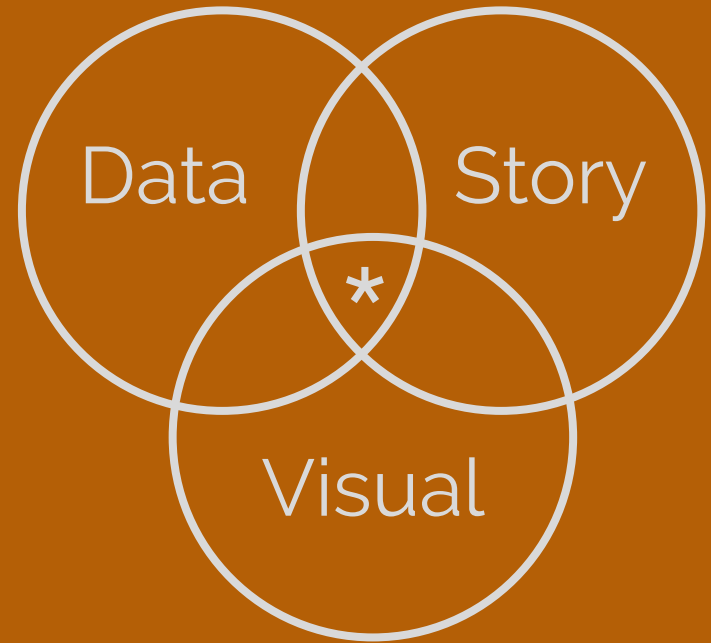# Data Visualisation

Amit Kapoor
@amitkaps

Interaction

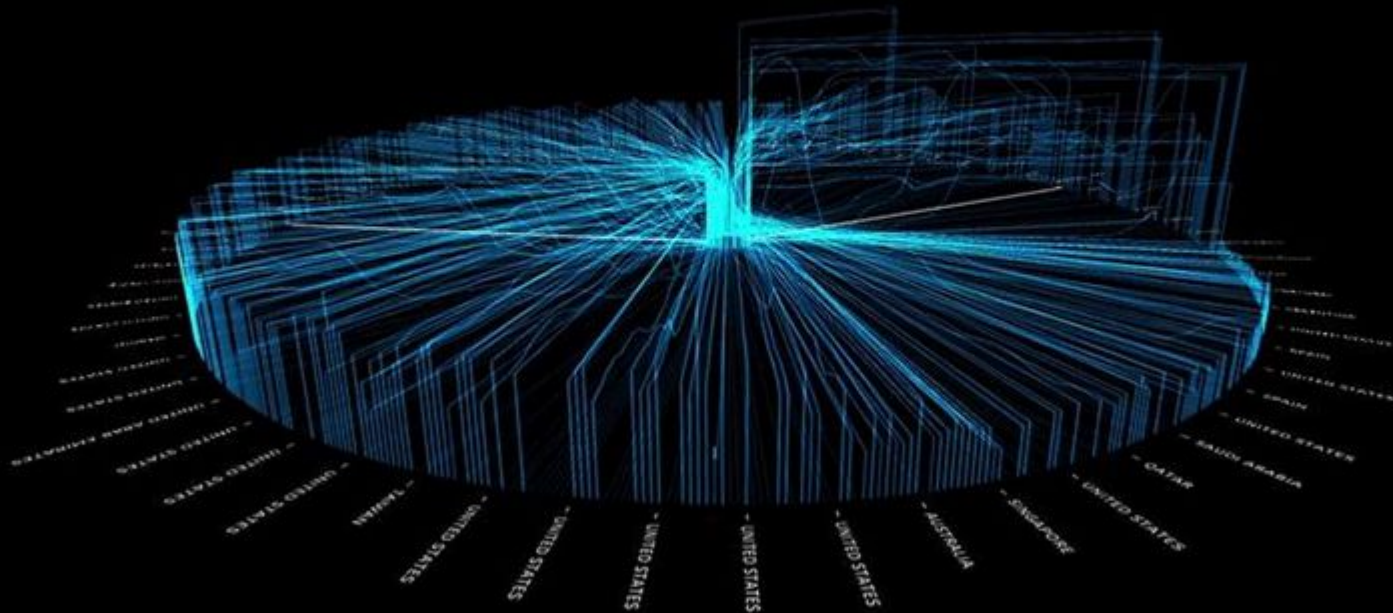# Animation (Motion)

Use of Motion

- Visual variable to encode data

- Direct attention

- Increase engagement

- Understand state transitions

- Understand system dynamics

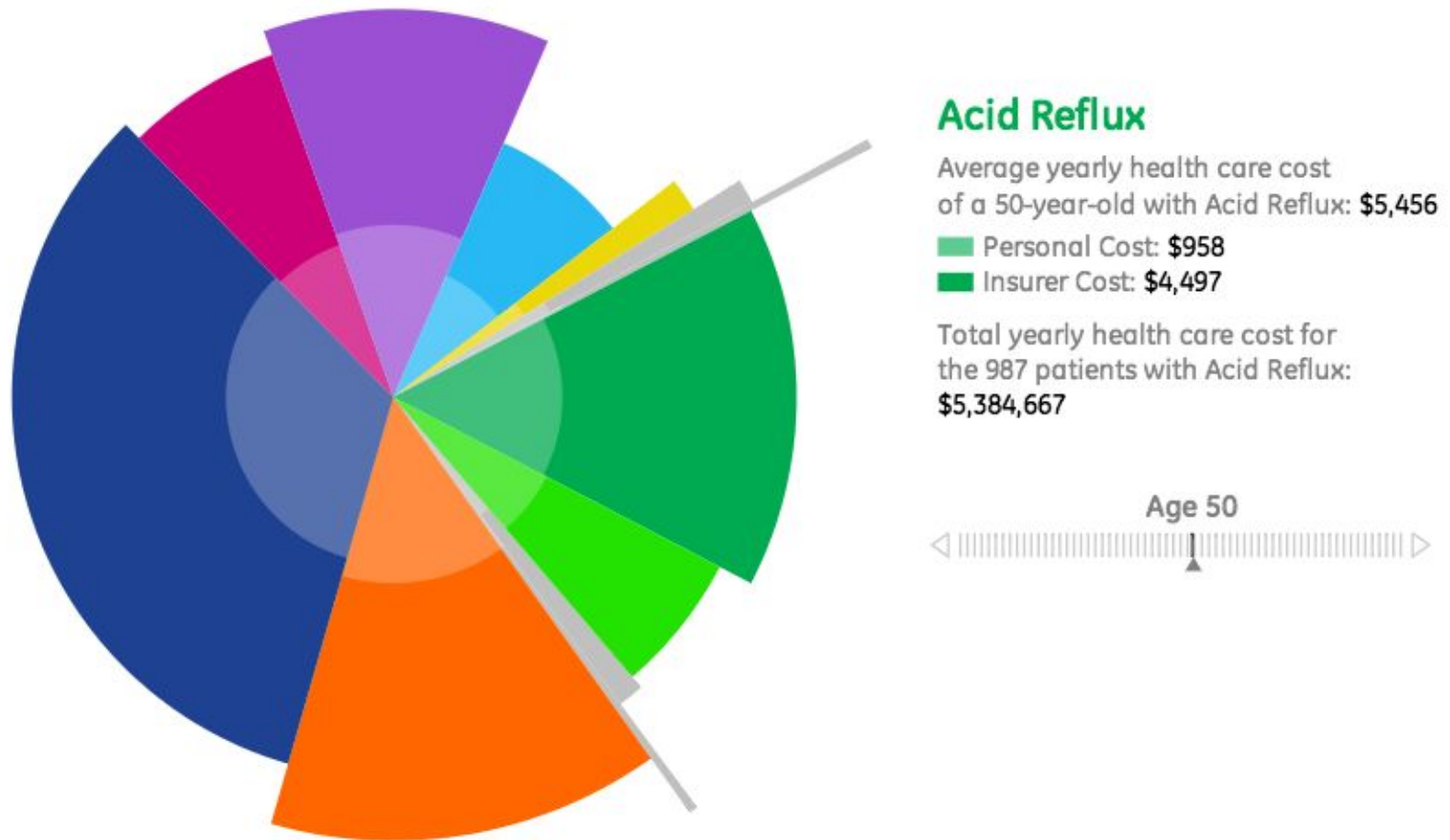# Encode Variables

Powering the World

Each flash represents a turbine turning on at some location in the world.

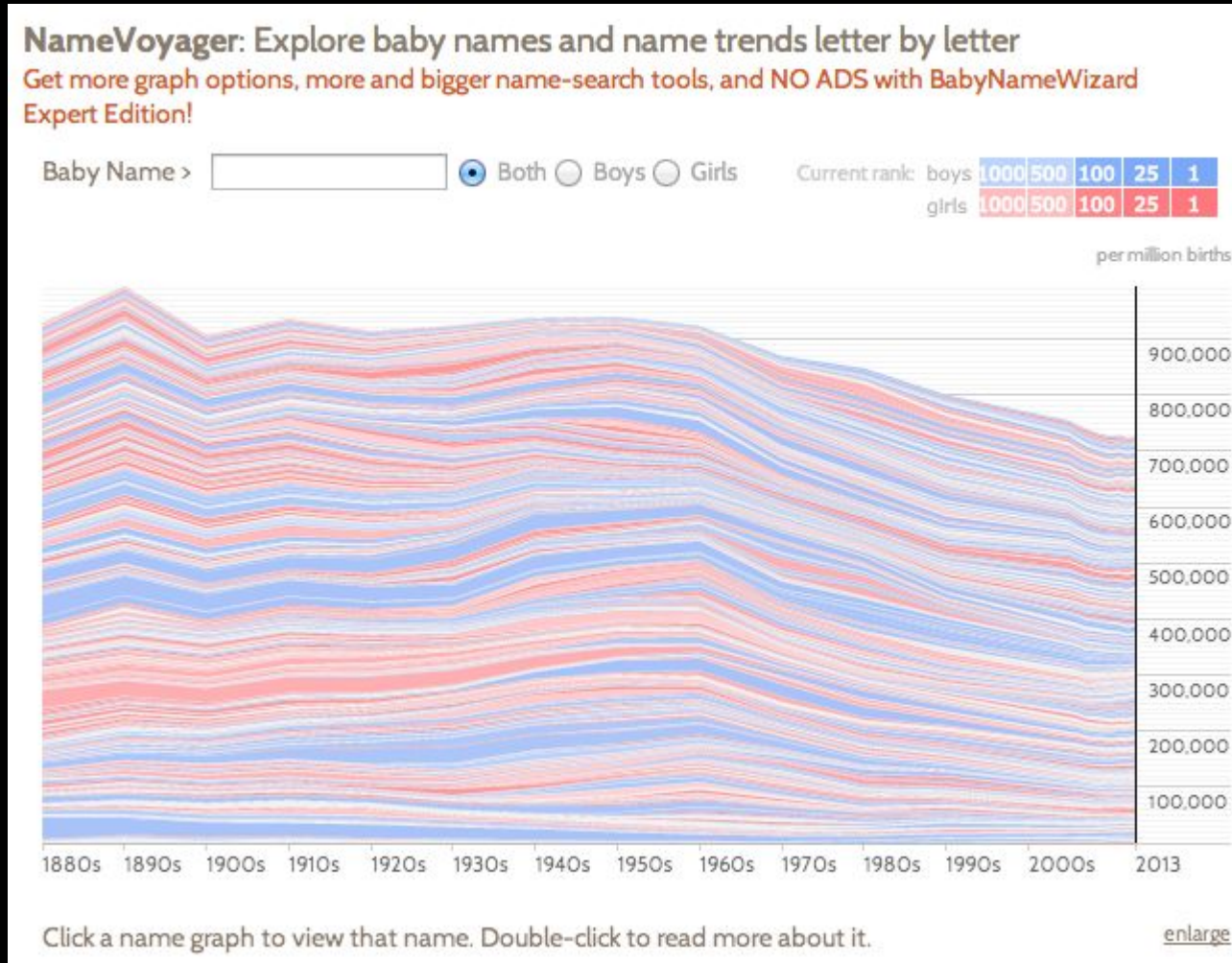The wheel is arranged according to capacity of the turbines.

Source: Turbine Power
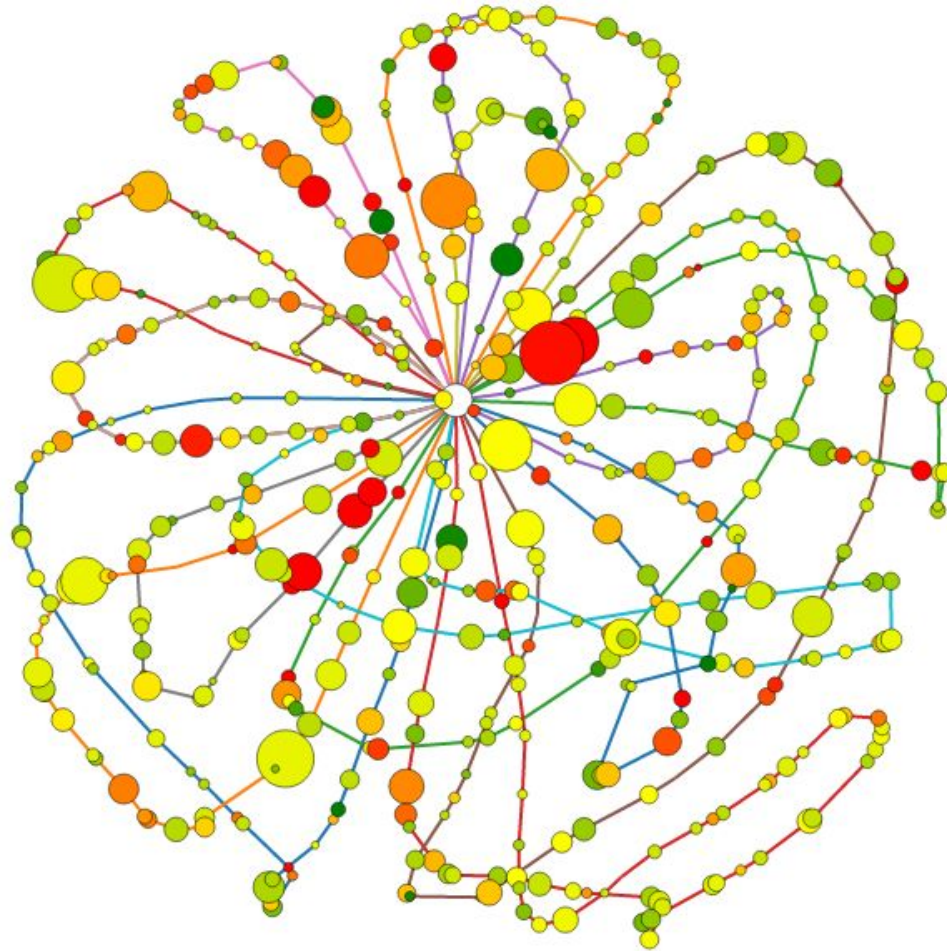
Attention & Engagment

Acid Reflux

Average yearly health care cost
of a 50-year-old with Acid Reflux: **$5,456**

■ Personal Cost: **$958**
■ Insurer Cost: **$4,497**

Total yearly health care cost for
the 987 patients with Acid Reflux:
$5,384,667

Age 50

◁ |||||||||||||||||||||||||||||||||||| ▷

Source: Cost of Sick

Motion - State Changes

Source: Baby Names Voyager
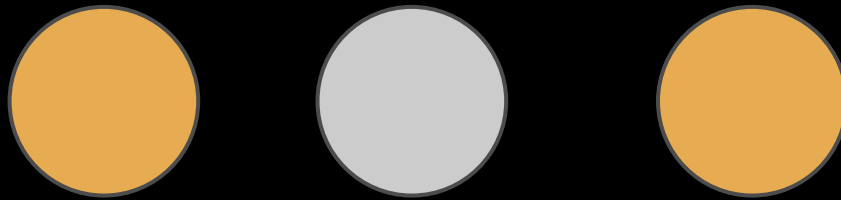
Motion-System Dynamics

Source: Route Map

Motion Pre-attentive

Pre-attentive, stronger than color, shape, ...

More sensitive to motion at periphery

Similar motions perceived as a group

Smooth at 24fps

Selective Attention

Source: Daniel Simons

Principles of Animation

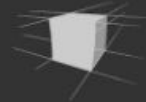|			
SQUASH & STRETCH	STAGING	ANTICIPATION	STRAIGHT AHEAD & POSE TO POSE
FOLLOW THROUGH & OVERLAPPING	SLOW IN & SLOW OUT	ARCS	SECONDARY ACTION
TIMING	EXAGGERATION	SOLID DRAWINGS	APPEAL

Source: 12 principles of Animation

Animation in Data Viz
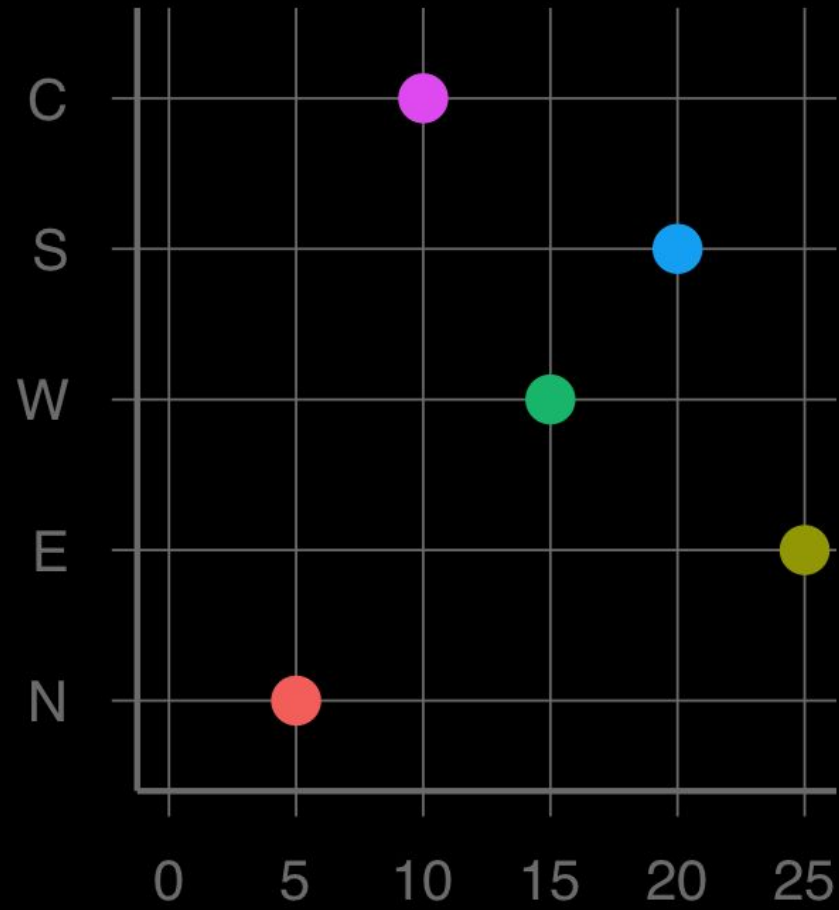
Make all motion meaningful

Avoid squash-stretch, exaggeration

Use consistent visual marks

Use simple transition - anticipation
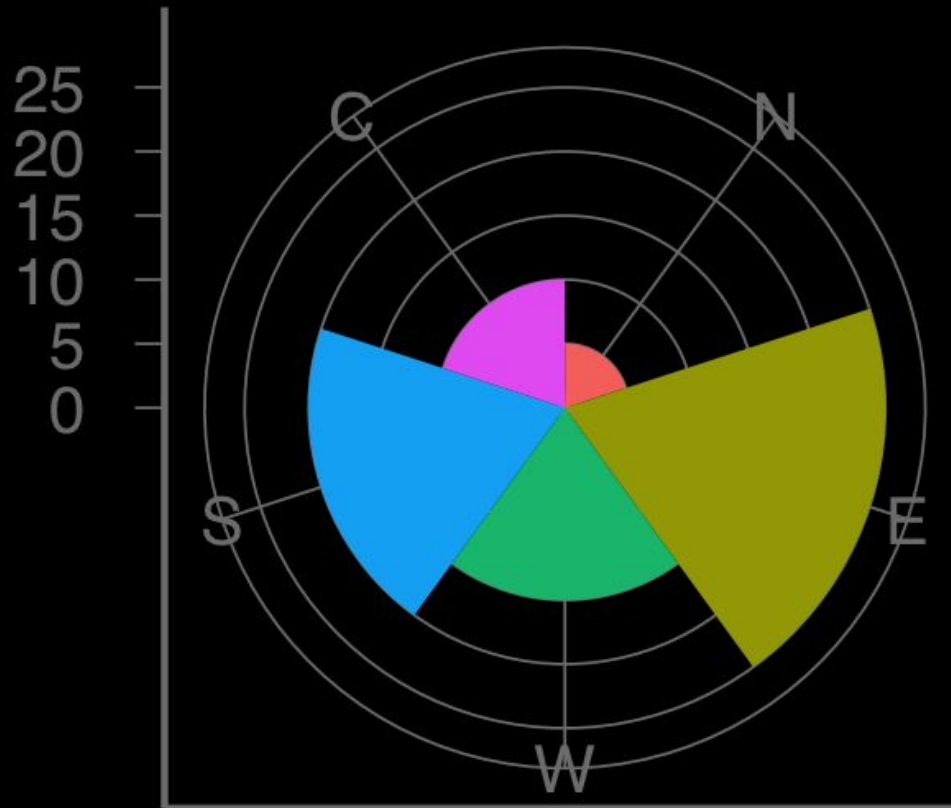
and staging

Do one thing at a time

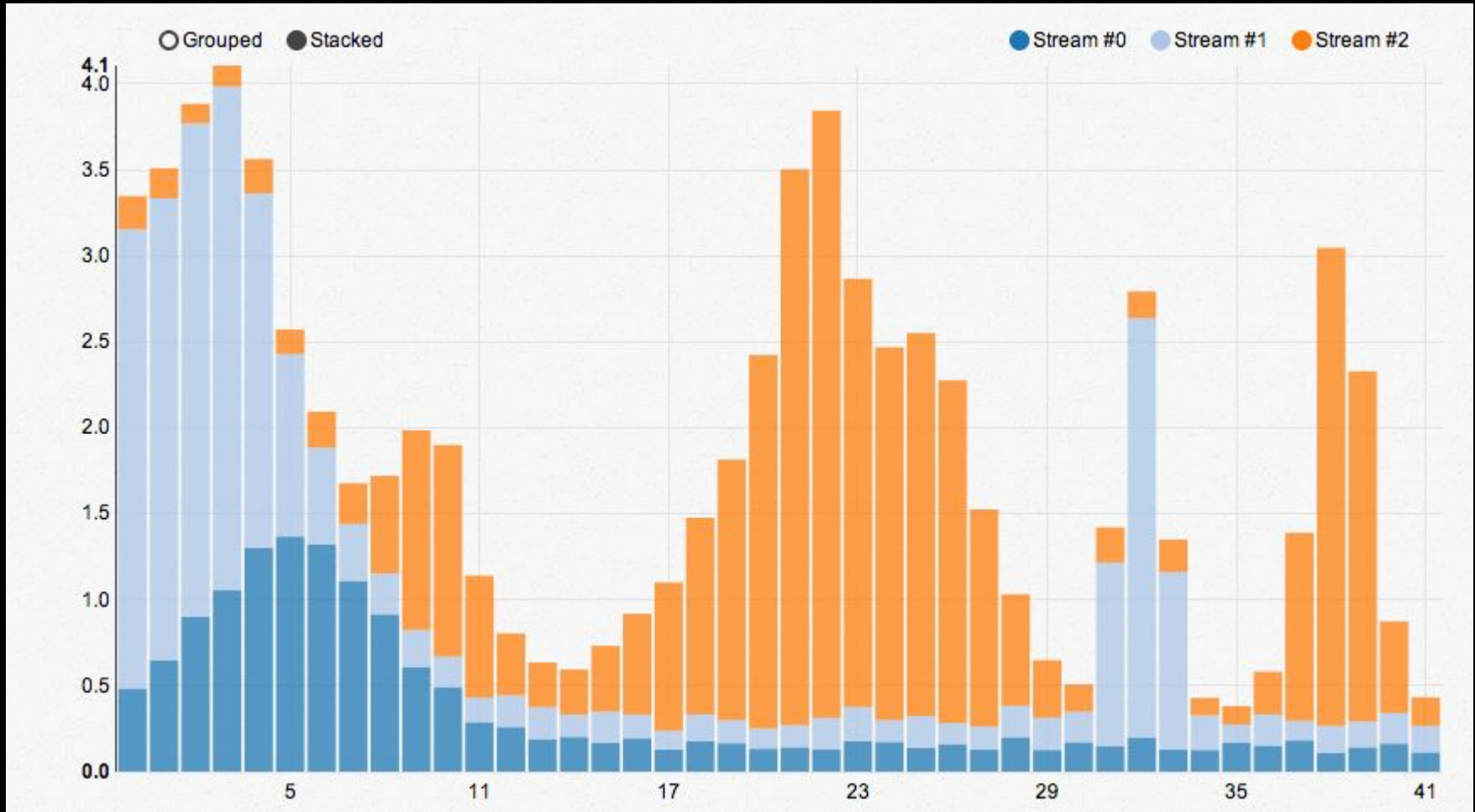# Consistent Visual Marks

Consistent Visual Marks

Change of Encoding

Consistent Visual Marks

Change of Axis

Animation Helps

Source: Multibar Transition

Staging and Anticipation

Source: Hans Rosling's - The Best Stats

Two sides of Animation

Direct	**Attention**	Distract
Easy Track	**Constancy**	False Relations
Cause & Effect	**Causality**	False Agency
Enhance Interest	**Engagement**	"Chart Junk"
Right: Interesting	**Speed**	Slow: boring
		Fast: errors

Interaction Layer

How do you drink water?

If you can find the button

Should you push or pull?

Norman Doors - Affordance
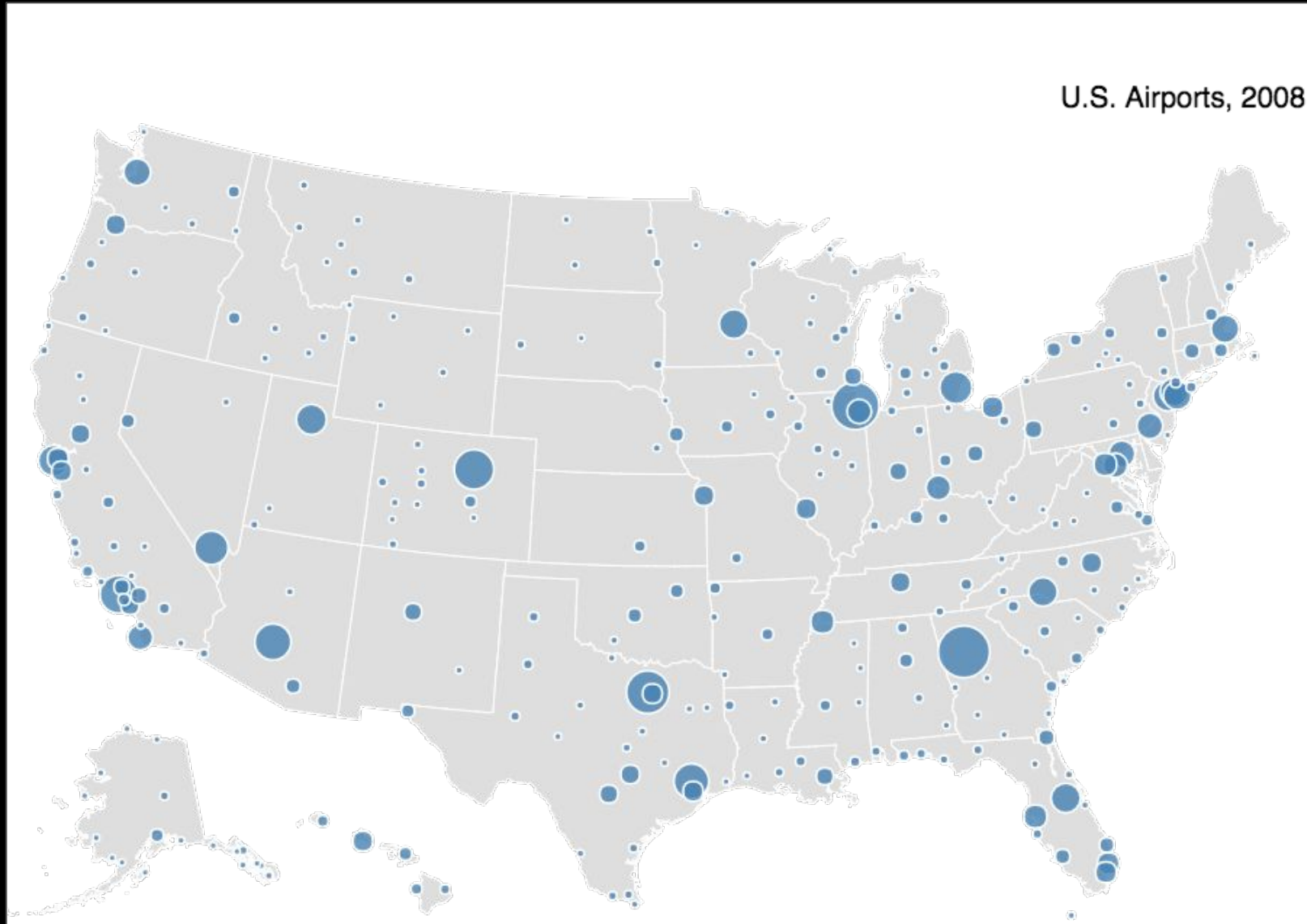
Shared Understanding

Evaluation

Conceptual Model

Gulf

Real Model

Execution
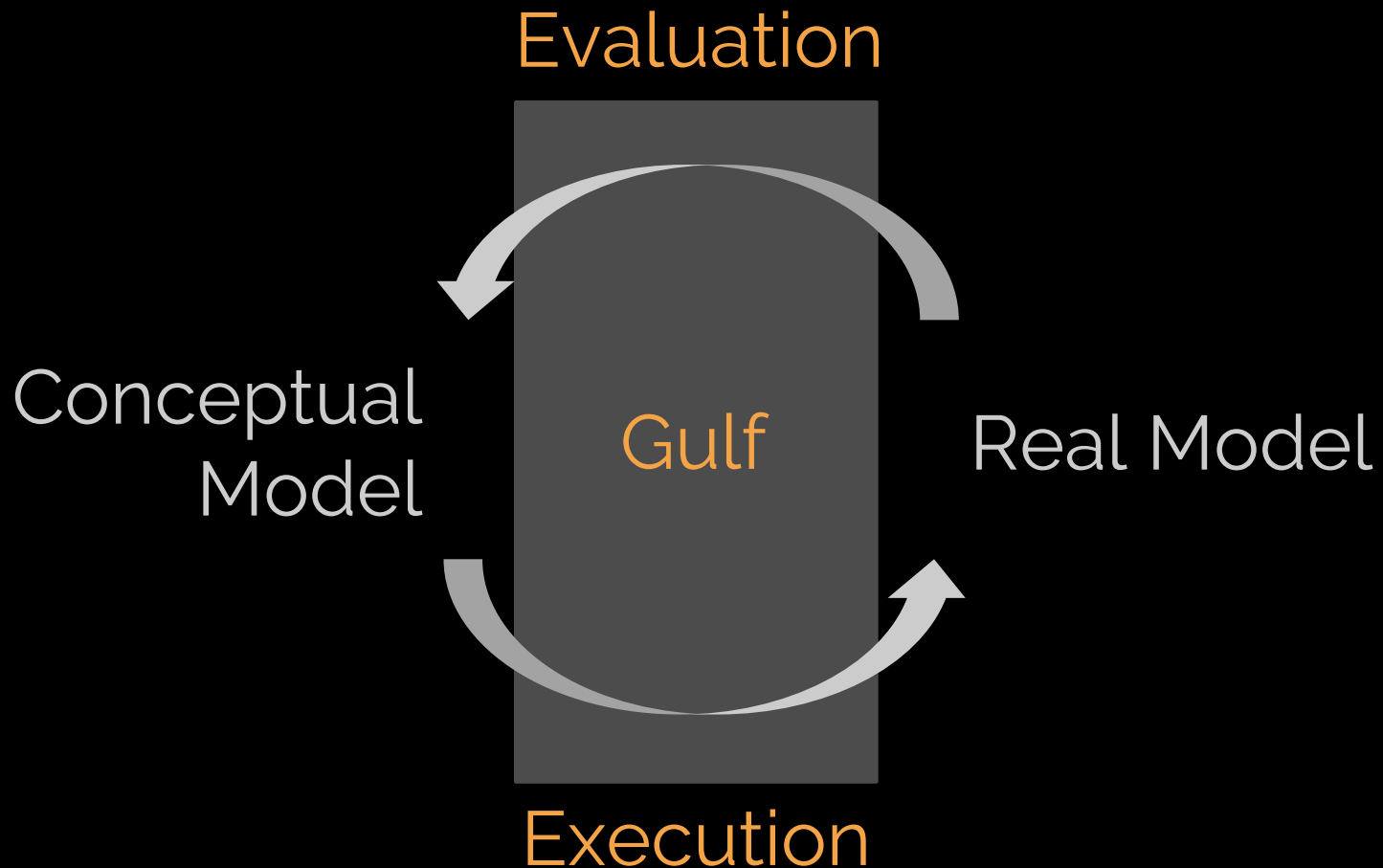
Interaction Layer

- **Navigation**: Pan, Zoom, Scale, Rotate
- **Transitions**: Scrolling, Layers
- **Staging** and **Animation**
- **Selection** and **Highlighting**
- **Filtering**, **Brushing & Linking**
- **Sorting**
- **Dynamic Queries**

Selection & Highlighting

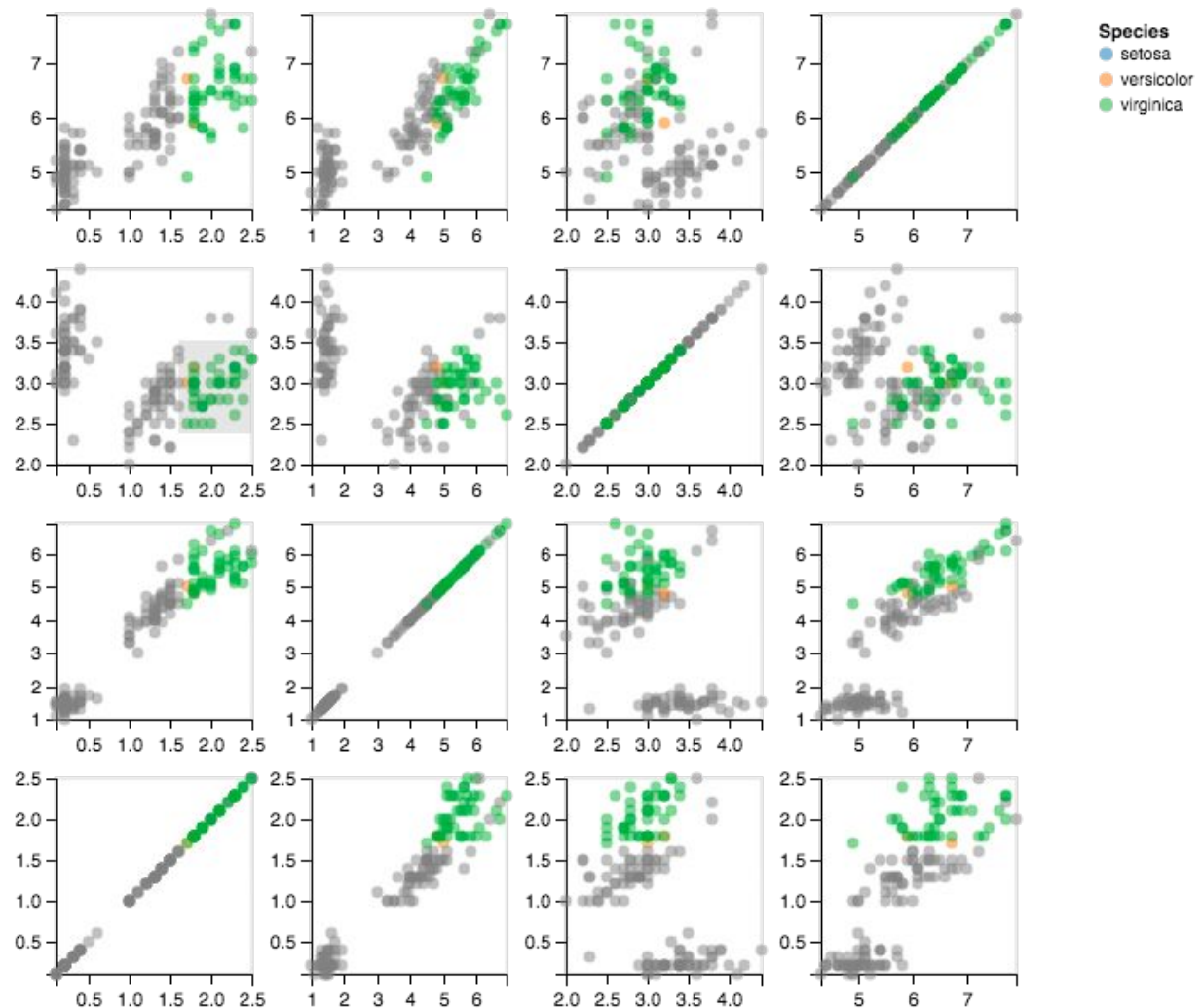Source: <u>Vega Explorer</u>

U.S. Airports, 2008
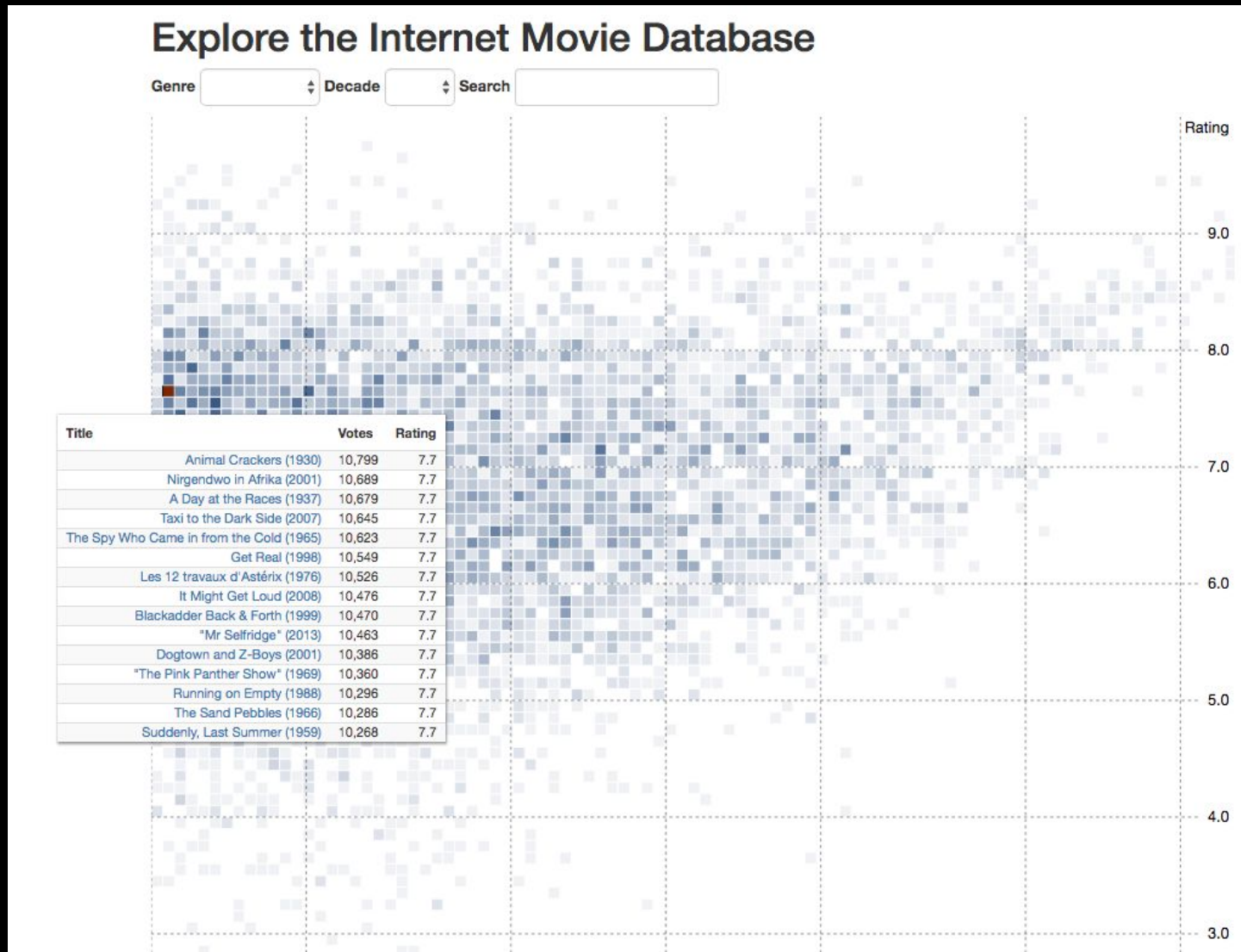
Filtering

Overview & Focus
Source: [NBA History](#)
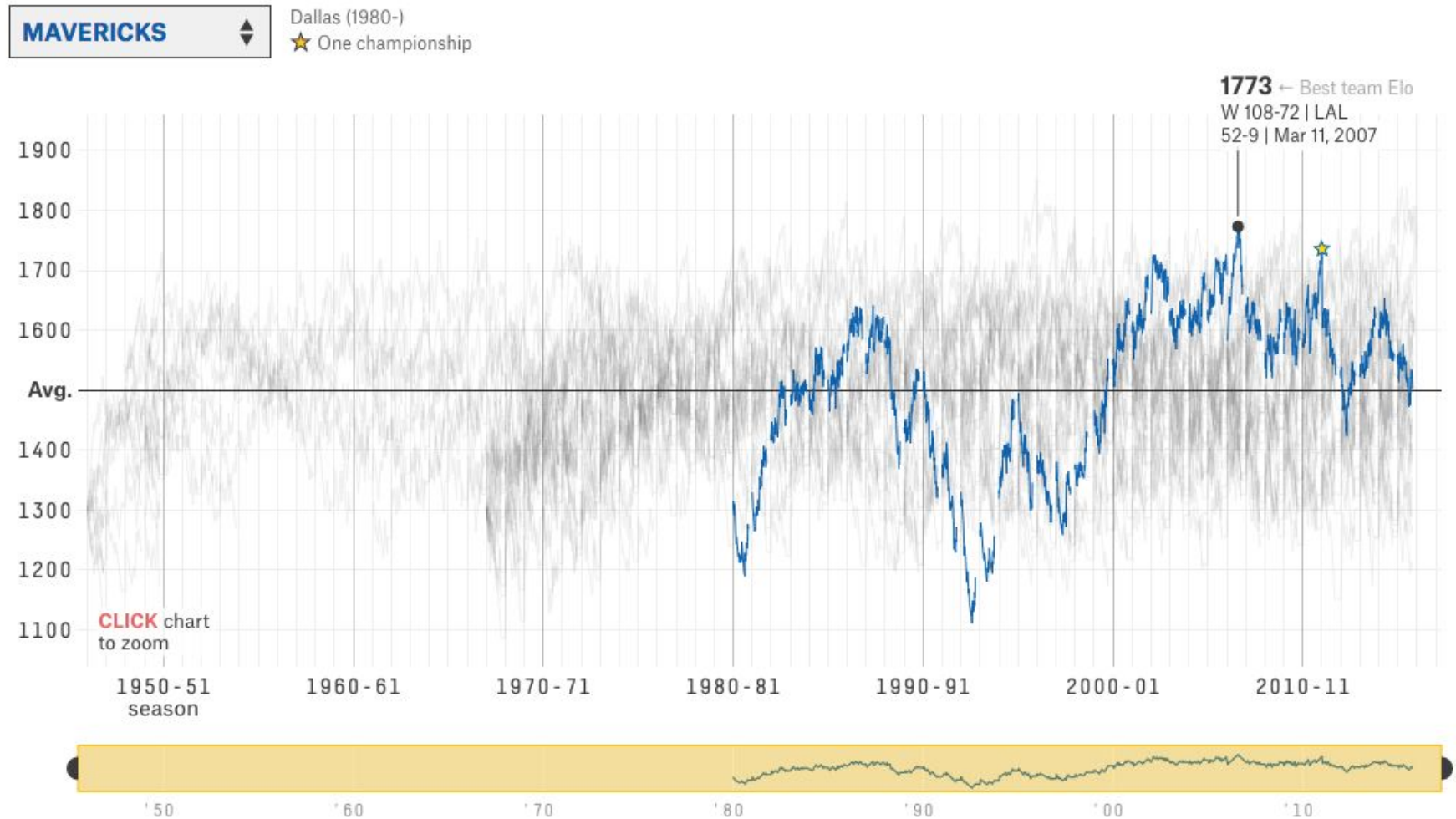
Brushing & Linking
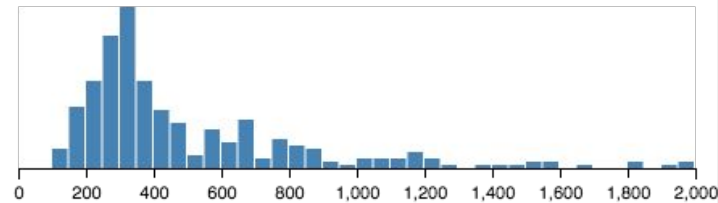Source: Vega Explorer

Cross Filtering
Source: Vega Explorer
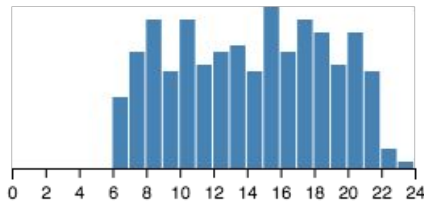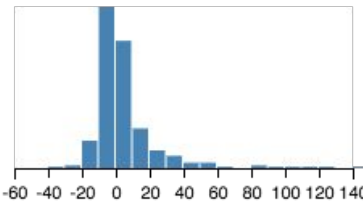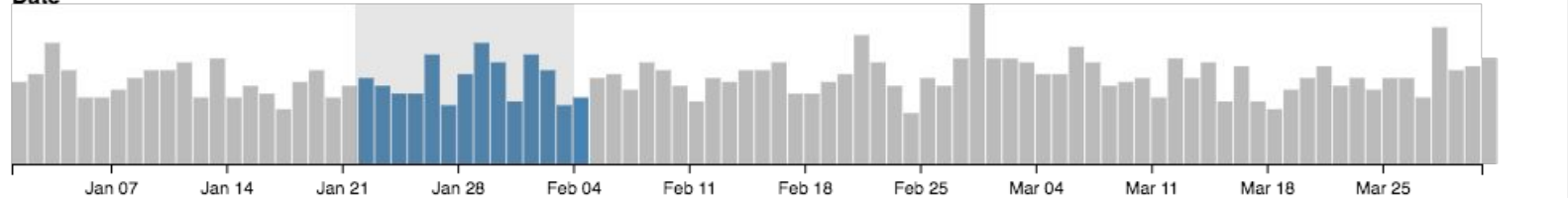
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