

Creating Interactive Dashboards with Google Charts

EVERYTHING YOU NEED TO KNOW ABOUT
GOOGLE CHARTS



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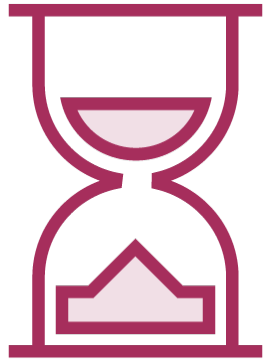
www.gregsommerville.com



Demo of the dashboard webpage



Benefits of a Dashboard



Timely data



New Insights



**Continuous
Improvement**



**Increased
Productivity**



Demo



Our Dashboard:

- 4 different charts
- Each has a different interaction
- Pulls data from Google Spreadsheet



Demo of the dashboard webpage



Summary



Next Up:

- Google Charts Core Concepts
- Required HTML
- Required JavaScript



A Quick Intro to Google Charts



Resources for Google Charts

Home Page:

<https://developers.google.com/chart/>

Discussion Forum:

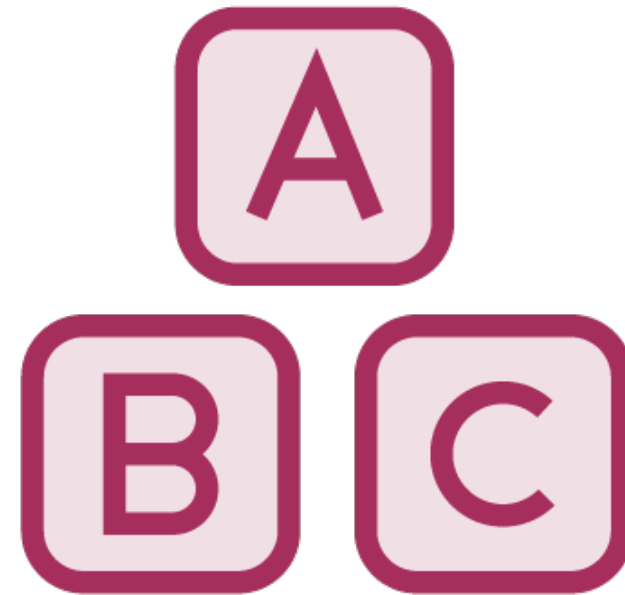
<https://goo.gl/405bu8>

Stack Overflow:

<http://stackoverflow.com/questions/tagged/google-visualization>



Released in 2008
Frequently updated
No server hits
Cross-browser
compatible
Mobile friendly



Basic Information



Starting HTML for Charts

```
<html>

  <head>
    <script type="text/javascript"
      src="https://www.gstatic.com/charts/loader.js">
    </script>
  </head>

  <body>
    <div id="divChart"></div>
  </body>

</html>
```



Starting JavaScript for Charts

```
// Load the Charts API with the corechart package
google.charts.load('current', { 'packages': ['corechart'] });

// Set a callback to run when the API is loaded
google.charts.setOnLoadCallback(drawChart);

function drawChart() {
    // Prepare the data and chart options, and draw in the <div>
    var data = google.visualization.arrayToDataTable(someArray);
    var chartOptions = {};
    var chart = new google.visualization.PieChart(
        document.getElementById('divChart'));
    chart.draw(data, options);
}
```



Demo of the basic chart



Version Numbers

Release Notes:

https://developers.google.com/chart/interactive/docs/release_notes

Discussion Forum:

<https://goo.gl/405bu8>



The DataTable Class: Basic Operations



DataTable vs. DataView

DataTable

Data arranged into rows and columns

Read-Write

Can start empty but be populated

All columns and rows used in chart

DataView

Uses an existing DataTable

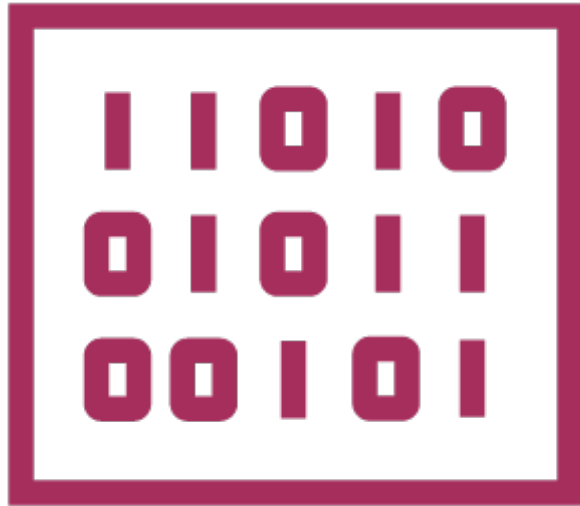
Read-Only

Cannot be populated – uses underlying DataTable data

Can choose columns or rows to show



DataTables



Each column has a single data type

Populate a DataTable by:

- Start empty, add rows and columns
- Use `arrayToDataTable()`
- Pass parameter to constructor
- Datasource Query for web-based APIs

Inbound (Incorrect) Data Format

Column 0	Column 1	Column 2	Column 3	Column 4	Etc...
Aardvarks	Badgers	Cougars	Donkeys	Elephants	
12	16	22	102	2	



Data Format for Pie Charts

Column 0	Column 1
Label for Pie Slice 1	Numeric Data for Slice 1
Label for Pie Slice 2	Numeric Data for Slice 2
Label for Pie Slice 3	Numeric Data for Slice 3
Etc...	



Demo of manipulating a DataTable



DataTables: Columns



Data Type

Label

Column ID

Column Properties



Column Roles

Example Role Types:

- Domain (implicit)
- Data (implicit)
- Tooltip
- Annotation
- Interval values
- Emphasis/De-emphasis
- Color & Drawing styles



Formatters

1	Aardvarks	\$12.00
2	Badgers	\$16.00
3	Cougars	(\$22.00)
4	Donkeys	\$76.00
5	Elephants	\$2.00

Number Formatter



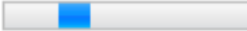
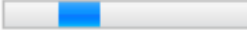
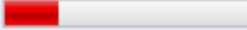

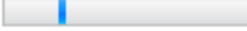
Formatters

1	Aardvarks	▲ 12
2	Badgers	▲ 16
3	Cougars	▼ -22
4	Donkeys	▲ 76
5	Elephants	▲ 2

Arrow Formatter



Formatters

1	Aardvarks	 12
2	Badgers	 16
3	Cougars	 -22
4	Donkeys	 76
5	Elephants	 2

Bar Formatter



Formatters

1	New Year's Day	January 1, 2016
2	Groundhog Day	February 2, 2016
3	Valentine's Day	February 14, 2016
4	St. Patrick's Day	March 17, 2016
5	Mother's Day	May 8, 2016

Date Formatter



Demo using a formatter



Problems with Formatters

Only available with DataTables

Buggy in some releases



The DataView Class



```
var data = new google.visualization.DataTable();  
var view = new google.visualization.DataView(data);
```

Creating a DataView

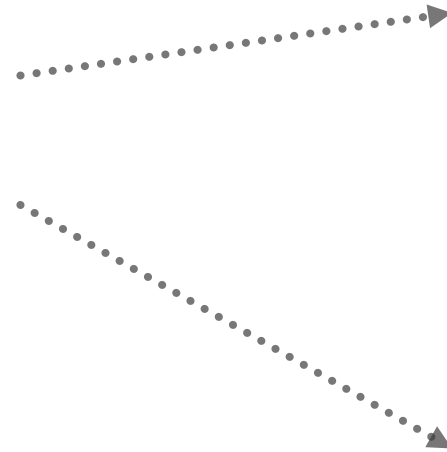
Create a DataView by passing the associated data table as a parameter to the constructor



Filtering Rows and Columns

DataTable

A	B	C	D	E
A1	B1	C1	D1	E1
A2	B2	C2	D2	E2
A3	B3	C3	D3	E3



DataView

B	C	E
B1	C1	E1
B3	C3	E3

DataView

A	B	D	E
A2	B2	D2	E2
A3	B3	D3	E3



Demo: filtering using DataView




```
// sorting a data table by column 1, then 2  
var data = new google.visualization.DataTable();  
  
data.sort([{column: 1}, {column: 2}]);
```

Sorting a DataTable

This code sorts the data within the table.



```
// sorting a DataView by column 1, then 2
var data = new google.visualization.DataTable();
var view = new google.visualization.DataView(data);

var sortOrder = data.getSortedRows(
    [{column: 1, desc: true}, {column: 2}]);

view.setRows(sortOrder);
```

Sorting a DataView

This code creates a list of sorted rows, which is passed to the DataView. The table is not sorted.



Loading Dynamic Data



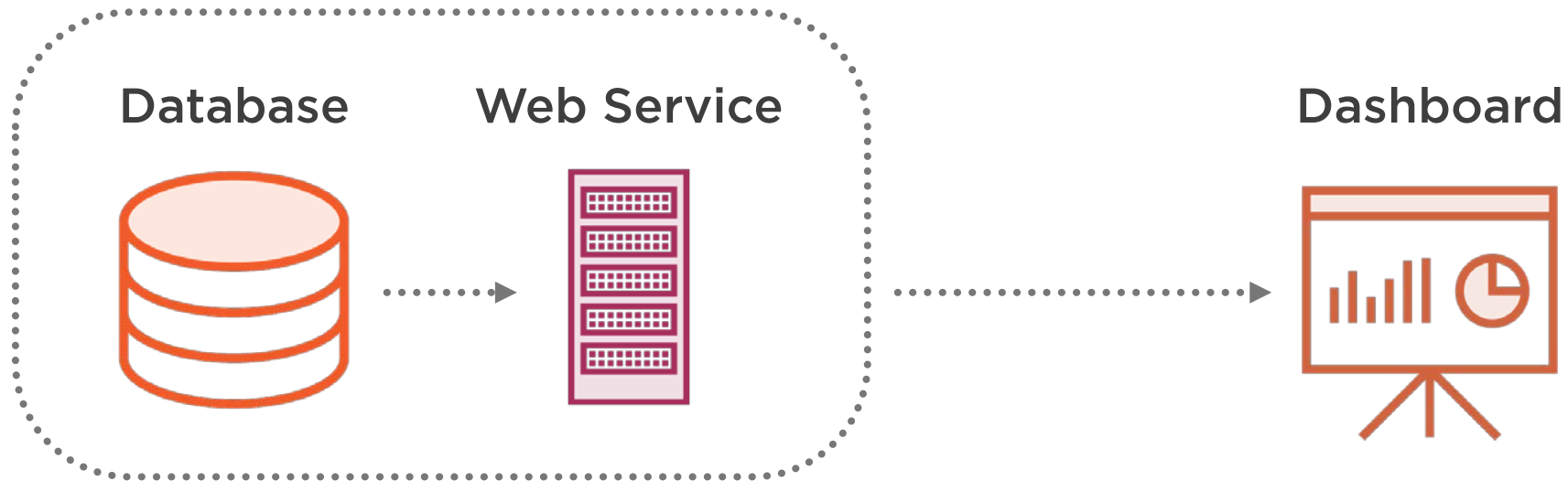
Loading a DataTable from an Array

```
// Load the array and create a corresponding DataTable
var dataArray = [
  ['Aardvarks', 12, 3, 1],
  ['Badgers', 16, 7, 0],
  ['Cougars', -22, 14, 0],
  ['Donkeys', 76, 20, 1],
  ['Elephants', 2, 6, 1]
];

var dataTable = google.visualization.arrayToDataTable(dataArray);
```



Getting Data from a Web API



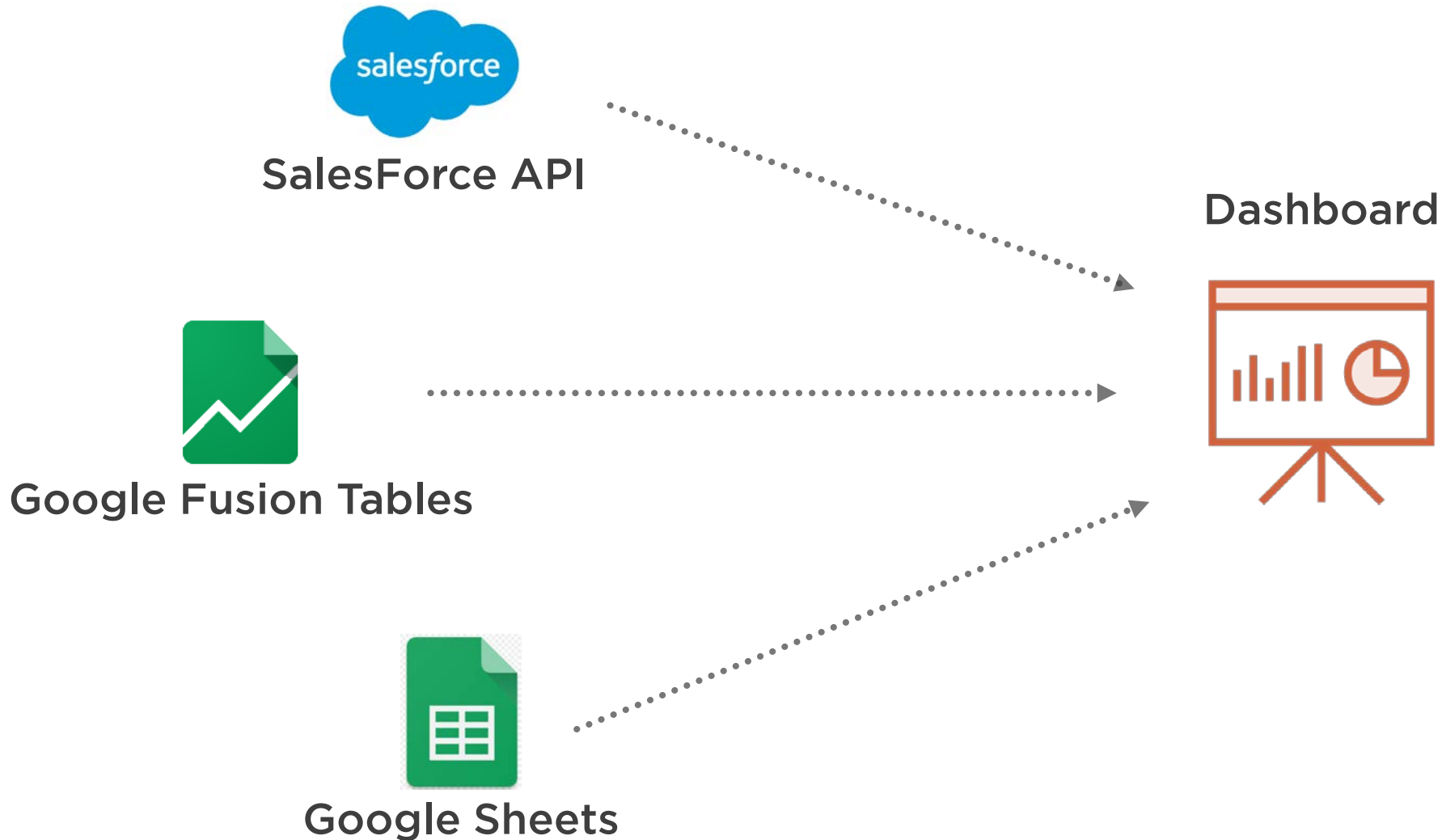
Loading a DataTable via an AJAX Call

```
// Use jQuery to make an AJAX call to get our data
$.ajax({
  method: 'POST',
  url: 'url-for-API',
  data: { param: 'value', otherParam: 'otherVal' }
})
.done(function(result) {
  // In this case, result is in JSON format, so deserialize
  var dataArray = JSON.parse(result);
  var dataTable = google.visualization.arrayToDataTable(dataArray);

  // Now that we have the data, we can chart in the usual way
});
```



Getting Data from a DataSource Query



Demo: getting data from Google Sheets



Summary



- **Demonstration Dashboard**
- **Basic HTML & JavaScript**
- **DataTable**
- **DataTable Columns**
- **DataView**
- **Sorting DataTable & DataView**
- **Dynamic Data Loading**

