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## VECTOR GRAPHICS

VECTOR DRAWING  
IN FLASH MX

We get to grips with some of *Flash MX*'s core tools – namely the program's unique drawing features – and create a zoomable map for a Website

Despite the best efforts of the marketing people at Macromedia, *Flash* is still most famous for its animation capabilities. But such perception does it a disservice, because in *Flash MX* we have a package that can do much, much more. It's a fully-fledged Web authoring system, complete with its own programming language and database connection capabilities. In this three-part series, we'll explore the key features, starting this month with the very core of the program: its drawing tools.

Vector graphics lie at the heart of *Flash*. Although it's grown into a multimedia tool that supports bitmap images, video and sound, vector images are the glue that holds these cumbersome components together. While bitmap images are made up of individual pixels, each one requiring its own entry in the data file that describes it, vector images are made up of co-ordinates. Think of them as points on a grid, describing shapes, lines and fills. As a consequence, vector images are smaller in file size, can be scaled to any dimension, and they don't suffer from the same loss of quality that plagues optimised bitmaps.

There are other vector formats on the Web – but the fact that they're not in regular use is testimony to *Flash*'s popularity. The World Wide Web consortium is trying to pioneer the SVG (Scalable Vector Graphic) format – a dynamic graphics language created in XML. The format has many interesting features and is supported in *Illustrator*, *CorelDRAW* and *FreeHand*, but like *Flash* it requires a plug-in to function. WebCGM (Computer Graphics Metaformat) is a subset of SVG that can be viewed directly in current versions of *Internet Explorer*.

Despite these 'official' standards, *Flash* is the only vector format to have had any real impact on the Web. Part of it could be down to player distribution; around 98 per cent of browsers have the *Flash* plug-in. On the other hand, it could be down to *Flash*'s great toolset – a handy bunch of widgets that enable you to create images with the smallest number of points.

*Flash MX* has all the tools you'd expect from a professional-level vector drawing

package, including freehand and Bézier editing features. But it wasn't always that way. Until quite recently, the program featured a reduced drawing toolset that gave the illusion of reduced functionality. In fact, *Flash*'s unique approach to vector illustration is flexible and produces files with far fewer points than 'traditional' tools. Drawing and editing lines, curves and fills is easy with the simple, context-sensitive tools available.

Over the next few pages, we take you on a tour of *Flash*'s drawing complement, as we complete a project in *Flash*. The brief is to create a zoomable street map. Our tutorial is structured so that you can create a map of any place you like. We simply outline an approach to the task and provide you with some suitable techniques to follow. Using vector graphics in *Flash* will enable you to make artwork that is resolution-independent, and that you can transfer to the Web without any loss in quality.

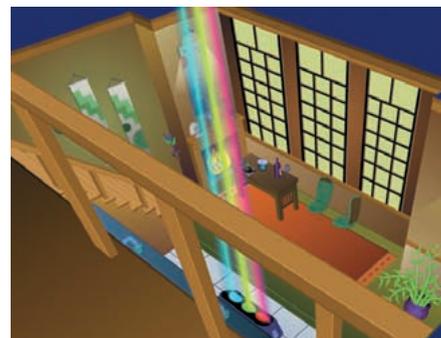
**INFO** Tutorial by Karl Hodge, khodge@spodgod.com.  
Thanks to *Time Out* magazine (www.timeout.com) for permission to use its map for the purposes of this tutorial.



Rob Collinet uses *Flash* to develop illustrations with a retro feel. His site currently includes example artwork and *Flash* games. His work's easy to find at [www.robcollinet.com](http://www.robcollinet.com).



Team Artonomy creates its impressive vector artwork in *Illustrator*, but when designs are destined for the Web, the results are often imported into *Flash* by its clients. Find out more at [www.team-artonomy.com](http://www.team-artonomy.com).



Someone has to create backgrounds for all those Web animations, and at [www.urbanentertainment.com](http://www.urbanentertainment.com), it's Sylvia Czizgenyi. Her portfolio site at [www.sylviac.com](http://www.sylviac.com) lets you get a look at the original artwork for classics such as *Undercover Brother*.

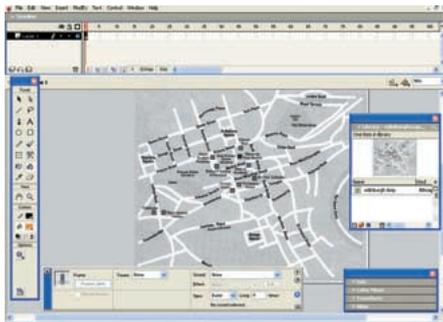


Though he boasts mainstream clients such as *Time Magazine* and the Discovery Channel, Jack Mortensbak fuses his *Flash* illustration with trippy, hippy vibes. Check out his portfolio at [www.illoboy.com](http://www.illoboy.com).

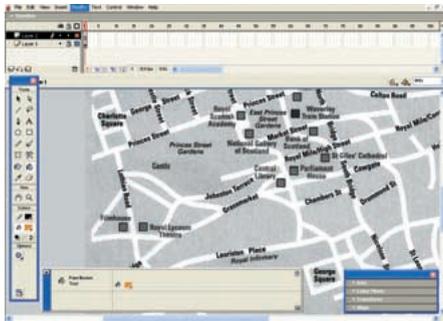


## PART 1 LINE DRAWING

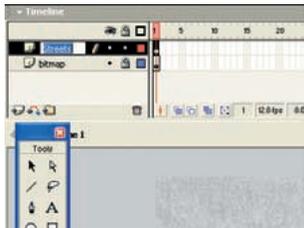
Flash gives you a flexible set of line drawing tools to choose from ↓



**1** We're drawing a street map, and although there are several ways to convert the data into a vector format in *Flash*, the easiest is to start with a bitmap image of the map you want to convert. In our case, we used a scan of a street map – this one has been used with the kind permission of *Time Out* magazine, the arts and entertainment weekly. For more info, see [www.timeout.com](http://www.timeout.com). Please obtain permission of the copyright holder if you are going to use a scanned-in map – otherwise, draw your own.



**2** Create a new document in *Flash* and set the size of the movie to the same size as the bitmap image – 700x700 pixels is probably about right. Import the map image to the stage and use the Align panel (Window>Align) to centre it. Click the Insert>Layer button on the timeline.



**3** Double-click on the new Layer 2 label and name it 'Streets'. Double-click the Layer 1 label and name it 'bitmap'. Select the layer labelled Streets. Now manually trace the bitmap image using *Flash's* tools.

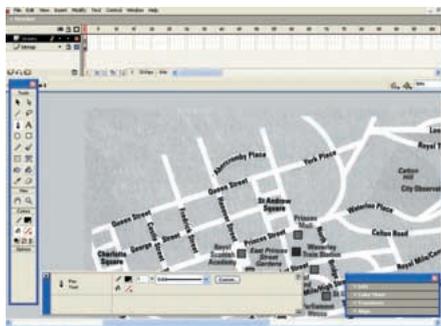
## >INSIGHT

### CONTEXTUAL PEN

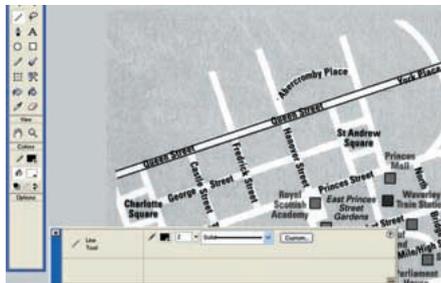
The Pen tool behaves in a context-sensitive way, altering its function according to the circumstances. Create a closed shape with it, for instance, and said shape is automatically filled with the current chosen fill colour. Similarly, clicking points within a closed shape deletes those points. The same holds true for anchor points within a line.

### PENCIL MODES

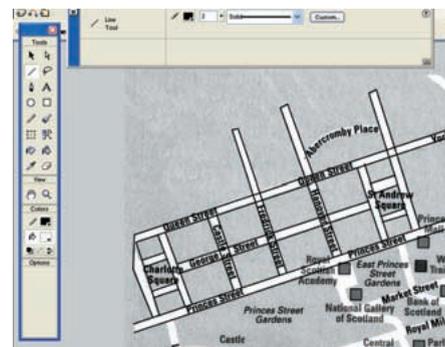
With the Pencil tool selected, choose Straighten under the Options section of the Tools panel to quickly draw perfect squares, ellipses, circles and rectangles. However, although the fill colour box is active in the Tools panel when the Pencil is selected, you'll have to fill the shape with the Paint Bucket once you're done.



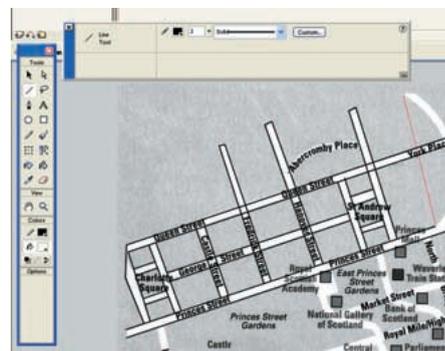
**4** *Flash* gives you a number of different ways to draw lines – and lines are what we need to trace our complicated street map. For most drawing package aficionados, the Pen tool will be the obvious first choice. Bring it up from the Tool palette.



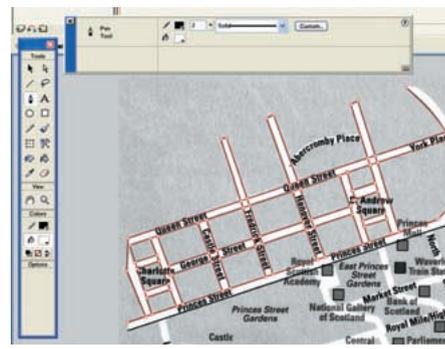
**5** In actual fact, *Flash* provides a number of alternatives to manipulate lines, alternatives that make the Pen tool seem positively cumbersome. For straight lines, it's best to go for the Line tool – switch on Snap To Objects from the View menu to join consecutive lines. Use the Properties panel to set the Stroke height to 2 pixel and the type to Solid.



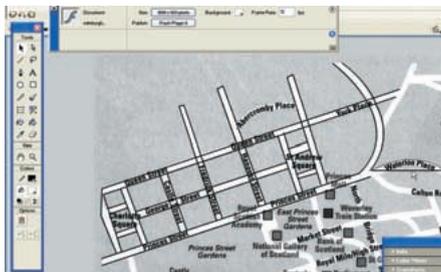
**6** In our example, we've used the Line tool to trace over a series of streets with a straight grid structure. When drawing in straight lines, don't worry about overlapping. We'll show you how to clean up loose ends with *Flash* in a moment.



**7** For curved areas, we've used two different techniques. The Pen tool comes in handy for meandering lines. Select the Pen and place a start point, then place a second point at the end of the curve, holding down the left mouse button.



**8** Move the mouse to adjust the curve of the line until it fits. When you're done, release the mouse button and click on the last point you placed to deselect it. Click the final point a second time if you wish to continue drawing from that point.



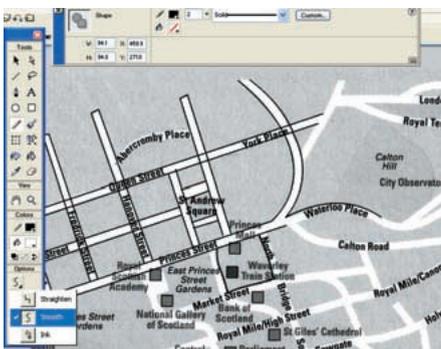
**9** The more 'traditional' way to create curves in *Flash* is to draw a straight line between two points of a curve, then switch to the Arrow tool. Hover the cursor near the line and the arrow switches to the curve adjustment icon. Click and drag to change the straight line to a curve.

## PART 2 VECTOR EDITING

It's not all points and Bézier handles in *Flash*. You can edit shapes and lines in a more intuitive way ↴



**10** As you trace your map, the Pen and Line tools will be your obvious first choices, but did you know *Flash* also features a Pencil tool that you can use for drawing freehand lines? Handily, the app cleans up these lines on the fly.



**11** In the Options panel, choose either Smooth, Straighten or Ink to set the drawing mode. Ink simply anti-aliases the line you draw, Smooth reduces the number and complexity of curves in your line, while Straighten speaks for itself.



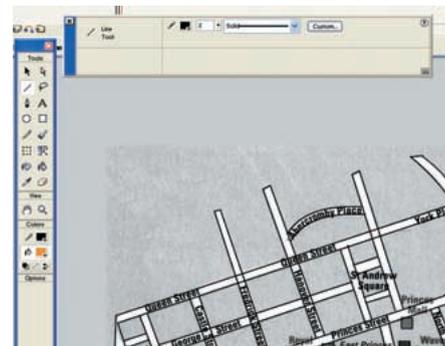
**12** Whichever method you use to trace or draw your lines, they always remain editable, either directly or via adjustments that you make in the Properties panel. The method of editing you choose is entirely independent of the tool used to create the original line.



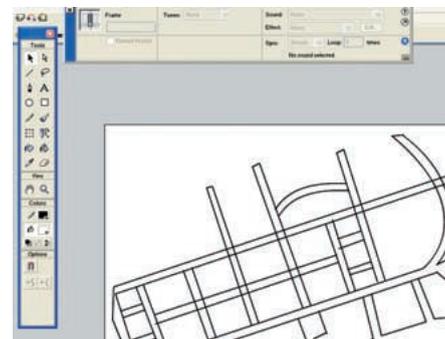
**13** For example, you can manipulate a curve drawn with the Pen tool using the curve adjustment features of the Arrow tool. Similarly, if you select the Subselection tool, click on any line and you can individually move and edit anchor points, whether they were created by the Pen or Line tool.



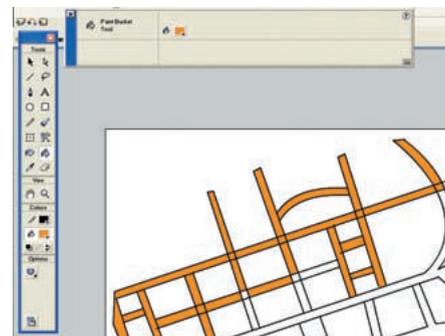
**14** Using the Arrow tool, you can also adjust the length of single lines or edit corners. Hover the Arrow tool over a corner or the end of a line until the cursor icon changes, then click and drag to adjust.



**15** One important thing to keep in mind as you trace over the streets in your street map is not to leave gaps. In the next steps, we'll be filling in the traced areas with colour. In our example, we 'closed off' streets that continued 'off the edge' of the map.



**16** When you've finished tracing the outlines of your street map, lock the layer containing the original bitmap, switch its visibility off and select the layer with your newly traced map.

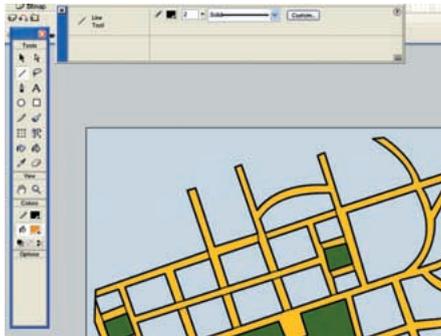


**17** Select the Paint Bucket tool and choose a colour for the streets in your map from the palette. We've noticed through experimentation that *Flash* is better at filling in less complex shapes created with lines than larger or more complex areas.

### >INSIGHT

#### BRUSH TOOL

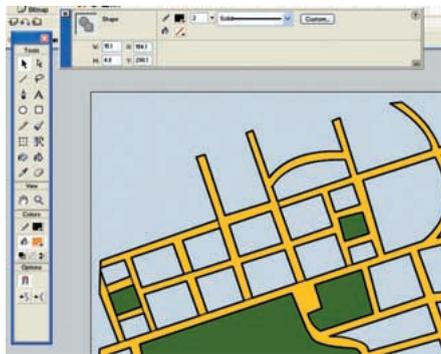
Although we don't use the Brush tool in this project, it can be handy. Essentially, it enables you to paint with any fill, including bitmap fills. With modes that enable you to paint in front or behind objects, inside lines or over lines, it's a more liberating way to add colour.



**18** Click within the lines you've drawn to start filling the 'streets' with colour. If it doesn't appear to work, try 'closing off' smaller areas, drawing single lines to seal any open shapes. Continue in this way until all the streets are filled.

## PART 3 ADVANCED FILLS

Next, use a splash of colour to bring your line art to life ↴



**19** Switch to the Arrow tool. Earlier, we stated that you could easily clean up overlapping lines in *Flash*. Using the Arrow tool, you should be able to select any overlaps and simply delete them. In this way, you can tidy up edges, remove lines used in the filling process and clean up the street 'grid'.



**20** You can use the Eraser tool to delete line sections that you can't select with a single click. Alternatively, use the Marquee or Lasso tools to make a selection, then hit the Delete key.

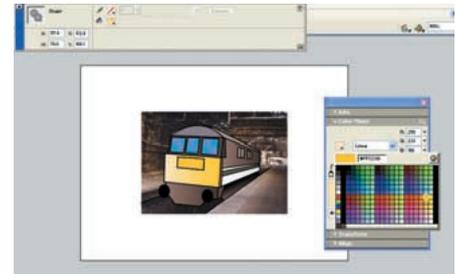
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### USING SHAPES

For this project, we created shapes using the Line and Pen tools, but you can also create simple shapes made up of line and fill combinations using the Oval and Rectangle tools. Uniquely, the line and fill are independent of each other when placed – and you can select and edit them individually. In *Flash*, overlapping shapes of the same colour on the same layer are automatically joined. If you use a shape of a different colour, the shape on top cuts a corresponding piece out of the shape below.

### ZOOMING IN

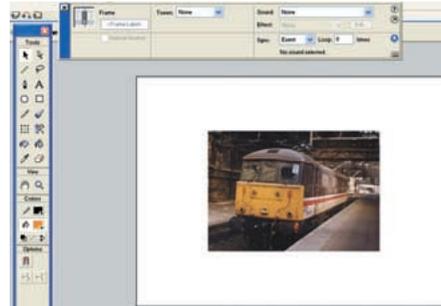
The finished version of our map has a zoom facility built in. To achieve this, we used Jack Lender's Zoom Me movie from [www.flashkit.com](http://www.flashkit.com), which you'll find on the CD in TutorialFlashMX. This is a ready-built 'shell' with ActionScript and UI elements that you can slot your movie clips into. Open `zoom_me fla` in *Flash MX*, go to the library and find our movie clip `zoom_this` (on the CD). To use your own map, replace the artwork in this clip with your own, then save the whole file under a new name. Use Control>Test Movie to try it out.



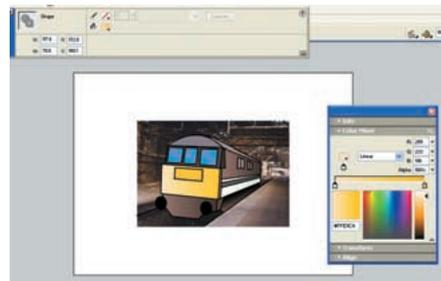
**23** A two-colour, black-to-white linear gradient is created by default. Click either colour to select, then edit it using any of the various methods available in the colour mixer. Use the Paint Bucket to fill an area with the gradient.



**24** You can alter the orientation, centre-point and dimensions of the gradient fill using Fill Transform. Select the tool, then click on the filled area you wish to edit. The cursor changes as you select the rotate or scale handle of the gradient selection.



**21** Our example map includes vector artwork representing a train. We created this in a similar way to the map. After importing a bitmap image of a train into *Flash*, we then traced over the subject's edges with the Pen and Line tools. You'll find the original image (`train.bmp`) on the cover CD.



**22** When filling the shapes within the train, we used a series of gradient fills. Select the Paint Bucket to begin with, then open the Colour Mixer panel (Window>Colour Mixer). Choose Linear from the dropdown menu in this panel.

## FINAL STEP

Delete the bitmap image from your file before publishing. Our finished map used almost every tool in the *Flash* drawing toolbox, from Line to simple shape-creation tools, and many, as shown, are interchangeable. The secret is to use functions that you feel most comfortable with. □

