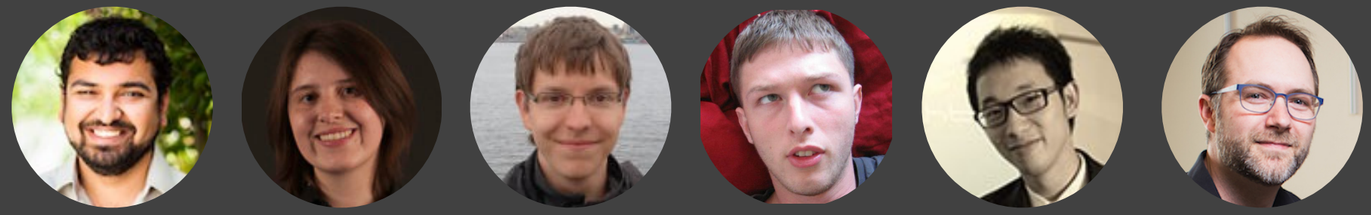
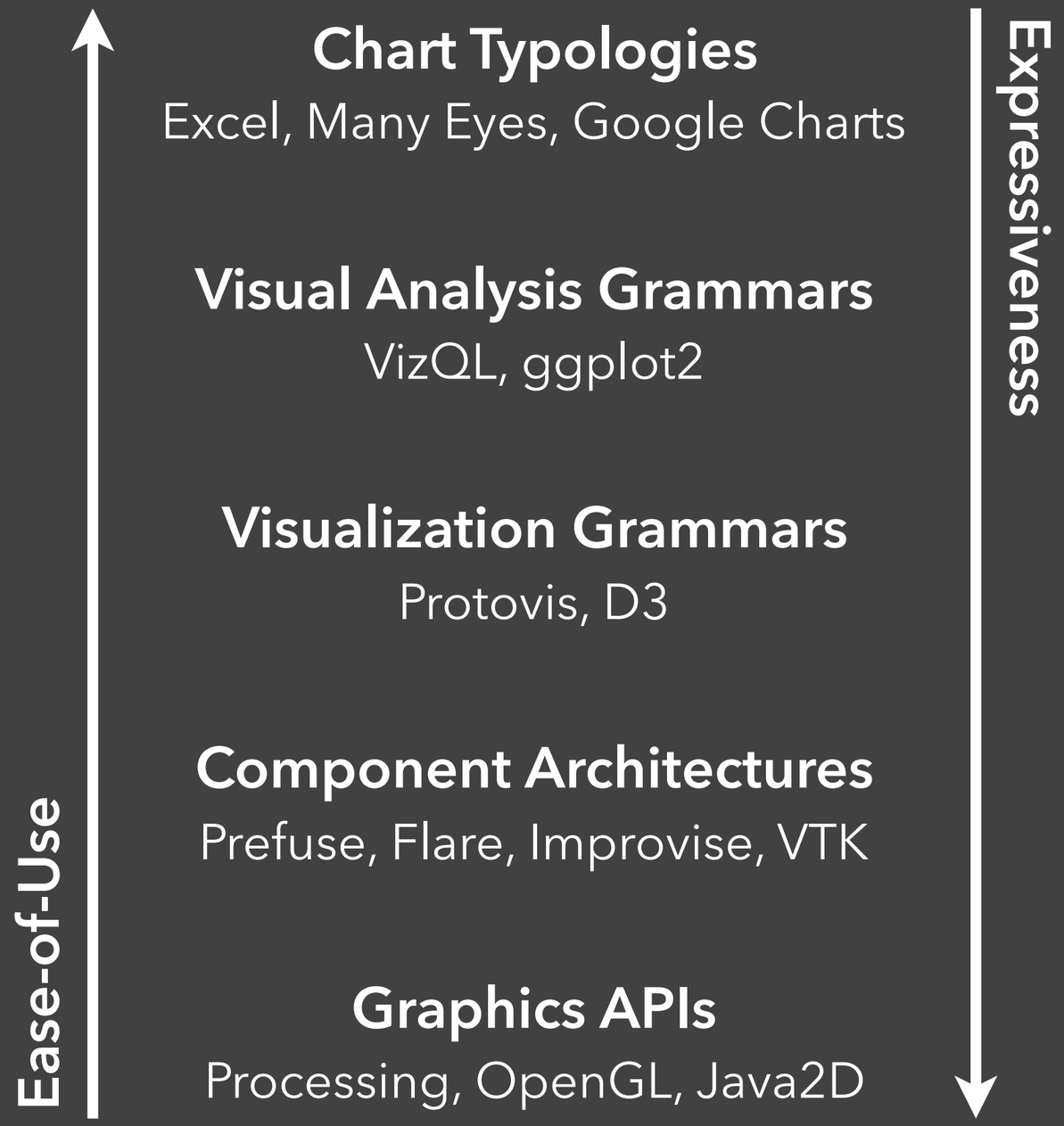
The Vega Ecosystem

Visualization in Practice



Arvind Satyanarayan @arvindsatya1
Stanford University

Jane Hoffswell
Dominik Moritz @domoritz
Ryan Russell
Kanit "Ham" Wongsuphasawat @kanitw
Jeffrey Heer @jeffrey_heer
University of Washington


Ease-of-Use
Chart Typologies
Excel, Many Eyes, Google Charts
Visual Analysis Grammars
VizQL, ggplot2
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Protovis, D3
Component Architectures
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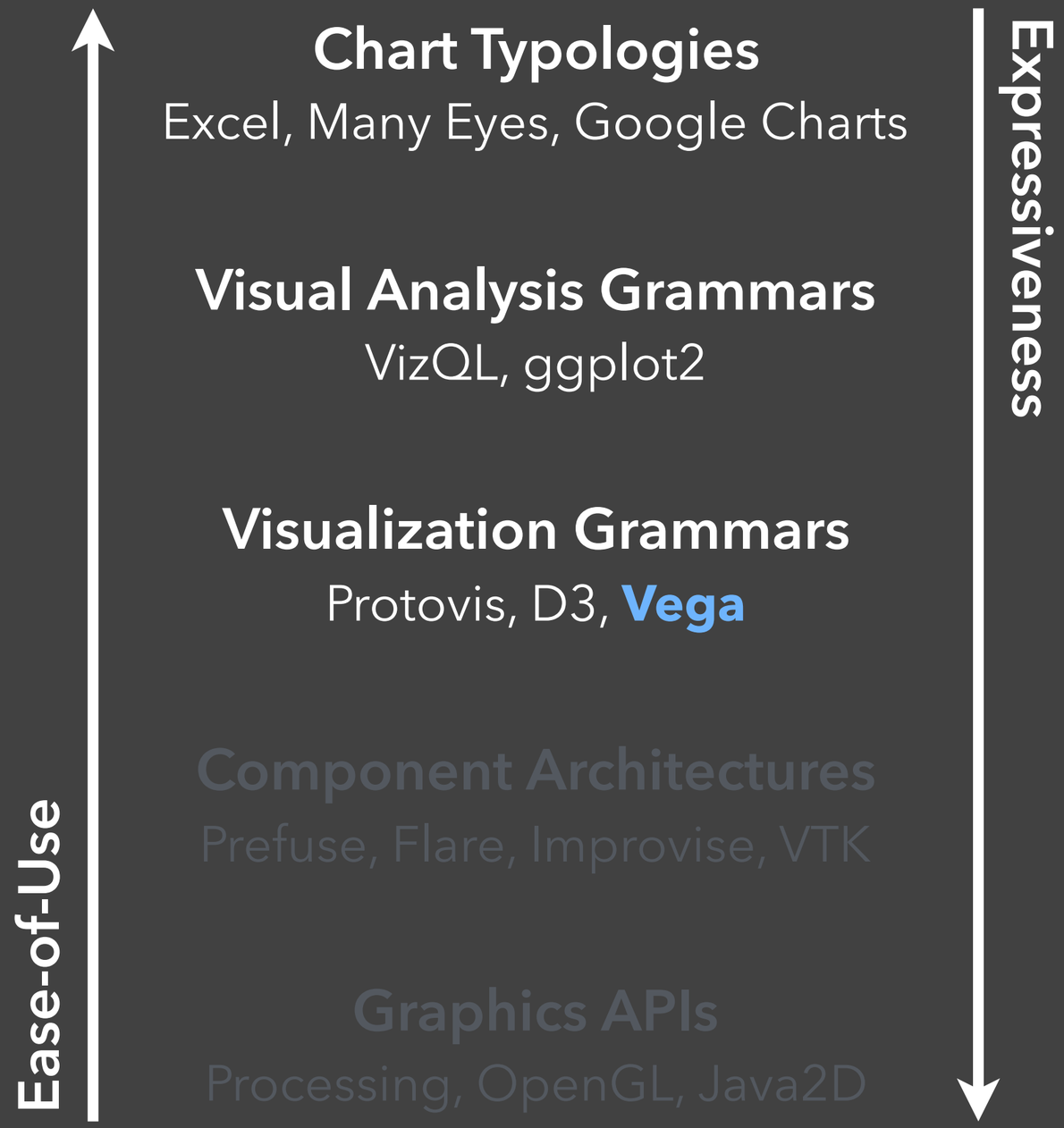
Expressiveness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```
{
  "width": 400, "height": 200,
  "data": [
    {"name": "table", "url": "/data/sample.json"}
  ],
  "scales": [
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      "range": "width",
      "domain": {"data": "table", "field": "u"}
    }, {
      "name": "ys","type": "ordinal",
      "range": "height",
      "domain": {"data": "table", "field": "v"}
    }
  ],
  "axes": [
    {"type": "x", "scale": "xs"},
    {"type": "y", "scale": "ys"}
  ],
  "marks": [{
    "type": "rect",
    "from": {"data": "table"},
    "properties": {
      "enter": {
        "x": {"scale": "xs", "field": "u"},
        "width": {"scale": "xs", "band": true},
        "y": {"scale": "ys", "field": "v"},
        "y2": {"scale": "ys", "value": 0},
        "fill": {"value": “steelblue"}
      }
    }
  ]
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    {"type": "x", "scale": "xs"},
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  "marks": [{
    "type": "rect",
    "from": {"data": "table"},
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        "x": {"scale": "xs", "field": "u"},
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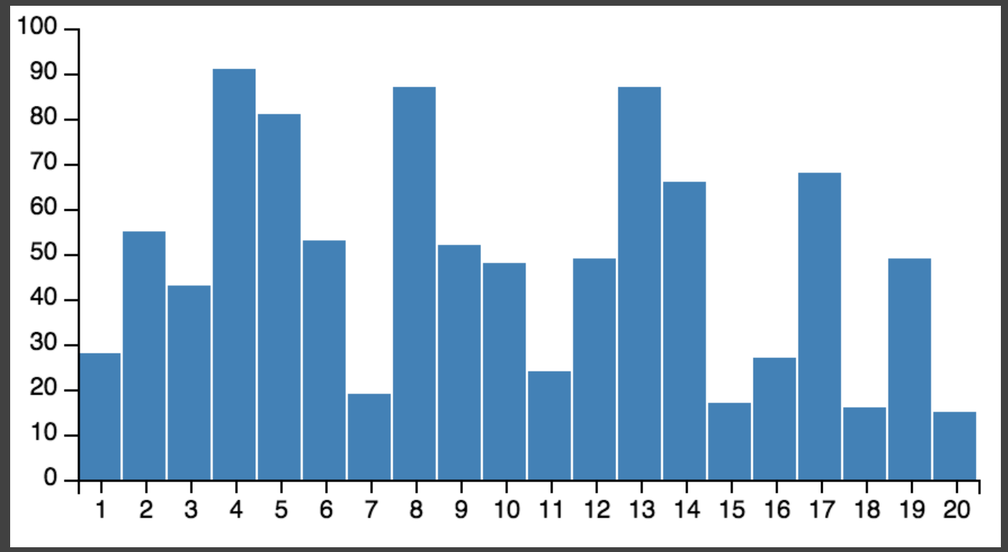

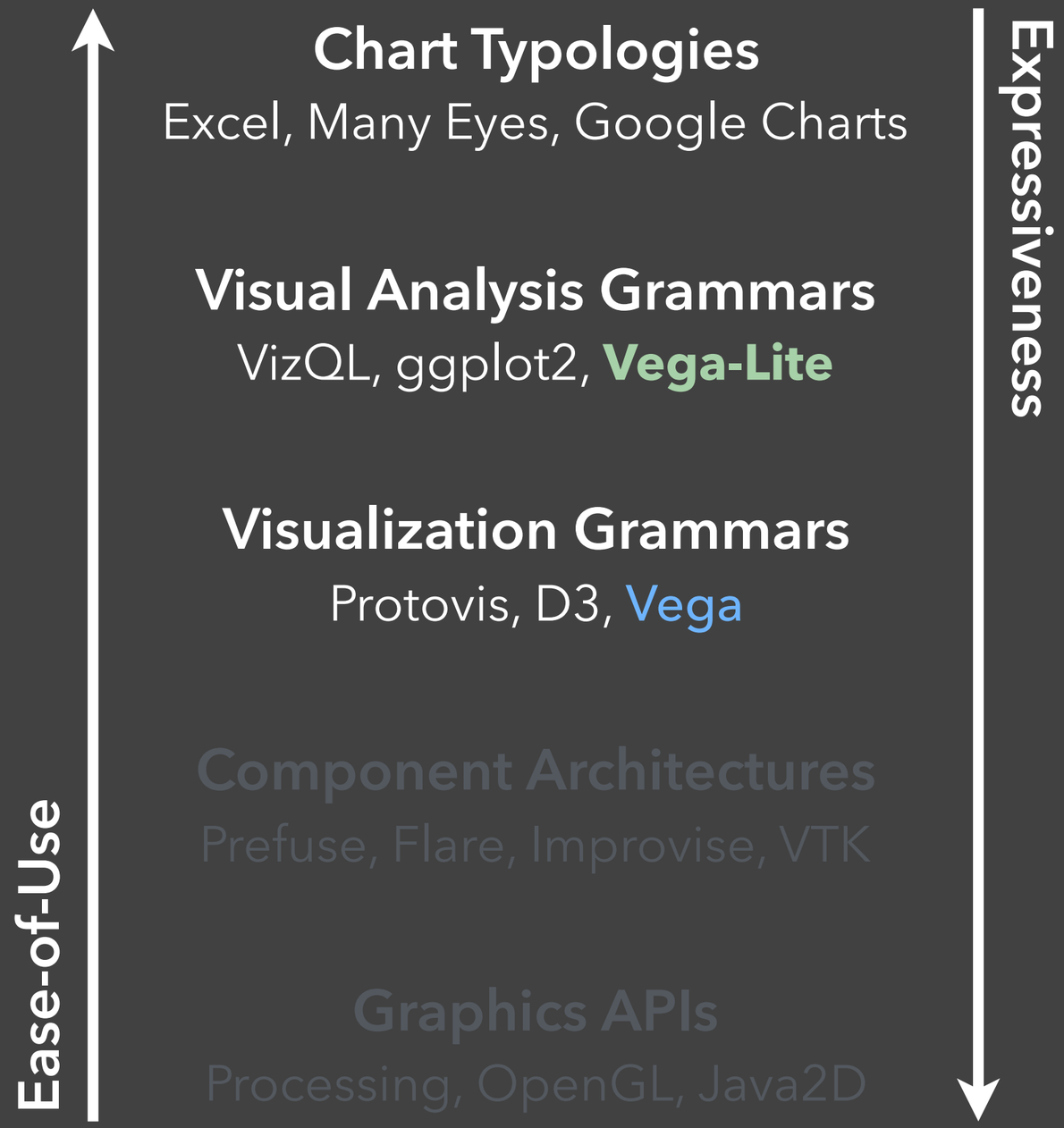
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  "mark": "circle",
  "encoding": {
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      "type": "quantitative"
    },
    "y": {
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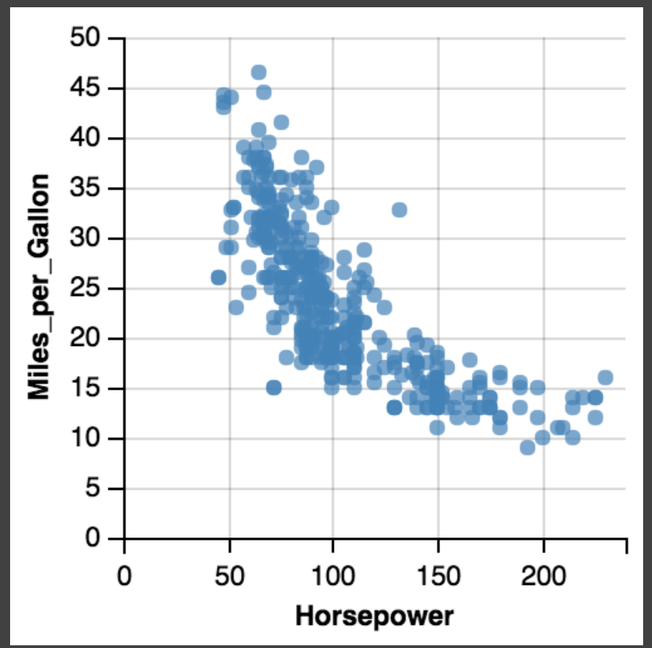

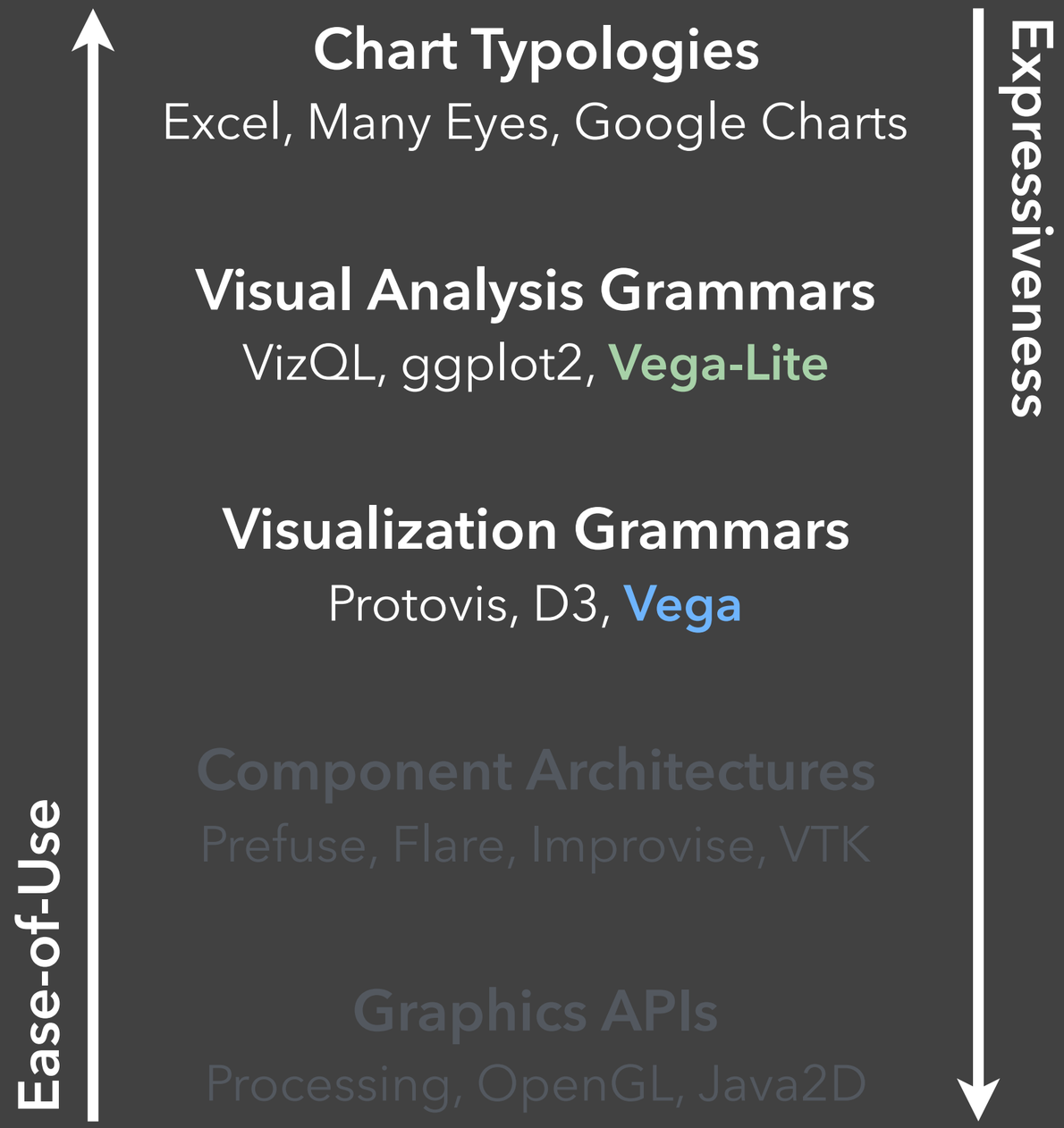

Declarative specification: describes *what* the visualization should look like vs. *how* it should be computed.

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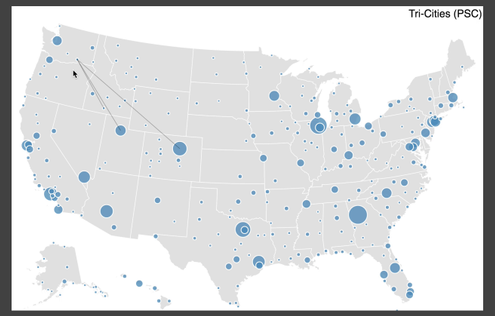

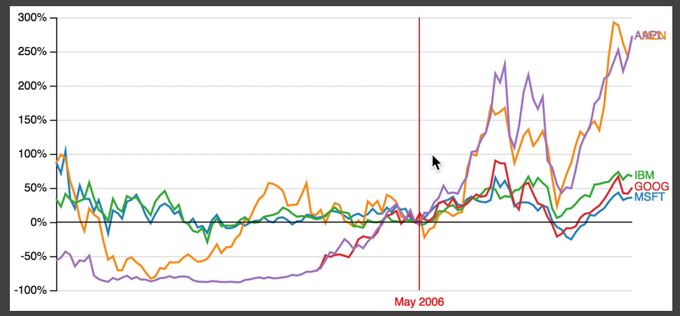

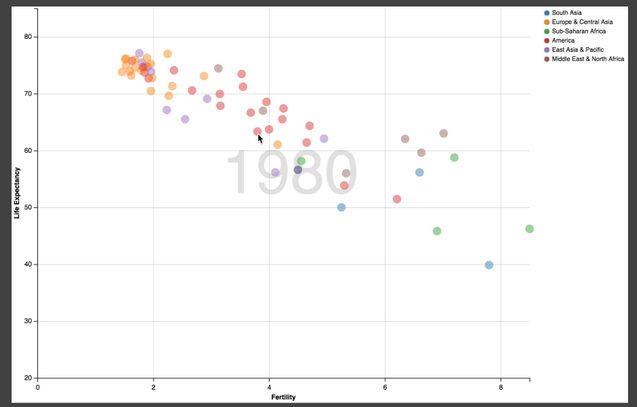

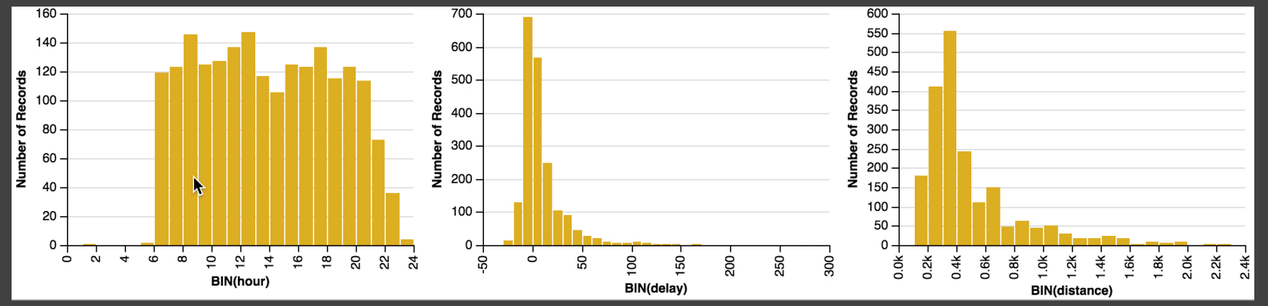

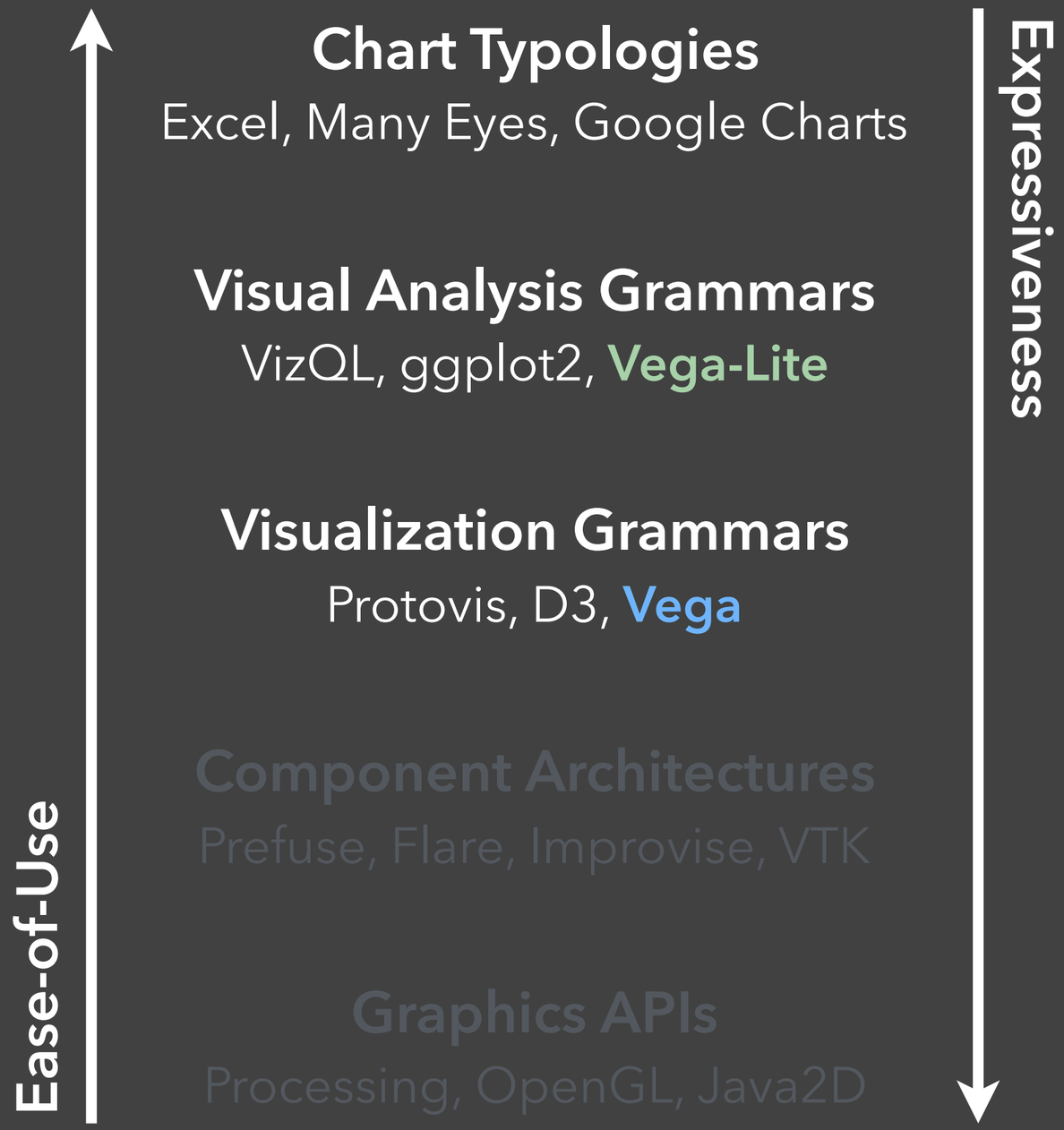

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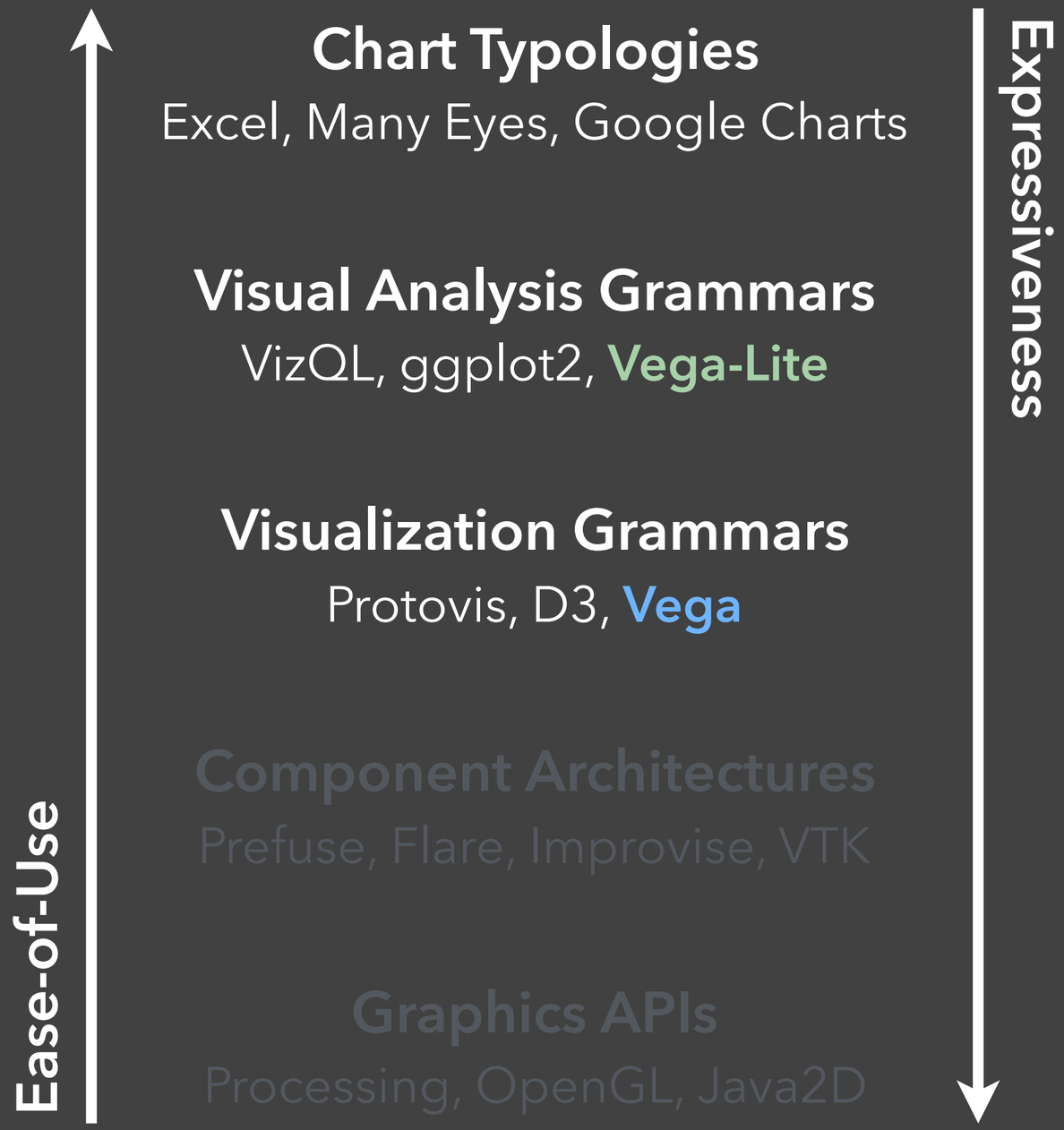

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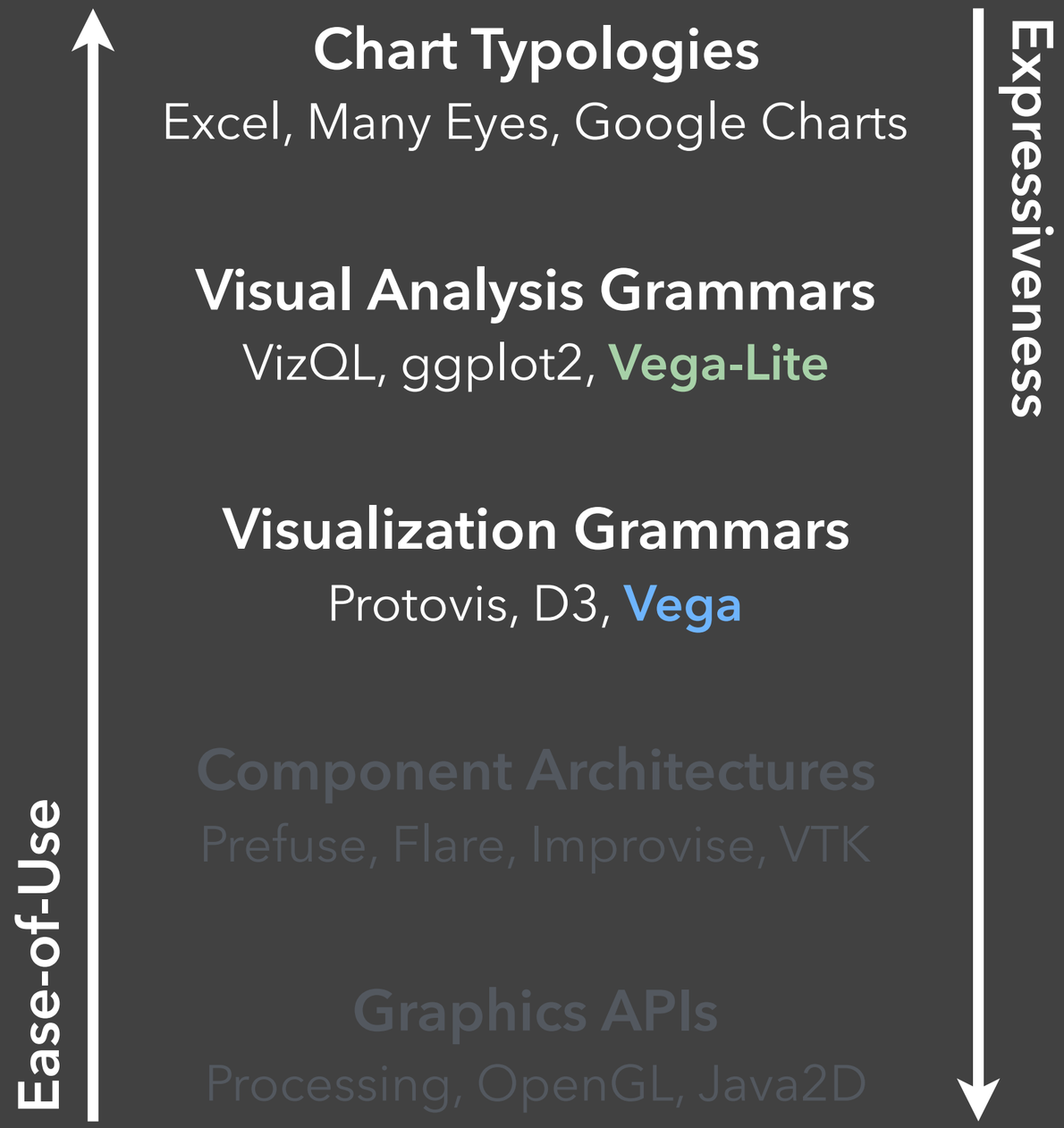
✓ Less code + faster iteration.

Accessible to a larger audience.



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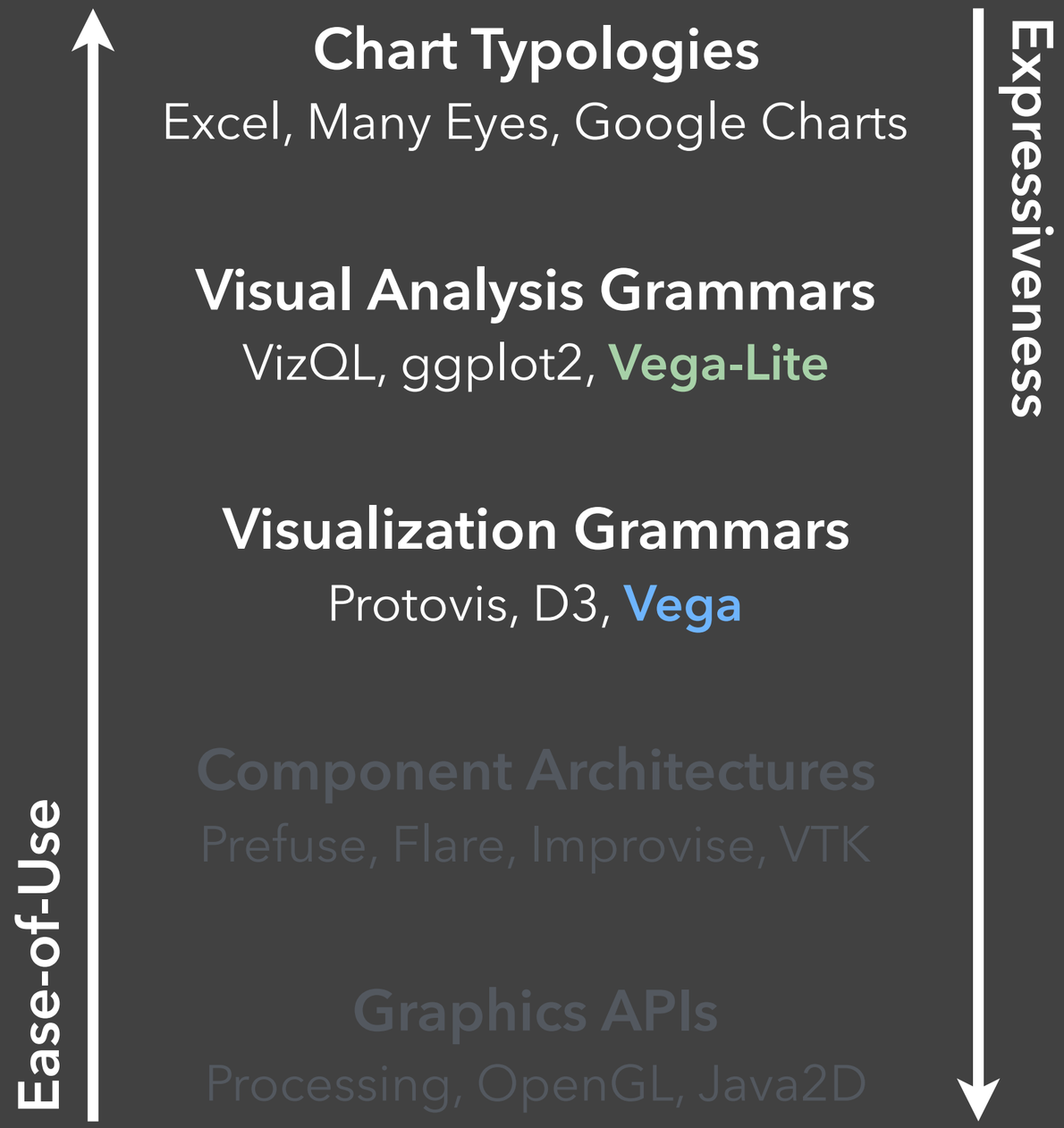

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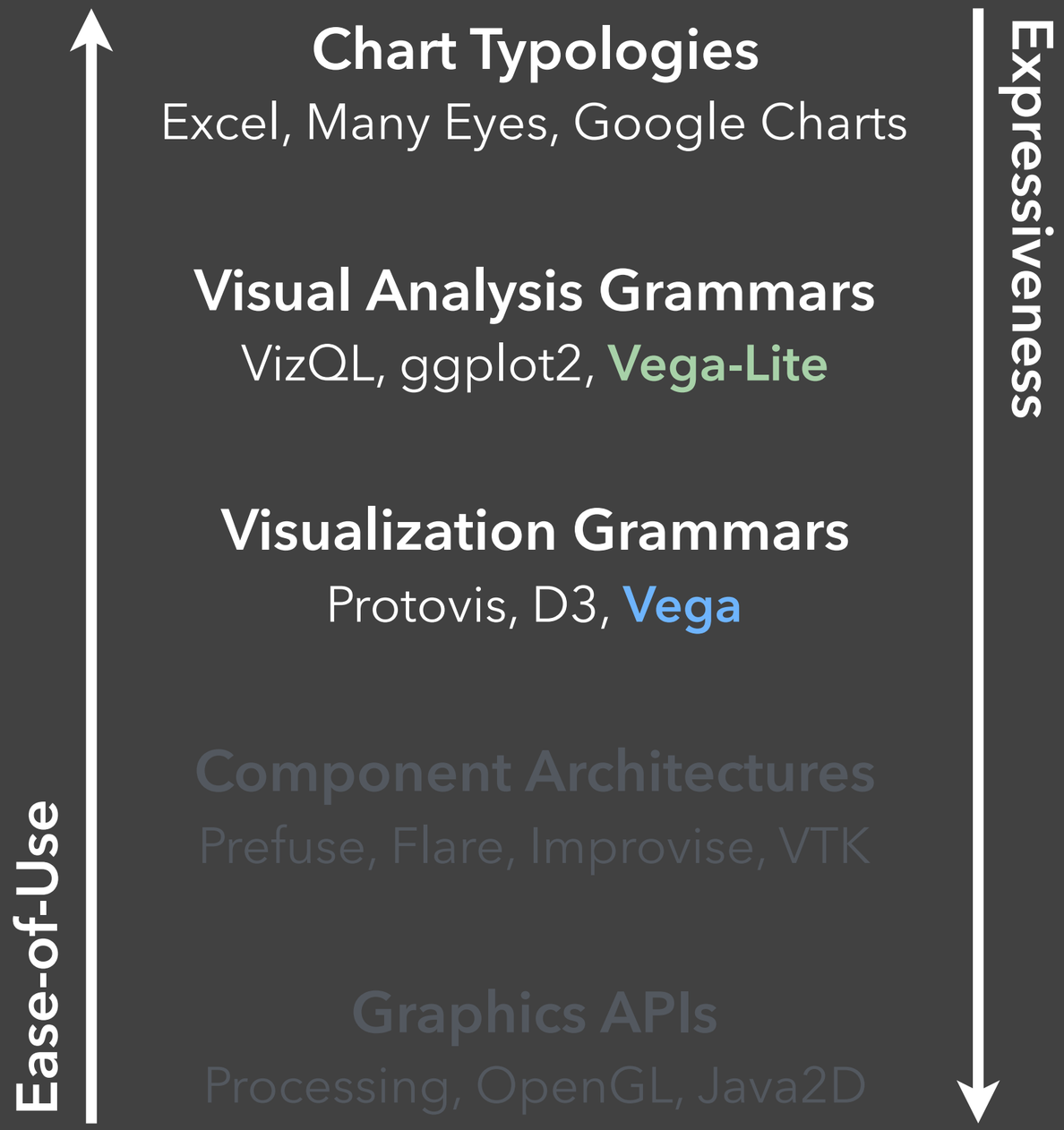
Write once. Re-apply with different input data. Re-target to multiple devices, renderers, or modalities.



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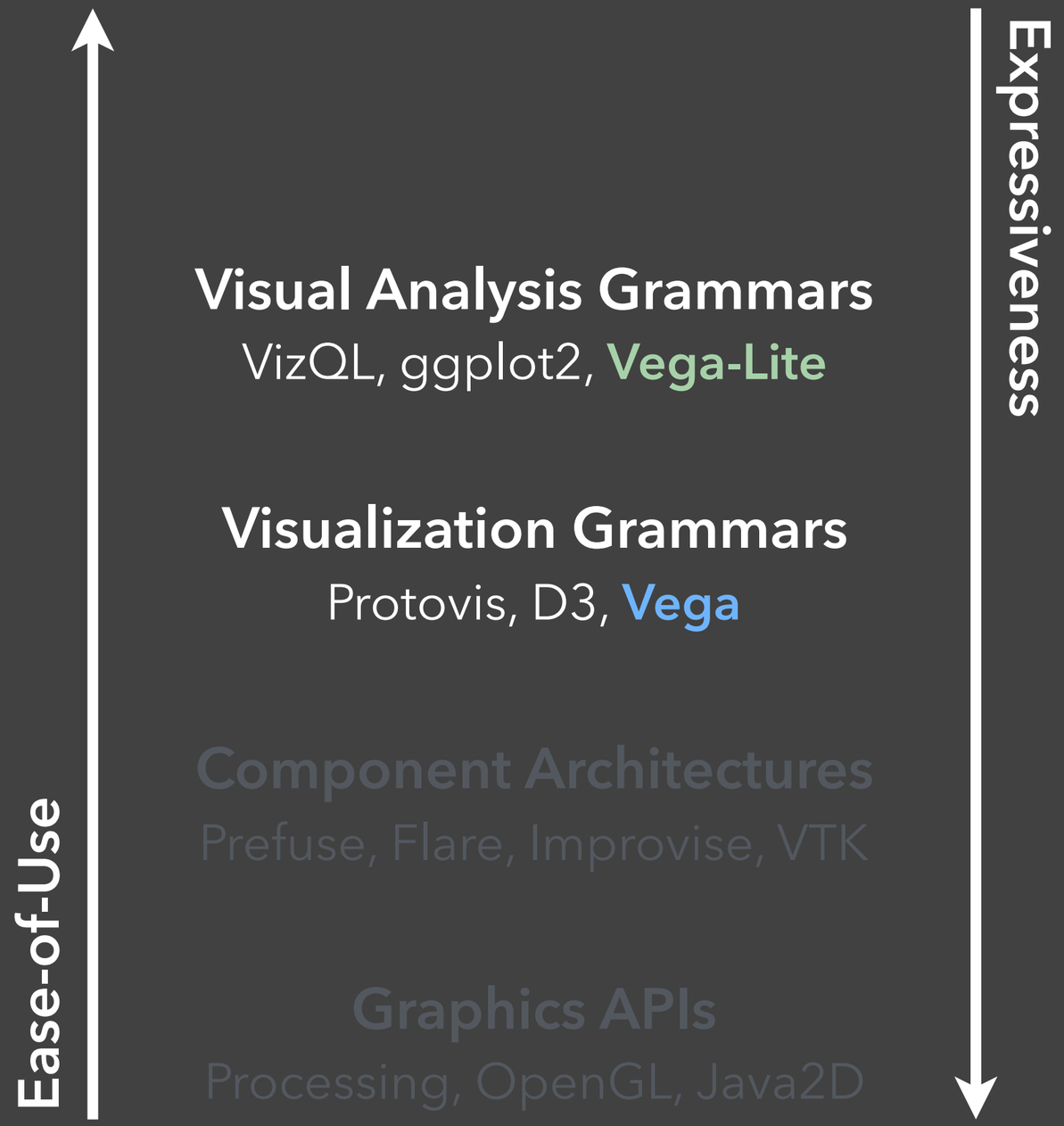
Higher-level software for creating and recommending visualizations.



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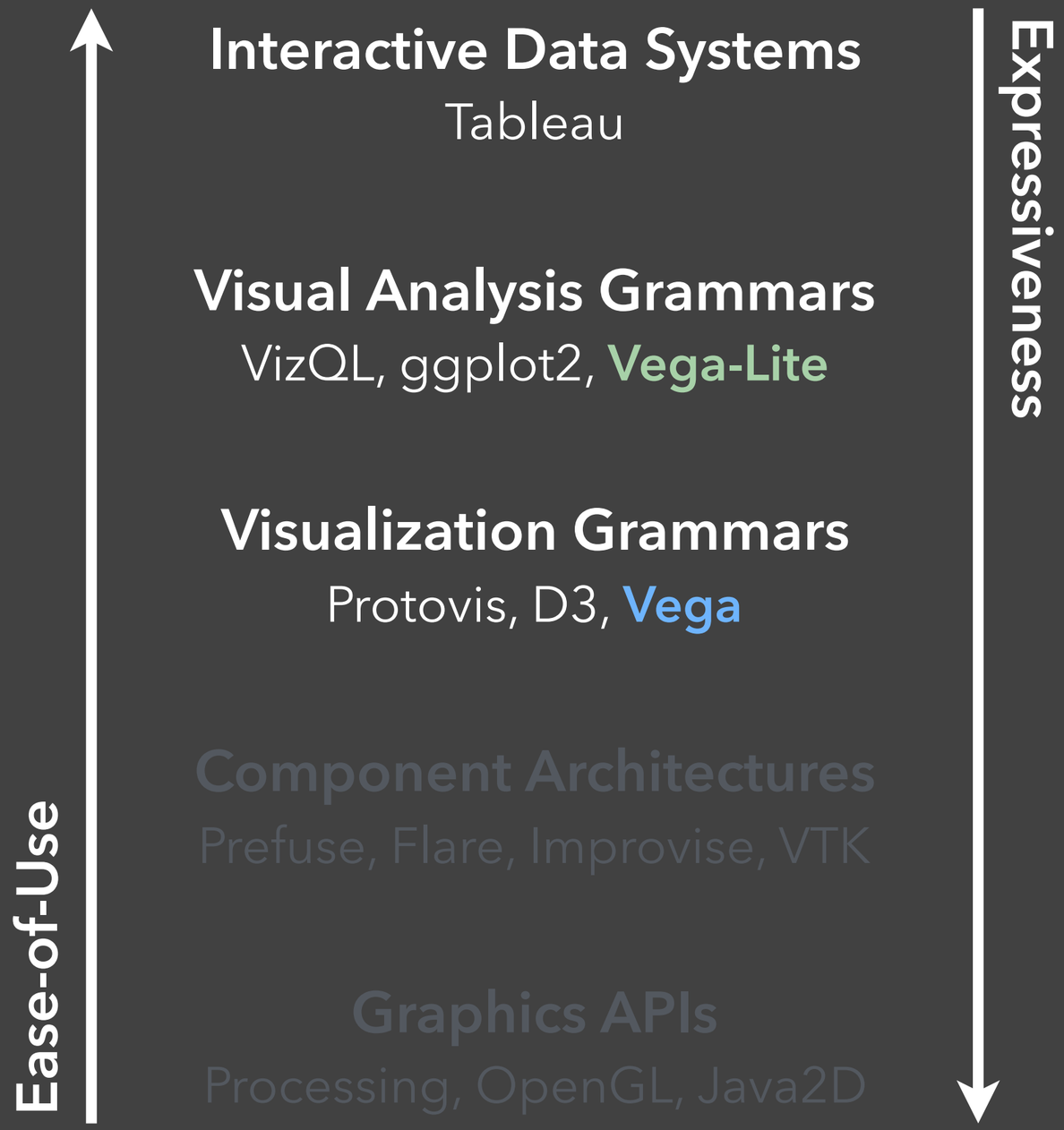

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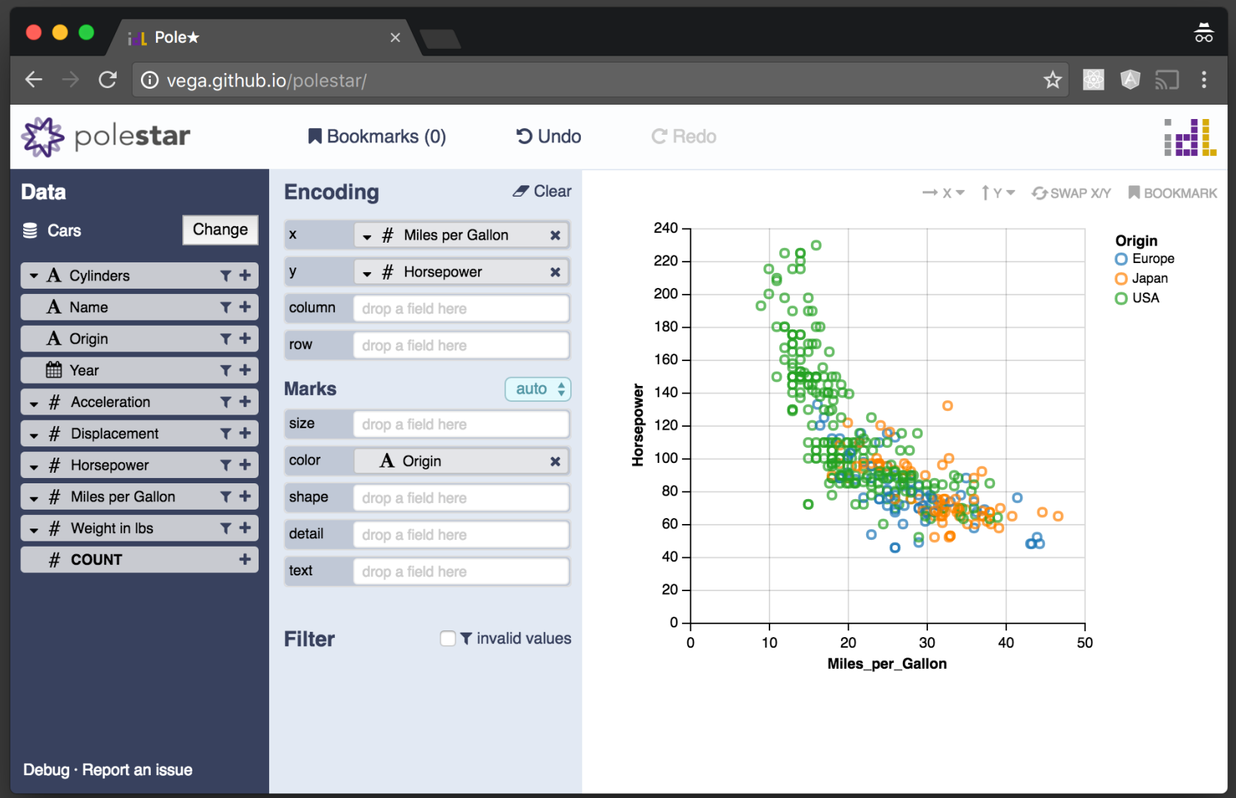

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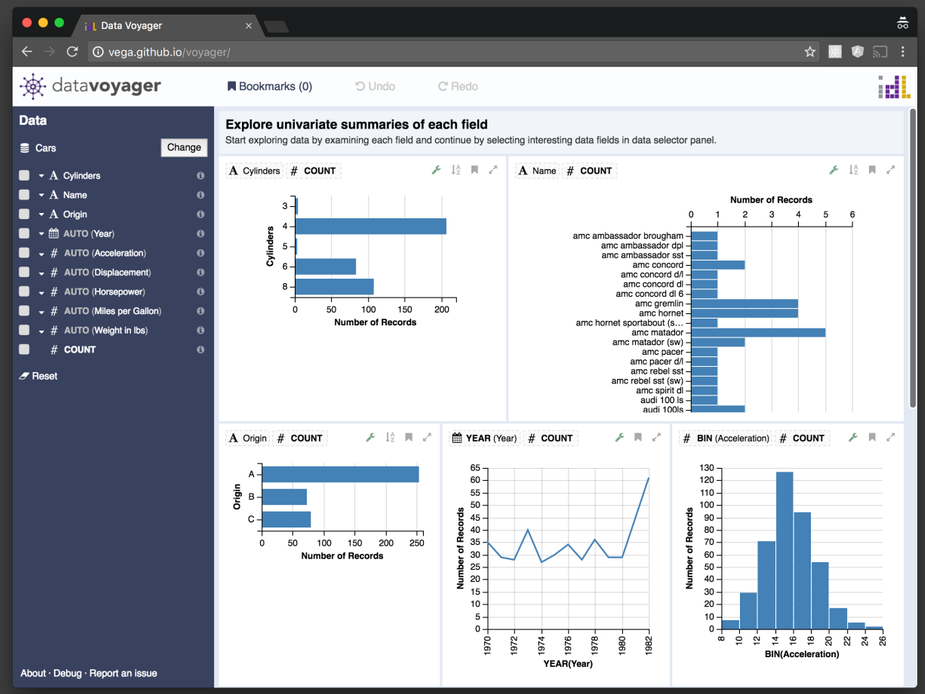

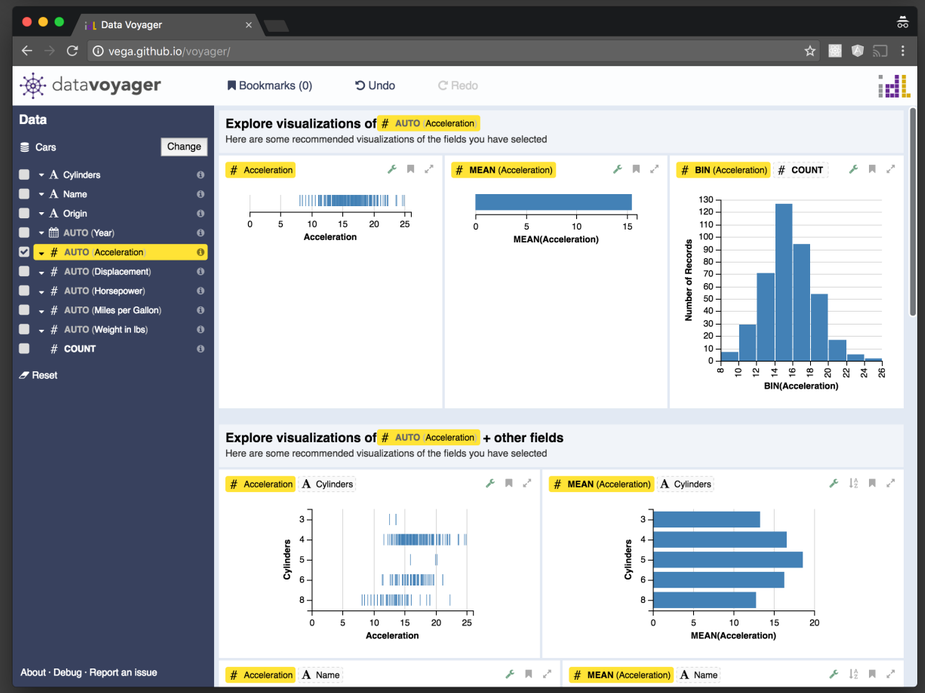

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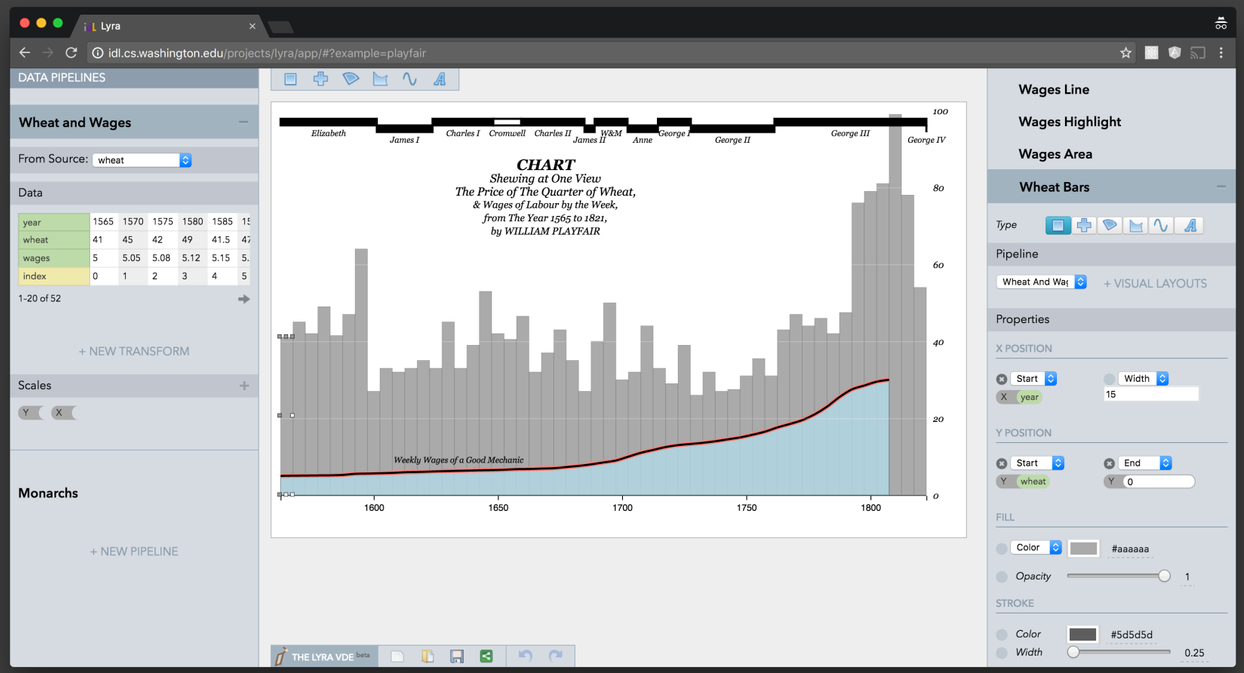

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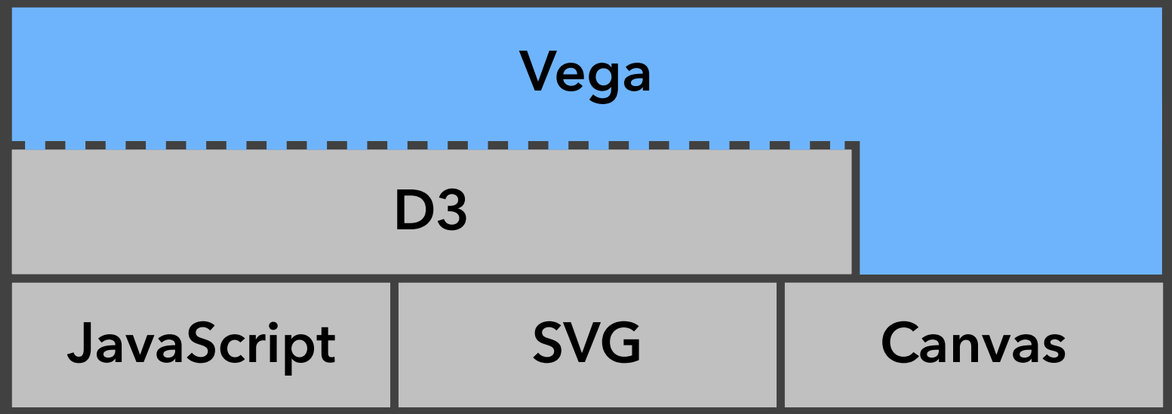

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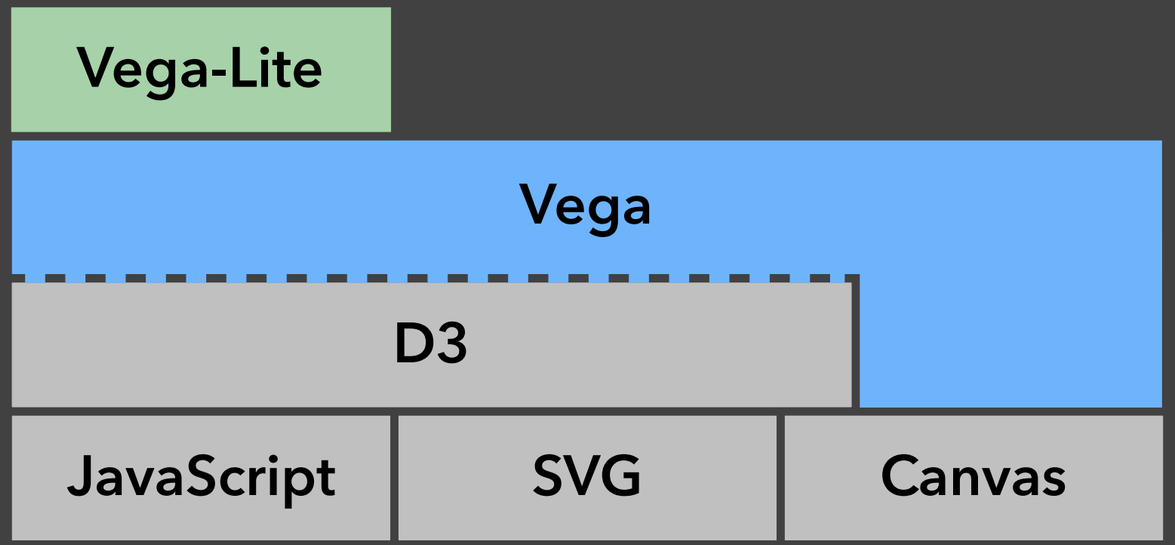

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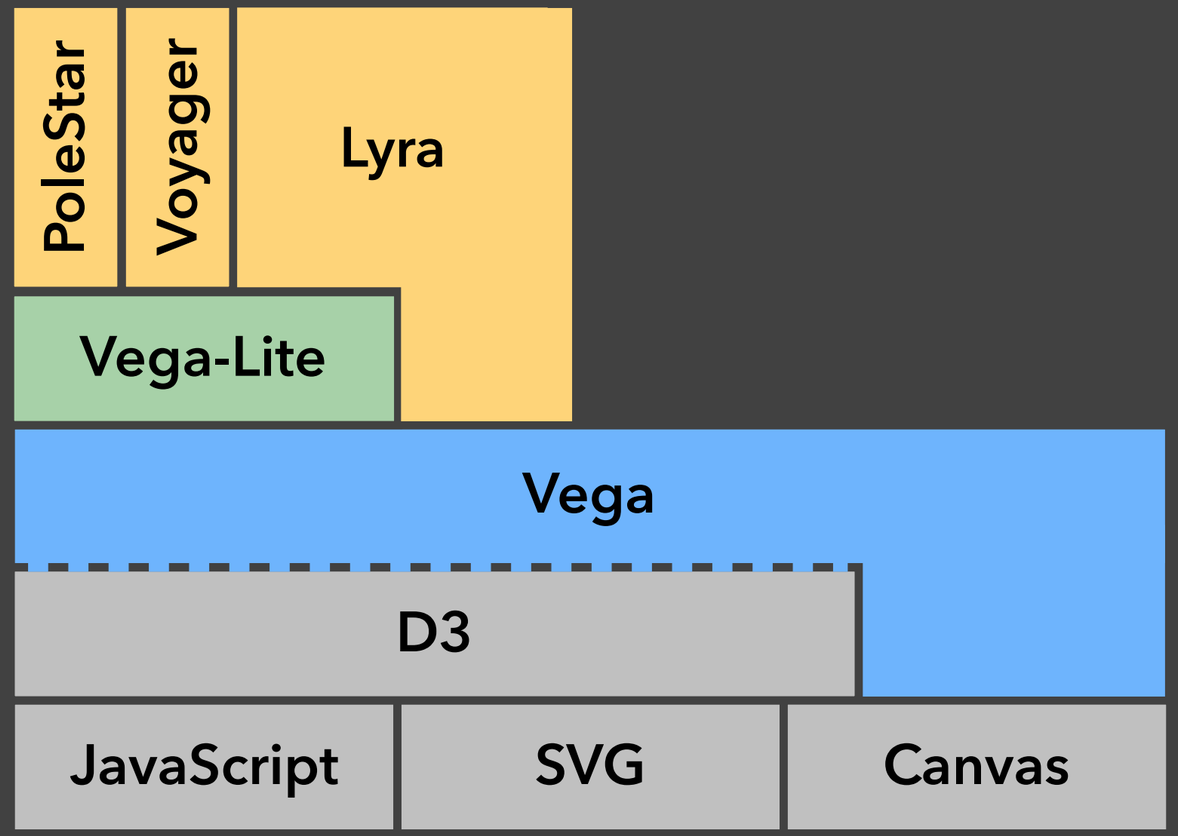

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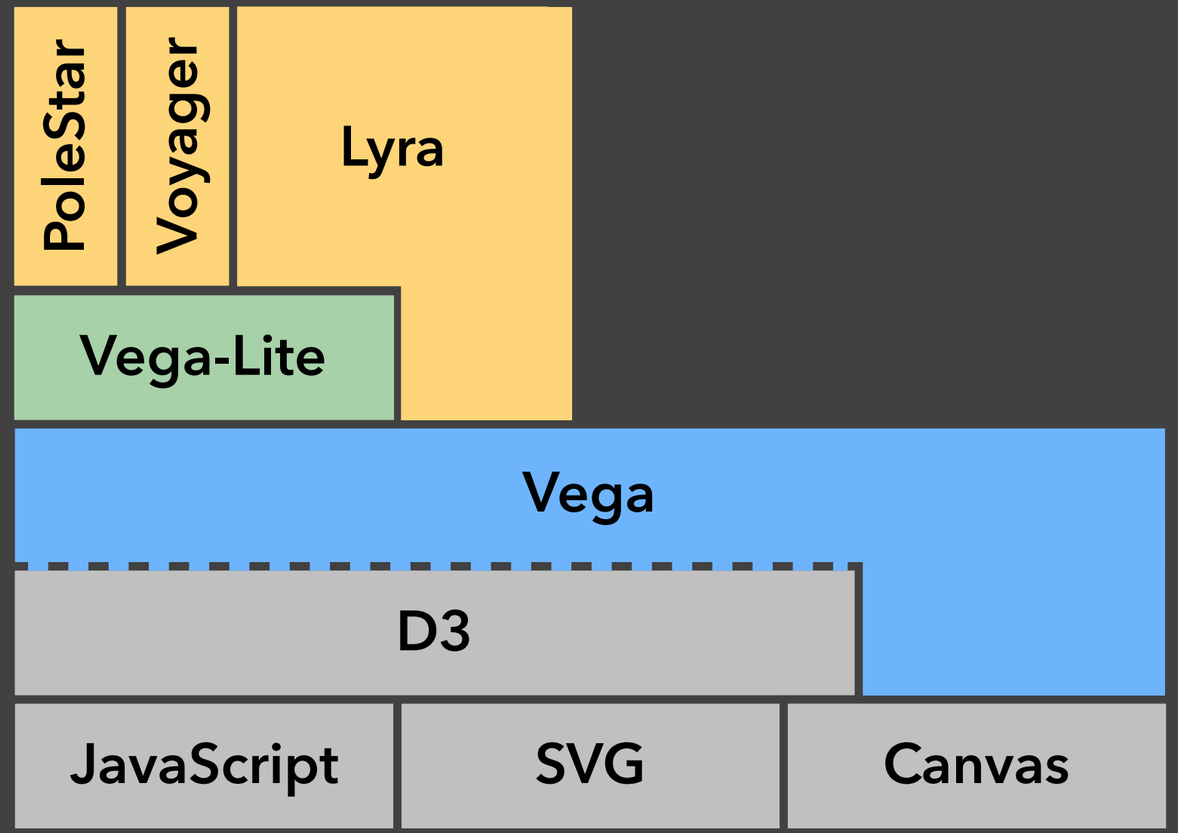

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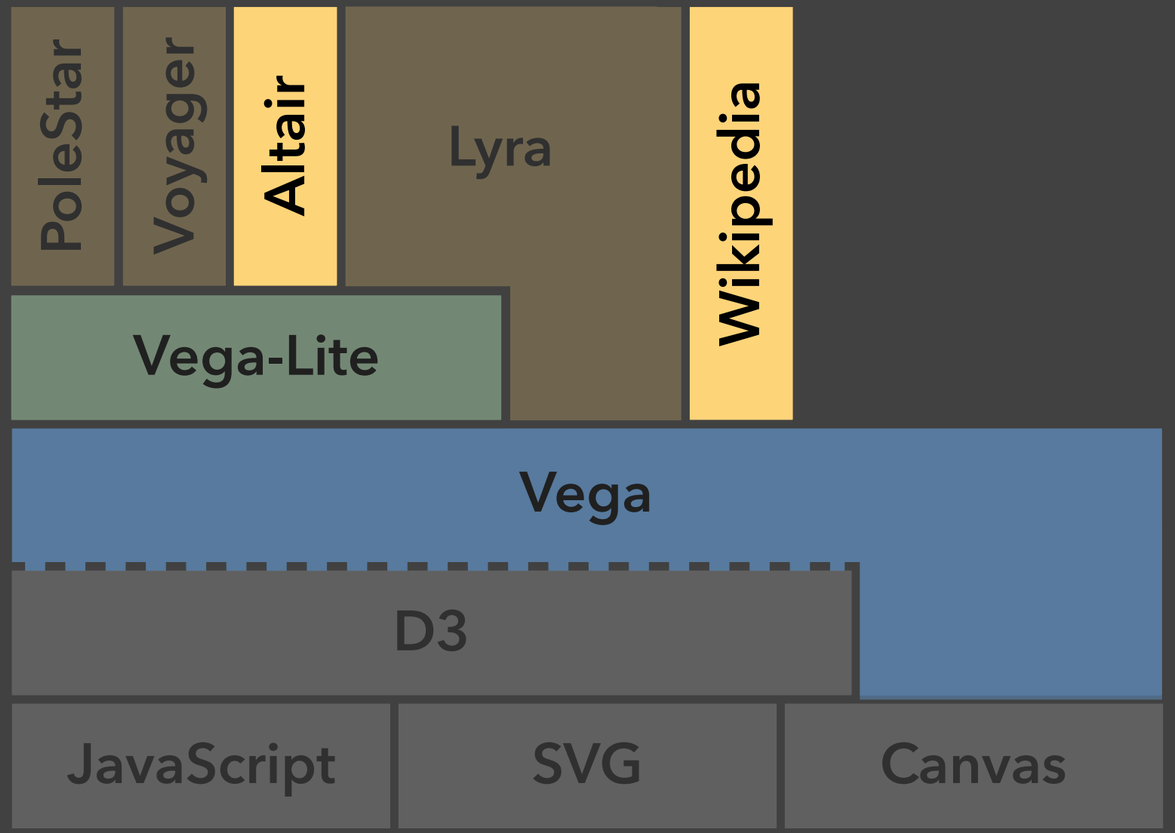

Wikipedia: Graph Extension

Led by Yuri Astrakhan from WikiMedia.

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Static visualizations (Vega 1) in May 2015.
Interactive visualizations (Vega 2) in December.

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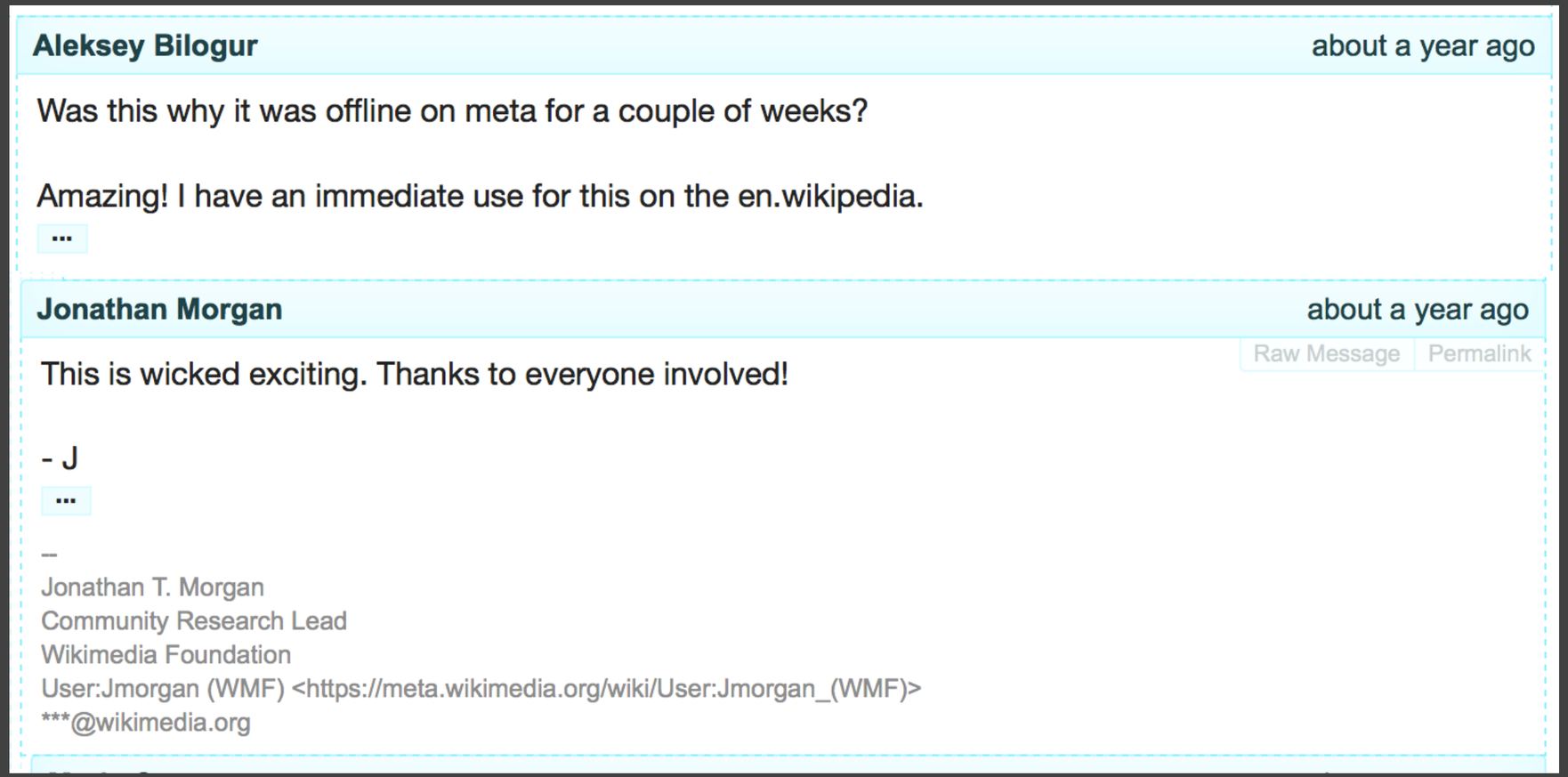

Aleksey Bilogur about a year ago

Was this why it was offline on meta for a couple of weeks?

Amazing! I have an immediate use for this on the en.wikipedia.

...

Jonathan Morgan about a year ago

Raw Message Permalink

This is wicked exciting. Thanks to everyone involved!

- J

...

–
Jonathan T. Morgan
Community Research Lead
Wikimedia Foundation
User:Jmorgan (WMF) <https://meta.wikimedia.org/wiki/User:Jmorgan_(WMF)>
***@wikimedia.org

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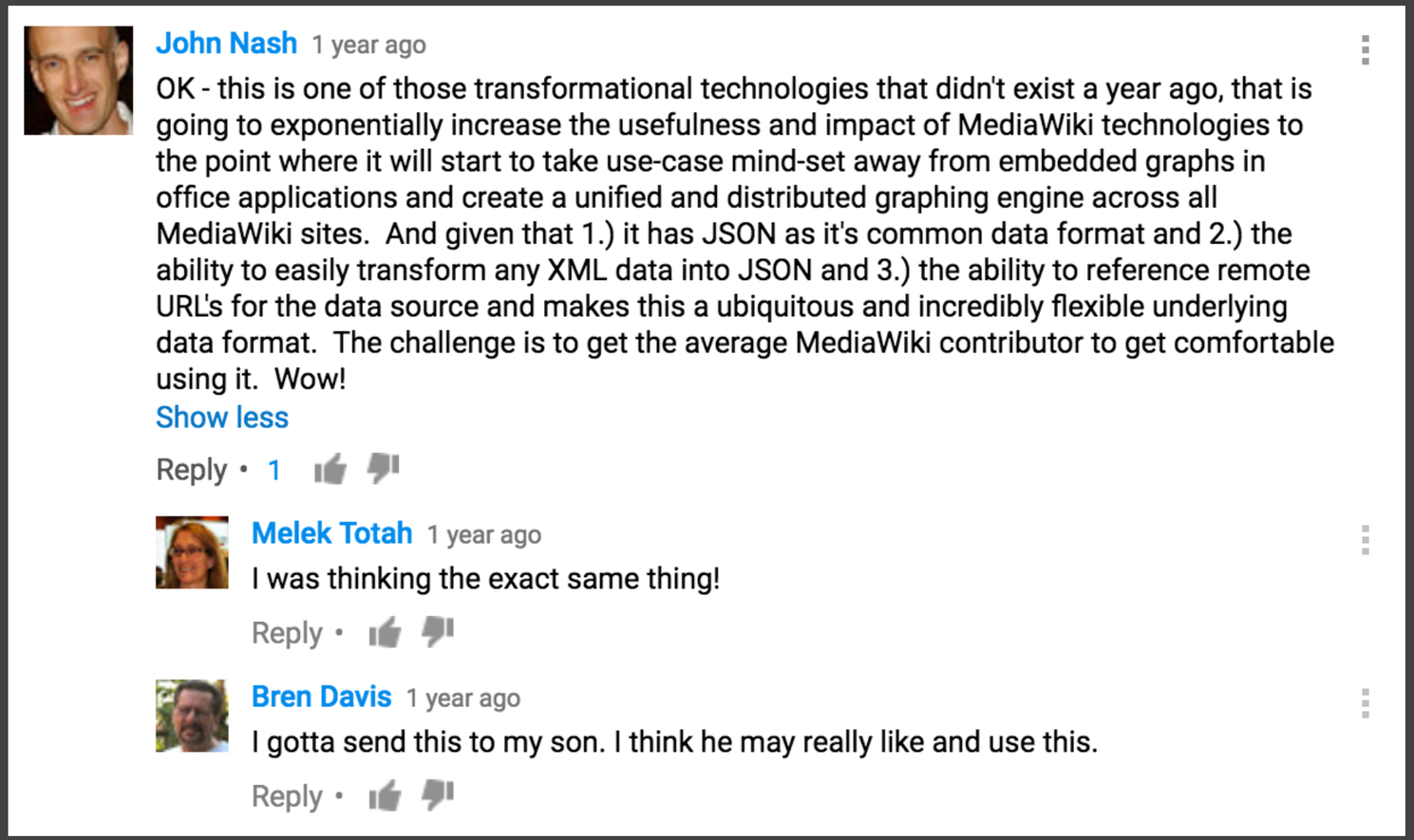

John Nash 1 year ago

OK - this is one of those transformational technologies that didn't exist a year ago, that is going to exponentially increase the usefulness and impact of MediaWiki technologies to the point where it will start to take use-case mind-set away from embedded graphs in office applications and create a unified and distributed graphing engine across all MediaWiki sites. And given that 1.) it has JSON as it's common data format and 2.) the ability to easily transform any XML data into JSON and 3.) the ability to reference remote URL's for the data source and makes this a ubiquitous and incredibly flexible underlying data format. The challenge is to get the average MediaWiki contributor to get comfortable using it. Wow!

Show less

Reply • 1

Melek Totah 1 year ago

I was thinking the exact same thing!

Reply •

Bren Davis 1 year ago

I gotta send this to my son. I think he may really like and use this.

Reply •

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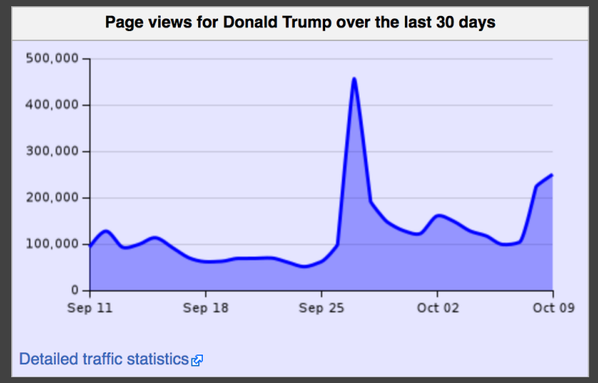

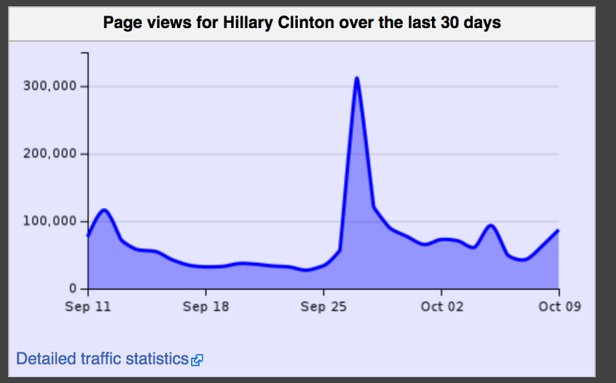

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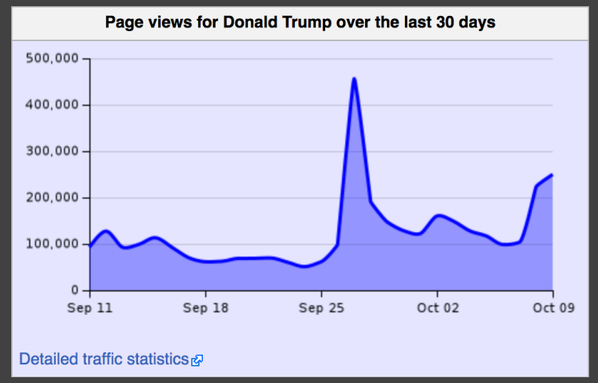

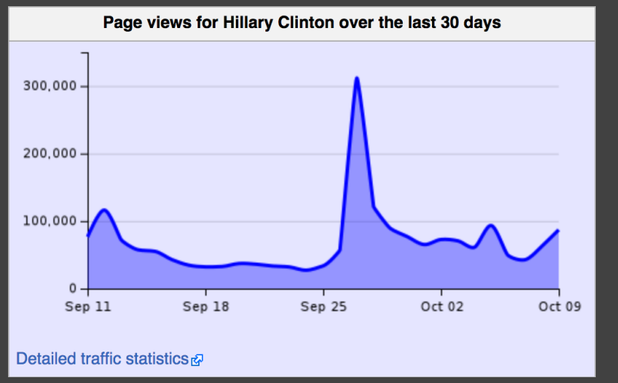


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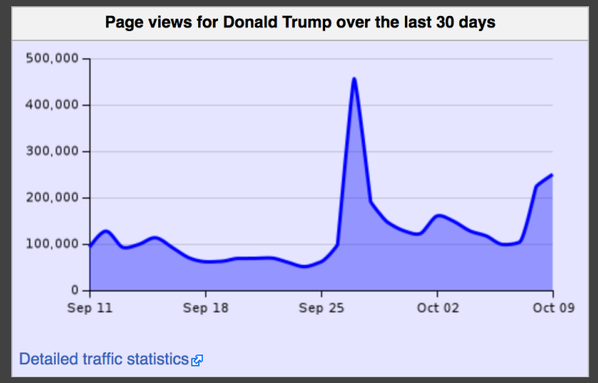

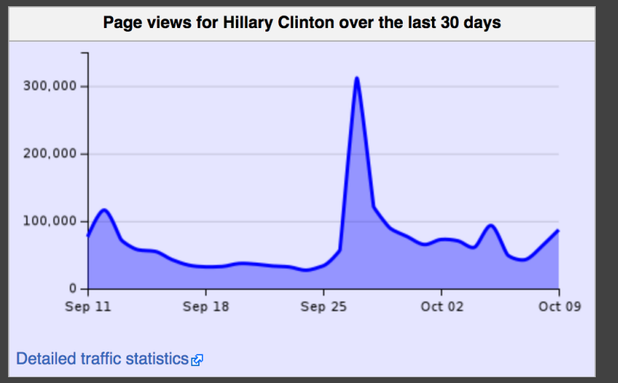


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{{Graph:PageViews | width = 200}}
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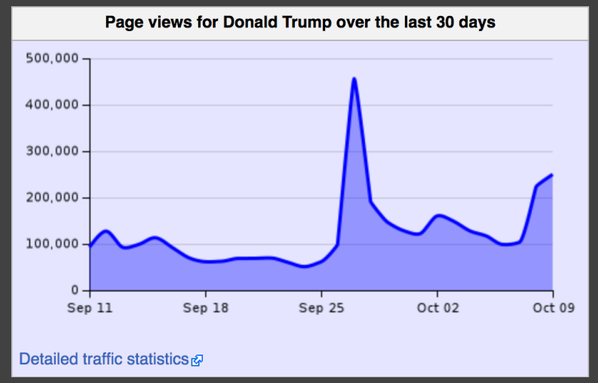

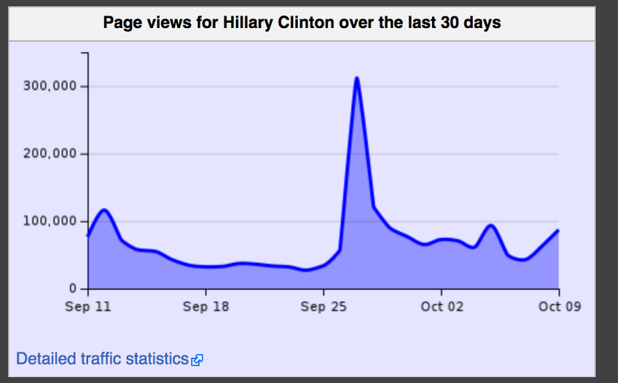


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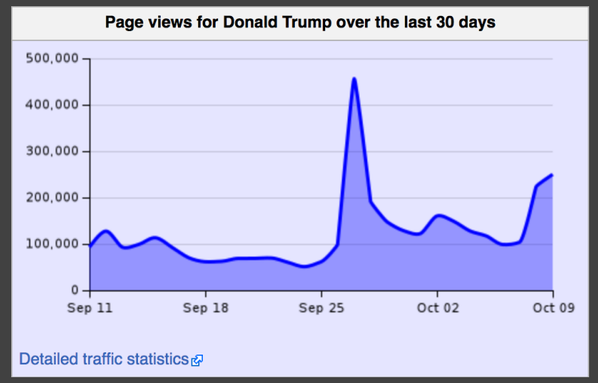

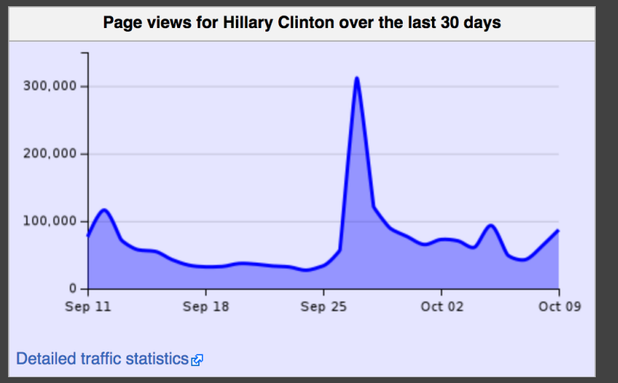


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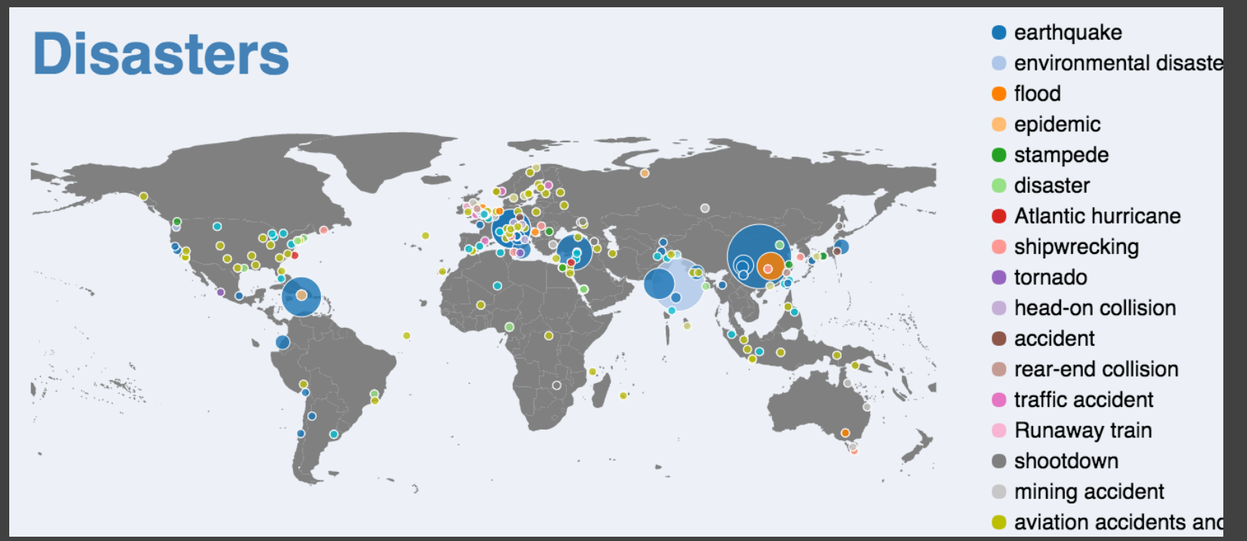

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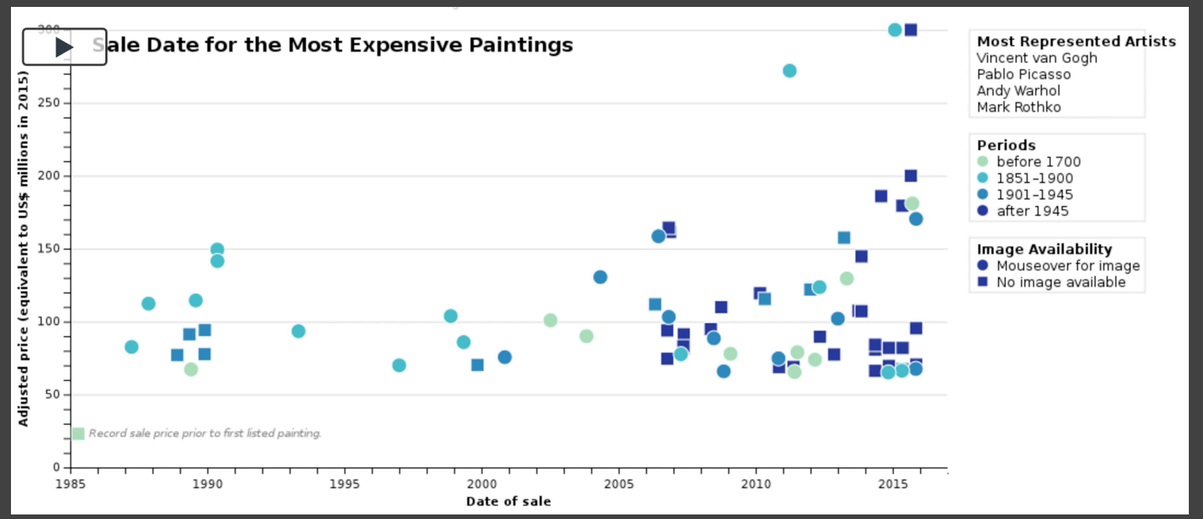

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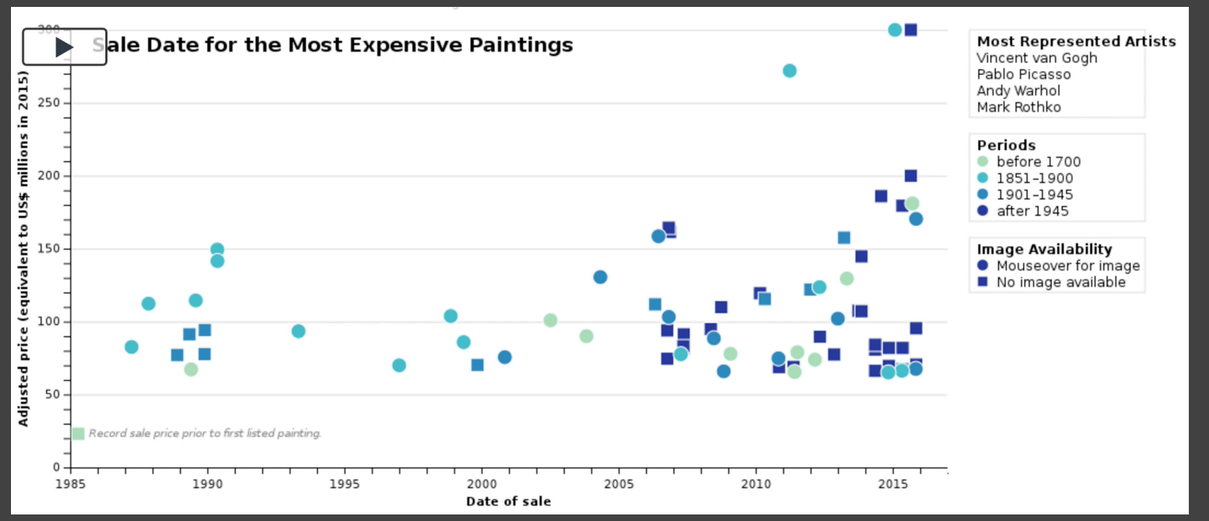

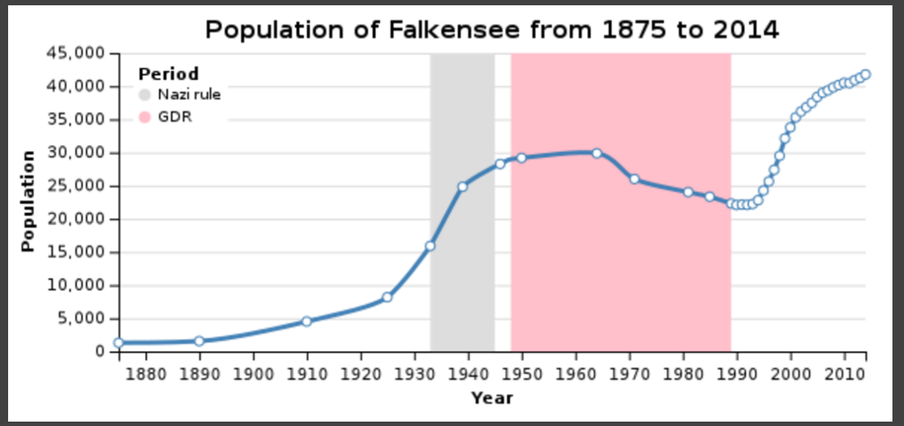

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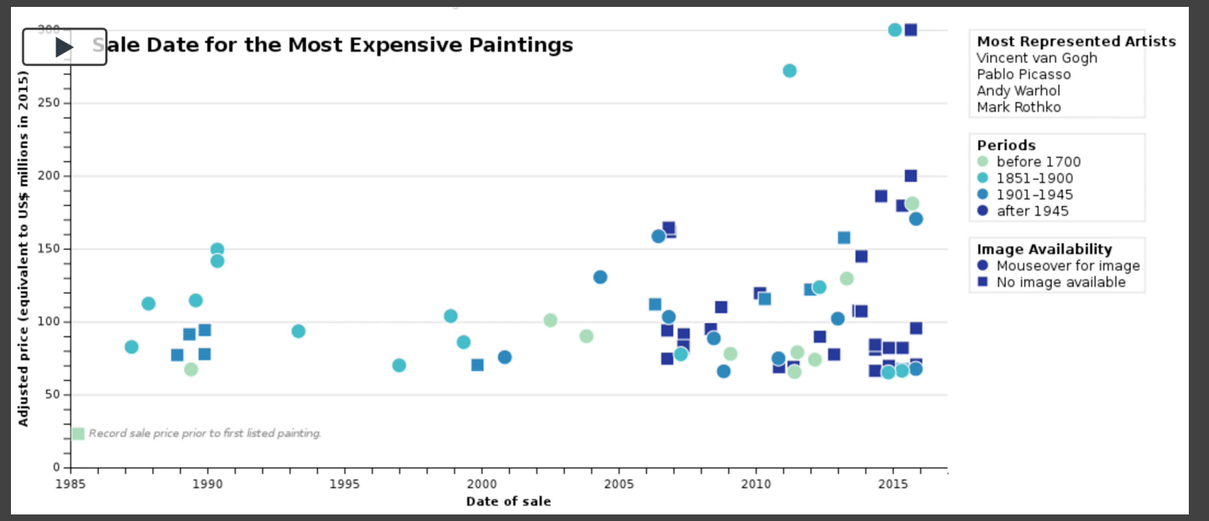

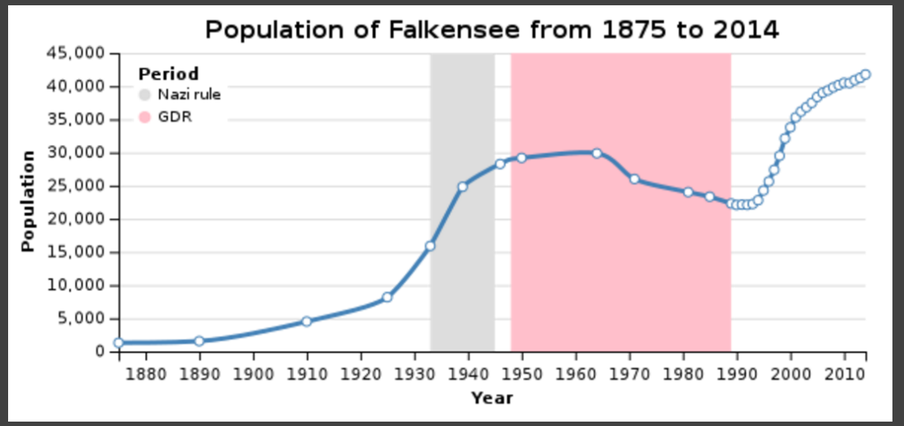

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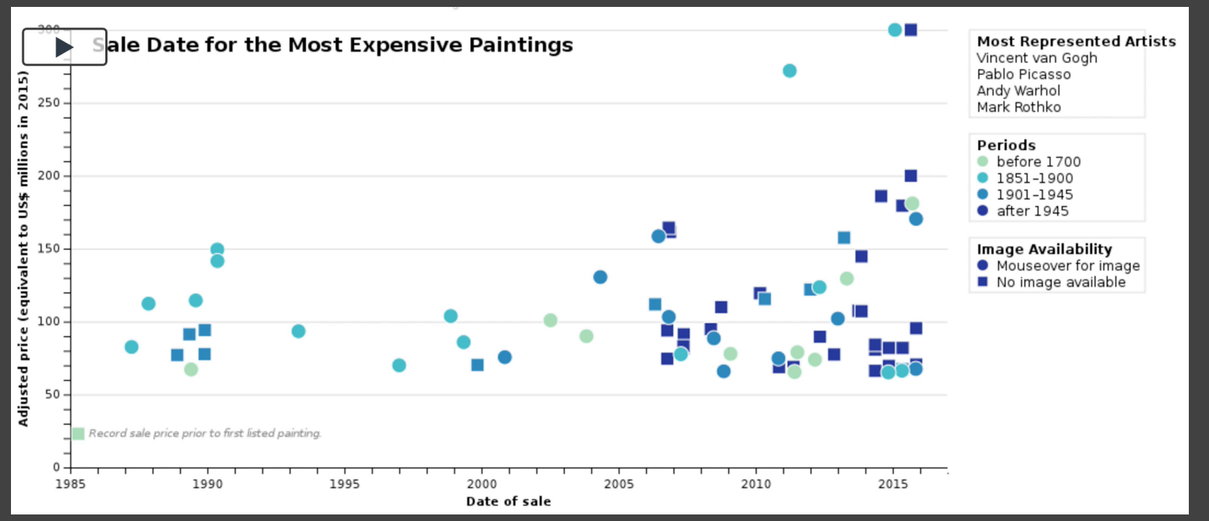

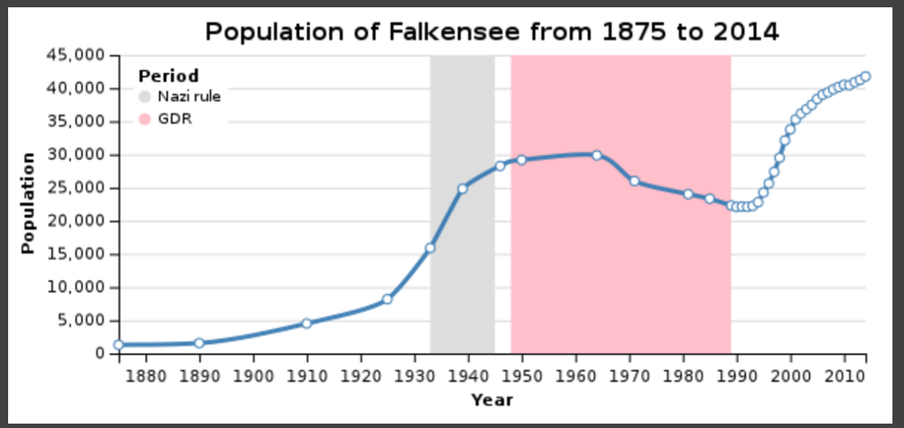

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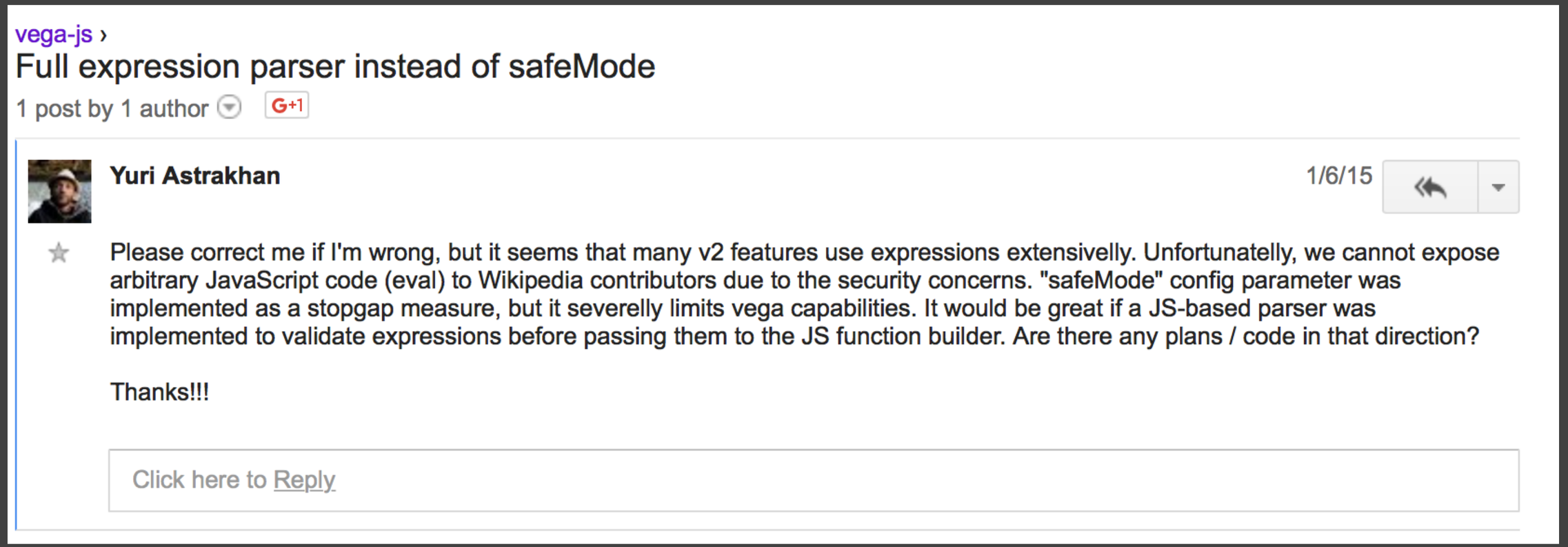

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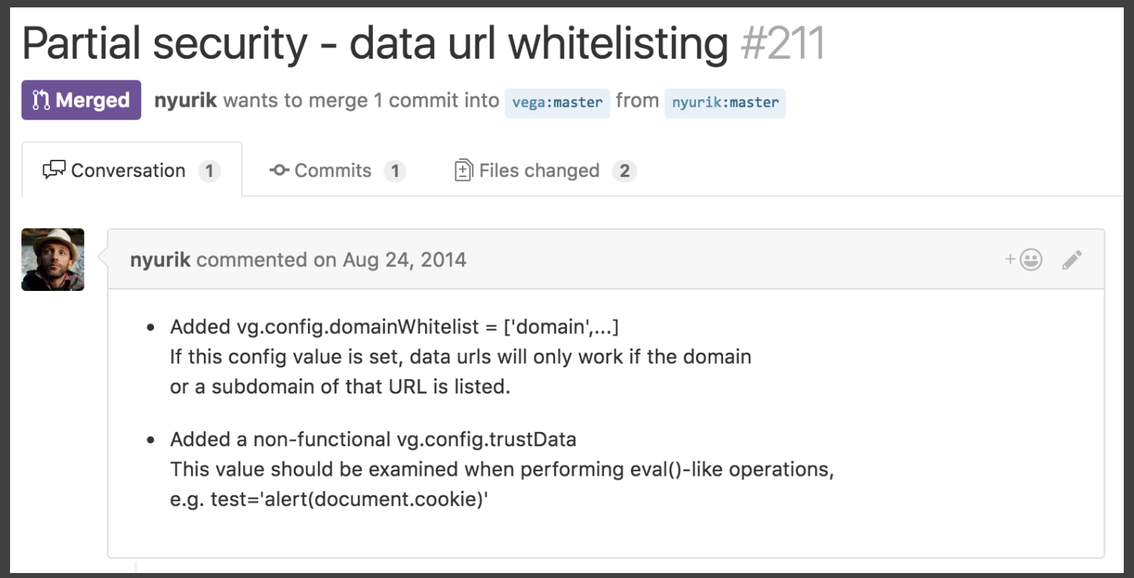

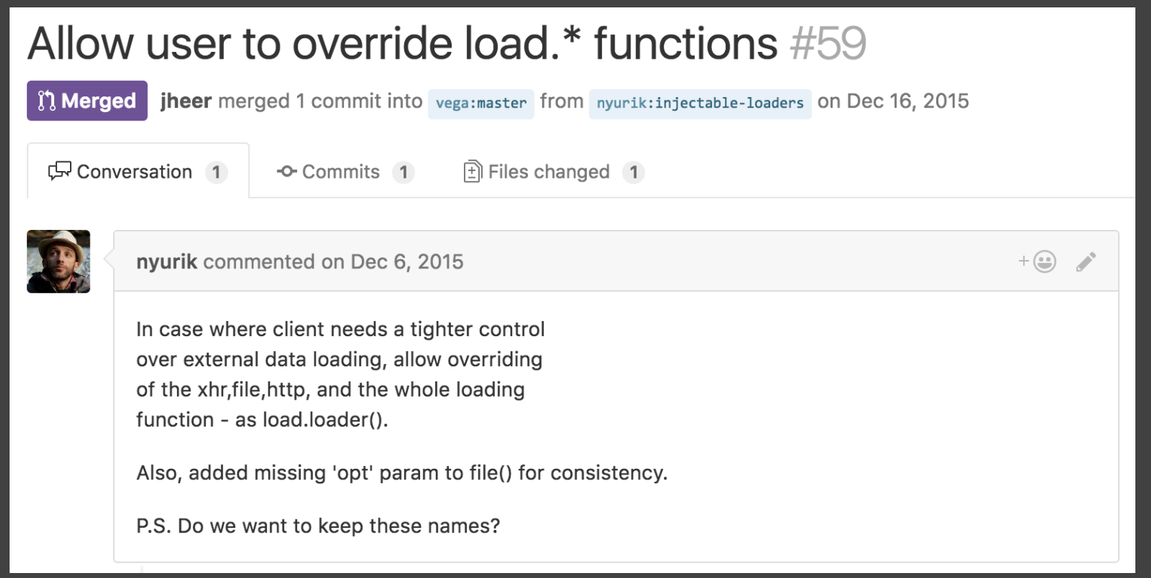

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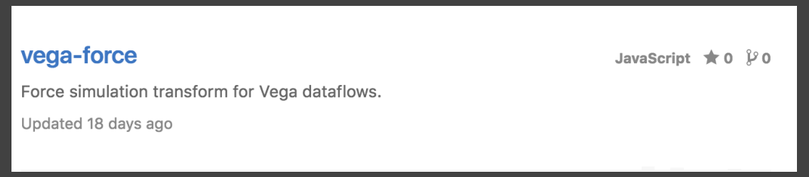
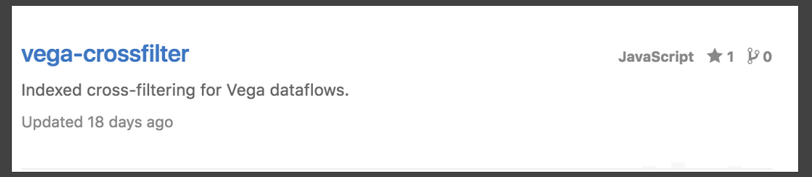
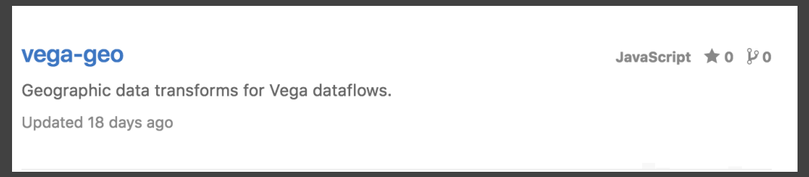
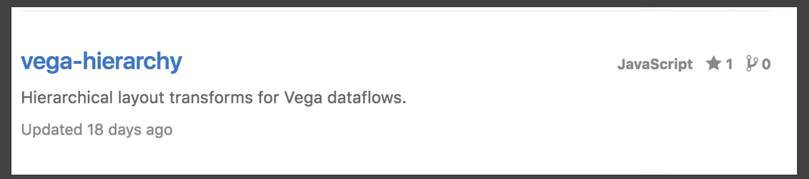
Data Loading – URL black/white-listing and custom handling (e.g., for WikiMedia protocols).

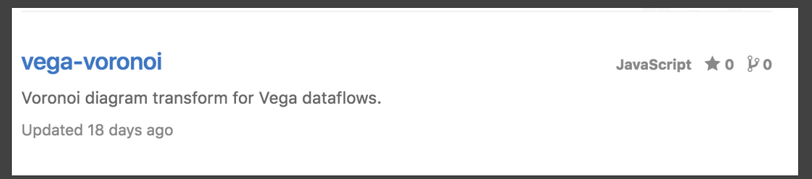
Modularity – only include needed functionality on a per-page basis.

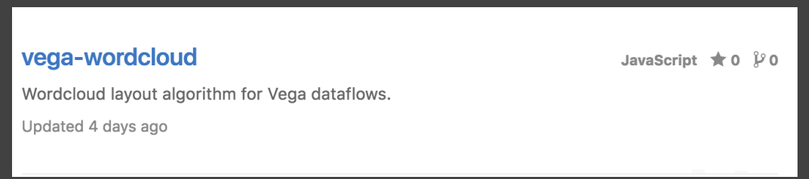












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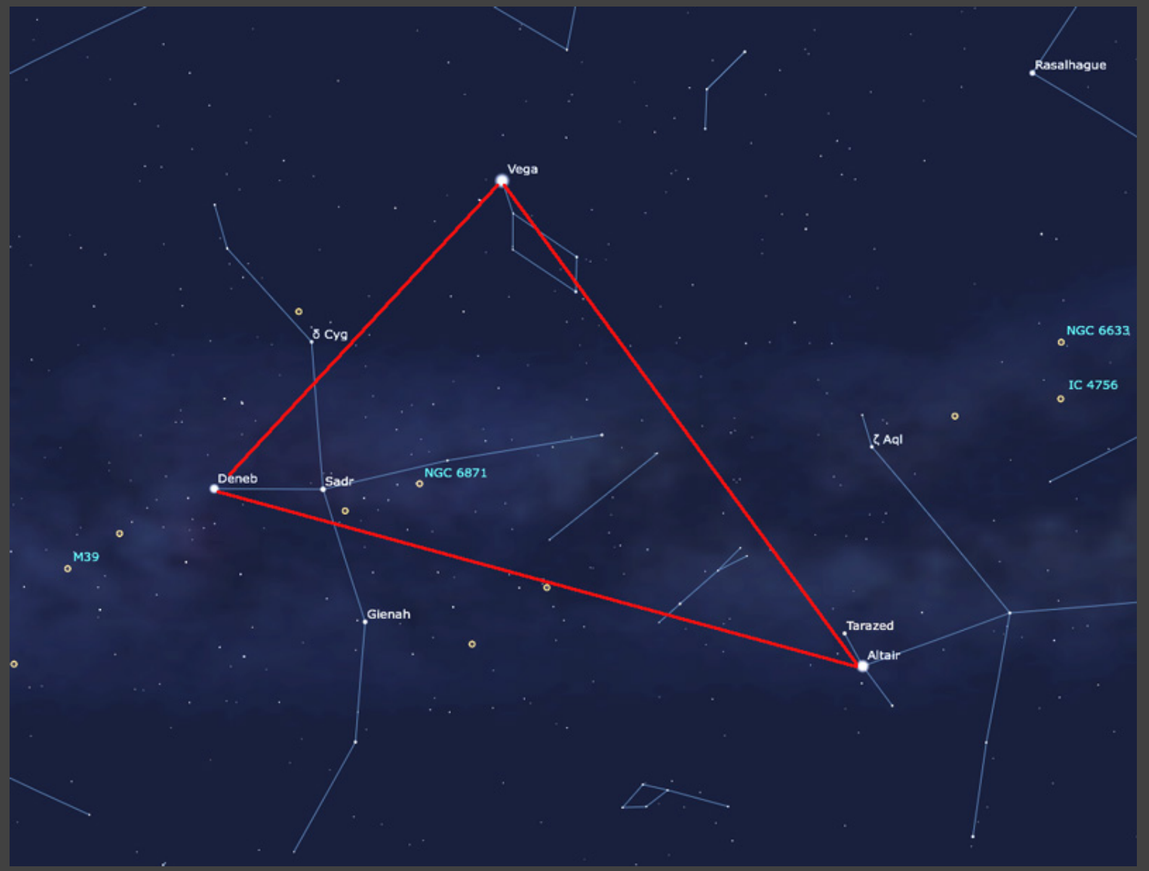

James Guilford, https://cuyastro.org/2011/07/15/a-summery-triangle/

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> *“It is this type of 1:1:1 mapping between thinking, code, and visualization that is my favorite thing about [Altair]”* – Dan Saber.
>
> https://dansaber.wordpress.com/2016/10/02/a-dramatic-tour-through-pythons-data-visualization-landscape-including-ggplot-and-altair/

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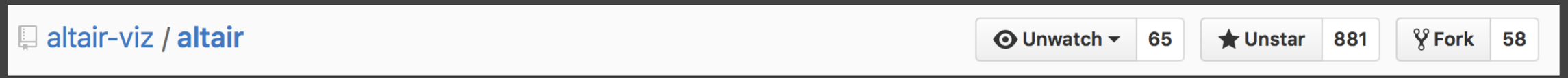
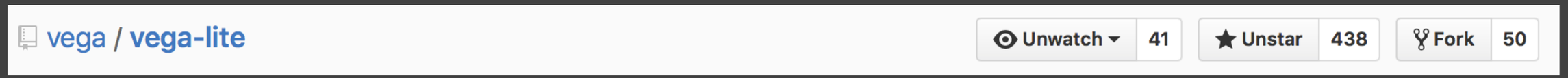
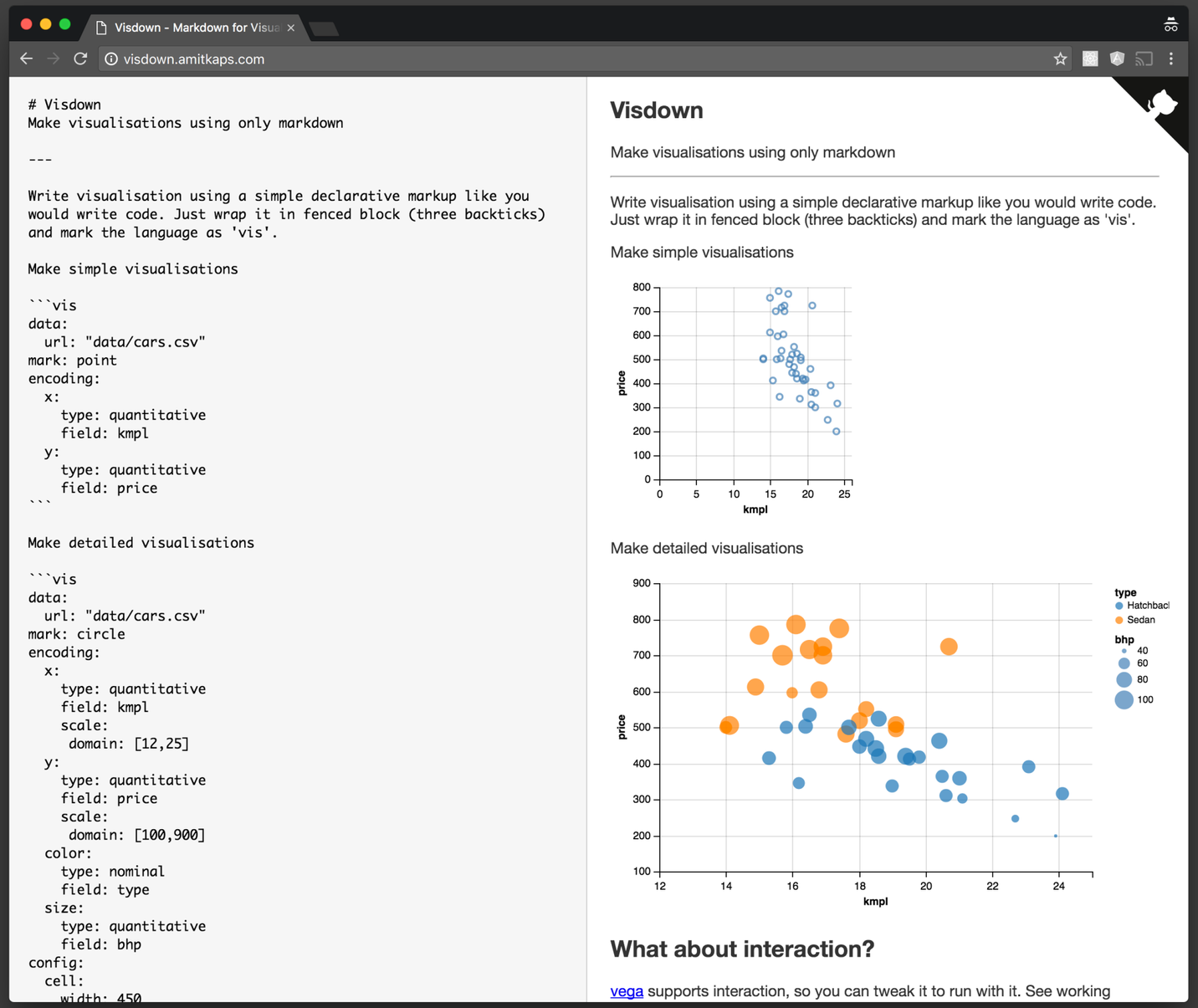
Has helped prioritize features on the roadmap: box plots and more responsive layout.







Visdown, Amit Kapoor. http://visdown.amitkaps.com/

Visdown - Markdown for Visua

visdown.amitkaps.com

```
# Visdown
Make visualisations using only markdown

---

Write visualisation using a simple declarative markup like you
would write code. Just wrap it in fenced block (three backticks)
and mark the language as 'vis'.

Make simple visualisations

```vis
data:
  url: "data/cars.csv"
mark: point
encoding:
  x:
    type: quantitative
    field: kmpl
  y:
    type: quantitative
    field: price
```

Make detailed visualisations

```vis
data:
  url: "data/cars.csv"
mark: circle
encoding:
  x:
    type: quantitative
    field: kmpl
    scale:
     domain: [12,25]
  y:
    type: quantitative
    field: price
    scale:
     domain: [100,900]
  color:
    type: nominal
    field: type
  size:
    type: quantitative
    field: bhp
config:
  cell:
    width: 450
```

Visdown

Make visualisations using only markdown

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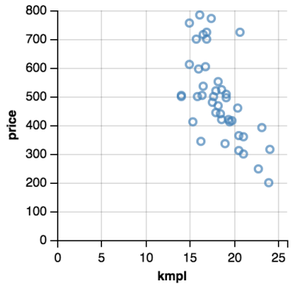
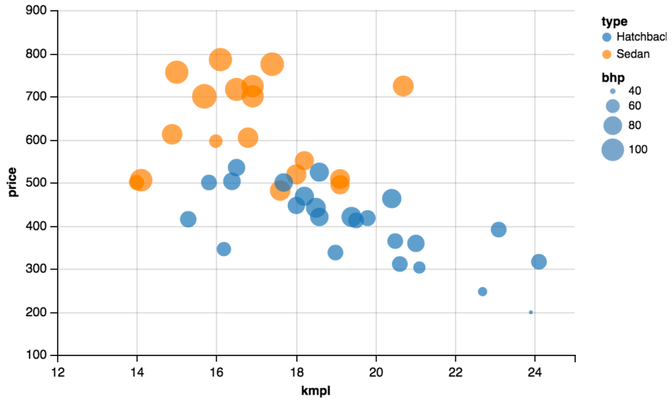
Make simple visualisations



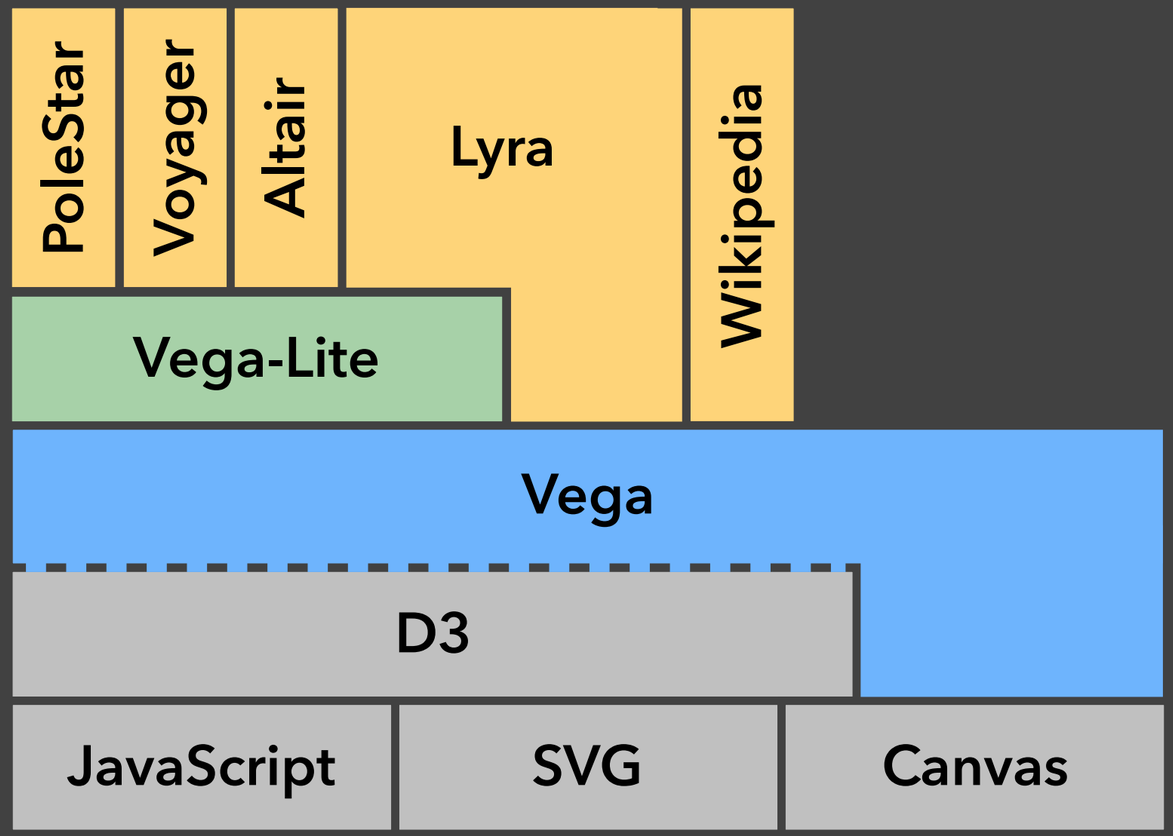
Make detailed visualisations



What about interaction?

vega supports interaction, so you can tweak it to run with it. See working

Visdown, Amit Kapoor. http://visdown.amitkaps.com/
```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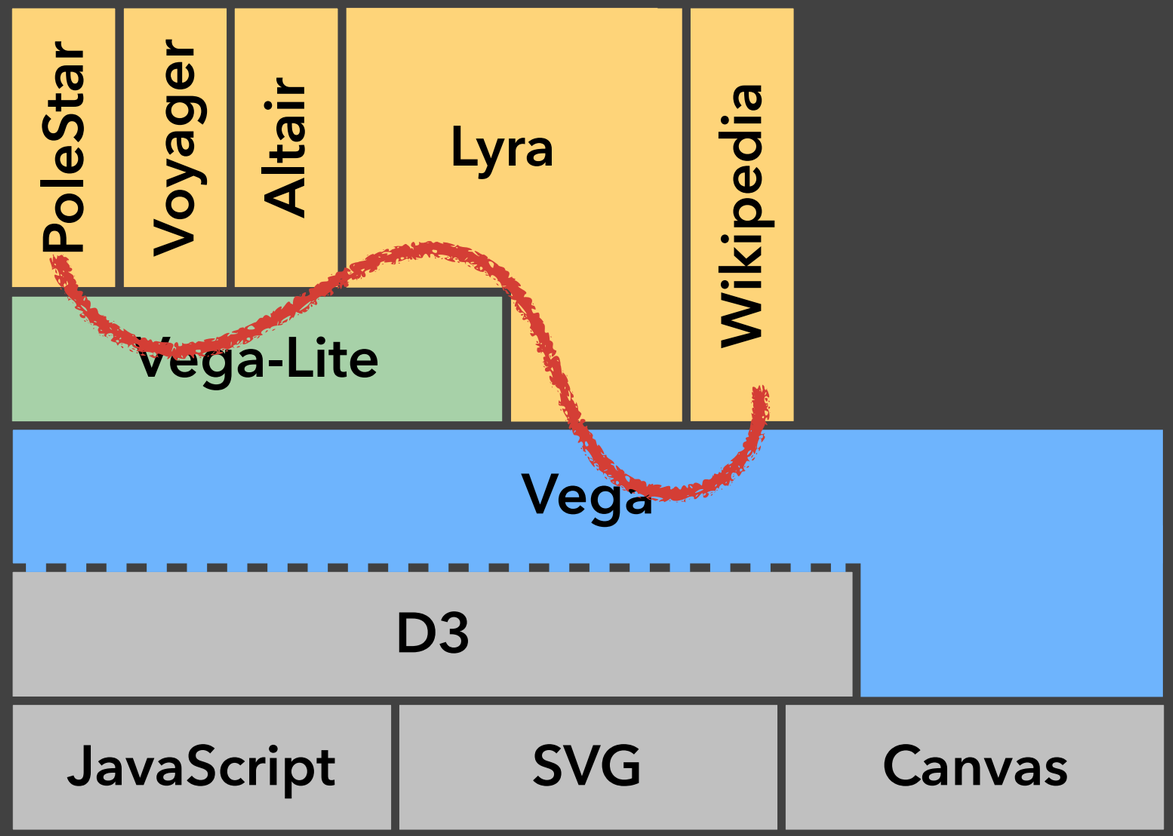
Altair
Lyra
Wikipedia
Vega-Lite
Vega
D3
JavaScript
SVG
Canvas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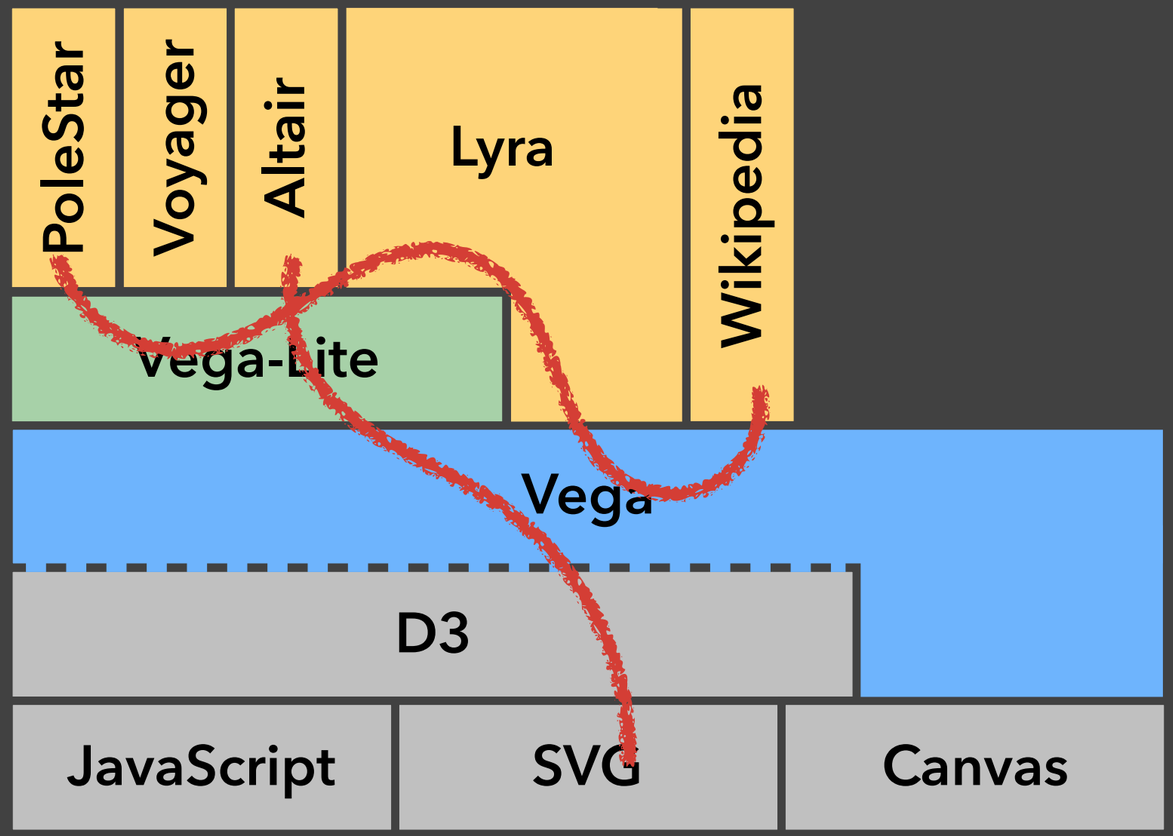
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Marketing

Interactive Data Lab Retweeted

Arvind Satyanarayan @arvindsatya1 · Aug 9

Honored our work on interactive Vega-Lite won Best Paper. Excited to present at InfoVis '16. vimeo.com/177767802 idl.cs.washington.edu/papers/vega-li…

Vega-Lite: A Grammar of Interactive Graphics

We present Vega-Lite, a high-level grammar that enables rapid specification of interactive data visualizations. Vega-Lite combines a traditional grammar of graphics,…

vimeo.com

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Arvind Satyanarayan @arvindsatya1 · 14 Jul 2015

After 500+ commits, proud to announce the release of Vega 2.0 featuring streaming data and declarative interaction. vega.github.io/vega/

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Introducing Vega-Lite – HCI & Design at UW

Today we are excited to announce the official 1.0 release of Vega-Lite, a high-level format for rapidly creating visualizations for…

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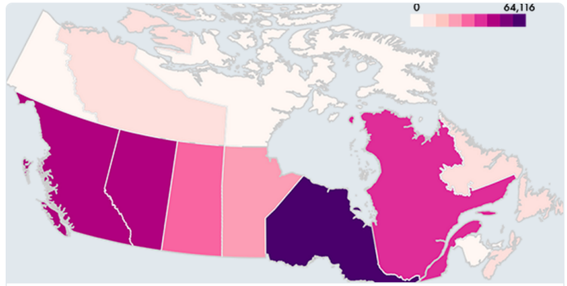
Interactive Data Lab @uwdata · Sep 27

Bayesian Surprise Maps to show the unexpected. New @uwdata blog post by Michael Correll!



Surprise Maps: Showing the Unexpected

In 1977, Jerry Ehman — an astronomer working with the SETI project to seek out alien life — came across an interesting radio signal, one…

medium.com

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Stories Responses

Date ↑	Views	Reads	Read ratio	Recommends
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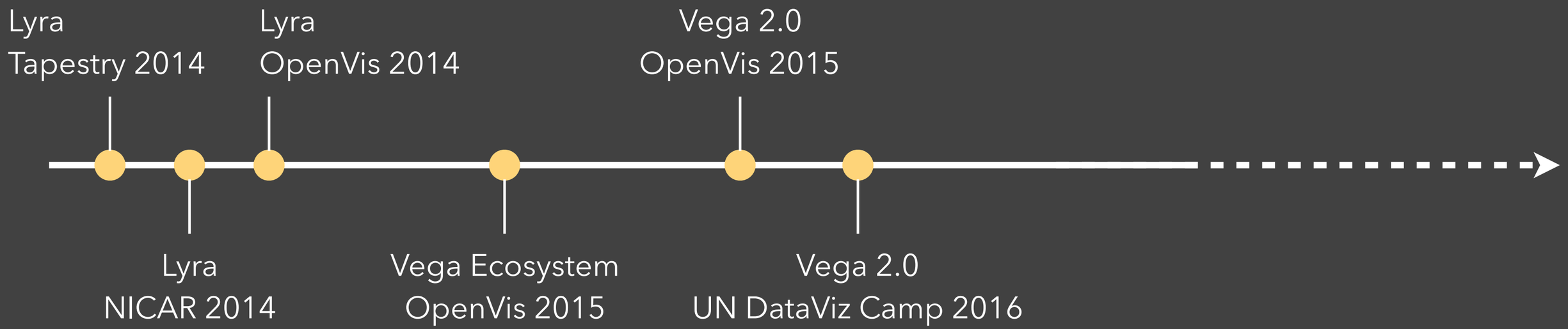
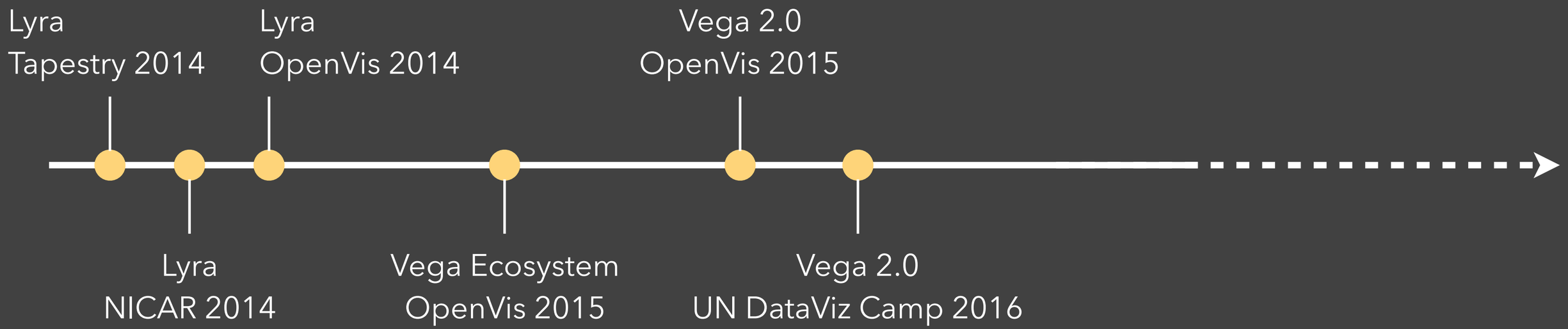
Atlas of Me: Personalized Spatial Analogy Maps for Unf... 10 min read · In HCI & Design at UW · View story · Referrers	298	93	31%	8
Author's Response to Stephen Few's critique of Hypoth... 7 min read · View story · Referrers	579	332	57%	10
Introducing Vega-Lite 5 min read · In HCI & Design at UW · View story · Referrers	20K	9.6K	48%	140
Hypothetical Outcome Plots: Experiencing the Uncert... 11 min read · In HCI & Design at UW · View story · Referrers	3.1K	1.2K	40%	22
Next Steps for Data Visualization Research 7 min read · View story · Referrers	3.6K	1.8K	51%	42

Marketing & Outreach

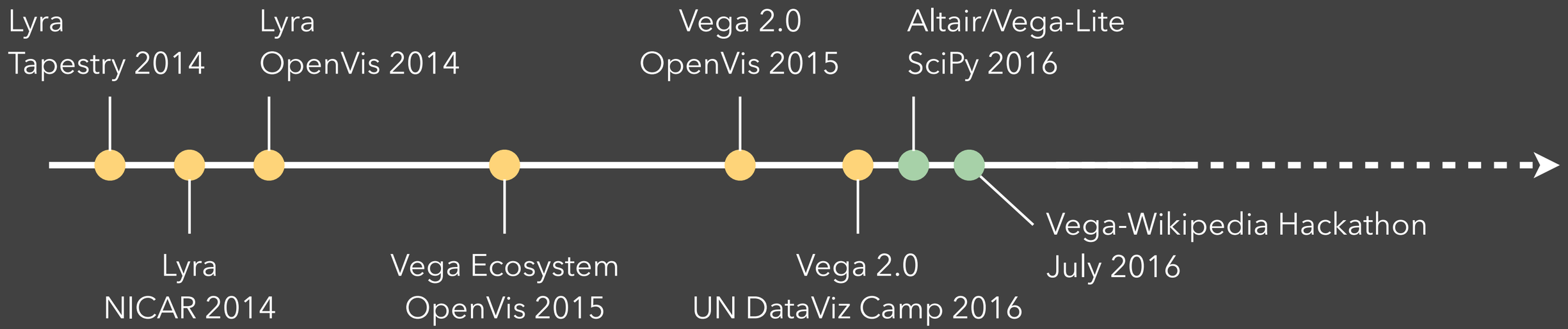


Marketing & Outreach



Talk about your work to diverse audiences, but craft the message for them specifically.

Marketing & Outreach



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Challenges

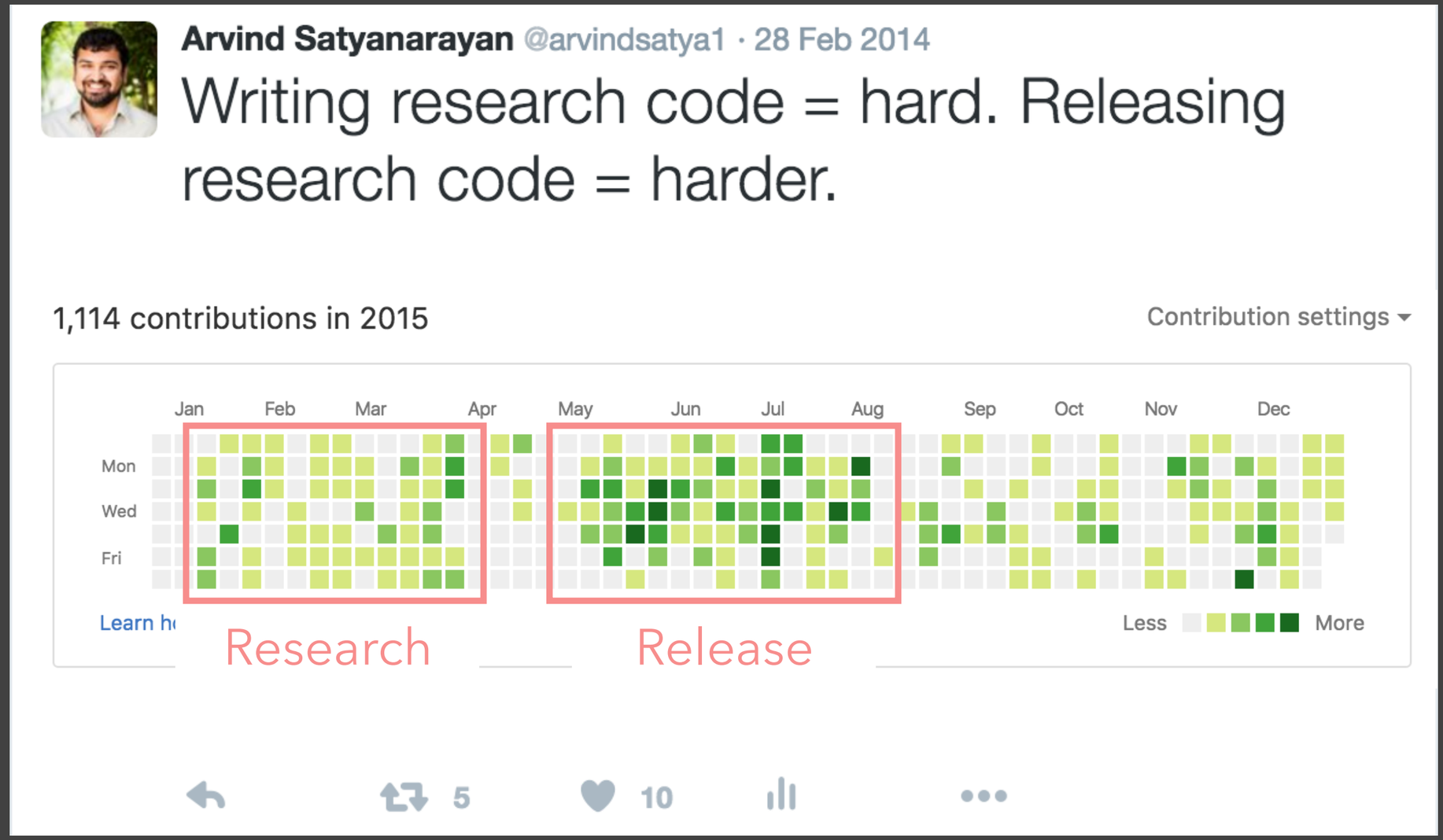
Challenges

Arvind Satyanarayan @arvindsatya1 · 28 Feb 2014

Writing research code = hard. Releasing research code = harder.

5 10

Challenges


Arvind Satyanarayan @arvindsatya1 · 28 Feb 2014
Writing research code = hard. Releasing research code = harder.
1,114 contributions in 2015
Contribution settings
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
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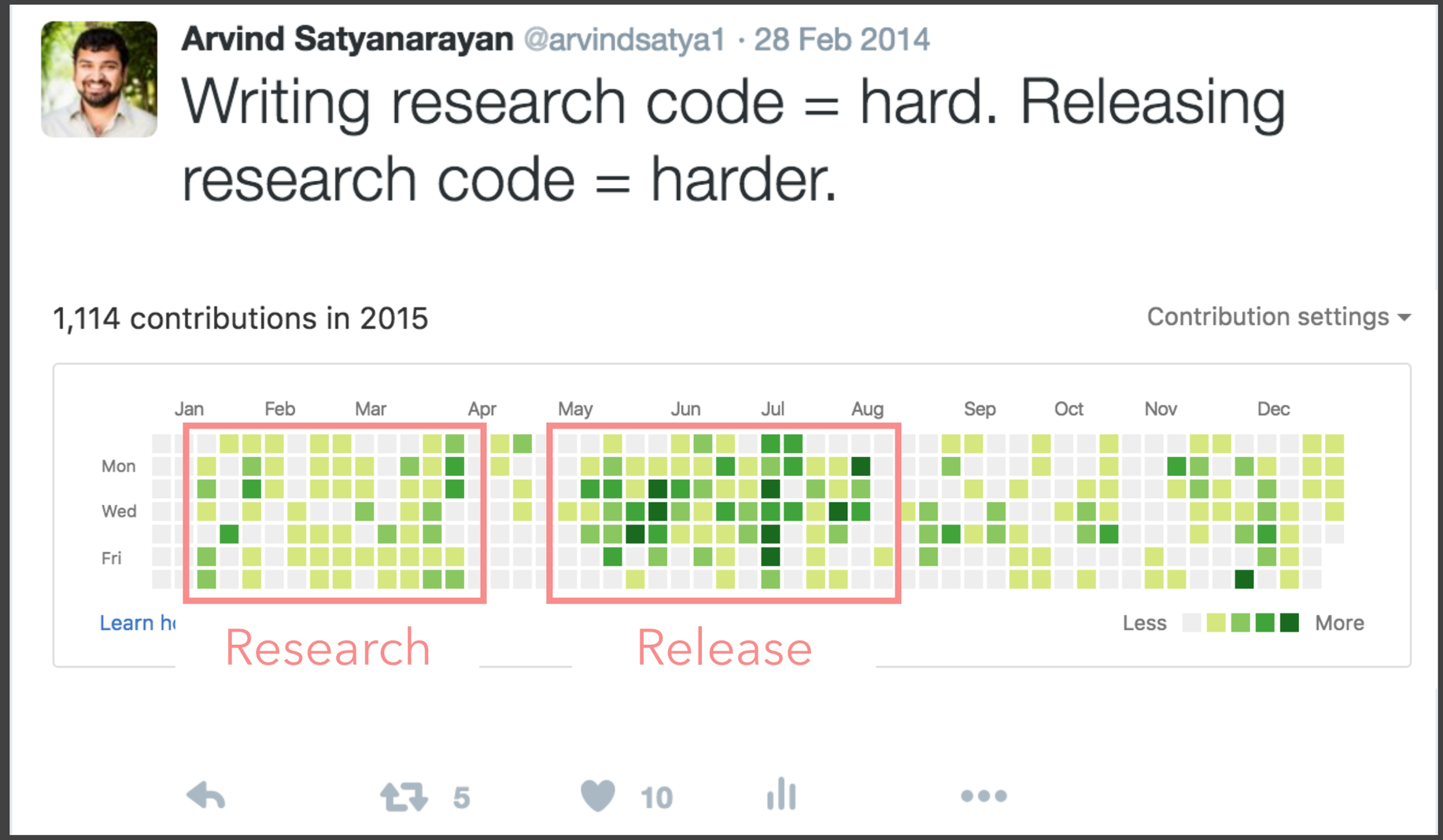
Challenges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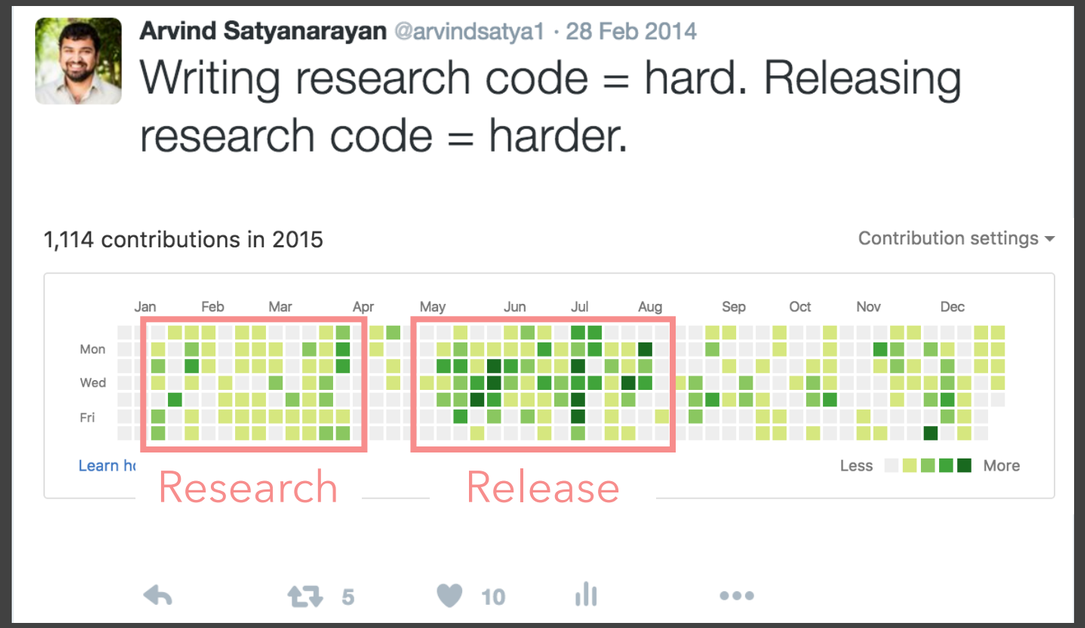
Challenges

Technical debt builds up with research.



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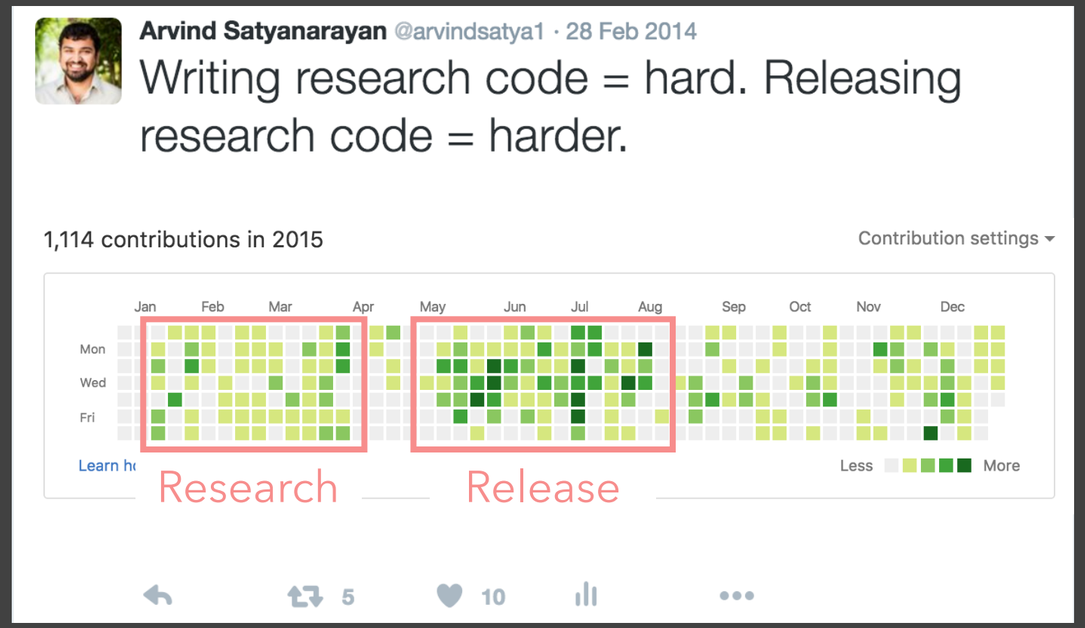
Hacking for "proof-of-concept" deadline.



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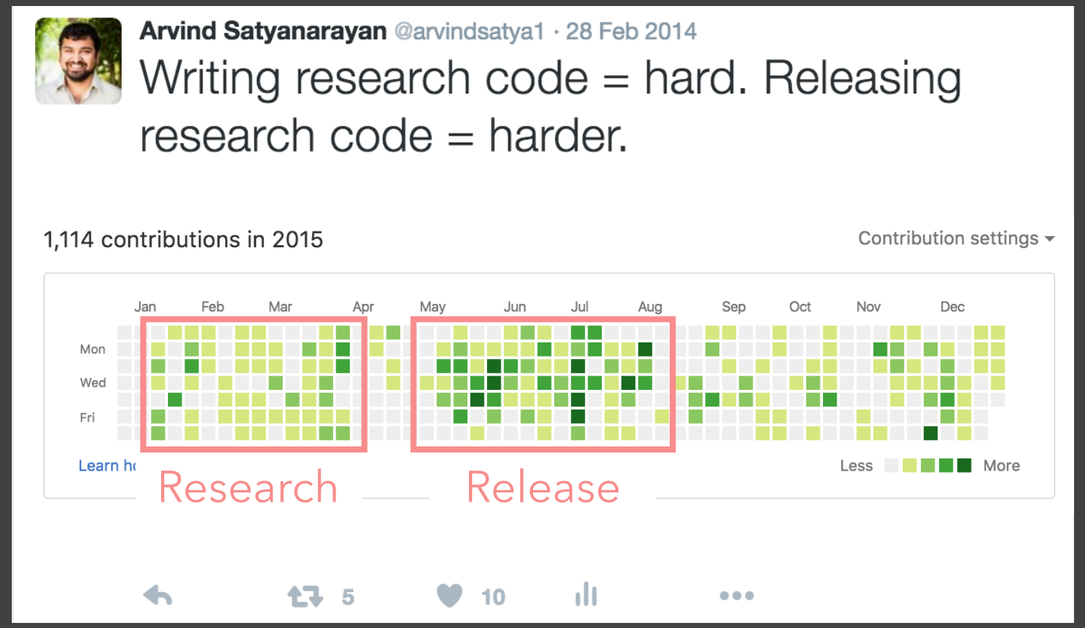

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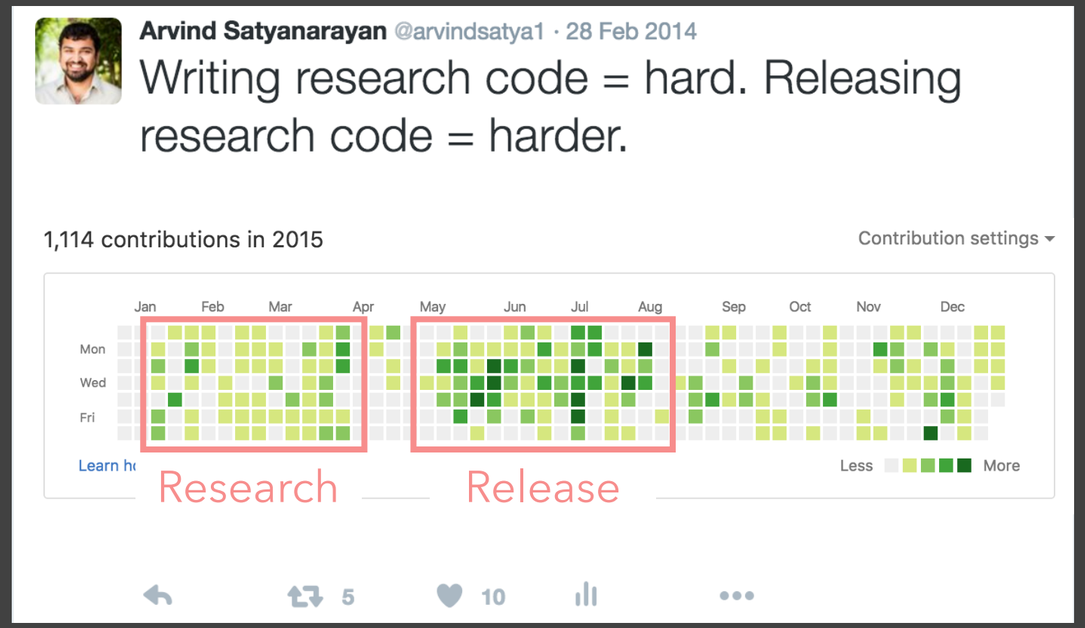

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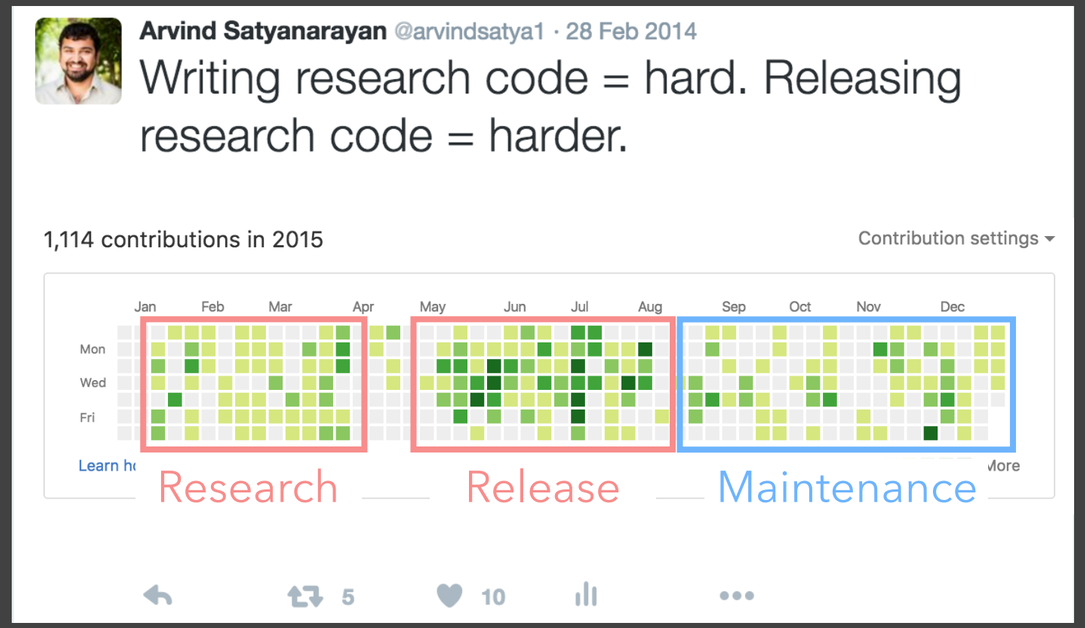

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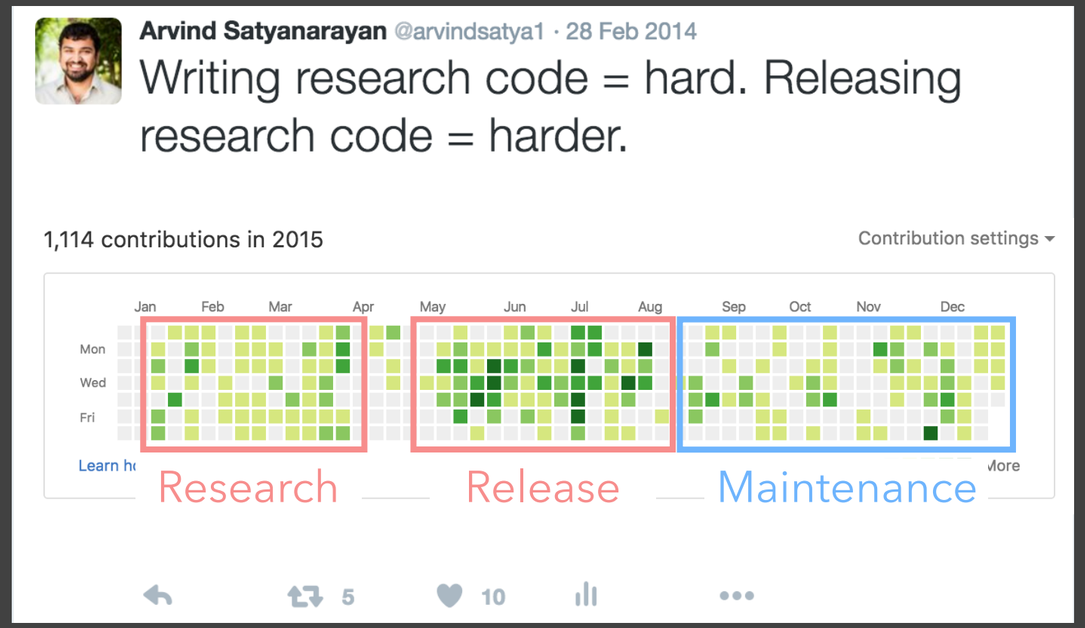

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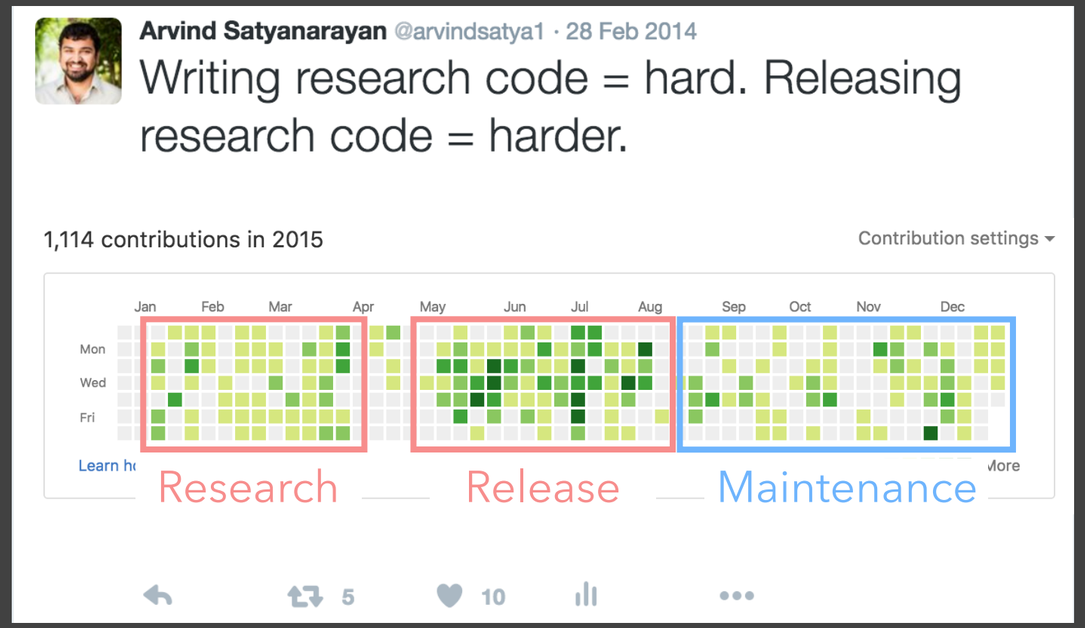

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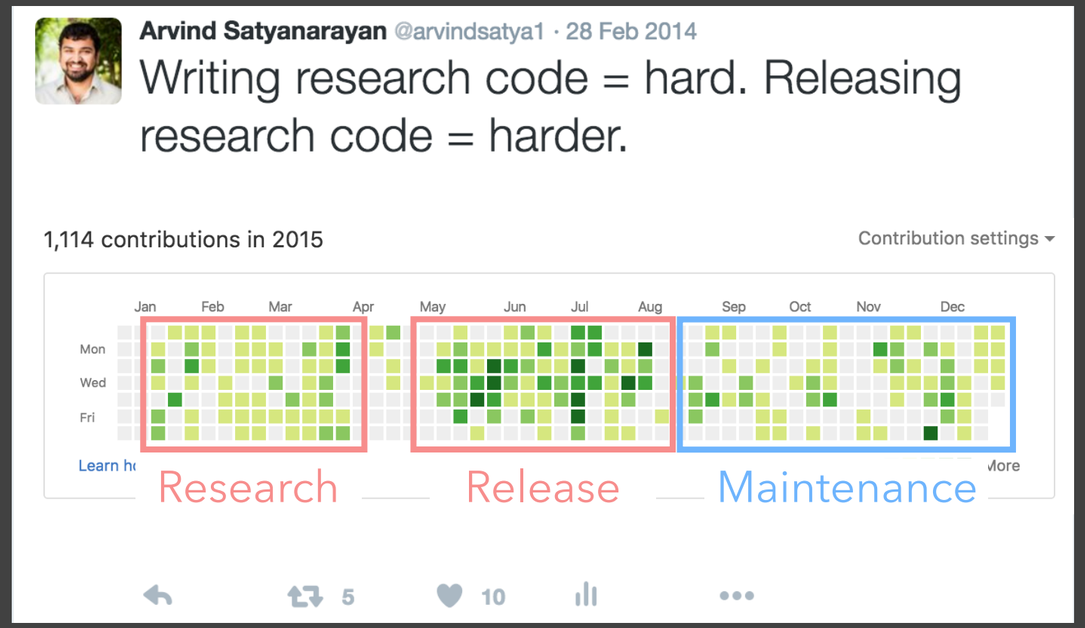

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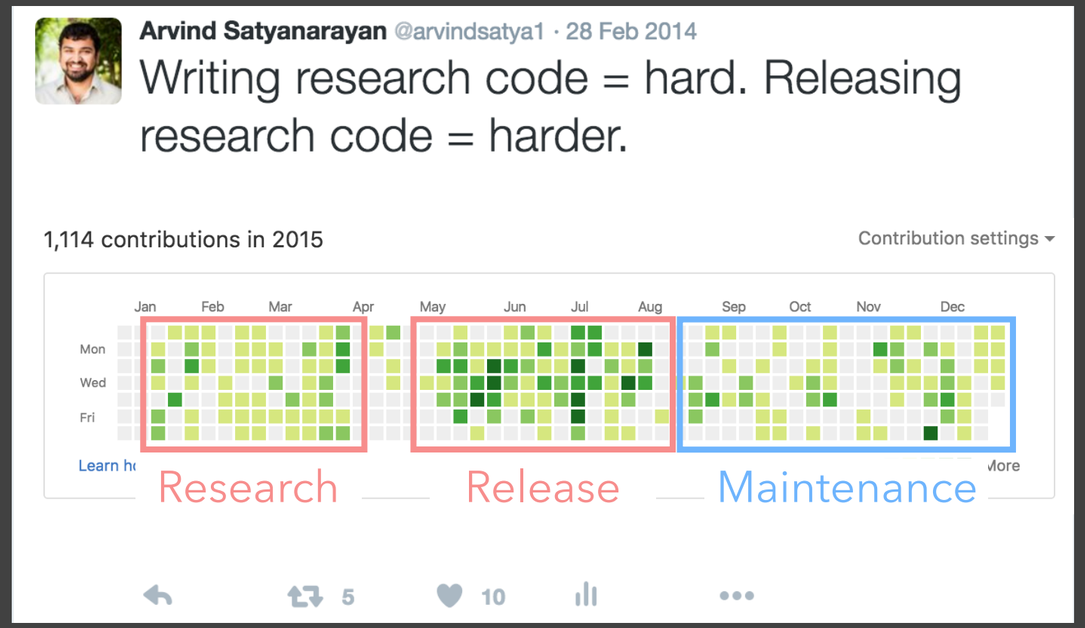
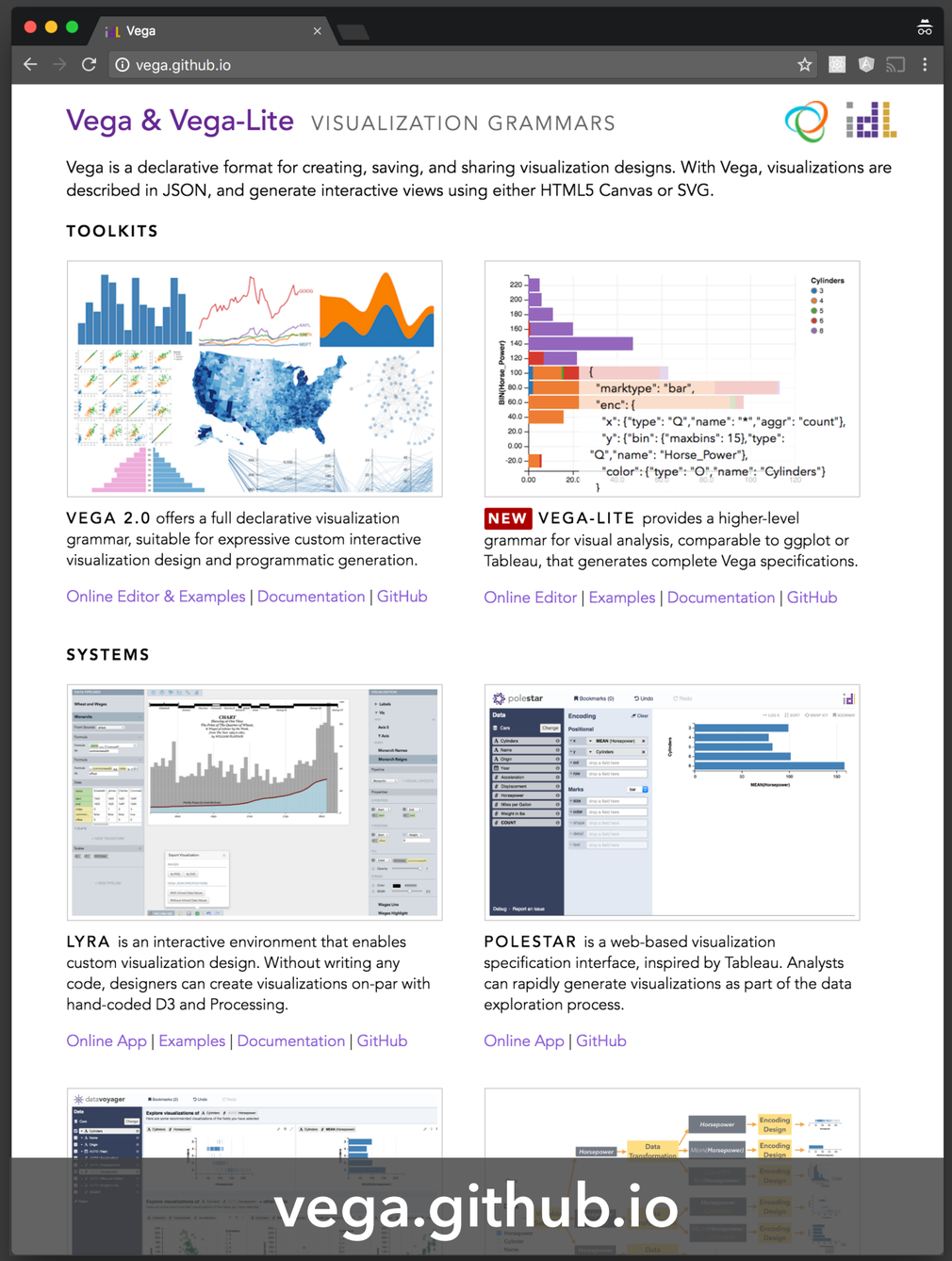
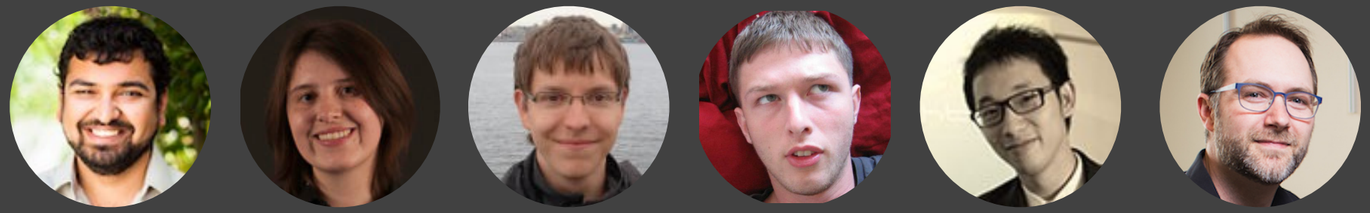
- Not only bug fixes, but feature releases to demonstrate active + healthy projects.

Developer experience.

- How to integrate Vega into your own system?
- How to contribute?







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