

Eye-catching graphics with the Google Charts API

WEB GRAPHER

The Google Chart API lets you draw custom graphs, charts, maps, and barcodes through a simple web interface. **BY MARTIN STREICHER**

If a picture is worth a thousand words, a chart must be something akin to a novella. With just a glance, a chart can convey the state of the stock market, a trend in website traffic, the distribution of voters by county, and how monies are allocated in a household budget. Additionally, a chart is simply more memorable than a large table full of numbers.

Oddly, though, very few websites use charts to great advantage, largely because creating a chart requires unique programming and specialized, server-side software to render data. For example, if your site is based on PHP, you must install pChart [1] (or an analog), add the GD graphics library, and write code to produce a graphic of any kind. Ideally, any contributor – an editor, a writer, or a user adding comments – should be able to create and embed a chart.

Indeed, dynamism, simplicity, and convenience are at the heart of the Google Chart application programming interface (API) [2], perhaps more accurately described as software as a service (SaaS). Simply craft a parameterized URL in the form `http://chart.apis.google.com/chart?parameter1¶meter2¶meterN` and let Google Chart do all the heavy lifting. Google Chart lets you render six kinds of charts, a Google-o-meter, a QR code (a kind of barcode),

and maps, and you can specify a googol of customizations, such as bar color, background color, legend, and more.

In this article, I'll help you get started with Google Chart. You'll learn how to draw charts and how to add special effects to improve your graphic creations.

Charting 101

To generate a chart with Google Chart, provide the prefix `http://chart.apis.google.com/chart?`, the chart type (such as pie or line), the size of the chart, your data, and any chart-specific parameters, such as colors and axis labels, to tailor the final result.

All chart options are set with `key = value` pairs. Some keys are common to all charts, whereas others are unique to a specific chart type. The syntax for the `value` specified in the pair tends to vary by chart type.

Chart size is measured in pixels and specified with the parameter `chs = WxH`, where `W` is the width and `H` is the height. For instance, `chs = 200x100` generates a chart 200 pixels wide and 100 pixels high. (The area of a map cannot exceed 440 pixels wide by 220 pixels high. For all other charts, width or height cannot exceed 1,000 pixels, and the maximum area is 300,000 square pixels.)

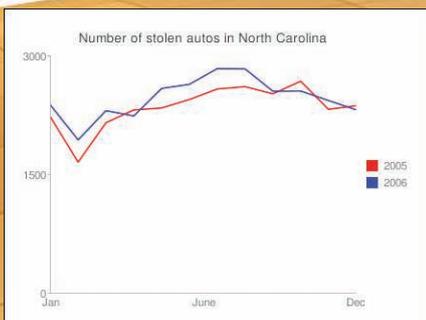


Figure 1: A sample line chart generated by the Google Chart API.

web page, use an *img* tag and set its *src* attribute to the URL of the chart. Provide a description of the chart in the *alt* attribute.

Map Maker

Drawing a map with the Google Chart service is as simple as drawing any other chart:

First, specify the map chart, select a region of the world to draw, then associate data with

each country, province, or state found in the map. Data can be discrete – say, to represent blue or red states in the United States – or continuous. Furthermore, you can associate a color with the minimum and maximum in a range and Google Chart renders intermediate values in graduated colors.

For example, Listing 2 generates a map of the United States, showing how states voted in the 2004 presidential election. Figure 2 presents the result.

In Listing 2, *cht = t* selects the map chart, *chtm = usa* chooses the United States as the region, and *chs = 440x220* draws the largest map possible. In the map chart, *chco = FF0000,0000FF,0000FF* specifies the default color of each state (red), and the beginning and end color (both blue) of the gradient.

The *chld* parameter contains the two-letter state code of each of the states won by the Democratic presidential candidate. Finally, *chd = s*: selects the simplified data encoding scheme, wherein all values must be represented by one of A-Z, a-z, and 0-9, where A is the minimum and 9 is the maximum. In other words, the simplified encoding scheme provides a granularity of 62 distinct values. Given that all states are colored red by default, any state with any other value – here, A – is colored blue.

Google Chart provides additional maps for Africa, Asia, Europe, the Middle East, South America, and the entire globe.

Swap Barcodes

In trendy Japan, kids share contact information in a



Figure 3: The author's email address captured in a QR code.

truly digital fashion: they swap barcodes. And now you can, too. Google Chart provides an API to encode up to 4,296 characters in a two-dimensional, monochrome glyph called a QR code.

To begin, I'll encode my email address in a QR code. Listing 3 shows how the image in Figure 3 was created.

When you use the QR code chart, *choe* specifies the text encoding. The *chld* parameter dictates the amount of error correction provided in the image. (Q embeds enough duplicate information that 25 percent of the QR code can be destroyed without affecting readability.) *chl* is the text to encode, typically provided as a URL that is then interpreted by an application.

If you have a cell phone, you can download BeeTagg [3] for free, take a picture of Figure 3, and decode the results to send me an email message. (As an alternative, Google offers a free QR code reader library called Zebra Crossing [4][5] and an experimental online barcode reader that interprets images you upload.)

A QR code can capture up to 4,296 characters. Figure 4, for instance, encodes an entire vCard.

Chart Your Heart Out

The Google Chart API is simple to use and easy to integrate into web applications. As shown here, you can use the API immediately – just embed a static link in your web page and let the browser request and render a chart each time the page is drawn.

To speed page rendering, you can request and cache the chart image on your own server, recreating the chart only when the underlying data changes. In addition to providing better efficiency, this technique better protects your raw data. A visitor



Figure 4: An entire vCard represented as a QR code.

Listing 3: Contact Information in a QR Code

```
01 http://chart.apis.google.com/chart?
02 cht=qr&
03 chs=200x200&
04 choe=UTF-8&
05 chld=Q&
06 chl=mailto:martin.streicher@gmail.com
```

to your site cannot “View Source” and copy the URL.

Of course, you can also mix the Google Chart API with AJAX techniques to modify charts on the fly in response to user input. Chart Maker [6] is a basic but effective demonstration of dynamic charting; others have used the Google Chart API to implement a loan calculator and executive dashboards.

Of course, Google Chart is often slower than charting tools that run on the desktop, such as Apple Numbers or Microsoft Excel. These latter applications use native drawing engines and do not require an Internet round-trip to transmit data and download a large graphic image. However, Google Chart is a free application

that is available from anywhere. If you are serious about using Google Chart in a production setting, pre-flighting and caching can greatly improve response time. ■

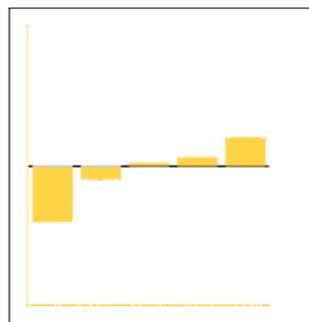


Figure 5: Rendering positive and negative values in a bar chart.

INFO

- [1] The pChart graphing framework for PHP: <http://pchart.sourceforge.net/>
- [2] The Google Charts API documentation: <http://code.google.com/apis/chart/>
- [3] BeeTagg: <http://www.beetagg.com/>
- [4] Google's free Zebra Crossing barcode reader library: <http://code.google.com/p/zxing/>
- [5] A guide to encoding data in QR codes: <http://code.google.com/p/zxing/wiki/BarcodeContents>
- [6] A simple Google Chart generator: <http://almaer.com/chartmaker/>
- [7] The JFreeChart charting library: <http://www.jfree.org/jfreechart/>