What is Canvas?

The HTML5 <canvas> element is used to draw graphics, on the fly, via scripting (usually JavaScript).

The <canvas> element is only a container for graphics. You must use a script to actually draw the graphics.

Canvas has several methods for drawing paths, boxes, circles, characters, and adding images.

The <canvas> element is used to draw graphics, on the fly, on a web page.

Draw a red rectangle, a gradient rectangle, a multicolor rectangle, and some multicolor text onto the canvas:



## Canvas versus Scalable Vector Graphics (SVG)

[SVG](http://en.wikipedia.org/wiki/Scalable_Vector_Graphics) is an earlier standard for drawing shapes in browsers. However, unlike Canvas which is [raster](http://en.wikipedia.org/wiki/Raster_graphics)-based, SVG is [vector](http://en.wikipedia.org/wiki/Vector_graphics)-based, i.e., each drawn shape is remembered as an object in a [scene graph](http://en.wikipedia.org/wiki/Scene_graph) or[Document Object Model](http://en.wikipedia.org/wiki/Document_Object_Model), which is subsequently rendered to a bitmap. This means that if attributes of an SVG object are changed, the browser can automatically re-render the scene.

In the Canvas example above, once the rectangle is drawn, the fact that it was drawn is forgotten by the system. If its position were to be changed, the entire scene would need to be redrawn, including any objects that might have been covered by the rectangle. But in the equivalent SVG case, one could simply change the position attributes of the rectangle and the browser would determine how to repaint it. There are additional JavaScript libraries that add scene-graph capabilities to the Canvas element. It is also possible to paint a canvas in layers and then recreate specific layers.

SVG images are represented in [XML](http://en.wikipedia.org/wiki/XML), and complex scenes can be created and maintained with XML editing tools.

The SVG scene graph enables [event handlers](http://en.wikipedia.org/wiki/Event_(computing)) to be associated with objects, so a rectangle may respond to an onClick event. To get the same functionality with canvas, one must manually match the coordinates of the mouse click with the coordinates of the drawn rectangle to determine whether it was clicked.

Conceptually, canvas is a lower-level API upon which an engine, supporting for example SVG, might be built. There are JavaScript libraries that provide partial SVG implementations using Canvas for browsers that do not provide SVG but support Canvas, such as the browsers in Android 2.x. However, this is not (normally) the case—they are independent standards. The situation is complicated because there are scene graph libraries for Canvas, and SVG has some bitmap manipulation functionality.