



Data Visualization in Google Charts

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Ball State University CBER

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Show examples from
cberdata.org

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Describe data viz process

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Explore other features



Examples

from the CBER Data Center



County Profiles

CENTER FOR BUSINESS AND ECONOMIC RESEARCH - BALL STATE UNIVERSITY

CBER DATA CENTER

PROJECTS AND PUBLICATIONS | ECONOMIC INDICATORS | WEEKLY COMMENTARY | COMMUNITY READINESS INITIATIVE | COUNTY PROFILES | COMMUNITY ASSET INVENTORY | BROWNFIELD GRANT WRITERS' TOOLBOX | MANUFACTURING SCORECARD

COUNTY PROFILES

GRAPHIC • INTERACTIVE • DATA

- Graphically displayed charts and graphs make trends easy to see and analyze.
- Interactive tables and charts allow you to see and sort the raw data behind the graphics.
- The most current data from leading sources categorized into five custom categories.

Introduction | Demographics | Economy | Entrepreneurial Activities | Youth | Social Capital

Wage and Employment Comparison

This chart compares the employment share and income shares of the different industry sectors. It is helpful to see how the size of an industry as measured by employment may be much different than its size as measured by wages.

Industry Sector	Employment %	Wages %
Farming, agric...	~1%	~1%
Utility, trade, a...	~15%	~15%
Manufacturing	~10%	~10%
Construction	~5%	~5%
Services	~55%	~55%
Government b...	~15%	~15%
Others (non-N...	~10%	~10%

Interactive Chart | Downloadable Chart | Table | Source

Wages and Employment by Industry

These graphs illustrate the share of employment and wages in key industries. These figures show employment and wages in each of the major industry sectors. As is evident, some sectors have seen long-term loss of employment, while others have grown enormously, while still others have been remarkably unchanged.

What this tells a community is the general trend the region has taken, which will undoubtedly be where the community will tend towards in the next few years.

Interactive Chart | Downloadable Chart | Table

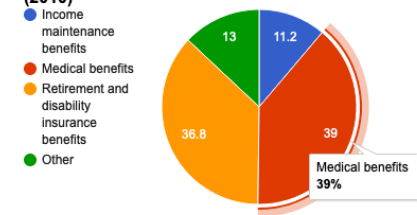
Breakdown of Transfer Payments

These pie charts show a breakdown of transfer payments into the county. Three types of payments make up the majority of government transfers: retirement and disability insurance, medical, and income maintenance benefits. Retirement and disability insurance benefits include mostly Social Security payments made to retirees, some disabled persons and surviving spouses and children. Medical payments come mostly in the form of Medicare and Medicaid. Medicare is supplemental insurance for retired persons, while Medicaid is primary healthcare for working age adults and children. Low-wage workers, those receiving social security payments for disability and those receiving traditional aid to the poor (TANF and Food Stamps), are typically eligible for Medicaid. Income maintenance benefits include Temporary Assistance to Needy Families (TANF), Food stamps and the Earned Income Tax Credit.

Interactive Chart | Downloadable Chart | Table | Source

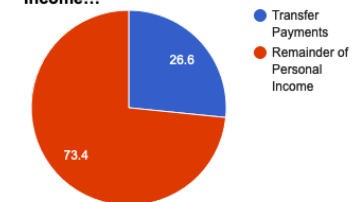
Bureau of Economic Analysis; Table CA 35 (<http://www.bea.gov/regional/reis/default.cfm?selTable=CA35>)
 Regional Economic Information System, Bureau of Economic Analysis, Table CA04 (<http://www.bea.gov/regional/reis/default.cfm?selTable=CA04>) and
 Regional Economic Information System, Bureau of Economic Analysis, Table CA35 (<http://www.bea.gov/regional/reis/default.cfm?selTable=CA35>)

Delaware County Types of Transfer Payments (2010)



"Other" includes unemployment insurance compensation, veterans benefits, and federal education and training assistance.

Delaware County Transfer Payments as Percent of Personal Income...





Manufacturing Scorecard

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Manufacturing Scorecard

CATEGORIES (ALL STATES)

- Manufacturing Industry Health
- Logistics Industry Health
- Human Capital
- Worker Benefit Costs
- Tax Climate
- Expected Liability Gap
- Global Reach
- Sector Diversification
- Productivity and Innovation

VIEW STATE REPORT CARD

Select state... View

About
Methodology
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Glossary
Credits

DOWNLOADS

National Report Cards (PDF)
2019 • 2018 • 2017 • 2016 • 2015 • 2014 • 2013 • 2012 • 2011 • 2010 • 2009 • 2008 Analysis • 2008 Scorecard

Indiana Report Cards (PDF)
2019 • 2018 • 2017 • 2016 • 2015 • 2014 • 2013 • 2012 • 2011 • 2010 • 2009 • 2008

Spreadsheets
2019 • 2018 • 2017 • 2016 • 2015 • 2014

Related Studies (PDF)
Manufacturing & Logistics: A Generation of Volatility & Growth (2017)
Advanced Manufacturing in the United States (2016)
The Myth and the Reality of Manufacturing in America (2017)
Manufacturing and Labor Market Frictions (2014)
Manufacturing Productivity Through the Great Recession (2013)

2019 Manufacturing Industry Health

Click on a state to view its full report card profile.

Map Table

About Manufacturing Industry Health

The production of goods holds a particular place of interest in the U.S. economy. Manufacturing firms are not necessarily reliant on local demand for goods and are therefore footloose. Their location then depends more on local factors such as the quality and availability of the labor force, transportation infrastructure, non-wage labor costs, access to innovative technologies, and the cost of doing business. Manufacturing is the production of both consumer durable goods (e.g. automobiles, electronics, and home appliances) and consumer non-durable goods (e.g. clothing, processed foods, and other goods that are consumed after use).

To measure manufacturing industry health, we include three variables—the share of total income earned by manufacturing employees in each state, the wage premium paid to manufacturing workers relative to the other states' employees, and the share of manufacturing employment per capita.

Sources: U.S. Department of the Census and Bureau of Economic Analysis.

Indiana

Click on a category to view state performance in that category

'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	
A	A	A	A	A	A	A	A	A	A	A	Manufacturing Industry Health
B-	B+	A	A	A	A	A	A	A	A	A	Logistics Industry Health
D+	C-	C	C-	D	C-	C	C	C	C	C	Human Capital
C	C	C-	D+	C-	C	D+	D+	B	B-	B	Worker Benefit Costs
A	A	A	A	A	A	A	A	A	A	A	Tax Climate
n/a	n/a	n/a	B	C+	C	B-	B-	B-	B-	C+	Expected Liability Gap
A	A	A	A	A	A	A	A	A	A	A	Global Reach
n/a	A	C-	C	C+	C	C	C	C	C	C	Sector Diversification
C	C	C+	B+	C+	C+	B-	B+	B	C	C	Productivity and Innovation

About Indiana

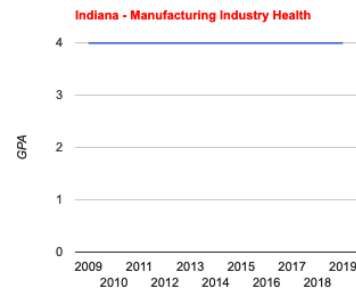
Indiana has a population of 6,516,922. The manufacturing industry is 14.2% of the state economy. The total personal income in Indiana is \$231,673,951,000 and earnings from manufacturing total \$32,939,743,000.

Source: Bureau of Economic Analysis, 2011

About Manufacturing Industry Health

Manufacturing is the production of both consumer durable goods (products that last at least 5-10 years) and consumer non-durable goods (products that are consumed after use). Location decisions for manufacturing firms generally depend on local factors such as the quality and availability of the labor force, transportation infrastructure, non-wage labor costs, access to innovative technologies, and the cost of doing business.

Sources: U.S. Department of the Census and Bureau of Economic Analysis.



GPA Key: 4 = A; 3 = B; 2 = C; 1 = D; 0 = F

About Logistics Industry Health

Logistics includes the ability to move, store, and distribute manufactured goods. Logistics firms depend upon many of the same factors as manufacturing firms in their location decision, but there is a more complex interplay between local conditions and the existing or planned transportation networks





Brownfield Grant Writers' Toolbox

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BROWNFIELD Grant Writers' TOOLBOX

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INDIANA COUNTIES: Delaware

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Health

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Brownfield Grants Awarded in Indiana
TIF-in-a-Box
Additional Resources
CBER County Profiles
Testimonials

Awards

IEDC Honorable Mention - 2011
Special Purpose Website
International Economic Development Council

UEDA Summit Award of Excellence Finalist - 2011
Excellence in Research and Analysis
University Economic Development Association

Demographics

Population of Delaware County, Indiana (1969-2015)

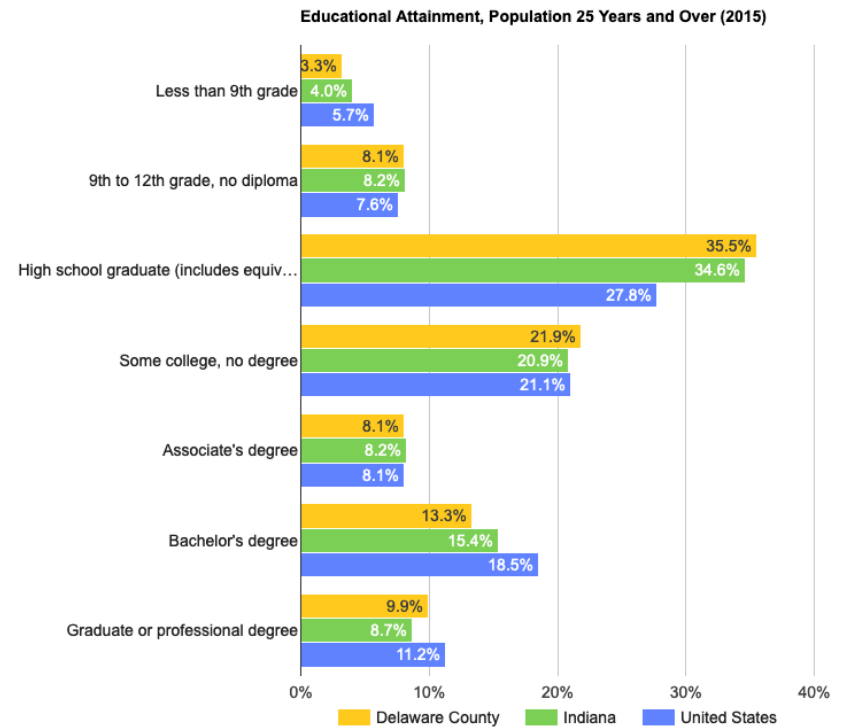
Population Growth

Year	Delaware County (%)	Indiana (%)
2010-2015	-0%	1%
2005-2015	-1%	5%
2000-2015	-1%	8%
1995-2015	-3%	12%
1990-2015	-2%	18%
1985-2015	-4%	20%
1980-2015	-9%	20%
1975-2015	-10%	23%
1970-2015	-9%	26%

Density Per Square Mile of Land Area (2015)

Entity	Density (per square mile)
Delaware County	296
Indiana	180
United States	83

Educational Attainment



Educational attainment is the most basic component of a region's economic development potential and serves both as an input to the region's economic performance and also as an amenity for new businesses and residents. These data from the U.S. Census show the proportion of adults who have attained different levels of education. They are compared to the state and national averages. It is worth noting that the relative age of the county population will heavily influence these data, with older adults being less likely to have completed high school or college. So, while this is one of the first measures of a community's health, other factors influencing these data, such as local high school graduation rates and the types of colleges and universities attended by local graduates are also important.



Data Viz @ Ball State CBER

Our process from spreadsheet to web graphic



Data Team @ Ball State CBER



**Srikant
Devaraj, PhD**

*Research
Assistant Professor*

- Data analysis



**Graham
Watson**

*Web Development
Manager*

- Development



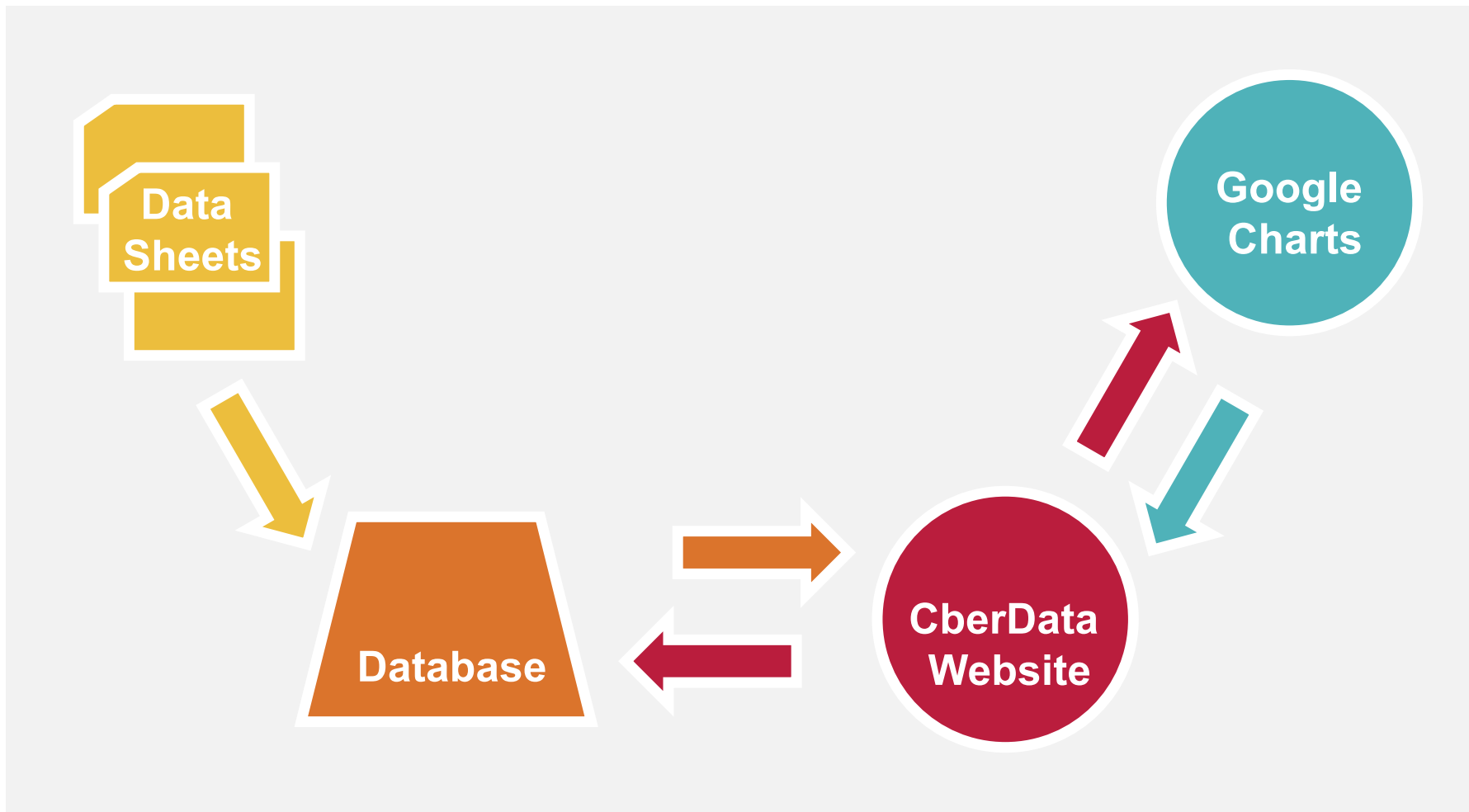
**Victoria
Meldrum**

*Publications
& Web Services*

- Design & usability



Process from Data to Graphic





Prepping the Data

- Srikant sends data spreadsheets to Graham
- Graham imports data into database
 - PHP script identifies categories & variables, assigns locations for website recall
 - Script to check for errors
 - Link multiple data sets together



Determine Features

- Srikant, Graham, & Victoria discuss project parameters
- Visualization through Google Charts

BROWNFIELD Grant Writers' TOOLBOX

Home
INDIANA COUNTIES
Delaware

Demographics

Economy

- Percent Share of Total Establishments
- Employment Growth
- Employment Trend
- Unemployment Rate
- **Personal and Household Income**
- Income Inequality
- Federal Spending

Health

All Charts

Brownfield Grants Awarded in Indiana
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Excellence in Research and Analysis
University Economic Development Association

Personal and Household Income

Personal and Household Income (2015)

Category	Delaware County	Indiana	United States
Per capita personal income	\$32,896	\$41,940	\$48,112
Median household income	\$38,830	\$49,255	\$53,889

This graph illustrates the county's per capita income and median household income relative to Indiana and the U.S. The personal income data includes income received by persons from all sources such as income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment and capital consumption adjustment, rental income of persons, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

The household income data include both working, and non-working households, and may include students. Higher proportions of elderly and families with very young heads of households will contribute to the share of low-income households. Also, a high share of agriculture, which sees much of its wealth accruing outside of income, will contribute to lower income households.

Data Table

Click on column headers to sort table.

	Delaware County	Indiana	United States
Per capita personal income	\$32,896	\$41,940	\$48,112
Median household income	\$38,830	\$49,255	\$53,889

Download Spreadsheet

Source

- Bureau of Economic Analysis (<https://bea.gov/Table/ITable.cfm?reqid=70&step=1&isuri=1&acrdn=7#reqid=70&step=30&isuri=1&7022=2067023=787024=non-industry67033=167025=467026=xx67027=2015&7001=72067028=367031=1800067040=167083=level67029=2087090=70>)
- America Community Survey - [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_B19013&prodType=table\(Median Household Income in the past 12 months\)](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_B19013&prodType=table(Median Household Income in the past 12 months))

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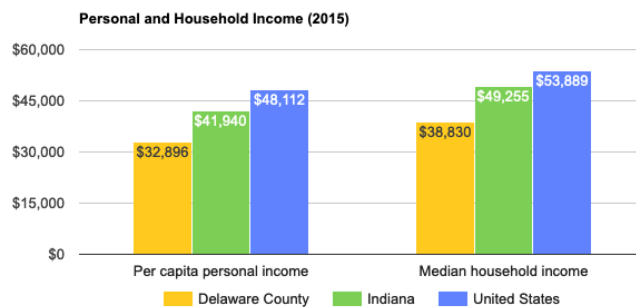
Using Google Charts

Google Charts uses JavaScript to read data and generate charts directly on your HTML5 webpage

1. Embed Google's JavaScript into the page
2. Specify chart type and appearance parameters in your code
3. Page code sources data points and generates graphic

Page Code

Personal and Household Income



This graph illustrates the county's per capita income and median household income relative to Indiana and the U.S. The personal income data includes income received by persons from all sources such as income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment and capital consumption adjustment, rental income of persons, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance. The household income data include both working, and non-working households, and may include students. Higher proportions of elderly and families with very young heads of households will contribute to the share of low-income households. Also, a high share of agriculture, which sees much of its wealth accruing outside of income, will contribute to lower income households.

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Personal and Household Income (2015)			
	Delaware County	Indiana	United States
Per capita personal income	\$32,896	\$41,940	\$48,112
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Download Spreadsheet

Source

- Bureau of Economic Analysis (<https://bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=7#reqid=70&step=30&isuri=1&7022=20&7023=7&7024=non-industry&7033=-1&7025=4&7026=xx&7027=2015&7001=720&7028=3&7031=18000&7040=-1&7083=levels&7029=20&7090=70>)
- America Community Survey - https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_B19013&prodType=table (Median Household Income in the past 12 months)

```
// Download Google's code used for generating Google Charts
<script type="text/javascript" src="https://www.google.com/jsapi"></script>
<script type="text/javascript">
```

```
// Initiate the Google Charts loader that will interpret the rest of our code
google.load("visualization", "1", {packages: ["corechart"]});
$(document).ready(function () {
```

```
// Begin defining a chart and identify where on the page it will be placed
const chartContainer = document.getElementById('chart_div');
const chart = new google.visualization.ColumnChart(chartContainer);
```

```
// Configure the appearance of the chart
const chartOptions = {
  "width": 725,
  "height": 300,
  "title": "Personal and Household Income (2015)",
  "titleTextStyle": {"color": "#000"},
  "legend": { "position": "bottom", "alignment": "center"
  },
  "vAxis": { "minValue": 0, "format": "$#,###"
  },
  "colors": [ "#FFCC33", "#81CF5A", "#5F8AFF" ]
};
```

```
// Define the data that will be displayed in the chart
const chartData = new google.visualization.arrayToDataTable([
  ['Category', 'Delaware County', 'Annotation', 'Indiana', 'Annotation', 'United States',
  'Annotation'],
  ['Per capita personal income', 32896, '$32,896', 41940, '$41,940', 48112, '$48,112'],
  ['Median household income', 38830, '$38,830', 49255, '$49,255', 53889, '$53,889']]);
```

```
// Tell Google Charts that some of the values should appear superimposed over the bars
chartData.setColumnProperty(2, 'role', 'annotation');
chartData.setColumnProperty(4, 'role', 'annotation');
chartData.setColumnProperty(6, 'role', 'annotation');
```

```
// Tell Google Charts to display each value as a dollar amount in popup windows
const formatter = new google.visualization.NumberFormat({pattern: '$#,###'});
formatter.format(chartData, 1);
formatter.format(chartData, 3);
formatter.format(chartData, 5);
```

```
// Generate and display the chart
chart.draw(chartData, chartOptions);
});
</script>
```



Community Readiness Initiative


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COMMUNITY READINESS INITIATIVE

- CRI Home
- Enroll
- FAQs for Communities
- Credits and Sources
- Login



The Indiana Office of Community and Rural Affairs invites your community to participate in the Community Readiness Initiative. [Enroll now.](#)

What Is the Community Readiness Initiative?

An objective perspective is difficult to gain from within your own community. The State of Indiana Office of Community of Rural Affairs (OCRA) invites your community to participate in the Community Readiness Initiative. Through the CRI program, teams will gain insight into the strengths and opportunities within their community to determine the best course of action to foster better community planning and growth for the future.

[View FAQ for communities](#)

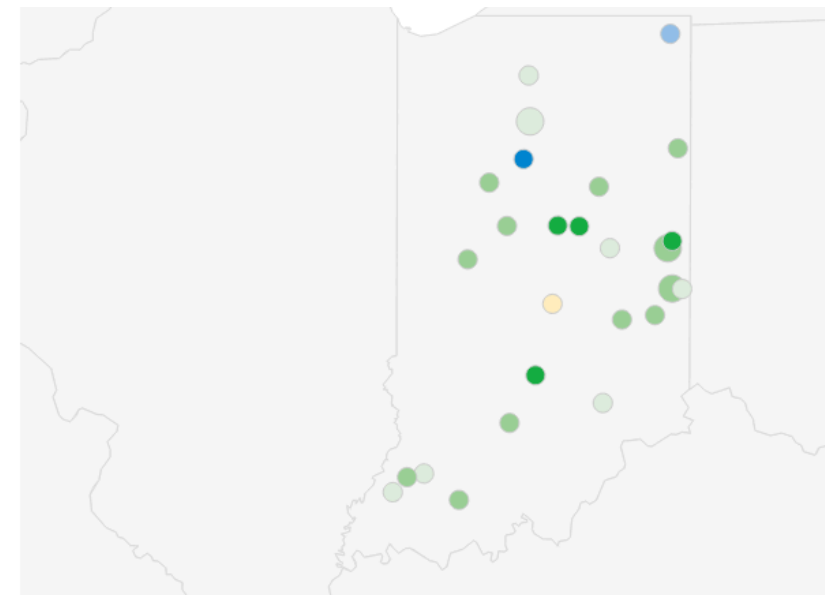
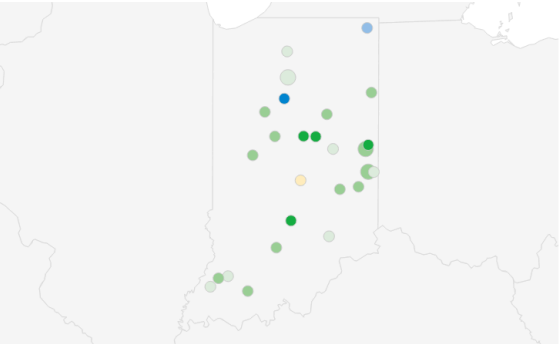
Email cricri@bsu.edu for questions and comments

Steps Toward Community Readiness








- [Enroll now](#) to participate in the Community Readiness Initiative or contact your [OCRA Community Liaison](#)
- Complete the leadership alignment assessment (for public officials)
- Complete the community alignment assessment (for organizations)
- Discuss preliminary community readiness findings during a town meeting
- Receive the community readiness report and establish an economic development policy

Map of Participating Communities

This map displays the communities that are currently taking part in the Community Readiness Initiative. See below for a legend that details the progress that each community has made, from enrollment to economic policy development.



CRI Phases

-  Prospective community
-  Enrolled
-  Leadership alignment survey phase
-  Leadership alignment analysis phase
-  Leadership alignment complete
-  Community org alignment survey phase
-  Community org alignment analysis phase



GeoCharts

1. Determine list of counties & municipalities
2. Write query to retrieve GPS coordinates from Google Maps API
3. Modify chart appearance
4. Source data points and generate map

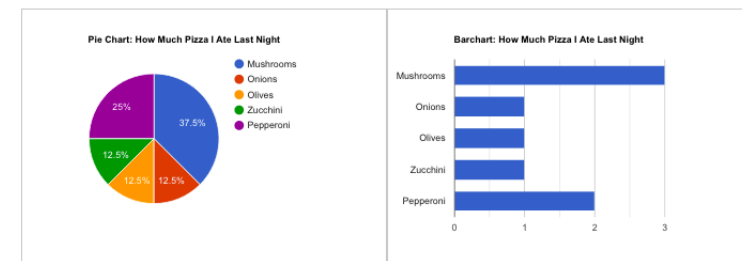


Why Google Charts?

- Rich set of features
- Longevity b/c Google product
- Free, open-source tools
- Robust developer guide
- Large developer community

Using a Single Callback to Draw Multiple Charts

The previous example uses two callbacks to draw the charts, because the data for the two charts are different. If you want to draw multiple charts for the same data, it may be more convenient to write a single callback for both charts. The following example illustrates this.



[Code it yourself on JSFiddle](#)

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

// Load Charts and the corechart and barchart packages.
google.charts.load('current', {'packages':['corechart']});

// Draw the pie chart and bar chart when Charts is loaded.
google.charts.setOnLoadCallback(drawChart);

function drawChart() {

var data = new google.visualization.DataTable();
data.addColumn('string', 'Topping');
data.addColumn('number', 'Slices');
data.addRows([
  ['Mushrooms', 3],
  ['Onions', 1],
  ['Olives', 1],
  ['Zucchini', 1],
  ['Pepperoni', 2]
]);

var piechart_options = {title:'Pie Chart: How Much Pizza I Ate Last Night',
  width:400,
  height:300};
var piechart = new google.visualization.PieChart(document.getElementById('piechart_div'));
```

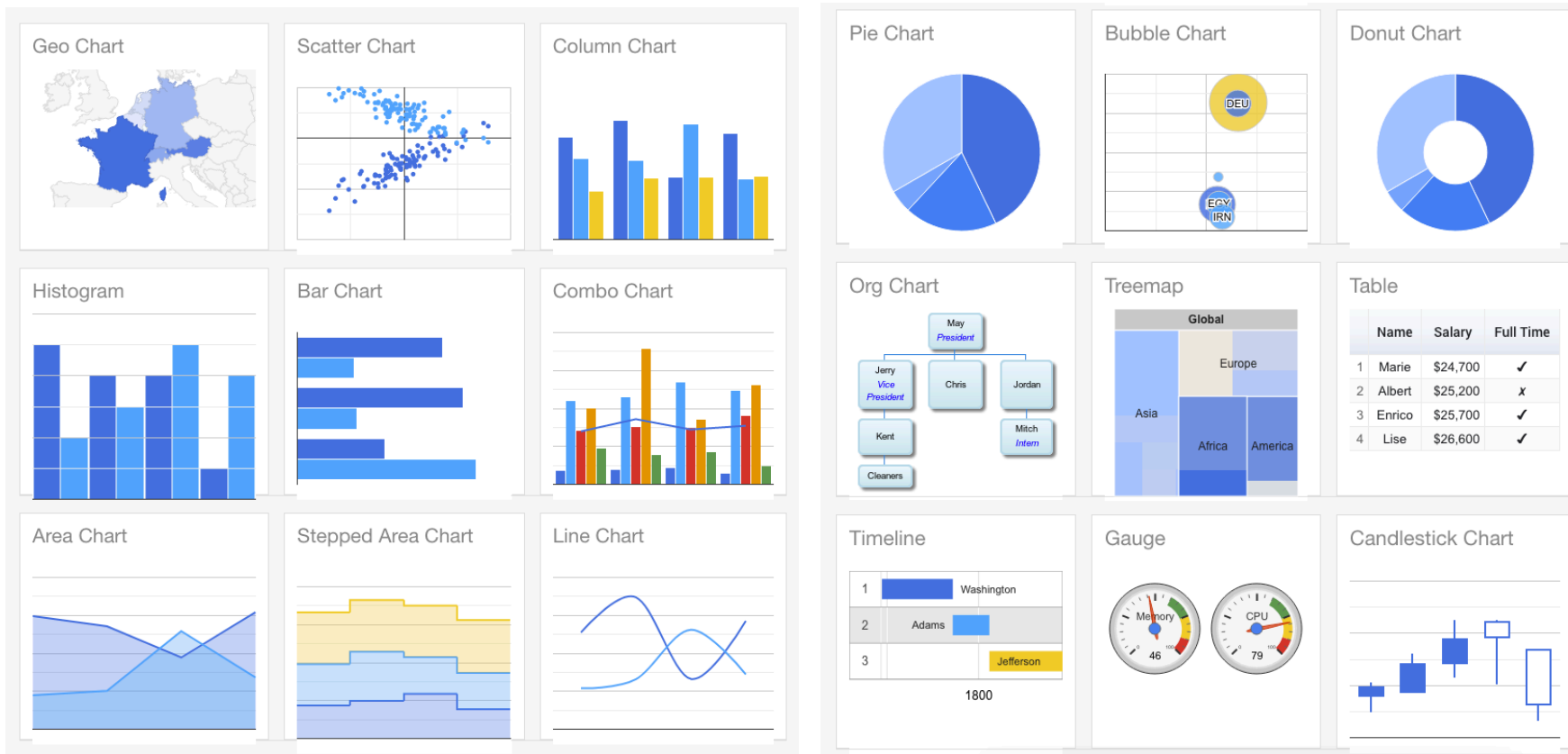


More from Google Charts

Other options and features



Chart Types



developers.google.com/chart



Other Features

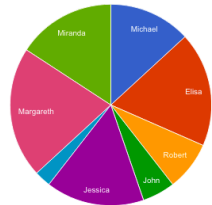
- Robust “how-to” guide & examples
- Animation
- Dashboards
- Interactive controls
- Export options
- Printable PNGs

Have a look at the following example where a category picker and a range slider are used to drive the data visualized by a pie chart.

Donuts eaten per person

Age Filter: 3.0 54.0

Gender Selection: Choose a value...



Name	Gender	Age	Donuts eaten
Michael	Male	12	5
Elisa	Female	20	7
Robert	Male	7	3
John	Male	54	2
Jessica	Female	22	6
Aaron	Male	3	1
Margareth	Female	42	8
Miranda	Female	33	6

★ Note: The dashboard is interactive. Try operating the controls and see the chart change in real time.

Using Controls and Dashboards

Here are the key steps for creating a dashboard and embedding it in your page. You'll find a code snippet demonstrating all these steps below, followed by detailed information about each step.

1. **Create an HTML skeleton for your dashboard.** Your page must have as many HTML elements as needed to hold every member of a dashboard. This includes the dashboard itself and all the controls and charts that are part of it. Typically you'll use a `<div>` for each one.
2. **Load your libraries.** A dashboard requires only two libraries to be included or loaded on the page: the Google AJAX API and the Google Visualization `controls` package.
3. **Prepare your data.** You'll need to prepare the data to visualize; this means either specifying the data yourself in code, or querying a remote site for data.
4. **Create a dashboard instance.** Instantiate your dashboard by calling its constructor and passing in a reference to the `<div>` element that will hold it.
5. **Create as many controls and charts instances as you need.** Create `google.visualization.ChartWrapper` and `google.visualization.ControlWrapper` instances to describe each chart and control that the dashboard manages.
6. **Establish dependencies.** Call `bind()` on your dashboard and pass in the control and chart instances to let the dashboard know what to manage. Once a control and chart are bound together, the dashboard updates the chart to match the constraints the control enforces over the data.
7. **Draw your dashboard.** Call `draw()` on your dashboard and pass in your data to draw the entire dashboard on the page.
8. **Programmatic changes after draw.** Optionally, after the initial draw you can programmatically drive the controls that are part of the dashboard, and have the dashboard update the charts in response to that.

Here's a simple example of a page that creates a simple dashboard with a range slider driving a pie chart. The resulting dashboard is shown below the snippet.

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1. Create An HTML Skeleton For Your Dashboard
2. Load Your Libraries
3. Prepare Your Data
4. Create A Dashboard Instance
5. Create Control And Chart Instances
6. Establish Dependencies
7. Draw Your Dashboard
8. Programmatic Changes After Draw

API Reference

- Dashboard
- ControlWrapper
- Methods
- ChartWrapper
- Controls Gallery
- CategoryFilter
- ChartRangeFilter
- DateRangeFilter
- NumberRangeFilter
- StringFilter



Contact



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Publications & Web Services

Ball State CBER **cber@bsu.edu**

bsu.edu/cber | cberdata.org | github.com/BallStateCBER