3x3 grids. Note the location of the possible point, line and polygon features that may be created),

- or
- **No** option to not do so. Selection of this option denotes that the first mode of subdividing is desired.
- **13** Scroll down in the *Copy Attributes into Polygons (Y=yes, N=No)*: data field, and **select** the:
 - **Yes** option to copy all attributes of the parent feature (the polygon or polyline being subdivided) into all of its children polygons (the new polygons that are being created as a result of the polygon subdivision by this command).
 - **No** option to introduce in the new polygons only the standard CEDRA-AVcad polygon attributes.
- **14** Click at the **OK** button to grid the quadrilateral(s) per the above specifications, or click at the **Cancel** button to abort the command.

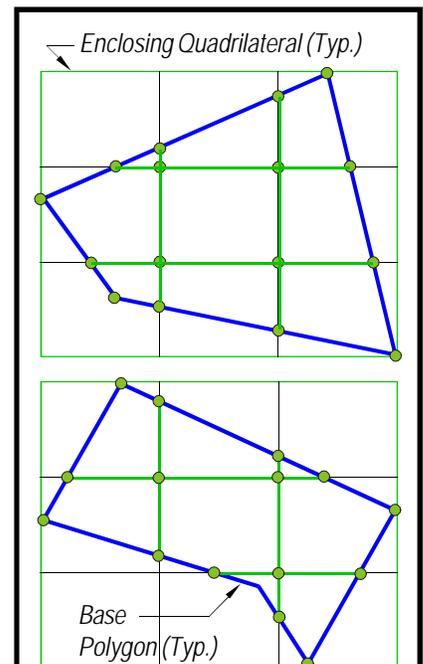


Figure 7
Four & Five Sided Polygons Divided Into a 3x3 Grid

Once the processing is complete, the new features are stored in the current active layer. The command remains active, so that, additional features can be selected for processing. To deactivate the command, simply select another command.

Notes

- a.** In the above option selection steps (8 through 11) the user may set to **Yes** more than one of the available options. That is to say, the user is able to create Points, Line Segments, Polylines and/or Polygons, all, or in any combination, in one operation, if so desired.

- b.** By selecting the **Yes** option in response to the *Horizontal/Vertical Subdivision (Y=yes, N=No)*: data field, the user is informing the command that the split lines are to be purely horizontal and vertical, see Figure 7. This pertains to the second mode of subdividing a feature, as described in the **Overview** section of this publication.

Selecting the **No** option denotes to the command that only four sided features can be processed and that the split lines will honor the slope or direction of the north-south and east-west sides, see Figure 3. When processing features containing more than four sides using the No option for this data field will yield undesirable results.

- c.** Once the user has subdivided a feature, the next time the command is invoked the default values, which are displayed, will be those that were last specified by the user.
- d.** By selecting the **Yes** option in response to the *Copy Attributes into Polygons (Y=yes, N=No)*: data field, the user is informing the command that any new polygon features that are created should contain the same attribute values as the source feature being subdivided. If

no new polygons are to be created, then the setting of this parameter has no effect upon the operation of the command.

Summary

Note that the last two parameters in the multi-input dialog box of Figure 2, which control the ability to subdivide a feature using purely horizontal and vertical lines, as well as, the ability to copy the attributes of the source features, have been recently added and 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 functionality.

As indicated at the outset of this publication, the addition of these new parameters was spurred by a request from a new user who needed this functionality. CEDRA users who have made requests for software modifications and/or improvements, know that CEDRA does it best in being responsive in implementing their requests in a timely manner.

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.