jansipke.nl

Photography, programming, puzzles and more...

Creating network diagrams with D3.js

D3.js is a JavaScript library for manipulating documents based on data. It can be used for all sorts of visualizations including network diagrams. In this article we will create a network diagram with nodes and directed links between them, visualized by circles and lines with arrowheads. We start with the file *index.html* that holds the HTML and basic SVG structure:

```
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="content-type"
content="text/html;charset=utf-8">
        <title>Cloud</title>
        <script type="text/javascript"
src="d3.v2.js"></script>
    </head>
    <body>
        <svg id="cloud" width="800"
height="600">
            <defs>
                <marker id="arrow"
viewbox="0 -5 10 10" refX="18" refY="0"
                        markerWidth="6"
markerHeight="6" orient="auto">
```

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You can contact me at jansipke@gmail.com

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```
                    <path
d="M0,-5L10,0L0,5Z">
                </marker>
            </defs>
        </svg>
        <link href="cloud.css"
rel="stylesheet" type="text/css" />
        <script src="cloud.js"
type="text/javascript"></script>
    </body>
</html>
```


The file *cloud.js* contains the Javascript code to generate the SVG code according to some JSON content:

```
var width = 1200;
var height = 800;

var color = d3.scale.category10();

var force = d3.layout.force()
    .charge(-180)
    .linkDistance(70)
    .size([width, height]);

var svg = d3.select("#cloud");

d3.json("cloud.json", function(json) {
    force
        .nodes(json.nodes)
        .links(json.links)
        .start();

    var links =
svg.append("g").selectAll("line.link")
        .data(force.links())
        .enter().append("line")
        .attr("class", "link")
        .attr("marker-end",
"url(#arrow)");

    var nodes =
svg.selectAll("circle.node")
        .data(force.nodes())
        .enter().append("circle")
        .attr("class", "node")
        .attr("r", 8)
        .style("fill", function(d) {
return color(d.group); })
```

```
        .call(force.drag);

    nodes.append("title")
        .text(function(d) { return d.name;
});

    force.on("tick", function() {
        links.attr("x1", function(d) {
return d.source.x; })
            .attr("y1", function(d) {
return d.source.y; })
            .attr("x2", function(d) {
return d.target.x; })
            .attr("y2", function(d) {
return d.target.y; });

        nodes.attr("cx", function(d) {
return d.x; })
            .attr("cy", function(d) {
return d.y; });
    });
});
```

The file *cloud.json* contains the JSON that the Javascript uses to create SVG:

```
{
    "nodes":
        [
            {"name":"Client 1",
"group":1},
            {"name":"Loadbalancer 1",
"group":2},
            {"name":"Webserver 1",
"group":3},
            {"name":"Webserver 2",
"group":3}
        ],
    "links":
        [
            {"source":0, "target":1,
"value":1},
            {"source":1, "target":2,
"value":1},
            {"source":1, "target":3,
"value":1}
        ]
}
```

The final file *cloud.css* contains the CSS to make things more pretty:

```
circle.node {
    stroke: #fff;
    stroke-width: 3px;
}

line.link {
    stroke-width: 2px;
    stroke: #999;
    stroke-opacity: 0.6;
}

marker#arrow {
    stroke: #999;
    fill: #999;
}
```

Tagged on: Javascript Visualization

admin 2012-09-25 Programming 10 Comments

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Using the pipe backend in PowerDNS →

10 thoughts on “Creating network diagrams with D3.js”

João
2013-04-19 at 09:24
Permalink

Hi,

Awesome tutorial.. What if i want to add the name of the node to appear inside the node itself????

Thanks for the tutorial,
João

Reply

Jacob Briggs
2015-03-16 at 16:45
Permalink

Joao, here you go:

cloud.js

```
var width = 1200;

var height = 800;

var color = d3.scale.category10();

var force = d3.layout.force()
    .charge(-180)
    .linkDistance(70)
    .size([width, height]);

var svg = d3.select("#cloud");

d3.json("cloud.json", function(json) {
    force
        .nodes(json.nodes)
        .links(json.links)
```

```
    .start();

var links = svg.append("g").selectAll("line.link")
    .data(force.links())
    .enter().append("line")
    .attr("class", "link")
    .attr("marker-end", "url(#arrow)");

var nodes = svg.append("g").selectAll("circle.node")
    .data(force.nodes())
    .enter().append("circle")
    .attr("class", "node")
    .attr("r", 8)
    .style("fill", function(d) { return color(d.group); })
    .call(force.drag);

var texts =  svg.append("g").selectAll("circle.node")
    .data(force.nodes())
    .enter().append("text")
    .attr("class", "label")
    .text(function(d) { return d.name; })
    .call(force.drag);

force.on("tick", function() {
```

```
    links.attr("x1", function(d) { return d.source.x; })
        .attr("y1", function(d) { return d.source.y; })
        .attr("x2", function(d) { return d.target.x; })
        .attr("y2", function(d) { return d.target.y; });

    nodes.attr("cx", function(d) { return d.x; })
        .attr("cy", function(d) { return d.y; });

        texts.attr("x", function(d) { return d.x; })
            .attr("y", function(d) { return d.y; });
    });
});
```

cloud.css

```
circle.node {
    stroke: #fff;
    stroke-width: 3px;
}

line.link {
  stroke-width: 2px;
  stroke: #999;
  stroke-opacity: 0.6;
```

```
}

text.label {
  font: 10px sans-serif;
  pointer-events: none;
  text-shadow: 0 1px 0 #fff, 1px 0 0 #fff, 0 -1px 0 #fff, -1px 0 0 #fff;
}

marker#arrow {
    stroke: #999;
    fill: #999;
}
```

Reply

Rakesh Ranjan
2015-08-20 at 12:49
Permalink

How to make marker for arrow in script tag so that i can change its color(fill) dynamically

Reply

Rithvika
2016-08-05 at 09:15
Permalink

How to give images from json data?

Reply

Knut
2015-04-01 at 12:51
Permalink

Thanks a ton for this template!
I struggled for quite some time with the dragging behavior of the labels… :-/ But now it's up and running.

Groetjes,
Knut

Reply

Poyal Biswas
2015-04-14 at 15:14
Permalink

I am trying to develop a similar kind of project in eclipse. I just wanted to know the directory structure, as in where should the css files be located and where will my json data be kept?

Reply

Suyash
2015-06-26 at 07:35
Permalink

hello
i want to display connection among nodes like a central node is connected to subnodes …i want to display it with sequence diagram..
can u please provide me one template to implement it

Reply

Bilal
2015-10-25 at 14:24

Permalink

Hello,

Thanks for this great tutorial, very usefull to start great stuff with d3js.
I produced this jsfiddle example with your code :
http://jsfiddle.net/bilalel/7avxbpyj/

Bilal

Reply

Kailas
2016-02-15 at 06:09
Permalink

Great Tutorial,

Hi Jan, I am trying to develop network diagram but unable display small and big nodes positions.

http://stackoverflow.com/questions/35377229/how-to-show-big-circle-outer-side-and-small-circle-inner-side-in-d3js

https://plnkr.co/edit/I9zhUBDgAct1b1zxEXI8?p=preview

Please Help Me.

Reply

Michael Kalango
2019-03-28 at 15:07
Permalink

Hi, how can i create such a project using a spreadsheet data to create the nodes, links and arrow

direction dynamically. Would love the help as its all meant to be packaged as an app.

The generated network diagram can be interacted with to show the shortest links to things, a change in direction of arrow affects the spreadsheet data automatically

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