

Nodes, Paths, and Stuff... (back to basics)

3-13-99

Ok, what's a node?

Well, here's what Corel's on-line help says: *"The square points at the end of lines and curve segments. You can alter the shape of a line or curve by dragging one or more of its nodes."*

Do all Corel objects have nodes? Yes they do, with one exception—bitmaps. Nodes are the cornerstone of vector art—the type of artwork produced by CorelDraw. It is the nodes, and their associated *control points* that define the shape of an object.

Types of nodes:

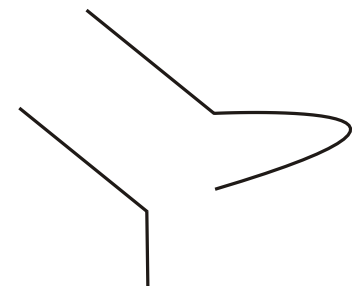
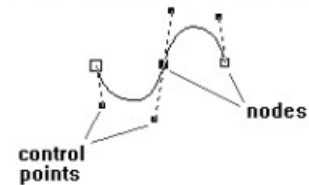
There are two general categories of segments defined by a node: *lines and curves*. You might think that a line or curve segment is defined by two nodes, the one at the beginning and the one at the end, but the actual characteristic of a segment is defined by the node at the clockwise end of the segment. In other words, the "curve" at right has three nodes. The clockwise most node defines the shape of the curve segment.

The middle node defines the line segment, while the end node simply defines where the line segment ends. If we were to convert the middle node from a line to a curve (using the shape tool), we could shape that line segment. If we tried to do the same thing with the end node, we would not even be offered any options. It is always a cusp node, because there is no curve leaving it.

Similarly, the clockwise-most node is a curve node, but because it is the end of an open curve, defining it as anything but a cusp has no real meaning, so these options are grayed out. The only thing we can do to it is convert it to a line node, which would result in a shape like the one shown right below it.

Control point

Points that extend from nodes along curves that are being edited with the Shape tool. Control points determine the angle at which the curve passes through the node. Control points appear when you select a node or segment with the Shape tool.



Cusp: This is the most flexible type of node. Its control points can be moved completely independent of one another. This type of node is especially useful for sharp angled curves like the one shown here. I selected the middle node and converted it to a curve. This not only changes the segment it controls from a line to a curve, but automatically makes the node a cusp. Then I reshaped the curve.

You can reshape by moving the control points or simply clicking somewhere on a curve segment and moving it. I find the second method easier in most cases, but there are times when you will need to work directly with the control points to get exactly what you want.



Smooth: "A node where the control points are always directly opposite each other. When you move one of these control points, the other also moves. However, you can vary the distance between the control points and the node independently. Smooth nodes produce a smooth transition between line segments."

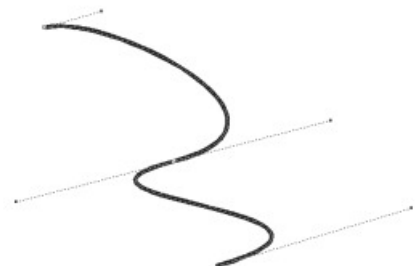


Shown at left and right are two examples that include smooth nodes. Smooth nodes are

especially effective for smooth transitions from a line segment to a curve segment, as shown in the closed curve on the left.

Symmetric: These are much like smooth nodes, but with one more restriction. The length of the control points are always equal. In other words, the shape of the curve coming into the node is always exactly the same as the shape leaving the node.

The differences between a symmetric and smooth node are often subtle. Take a close look at the two curves at the right. Notice that the lengths for the control points on the bottom curve are equal, and the resulting effect that has on the overall shape of the curve.



Special Cases

Corel, unfortunately, sort of confuses things, by using the term node a bit loosely. If you create a rectangle, then switch to the shape tool, there appear to be four nodes. Grab one and move it, and instead of a the node moving and causing both attached segments to move with it, it appears like you now have 8 nodes and the corners of the rectangle are rounded. Yet, convert a rectangle to a curve, and the nodes behave just like with any freehand- or bezier-drawn curve.

Similarly, with ellipses, when first drawn it appears like they only have one node. Grab this node with the shape tool, and you can either create a pie wedge or an open arc, which now appears to have two nodes. You can even come back later and readjust the wedge/arc, by grabbing one or the other nodes. On the other hand, if you convert an ellipse to a curve, it will become a normal curve with four nodes. *Convert a wedge or an arc to a curve, how many nodes will it have?*



Paths in Photo-Paint

Photo-Paint has a very similar feature called paths. If you know how to work with the shape tool in Draw, you pretty well know how to work with the path tool in Photo-Paint. In fact, simple vector shapes, created in Draw, can be imported as paths in Photo-Paint.

Ok, so what?! What the heck are paths used for? They serve a couple purposes. If you export to EPS format with a path in place, it acts as a clipping path, hiding everything outside the path. Most of you probably don't do much EPS export for placement in Ventura Publisher, Quark Express, PageMaker, et cetera, but there are other very useful reasons for working with paths.

A path can be "stroked." This means, you can draw a path and then choose some sort of paint tool to create a stroke that follows (outlines) the path. You can do this with masks, as well; but you can't reshape masks as easily as you can a path. (Remember that path editing works almost identically to node editing in Draw.)

This brings me to perhaps the most useful aspect of paths. You can create a mask from a path. This means that you have all the freedom of node editing to properly shape the path (future mask), then simply create a mask from it to do all the cool things one can do with masks in Photo-Paint.

I'm sure you all saw the front page of our last newsletter. After you got over your shock, you might have wondered how I colorized an old grayscale photo. I first had to convert the image from grayscale to RGB, but the key was working with paths. After carefully creating paths, I converted them to masks, then used the masks to create objects within my image, adjusting the color for each separate object. The final touch was to use the image sprayer to add some psychedelia to the background and then apply a few effects to soften the result.

Below is a the photo, and a version showing the individual components...

