

D3.js Data Visualization Fundamentals

COVERING THE BASICS



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Overview

What is D3?

Origins

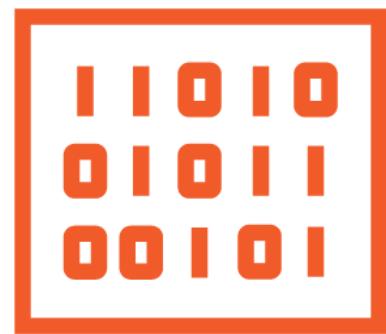
Scalable Vector Graphics (SVG)

- Render technology
- Drawing shapes
- With SVG as well as with D3 and SVG

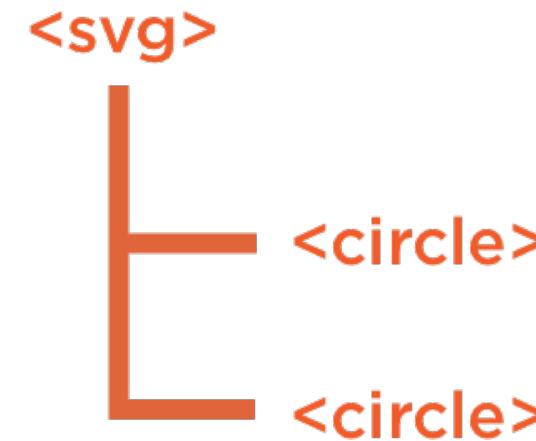
How D3 can help you

Data-Driven Documents

Data-Driven Documents

A square icon containing binary code. It has a thick orange border and a white background. Inside, the binary digits '11010', '01011', and '00101' are arranged in three rows, each consisting of five digits.

11010
01011
00101

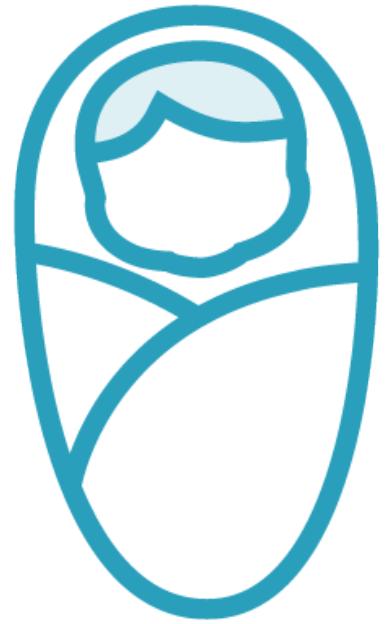
A diagram illustrating an SVG structure. It shows a large orange bracket labeled '<svg>' at the top. Below it, a smaller bracket on the left is labeled '<circle>' and another smaller bracket on the right is also labeled '<circle>'.

<svg>

<circle>

<circle>

D3 Origins



Born 2011



Stanford Vis Group

Mike Bostock

CITATION



D3: Data-Driven Documents

Michael Bostock, Vadim Ogievetsky, Jeffrey Heer

IEEE Trans. Visualization & Comp. Graphics (Proc. InfoVis), 2011

[PDF](#) | [Software](#) | [Video](#)

Data-Driven Documents (D3) is a novel representation-transparent approach to **visualization for the web**.

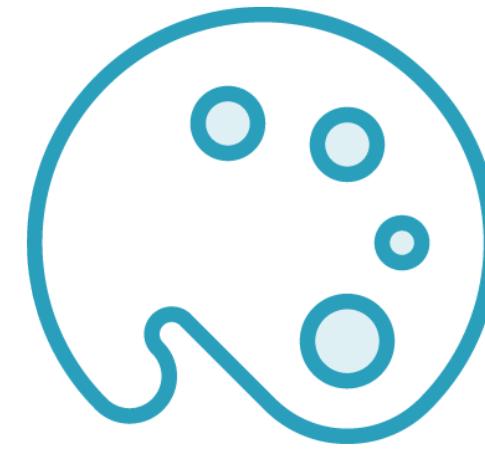
Rather than hide the underlying scenegraph within a toolkit-specific abstraction, D3 enables direct inspection and manipulation of a native representation: the standard document object model **(DOM)**. With D3, designers selectively **bind** input data to arbitrary document elements, applying **dynamic transforms** to both generate and modify content.

```
d3.barChart(data)
    .pleaseMakeMyChart();
```

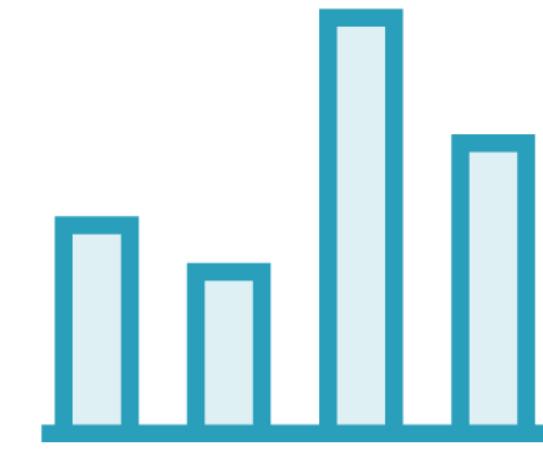
D3 Strengths



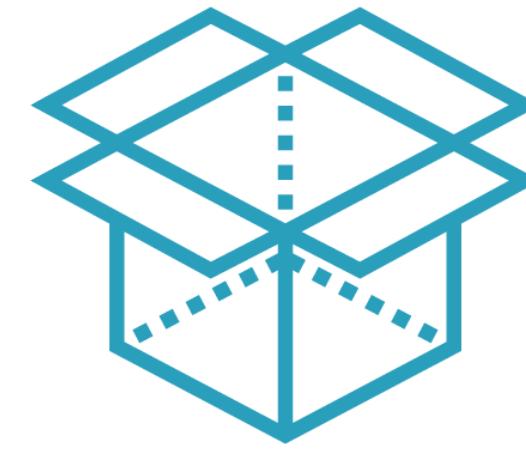
You are in control



Expressive



**Standard or fully
bespoke charts**

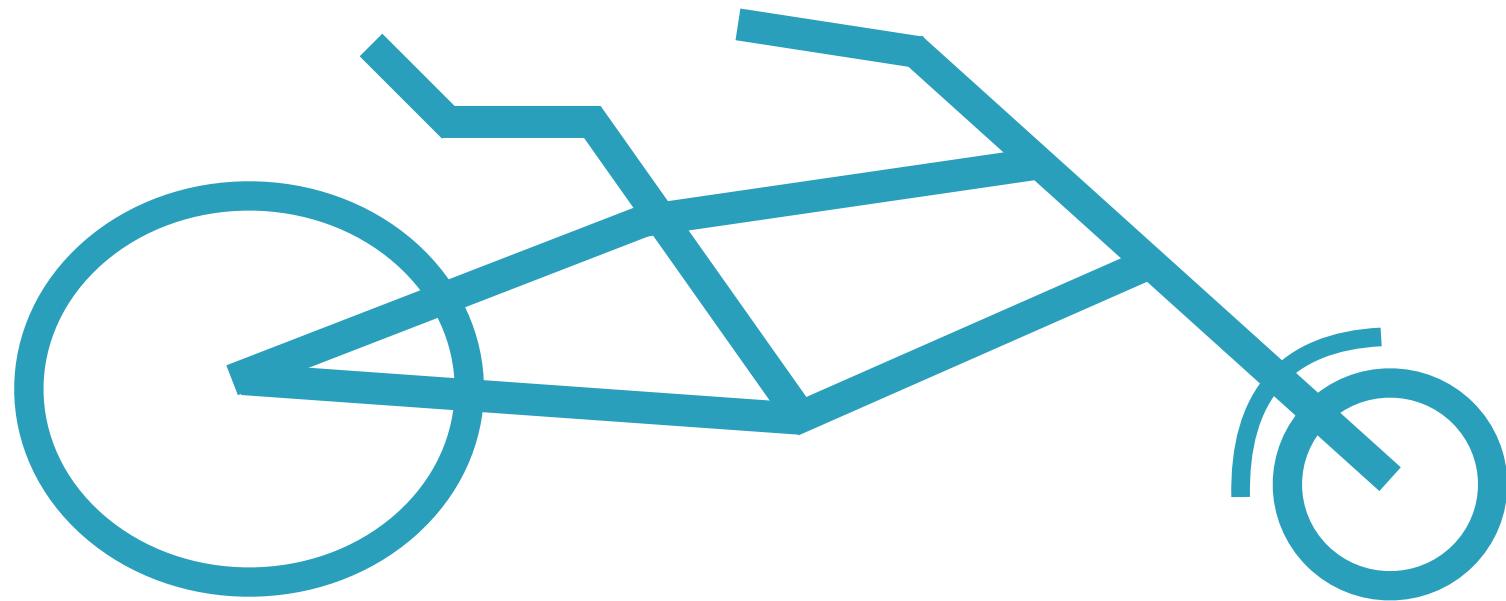


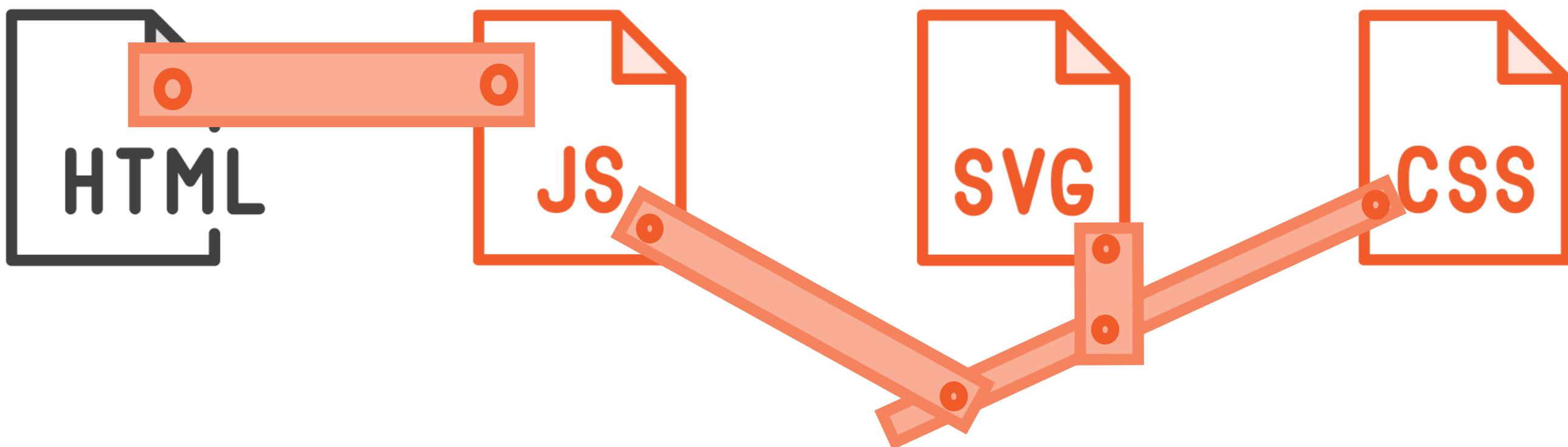
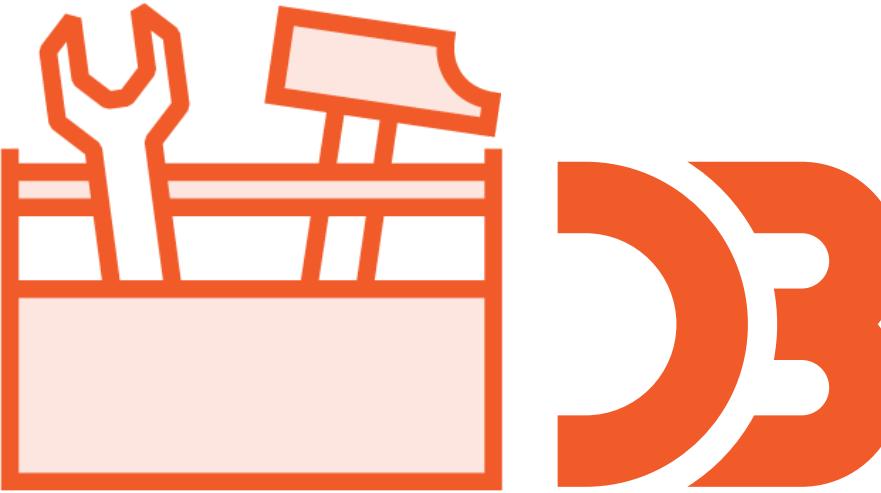
Not boxed in

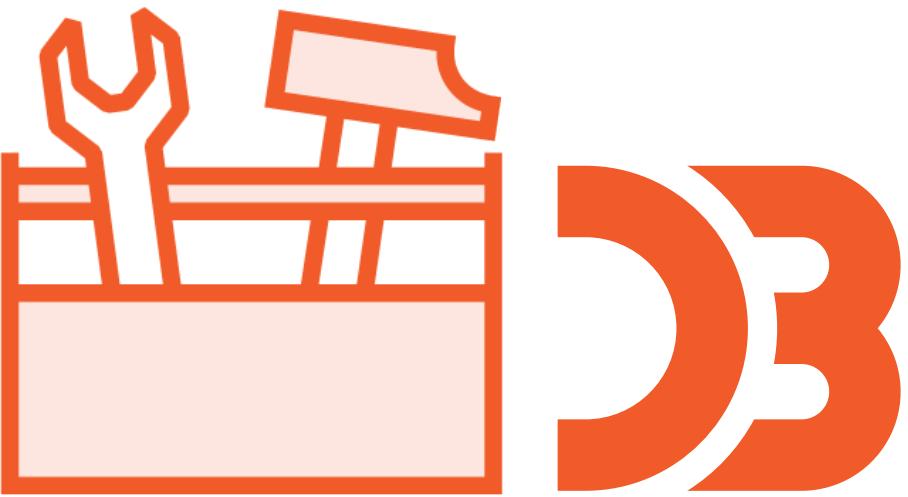
Your Strengths



Your Strengths



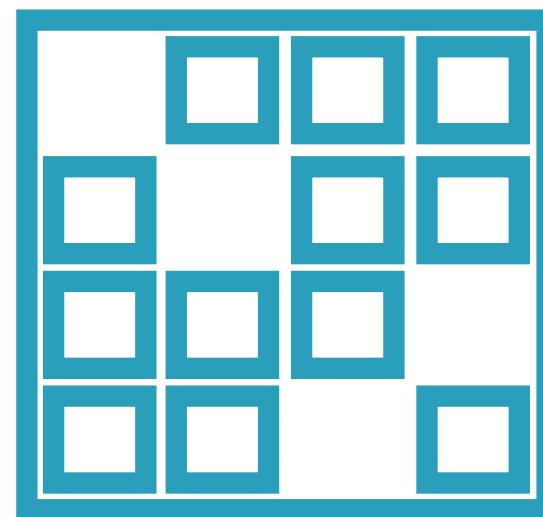




What's in It?

What's in It?

v5

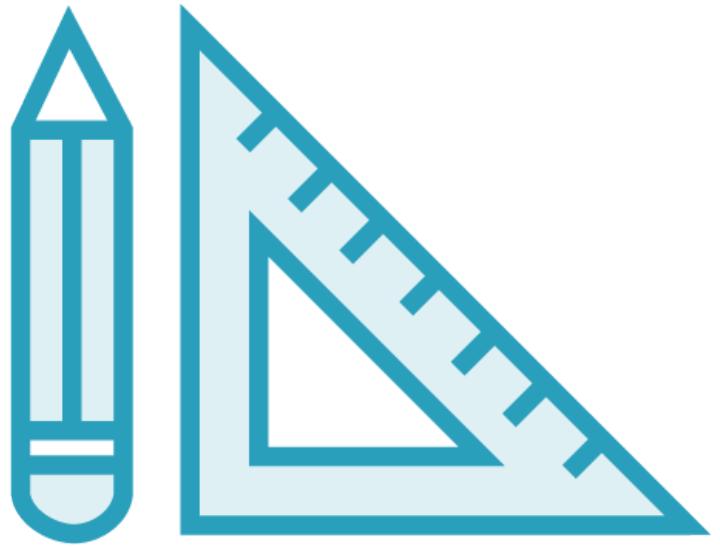


Modular system



Build your own

Rendering D3

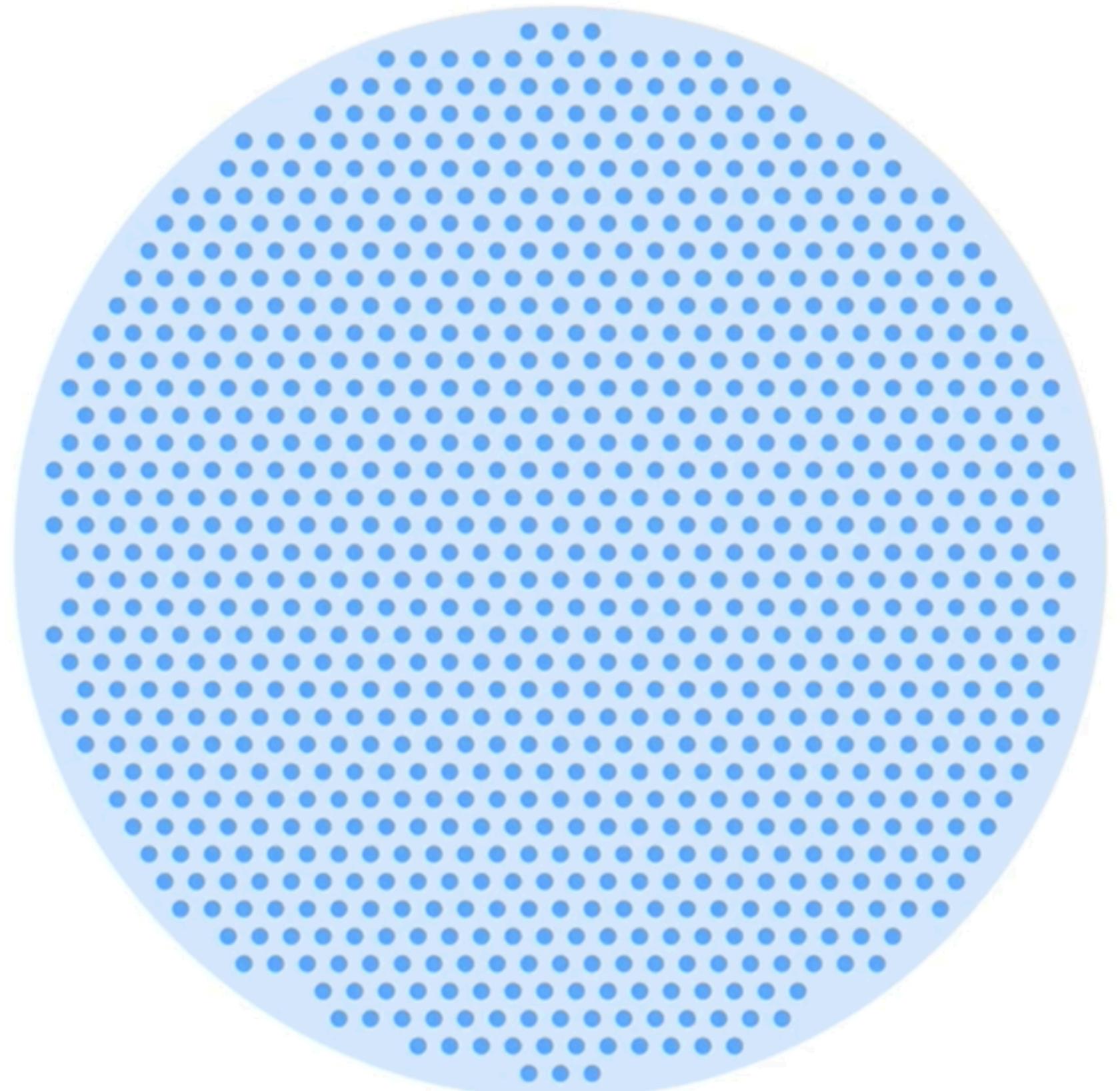


**Technology to
draw/render**



**D3 doesn't draw
It helps you draw.**

D3 Functions



D3 Modules



D3 Modules



d3-shape
helps you to draw

D3 Modules



d3-scale
data to screen space

D3 Modules



d3-selection
join data to elements
manipulate DOM

D3 Modules



d3-geo
projections
spherical maths

D3 Modules



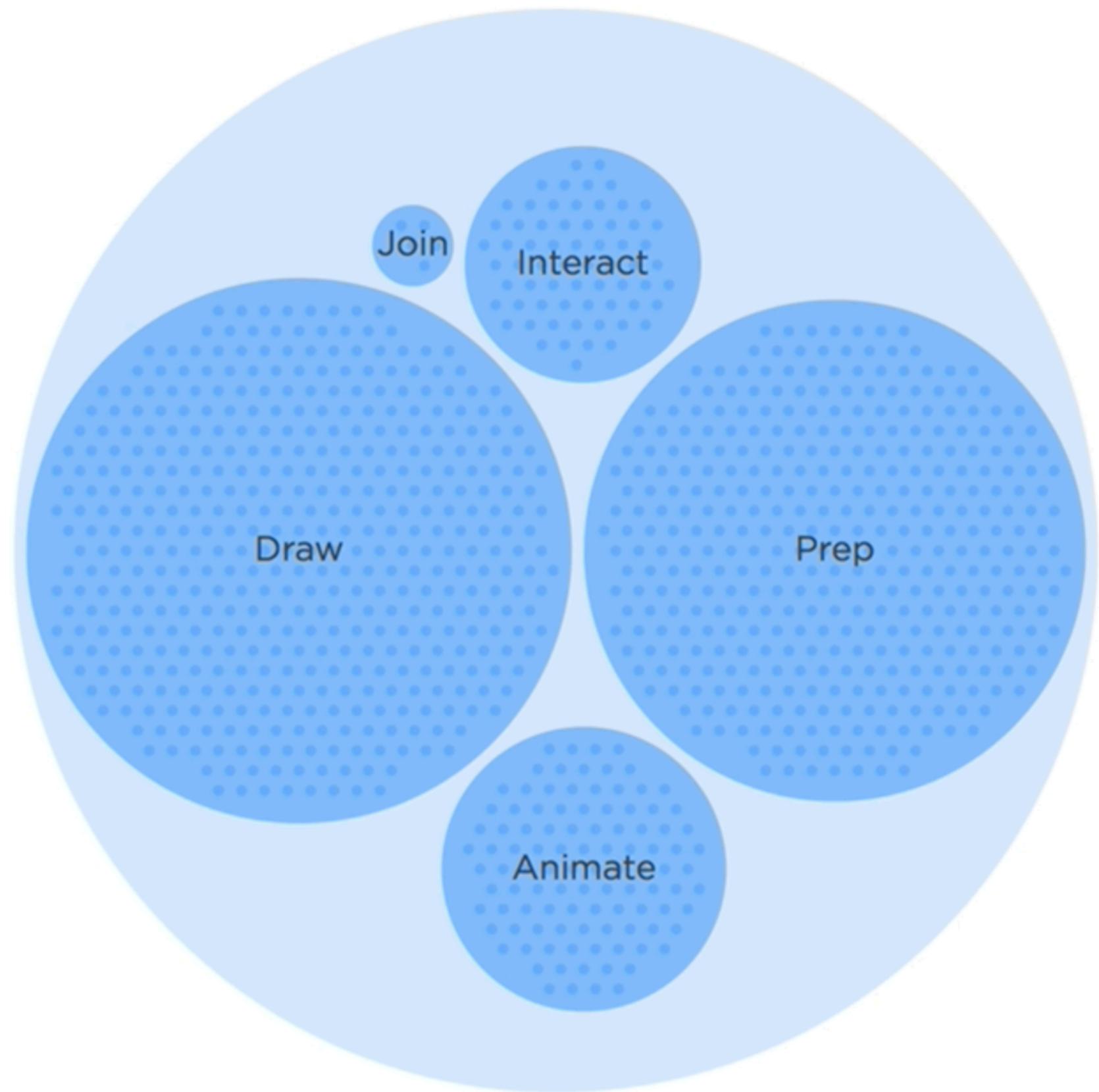
d3-axis
make axes

D3 Modules

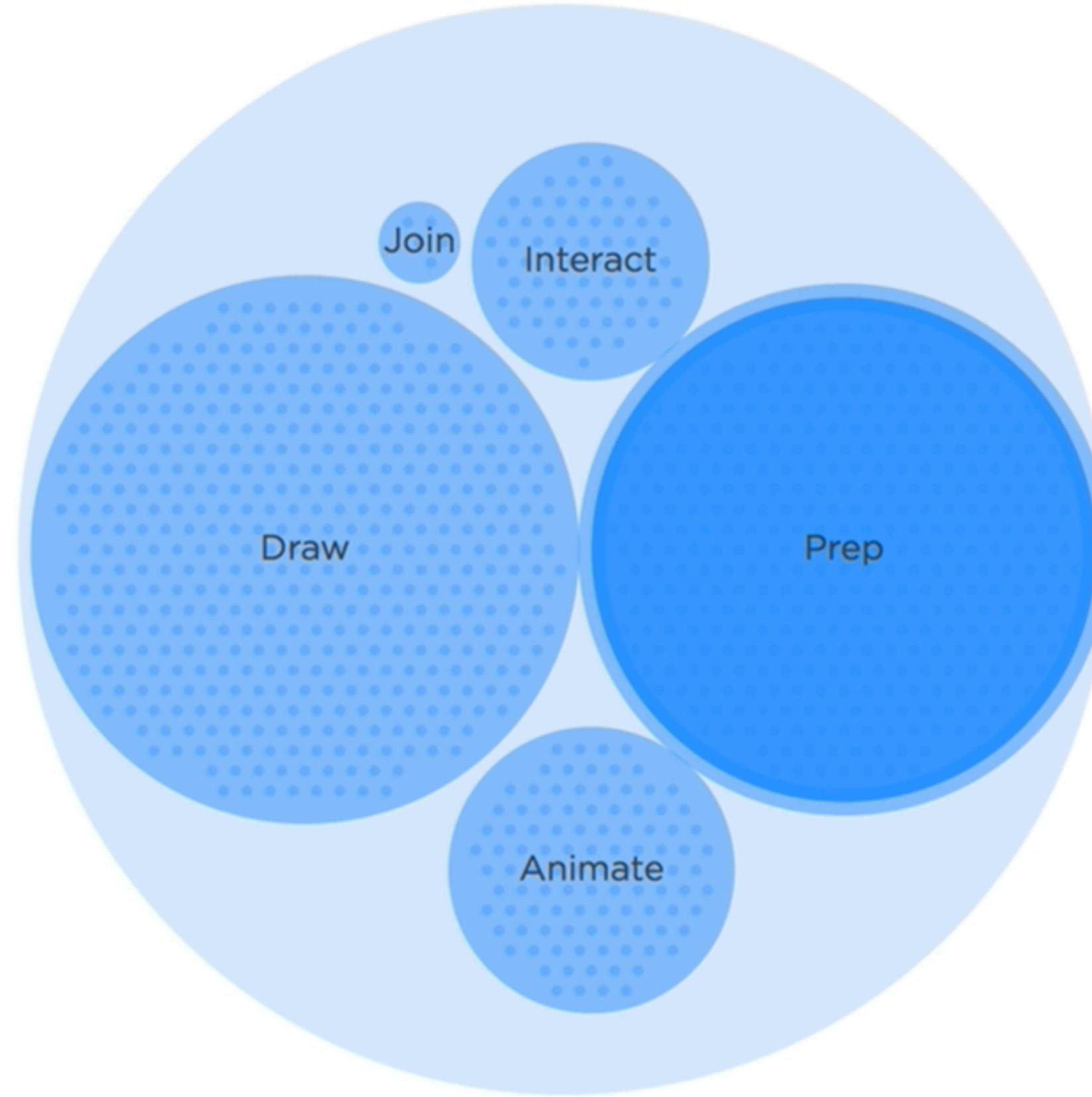


d3-zoom
helps you to
zoom and pan

D3 Visualization Process



D3 Visualization Process



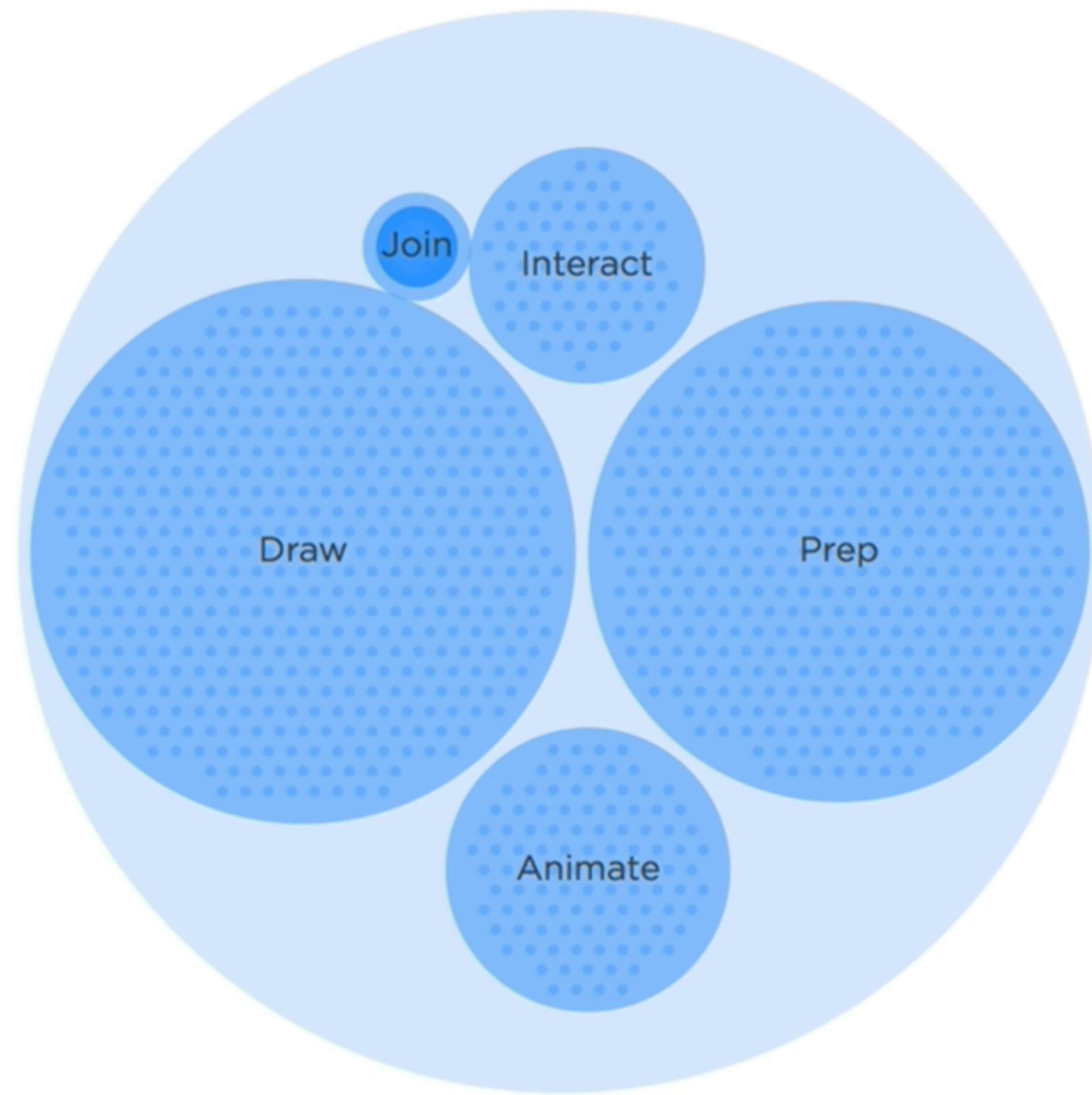
1. Data Preparation

Data utilities

Data scales

Data layouts

D3 Visualization Process



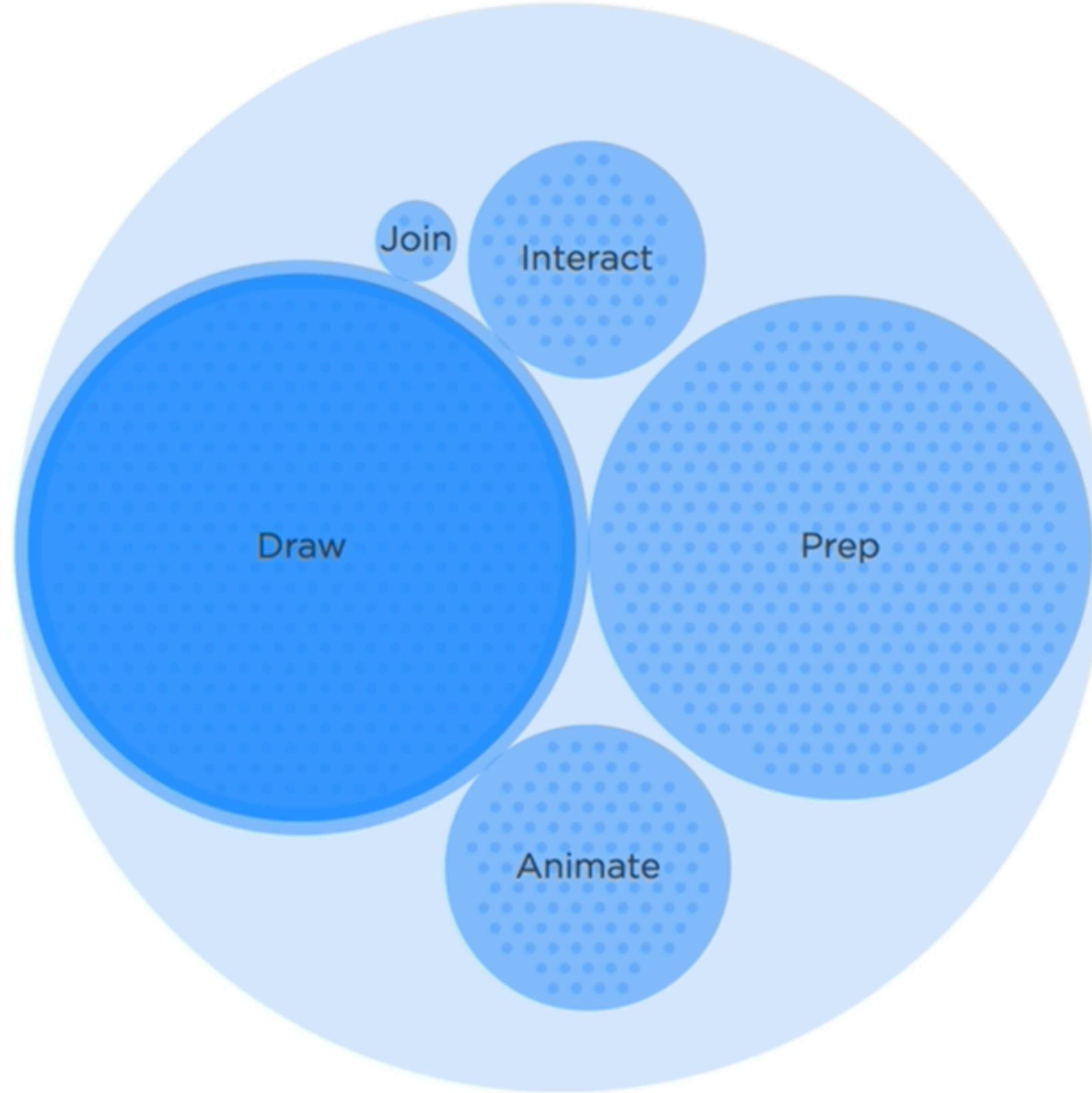
1. Data Preparation

2. Data join

Core Principle

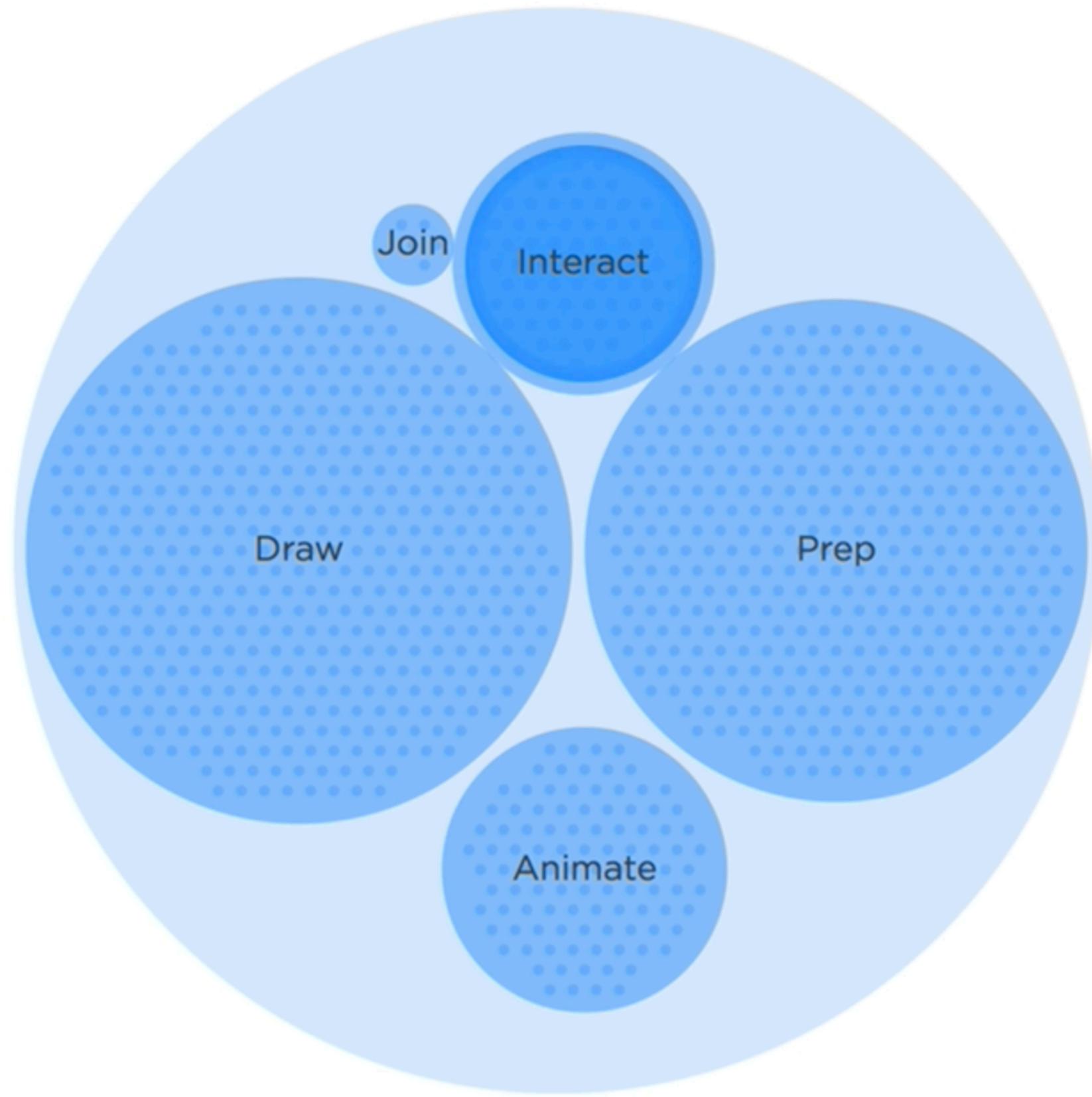
Joining data &
DOM elements

D3 Visualization Process



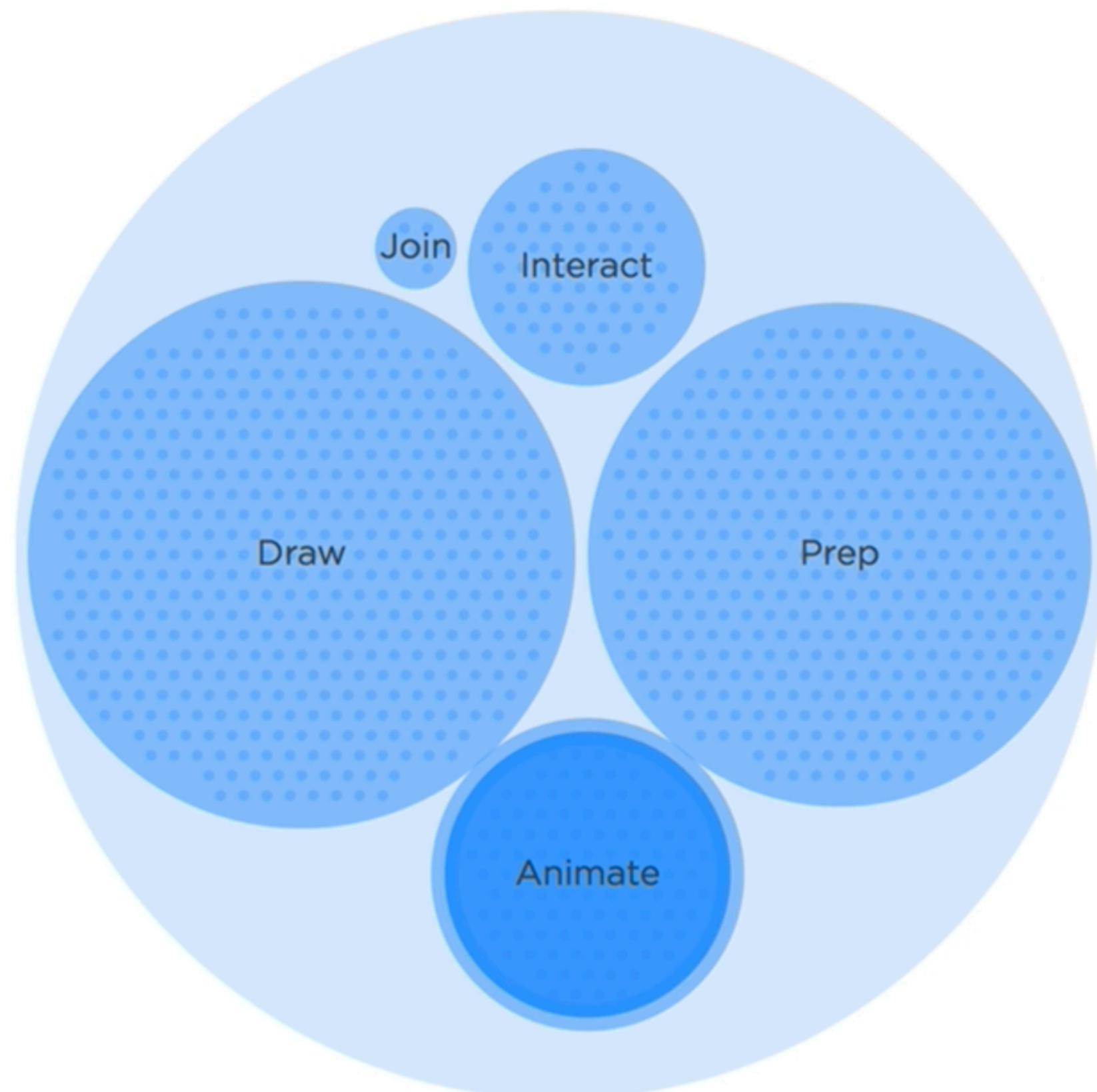
- 1. Data Preparation**
- 2. Data join**
- 3. Drawing**
 - Arcs
 - Polygons
 - Areas
 - Lines

D3 Visualization Process



- 1. Data Preparation**
- 2. Data join**
- 3. Drawing**
- 4. Interaction**
 - Zoom
 - Pan & Drag
 - Brush

D3 Visualization Process



- 1. Data Preparation**
 - 2. Data join**
 - 3. Drawing**
 - 4. Interaction**
 - 5. Animation**
- Transitions
Built in
Cheap

Rendering D3

<html>



<div>
<div>

1.

<svg>



<rect>
<circle>

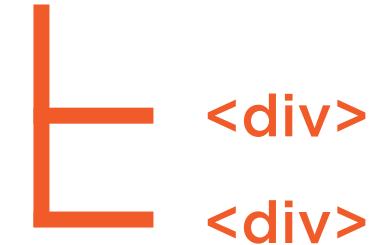
2.

<canvas>

3.

Rendering D3

<html>



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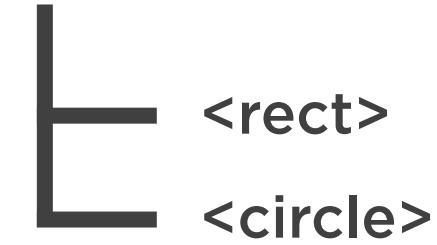
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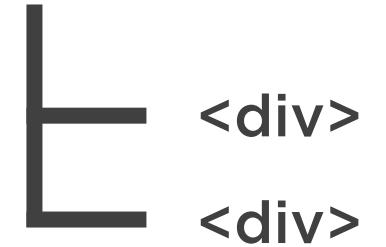
<svg>



<canvas>

Rendering D3

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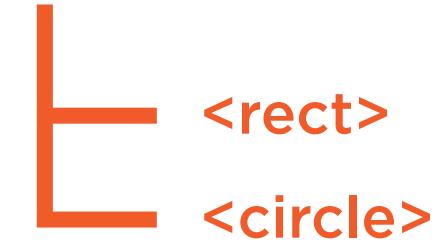
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<p>

<p>

<footer>

<svg>



<circle>



<rect>



<line>



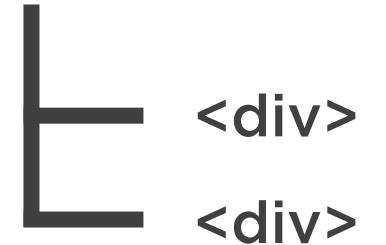
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<canvas>

Rendering D3

<html>



<header>

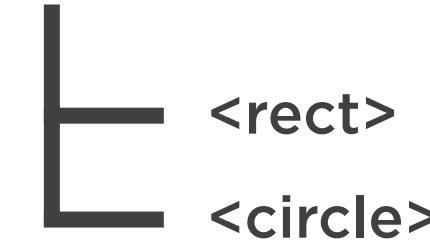
<div>

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<svg>



<circle>



<rect>



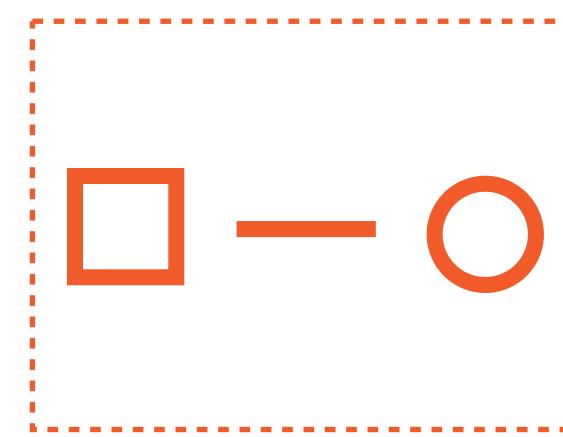
<line>



<path>



<canvas>



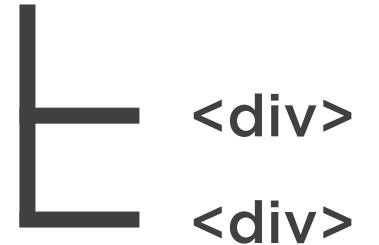
context.fillRect()

context.lineTo()

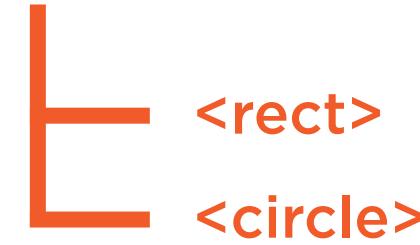
context.arc()

Rendering D3

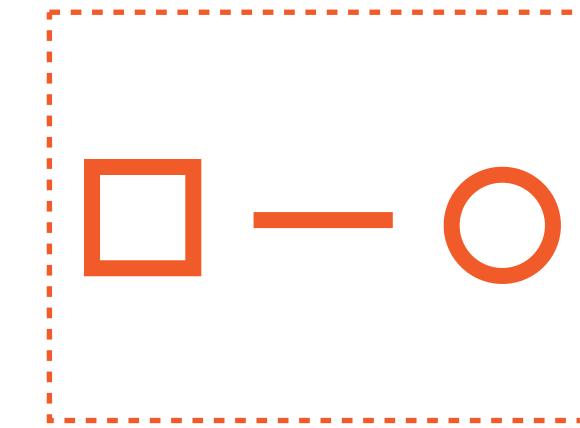
<html>



<svg>



<canvas>



<header>

<div>

<p>

<p>

<footer>



<circle>



<rect>



<line>



<path>



Rendering D3

Scalable Vector Graphics

<svg>



<rect>
<circle>



<circle>



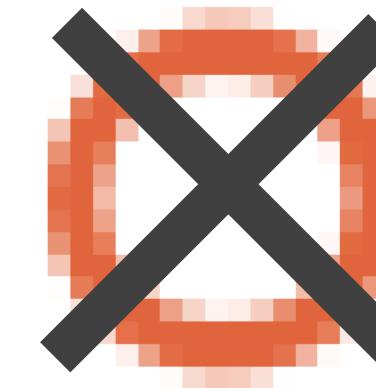
<rect>



<line>



<path>



Summary

D3 overview

Modular toolbox

SVG

Drawing with SVG

Drawing SVG with D3