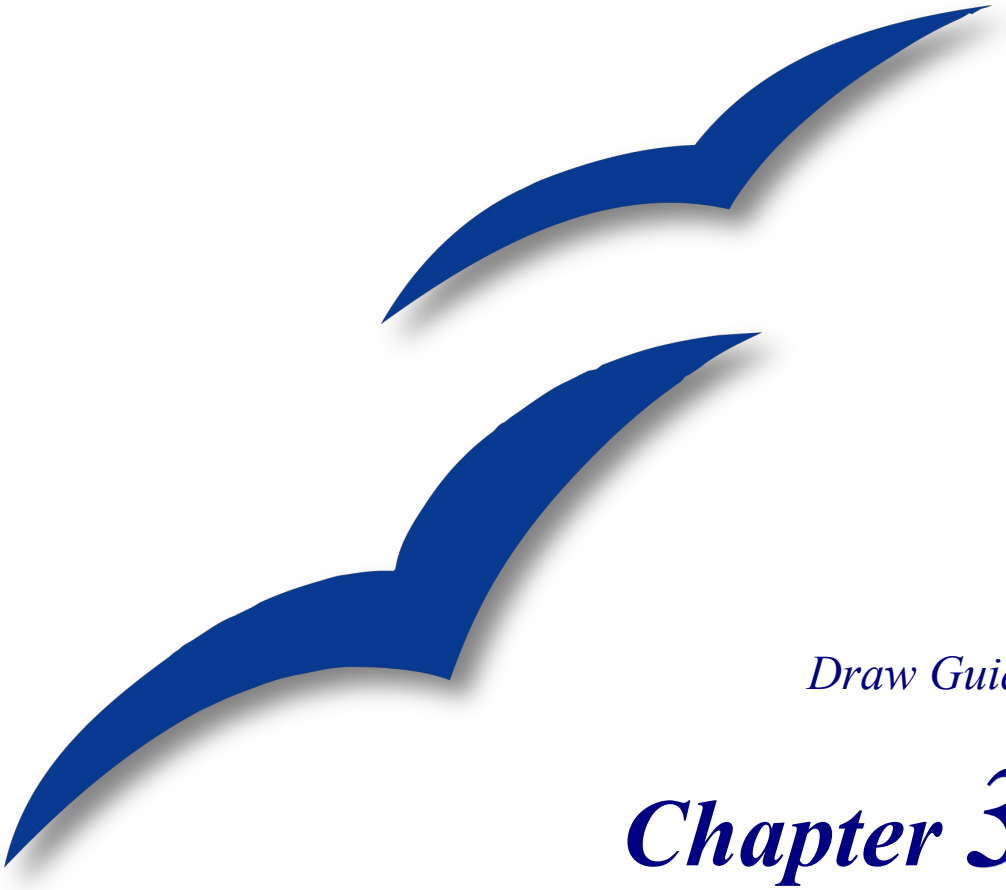

Draw Guide

Chapter 3
Working with Objects and Object Points

OpenOffice.org

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Contents

Copyright....i
Authors....i
Feedback....i
Acknowledgments....i
Publication date and software version....i
Introduction....1
Selection modes....1
Changing the selection mode....2
Selecting objects....2
Direct selection....2
Selection by framing....2
Selecting hidden objects....3
Arranging objects....3
Selecting several objects....3
Moving and dynamically adjusting an object’s size....4
Dynamic movement of objects....4
Dynamic size modification of objects....4
Dynamic size modification of objects with the help of the Status Bar....5
Modifying an arc....6
Rotating and shearing an object....6
Changing with the mouse....6
Changing inclination or perspective....7
Setting size and position exactly....8
Position and Size....8
Rotating objects....9
Slant and corner radius....9
Editing object points....10
An alternative way to change the form of basic shapes....11
How curves work....11
The Edit Points toolbar....12
The three kinds of tangent....12

Examples.....13

Introduction

This chapter looks at the tools and functions that let you modify existing drawings. All of the functions apply to the selected object or group of objects. The selected object or group can be distinguished from others by small colored squares or circles located around the object (this is also true when several objects are selected simultaneously). These points are called *handles*.

The handles form a rectangular frame that is just big enough to contain the object. Where several objects are selected, the frame around them corresponds to the smallest rectangle that can contain all of the objects. This frame is called the *selection rectangle*.

If the Options bar is displayed (select **View > Toolbars > Options** to turn it on, if it is not displayed), you can change the size of the handles using two buttons: **Simple Handles** shows the handles as flat squares, and **Large Handles** shows the handles in a larger size. You can combine the effects obtained by pressing on both buttons and thus have large handles having a 3D shape or small handles having no 3D shape, whichever suits your needs or preferences. The figure below shows the location of the handles and other buttons.

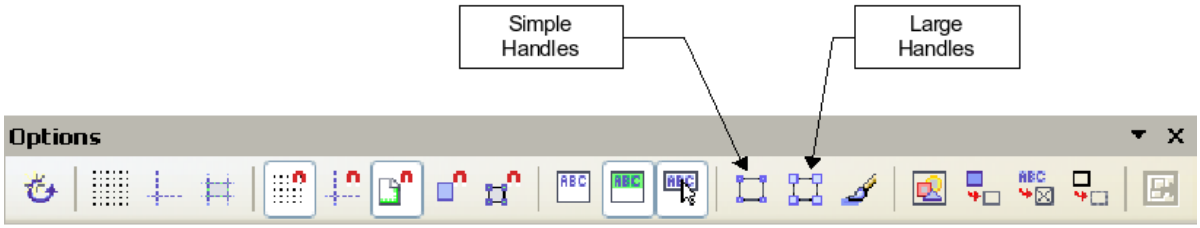


Figure 1: Location of handles on the Options toolbar

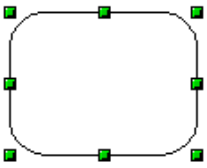
Selection modes

There are three selection modes:

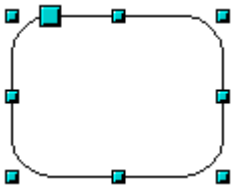
1) Moving and changing size
2) Editing
3) Rotating points

To set the default mode (1 or 2) for selecting objects, click on the **Points** button on the **Drawing** toolbar.

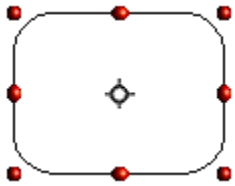
In standard mode (when you begin a new drawing), the **Points** button is not active, and the default mode is for selections to be moved or changed in size; these selections are indicated by small green squares.



When the **Points** button is active, the default mode is for selections to be edited; these selections are indicated by blue squares. Some objects will have one or more extra handles, which are larger or colored differently. This is explained in more detail in “Editing object points” on page 10.



Selections for rotating objects are indicated by small red circles and a symbol representing the center of rotation. To choose these selections, click on the **Effects** drop-down button from the **Drawing** toolbar and after that on the object.



Changing the selection mode

To go from one mode to another, you can do one of the following:

Choose the **Points** button from the **Drawing** toolbar to switch from simple selection mode to Points mode. You can also use the keyboard shortcut *F8* (Points).[1]

Choose the **Effects** drop-down button from the **Drawing** Toolbar to activate the Rotation mode for a selected object. To exit Rotation mode, click on the **Selection** icon.

If you often work in Rotation mode, you can choose the **Rotation Mode after Clicking Object** button from the **Options** bar and cycle through normal and rotation modes just by clicking on the object. This can be more convenient than repeatedly clicking the selected object, then clicking the **Rotate** button from the **Drawing** toolbar.

Selecting objects

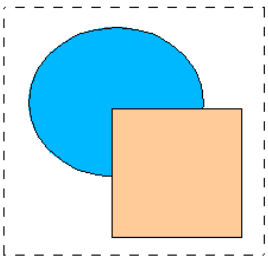
Direct selection

To select an object, the easiest way is to click directly on it. For objects that are not filled, you have to click directly on the object's outline to select it.

Selection by framing

You can select several objects at once by using the mouse to drag a large rectangle around the objects with the **Select** button, as shown. For this to work, the icon on the Drawing toolbar must be active.

Only objects that lie entirely within the rectangle will be selected.



1 This mode is described in more detail later in this chapter.

Selecting hidden objects

Even if objects are located behind others and not visible, they can still be selected. To select an object that is covered by another object, hold down the *Alt* key and click the object. To select an object that is covered by several objects, hold down the *Alt* key and click through the objects until you reach the required underlying object. To cycle through the objects in reverse order, hold down the *Alt*+*Shift* keys when you click. To help in making accurate selections, you can check the number and type of the selected objects, shown at the left of the status bar.

Note There may be some variation in the use of the *Alt* key on different operating systems. In general the *Alt* key on a Windows computer functions as described above, but on a Linux system it usually does not. If the *Alt* key on your system does not operate as described above, use the *Tab* key method described below.

To select an object that is covered by another object using the keyboard, use the *Tab* key to cycle through the objects, stopping at the object you wish to select. To cycle through the objects in reverse order, press *Shift*+*Tab*. This is a very quick way to reach the object you want, but it may not be practical if you have a large number of objects in your drawing.

When you click on the selected object, its outline will appear briefly through the objects on top of the selected object.

In the illustration below, the square located beneath the circle was selected in this way (the circle was made semi-transparent in order to see the square).

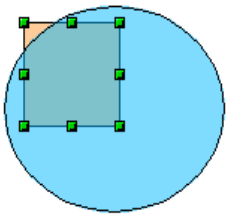


Figure 2: Selecting a covered object

Arranging objects

In a complex drawing, you may have objects stacked up, one on top of the other, with the result that a particular object is hidden by one or more other objects above it. You can rearrange the stacking order of objects (move an object to the front or to the back of the stack) by selecting the object, clicking **Modify > Arrange** and selecting the appropriate **Bring Forward** or **Send Backward** option, or by right-clicking the object and selecting **Arrange** from the context menu, then selecting from the list of **Bring Forward** or **Send Backward** options.

On the Drawing toolbar, the Arrange tear-off menu on the button contains the above options. A keyboard shortcut is *Shift*+*Ctrl*++ to bring an object to the top, and *Shift*+*Ctrl*+− to send an object to the bottom.

An exception to the above is an object which is located on the Controls layer. Such objects always lie above all other objects and are located within a separate stack on the Controls layer.

Selecting several objects

To select or deselect several objects one by one, hold down the *Shift* key and click on the various objects to be selected or deselected. One click on an object selects it; a second click deselects it.

Moving and dynamically adjusting an object's size

There are several ways of moving or changing the size of an object. The method described here is called *dynamic*—in the sense that it is carried out using the mouse.

When you dynamically change an object, remember to check the right-hand area of the Status Bar at the bottom of your screen. This shows detailed information about the ongoing manipulation. For example, during a resizing manipulation, the following information is displayed.

The Information field (not shown in Figure 3) shows which object is selected; the (current) position —X/Y coordinates, and object dimensions —width x height, of the object being moved are shown. The information displayed changes as the mouse is moved. The units of measurement displayed are those selected under **Tools > Options > OpenOffice.org Draw > General**.

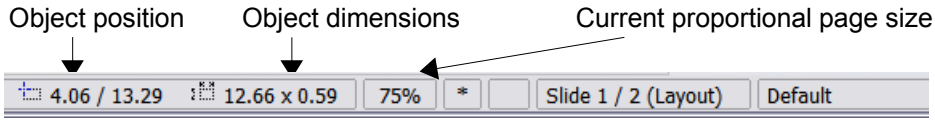


Figure 3: Status Bar during dynamic adjustment

Dynamic movement of objects

To move an object, select it and then click within the object's border and hold down the left mouse button while moving the mouse. During movement, the shape of the object appears as dotted lines to help with repositioning.

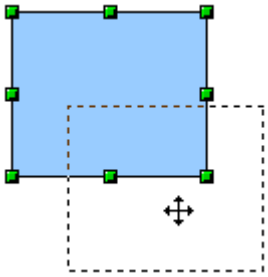


Figure 4: Moving an object

To drop the object at its new location, release the mouse button. The new position appears immediately in the Status Bar.

Dynamic size modification of objects

To change the size of a selected object (or a group of selected objects) with the mouse, you need to move one of the handles located around the selection. As shown in the following illustration, the outline of the resulting new object appears as a dotted line while the mouse button is pressed.

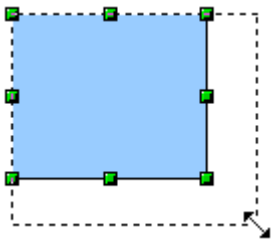


Figure 5: Changing the size of a selected object

The results will differ depending on which handle you use. If you choose a corner handle (as shown in the figure above), you will resize the object along two axes at the same time. If you use a side handle, the objects will only be resized along one axis. The new size will appear immediately in the Status Bar.

Note If you press the *Shift* key at the same time as you carry out the resizing operation, the increase or decrease in size will be carried out symmetrically with respect to the two axes, which enables you to keep the same height/length aspect ratio of the object.

Dynamic size modification of objects with the help of the Status Bar

If you select an object and modify it using the mouse, the changes are immediately reflected in the Information field of the Status Bar. With geometric *shapes* (such as Basic Shapes, Symbol Shapes, Block Arrows), the only information shown in the Status Bar is that the shape is being resized, as shown in the top-left image in Figure 6. With geometric *elements* (rectangles, circles, and so on), the changes to the attributes of the element (either relative or absolute) are also shown, as in the top-right image in Figure 6.

In the case of a rectangle, the relative percentage of the x and y dimensions of the original shape are shown. For a line, much more information is given: the absolute change in x,y coordinates of the end point being moved, together with the current length and bearing of the modified line. These are all given in the Status Bar and updated dynamically as the end point is moved (see Figure 6).

This information can be very useful. It is the only place in which one can see the exact start and end angle locations of an arc, or where the length and bearing of a sloping line are shown. With this information you can size the object with considerable accuracy.

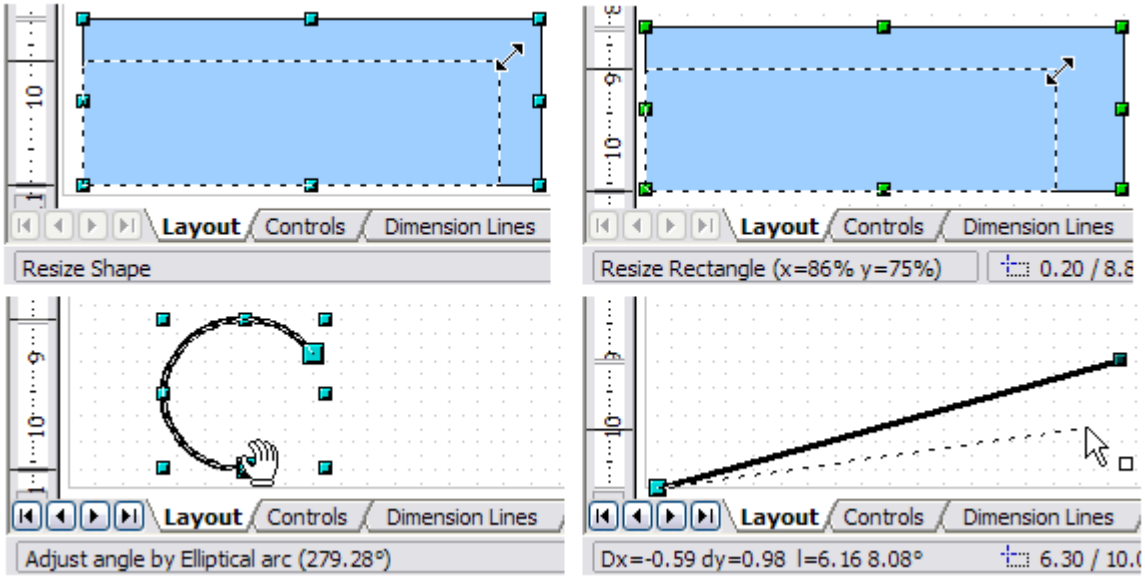


Figure 6: The Information field during dynamic size modification of objects

Modifying an arc

The beginning and end points of an arc can be modified. Select the arc and click on the **Points** icon on the Drawing toolbar to enter the Edit points mode[2]. In this mode, the handles on the selection frame change—two larger blue handles appear at the beginning and end points of the arc. When the mouse hovers over one of these points the cursor will change to a hand.

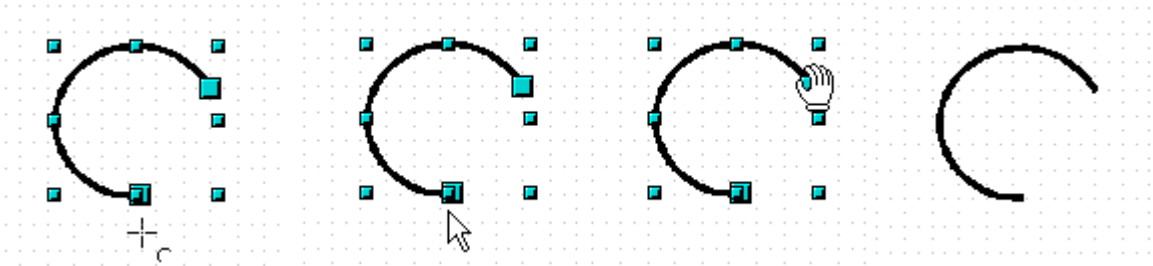


Figure 7: Editing an arc

If you click and hold the mouse button when the hand cursor appears, moving the mouse will change the location of the start or end point of the arc. The actual coordinates are shown in the Status Bar.

Rotating and shearing an object

Changing with the mouse

Rotating an object lets you slant the object along an axis. To do this dynamically, use the red handles, as you do when changing the size of the object.

Note	Rotation works in a slightly different way for 3D objects because the rotation occurs in 3D space and not in one plane. See Chapter 7 (Working with 3D Objects) regarding rotation when the Edit Points mode is active.

To rotate an object (or a group of objects), drag a red corner handle point of the selection with the mouse. The mouse cursor takes the shape of an arc of a circle with an arrow at each end. A dotted outline of the object being rotated appears and the current angle of rotation is dynamically shown in the Status Bar.

Rotations are made about an axis which is displayed as a small symbol. This is normally located at the midpoint of the object, but you can move the axis of rotation with the mouse to any location you like.

2 This mode is described in more detail later in this chapter,

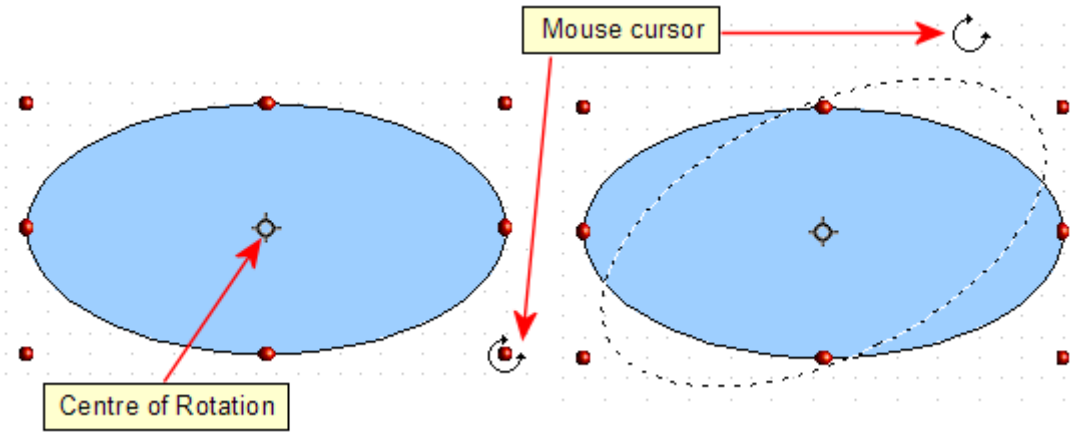


Figure 8: Rotating an object

If you hold down the *Shift* key during the rotation, the operation will be carried out in increments of 15°.

Changing inclination or perspective

To slant or shear objects, use the red handles located at the midpoint of an edge of the selected objects. The mouse pointer changes to a ⇋ when the pointer hovers over one of these midpoint handles. Not every object can be slanted—basic shapes can be rotated but not slanted.

The slant axis is the point directly opposite the midpoint handle to be used for shearing the object. This point stays fixed in location; the other sides and edges move in relation to it as the mouse is dragged (make sure that the ⇋ handle icon is showing before dragging).

Figure 9 shows how the vertices move in relation to each other during the shearing process. The circles represent the path of the vertices. The inclination axis is the bottom vertex of the triangle (the slanting handle used is the midpoint of the upper enclosing frame). All points on the figure will move through the same angle irrespective of the final shape. The actual angle is shown in the Status Bar.

Note Should you wonder where the triangle in the next figure comes from—it was produced with the (unfilled) polygon tool and then **Close Object** selected from the context menu.

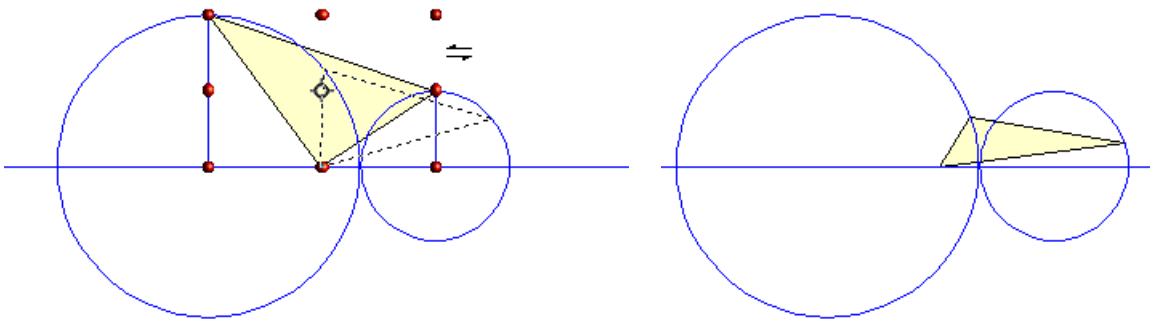


Figure 9: Shearing an object

This tool can be used to produce perspective drawings. The series of pictures in Figure 10 shows the method of constructing a cuboid or rectangular prism. To shorten the edges leading from front to back, reduce the length before you distort the height or width of the surface.

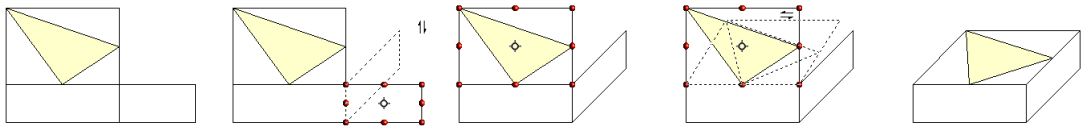


Figure 10: Perspective production of a cuboid

As with rotation, you can set the slanting to occur as steps of 15° by pressing the *Shift* key while moving the handle.

Setting size and position exactly

You can position and resize objects with the mouse, but this method is not very exact. If you need accurate positioning of objects, use **Format > Position and Size** from the menu bar, or right-click the object and select **Position and Size** from the context menu, or press *F4*.

Position and Size

Open the **Position and Size** dialog (see Figure 11) and click on the first tab to set the appropriate values.

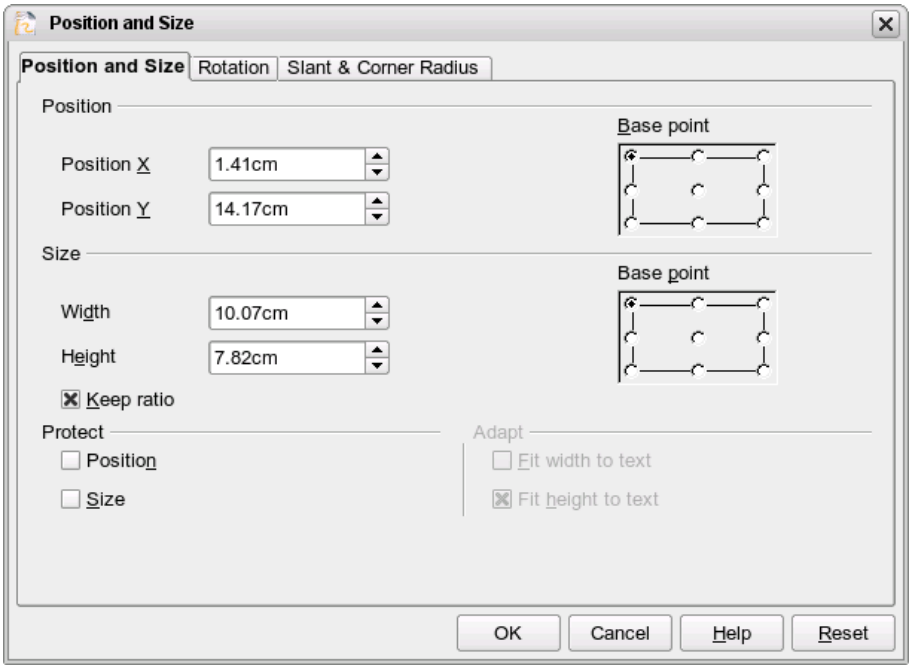


Figure 11: Position and size of an object

Position is defined as an X,Y coordinate relative to a fixed point (the *base point*), typically located at the upper left of the drawing area. If desired, you can temporarily change this base point to make positioning or dimensioning simpler (click on the radio button corresponding to the location of the base point in either of the two selection windows on the right side of the dialog—upper for positioning or lower for dimensioning). The possible base point positions correspond to the handles on the selection frame plus a central point. The change in position lasts only as long as you have the dialog open; when you close this dialog, Draw resets the base point to the standard position.

Tip The **Keep ratio** checkbox is very useful. Click it to keep the ratio of width to height fixed while you change the size of an object.

Either or both the size and position can be protected so that they cannot be inadvertently changed. Check the appropriate boxes to achieve this.

Tip You cannot move an object? Check to see if the position is protected!

Rotating objects

Click on the **Rotation** tab of the **Position and Size** dialog (see Figure 12). Here you can define the rotation angle, as well as the location of the pivot point.

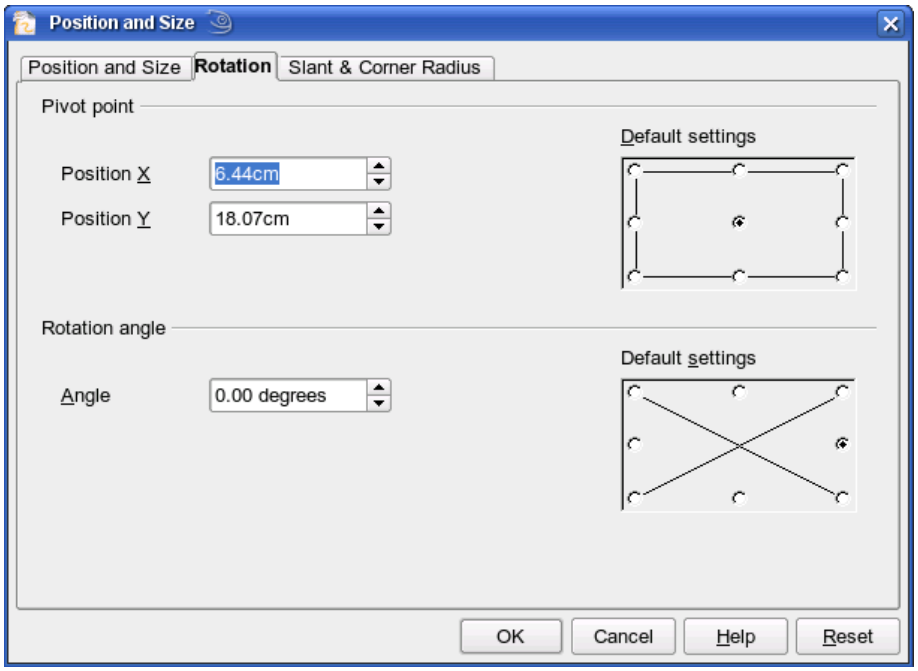


Figure 12: Rotating an object

Slant and corner radius

With some Draw objects the slant angle (inclination or shearing) and corner radius can be set in this dialog (Figure 13).

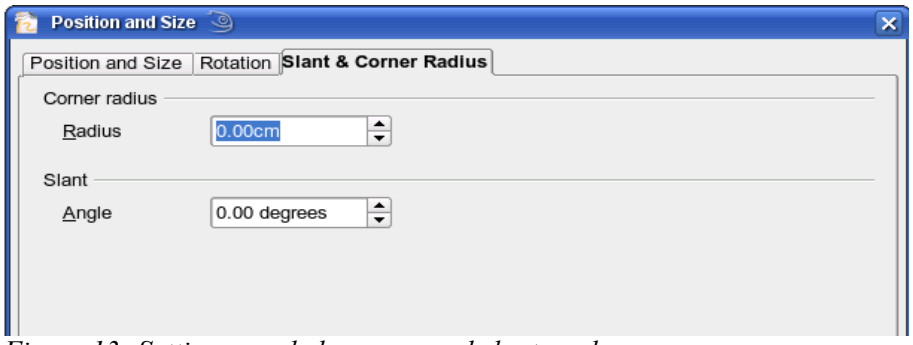


Figure 13: Setting rounded corners and slant angle

Corner radius

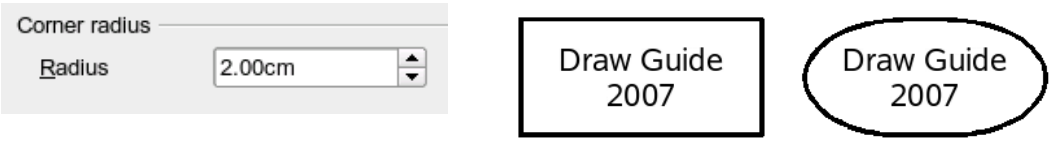


Figure 14: Example of setting rounded corners

You can use this dialog to round the corners of the usual Draw objects—text boxes, legends, rectangles, and squares, as shown in Figure 14. The same effect can be achieved when you are in the points mode (by clicking the **Points** icon on the Drawing toolbar), by dragging the large handle with the mouse. The larger the value for the corner radius, the more round will be the object.

Slant

You can shear the older, classic Draw objects, but not the newer Shape objects. Enter the slant angle in the box marked *Slant Angle*.

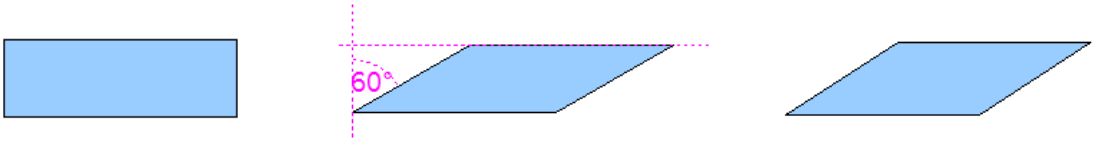


Figure 15: Example of setting the slant angle in a classic Draw object

Editing object points

For polygons and Bézier curves, Draw offers a complete set of tools that let you accurately edit the contour of an object. To edit other objects in the same way, you must first convert them into curves. To do this, select the object, then right-click and choose **Convert > To Curve** or choose **Modify > Convert > To Curve** from the menu bar.

You can also convert the shapes to a polygon (**Convert > To Polygon**). With polygons, the edge points are always connected with straight lines and not with curves. Some of the techniques described work equally with polygons as with curves.

An alternative way to change the form of basic shapes

In current versions of Draw, many of the new shapes can be directly edited without having to first convert them to curves. You can recognize these objects by the presence of one (or more) yellow handles. Figure 16 shows a selection of shapes with such handles.

If you hover the mouse pointer over one of these handles and then drag it, you can change the form of the shape; the exact type of change is dependent on the shape itself. The mouse pointer changes to a hand with index finger outstretched when hovered over one of these handles.

Examples of what you can do with this tool are rounding the corners of a rectangle or square, changing the angles of an arc or ellipse, or altering the control points of a circular or elliptical segment.

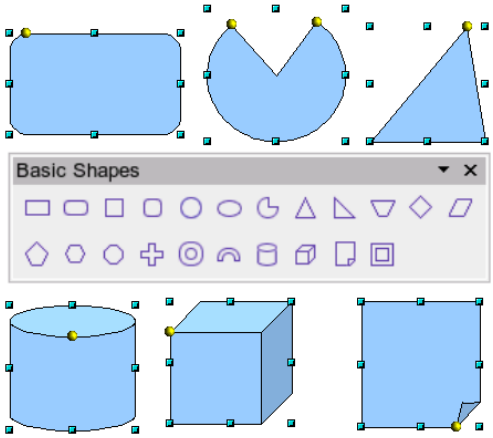


Figure 16: Some basic shapes with yellow "handles"

How curves work

Editing curves works on the basis of a method called Bézier curves[3]. The complete study of such curves goes beyond this scope of this guide, and only the basics of this powerful method of editing the contour of an object are covered here. Chapter 10 (Advanced Draw Techniques) provides more information on drawing and manipulating Bézier curves.

The editing of a Bézier curve consists in principle of moving points or tangents passing through these points. Each tangent has two control points—one at each end—and a junction point where it meets the curve. The relative angle and distance between the control points determine the shape of the curve. Figure 17 shows several variations starting from a basic circle and changing only one point on the circle.

You can create many different shapes by moving either the junction point itself, or one or both of the round handle points at either end of the tangent.

3 Bézier curves were invented by Pierre Bézier, an engineer working with the Renault car manufacturer, who developed the technique in the 1960s. The technology was intended to make modeling the surface of vehicles easier.

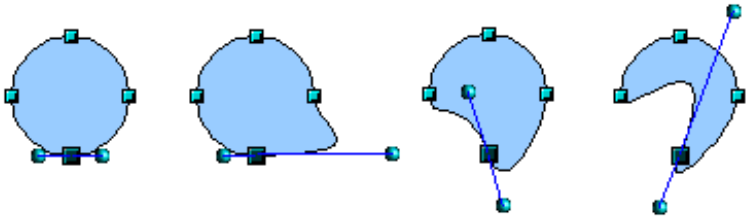


Figure 17: Creating different shapes by changing the tangent

Experimenting with moving the control points of a tangent will yield countless variations of the basic starting shape. Draw offers even more possibilities when you use the functions on the Bézier curve toolbar.

The Edit Points toolbar

When you work in Edit Points mode, use the Edit Points toolbar, shown in Figure 18. This toolbar can be activated by **View > Toolbars > Edit Points**. Once activated, it will appear whenever you select a curve and the Edit Points icon on the Drawing toolbar is active.

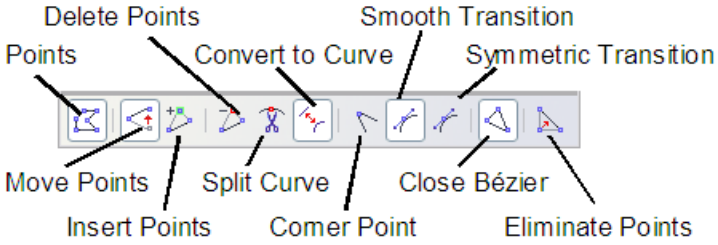


Figure 18: Edit Points toolbar

On this toolbar, some buttons are active or inactive depending on the selected object and object point. With the Convert to Curve icon, you can determine for individual points whether their connection will be made with straight lines or with curves.

Only with curves are the icons for tangents activated. An object which contains no curves is treated as a polygon.

The role of the three buttons enabling you to choose the type of tangent is described in the following chapter. The other buttons are described here in relation to working examples.

The three kinds of tangent

Three buttons in the Edit Points Toolbar let you select the type of tangent and convert from one type to another. Only one of these buttons can be active at any given time.

Figure 19: Symmetric Transition

The **Symmetric Transition** button lets you work with a symmetrical tangent (Figure 19). Any movement of one or the other of the handles will be carried over symmetrically to the other handle.

Figure 20: Asymmetric tangent

The **Smooth Transition** button lets you separately adjust the lengths of the two parts of a tangent and so make the curve flatter or steeper. In Figure 20, you can clearly see that the curve is flatter on the longest side of the tangent. The tangent remains as a single straight line. This kind of tangent is known as a smooth junction. This button should not to be confused with the preceding one because their representations are fairly similar.

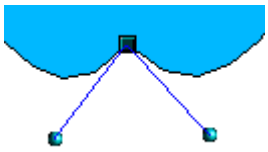


Figure 21: Inflexion point

It is also possible to completely detach both sides of the tangent. In this case, the central point is known as the *inflexion point*. Using this technique, you can draw spikes and troughs in objects. Use the **Corner Point** button to create an inflexion point around the selected point.

Examples

The following examples start from a filled circle. As mentioned earlier, in order to use Edit Points mode, you first need to convert the object to a curve.

You will notice that after the conversion, the handles located in the corners of the rectangle have disappeared. This behavior is normal in that the handles which are used in the Edit Points mode are located along the outline or trace of the drawn object.

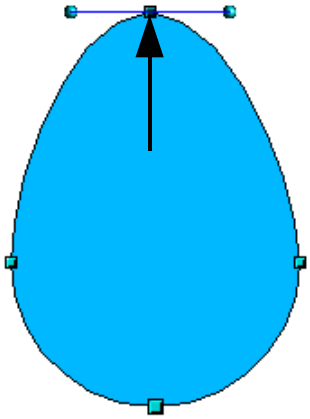
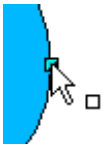
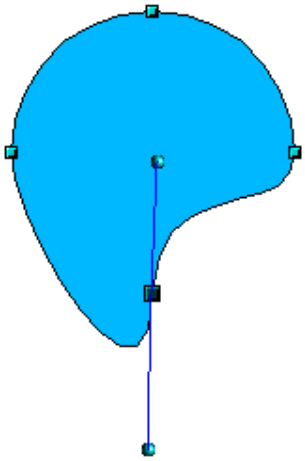


Figure 22: Moving a junction point

The **Move Points** button is the default mode when editing points. If it has not been activated, click on its button. When this mode is active, the mouse cursor has the following shape when it is hovered over an edit point:



Movement of a point is one of the easiest manipulations to do. Figure 22 illustrates how an egg can be drawn very easily by starting from a circle and dragging the the top point upwards.



To change the direction or location of the tangents, move the circular handles at each end. The mouse cursor then looks like this:

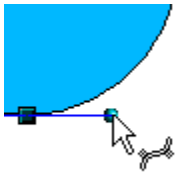
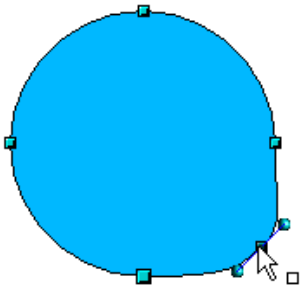


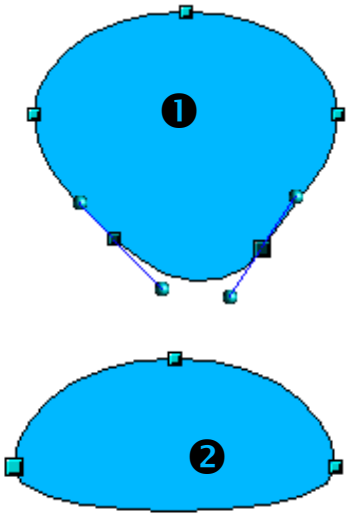
Figure 23: Rotating a tangent



Use the **Add Points** button to add an extra edit point to an existing curve. Click on the curve at the spot where you want to insert a point and then move the mouse slightly, in any direction, while holding down the button. Watch out! If you just click, the new point will not be added.

The tangent attributes associated with the new point depend on the buttons that are selected on the toolbar.

Figure 24: Adding an edit point to a curve



The **Delete Points** button has the opposite effect: it subtracts one or more points from the curve. The resulting curve stretches itself automatically around the remaining points after subtraction.

Select one or more points to delete. You can select several points by holding down the *Shift* key (❶).

When you have selected the points you want to delete, click the **Delete Points** button. The selected points disappear from the curve, which then reforms around the remaining points (❷).

You can also delete the selected points by pressing the *Del* key on the keyboard.

Figure 25: Deleting points from a curve

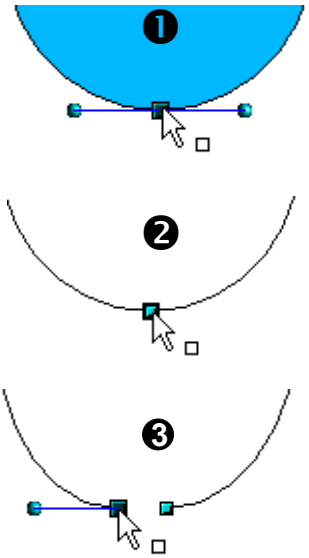


Figure 26: Cutting a curve

Use the **Split Curve** button to split or cut a curve at the location of the selected handle. If the object is filled, it will be emptied because the curve that represented the edge is no longer closed.

Check that you have selected the correct handle (❶), click the **Split Curve button** (❷) and notice that the object is no longer filled. You can then check, by moving the point, that the curve has indeed been separated (❸).

If you have an open curve, the start point of the curve is larger than the others.

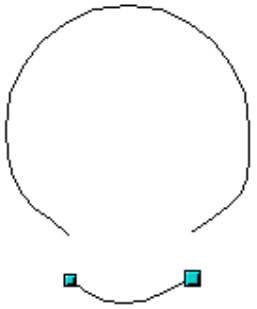


Figure 27: Moving a segment

You can also separate a curve at several points simultaneously. Just keep the *Shift* key pressed down and select all of the points at which the cut should occur.

Drag and drop segments with the mouse to move them from the original curve.

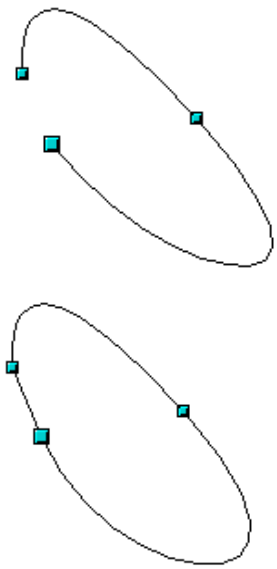


Figure 28: Closing an open curve

To close an existing curve, select an open curve and click on the **Close Bézier** button .

The opening point is identified by a slightly larger handle (Figure 28).

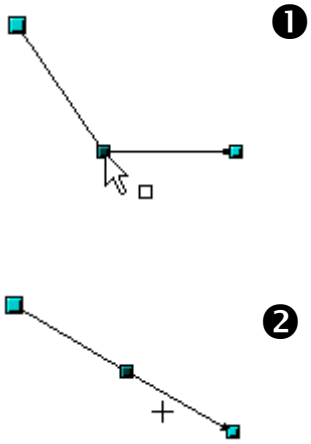


Figure 29: Using the "select points" switch

The **Select** button on the **Drawing** toolbar functions as a switch. It works as follows.

If you have two points linked together by a straight line (you do not need to have a curve between the points) and you insert a new point between them that is set at an angle to the initial straight line (and hence the two endpoints), then:

- If the **Select** button is active, you will have a drawing similar to that illustrated in ❶.
- If the **Select** button is not active, and you move the point you have just inserted to bring it back close to its initial position in the straight line, you will have a drawing similar to that illustrated in ❷.

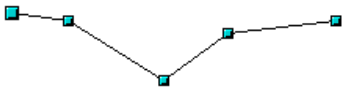


Figure 30: Select object and set Edit points mode

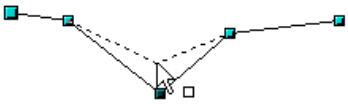


Figure 31: Draw virtual lines

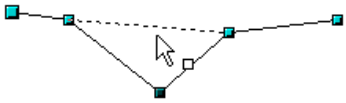


Figure 32: Release mouse button

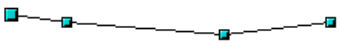


Figure 33: Line is reduced by one point

The **Eliminate Points** button button only functions with lines with multiple points.

If the button is active, clicking on a point, holding the mouse key down and moving the mouse will draw virtual straight lines between the neighboring left and right points.

When the two lines are more or less straight and you release the mouse button, the point is deleted and a line between the above mentioned two neighboring points replaces the previous two lines, thus eliminating one point.

Note that this only works when the angle between the two lines shown dashed in the figure at left is less than a certain amount.

In the **Tools > Options > OpenOffice.org Draw > Grid** window there are options for snap settings relating to editing points when rotating and in point reduction mode.

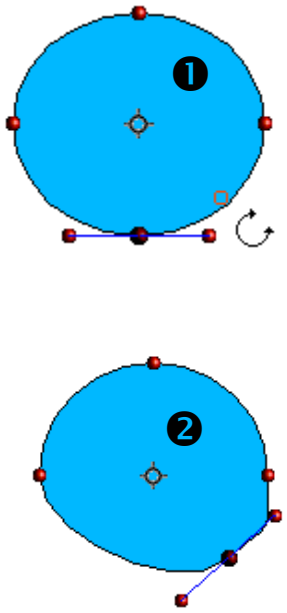


Figure 34: Moving a point on a curve

The **Rotate** function from the **Effects** drop-down button on the Drawing toolbar and the **Rotation Mode after Clicking Object** button on the **Options** toolbar can be used in Edit Point mode. In this case, it can be used to move single points around the contour of an object.

Switch into rotation mode by clicking on either of the rotation buttons. Notice that in rotation mode, all of the tangent points become red dots.

Select the point to be moved and then drag it around the contour while keeping the left mouse button pressed down (❶). When you let go of the mouse button, the point will be moved to the new position (❷).

If you move one of the handles located at the end of the tangents during rotation, you will make the object rotate in exactly the same way as with the usual rotation operations.

Important: To exit the effects mode, do not just click on the **Effects** button; click the **Select** button on the Drawing toolbar.