

vegawidget

Composing and Rendering Interactive Vega(-Lite) Charts

vegawidget

Using Vega-Lite in the browser

Rendering Vega-Lite specifications as htmlwidgets

Composing Vega-Lite specifications

vegawidget



Ian Lyttle, Schneider Electric

@ijlyttle



@AliciaSchep



Alicia Schep, Livongo



Stuart Lee, Monash University

@_StuartLee



Haley Jeppson, Iowa State University

@heyhayhay__



Wenyu Yang, George Washington University

@iuysa1



Heike Hofmann, Iowa State University

@heike_hh



vegawidget

What is **vegawidget**?

- CRAN package to render Vega-Lite specs
- GitHub organization with packages to help build and work with Vega-Lite specs in R



Vega-Lite

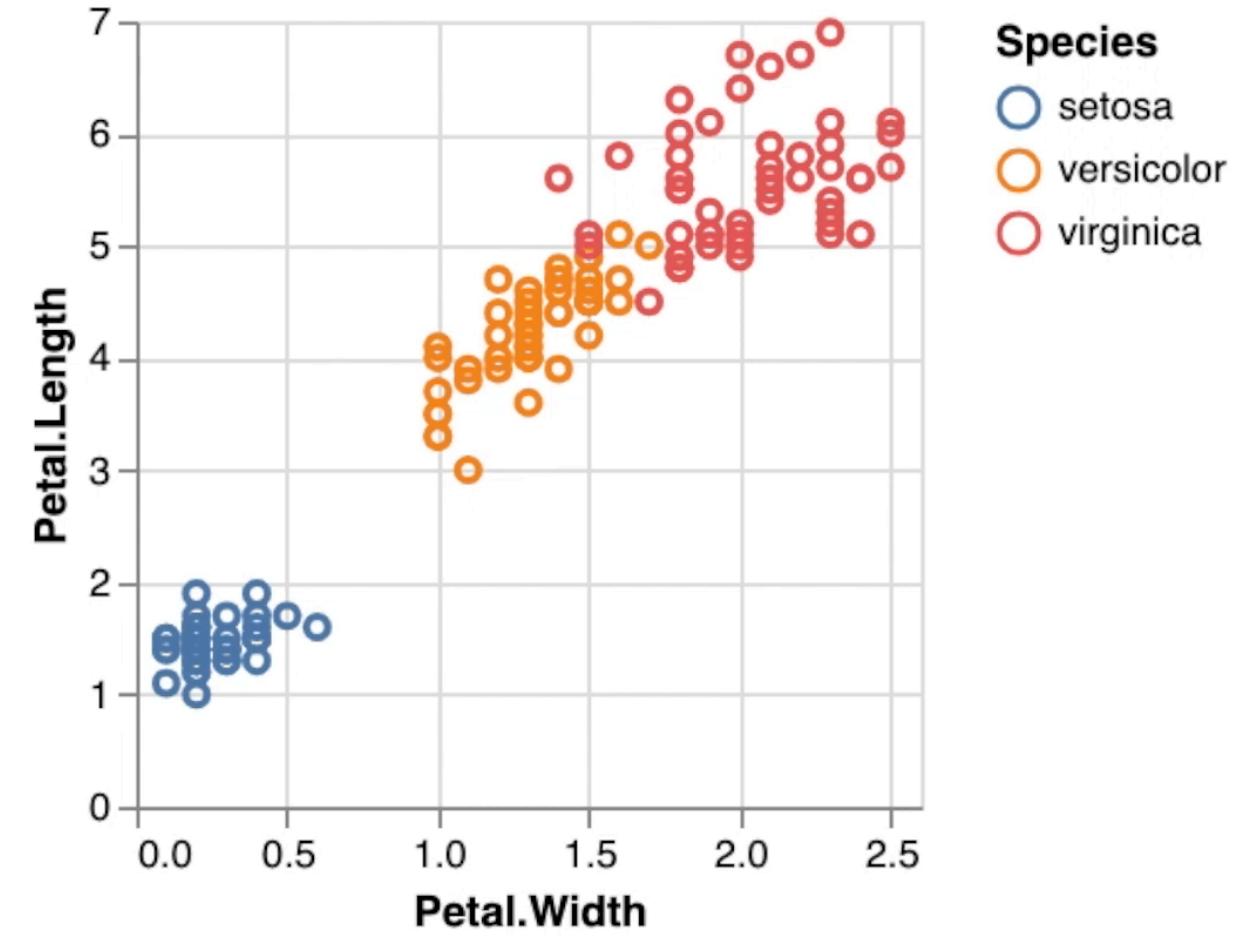
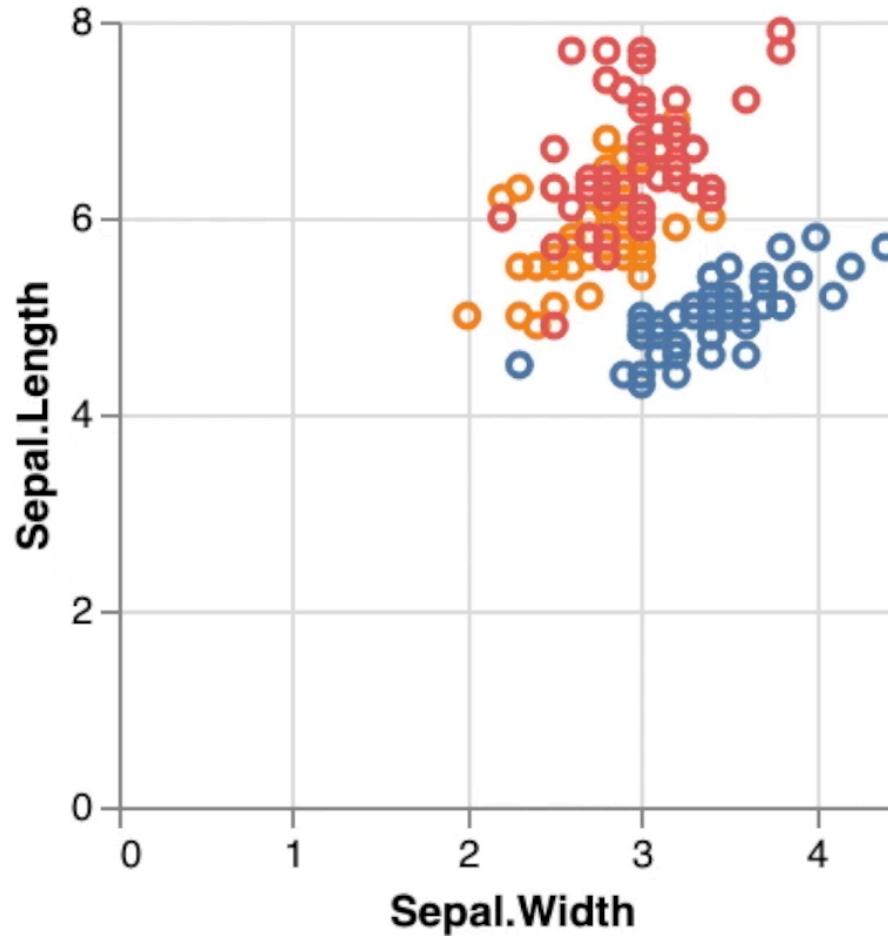
Interactive grammar-of-graphics, rendered in the browser

Built on Vega: Vega-Lite is more concise, but less expressive

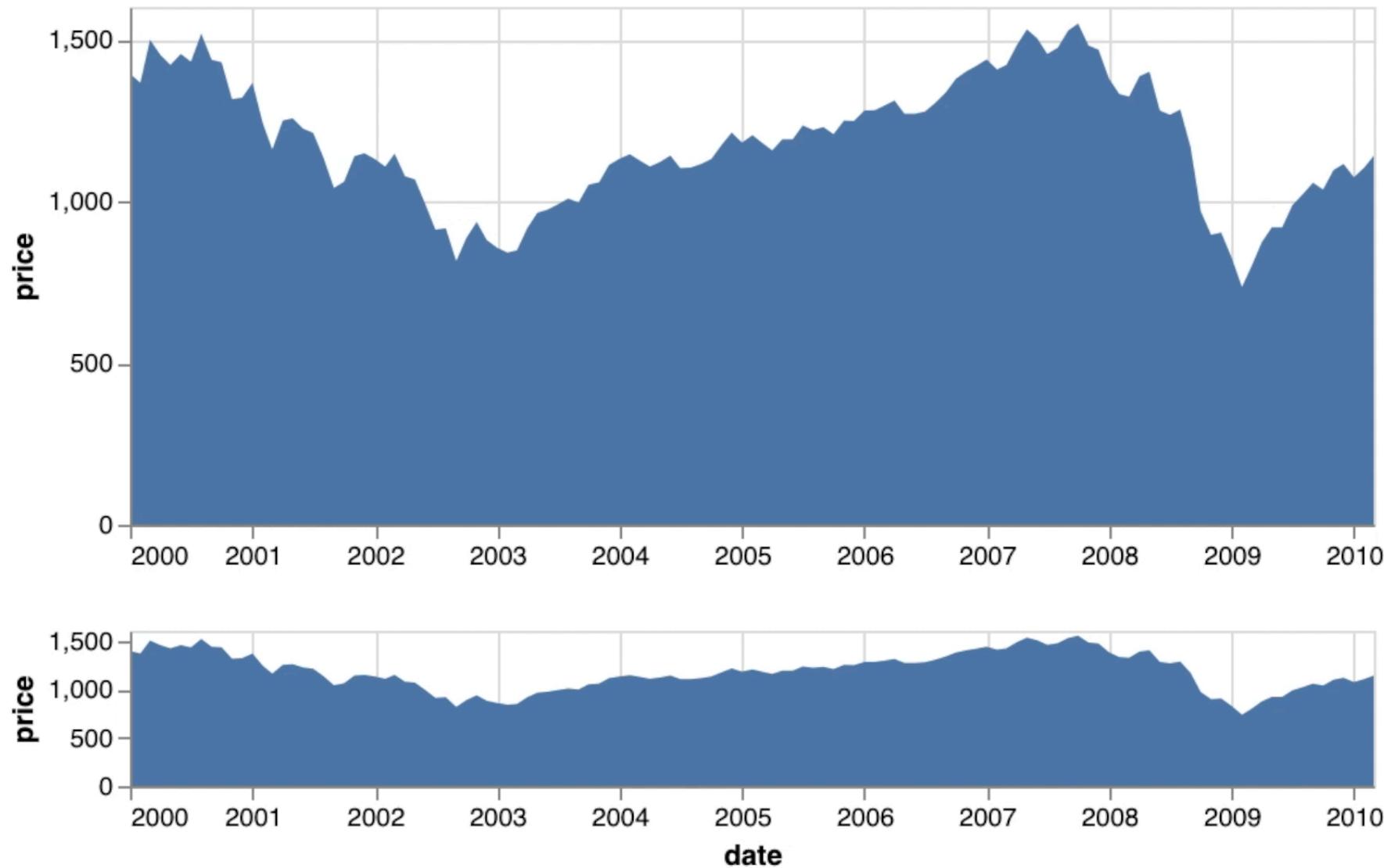
Developed by Interactive Data Lab, U Washington

Foundation for **vegalite** R package by Bob Rudis et al.

Vega-Lite: linked brushing



Vega-Lite: overview and detail



Grammar-of-Graphics as Food

saltfat
acidheat

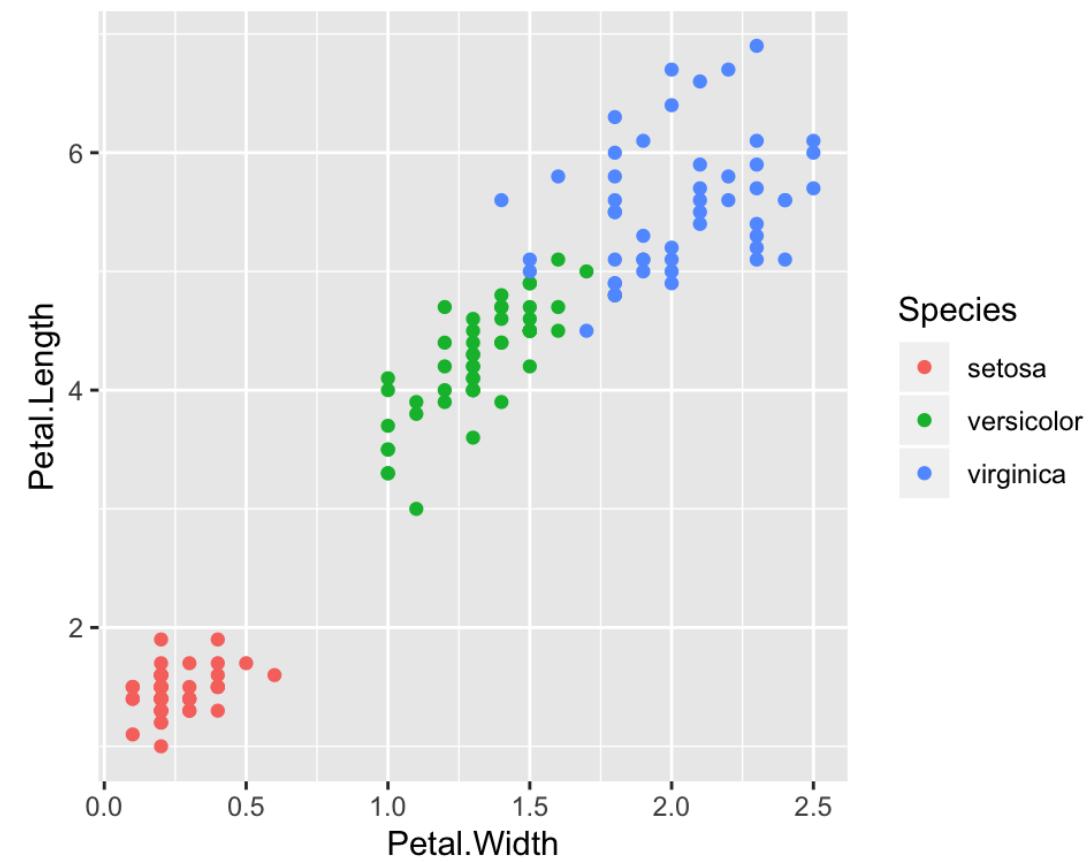
by Samin Nosrat



art by Wendy MacNaughton

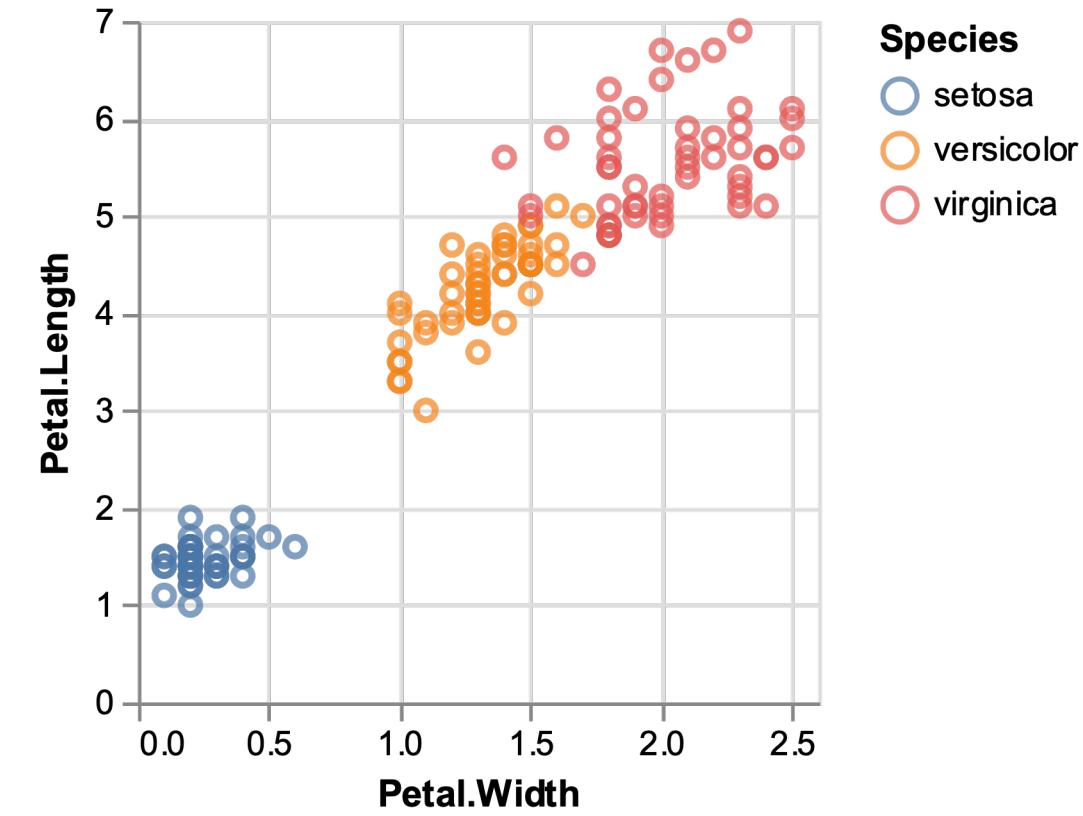
ggplot2

data stat aes geom



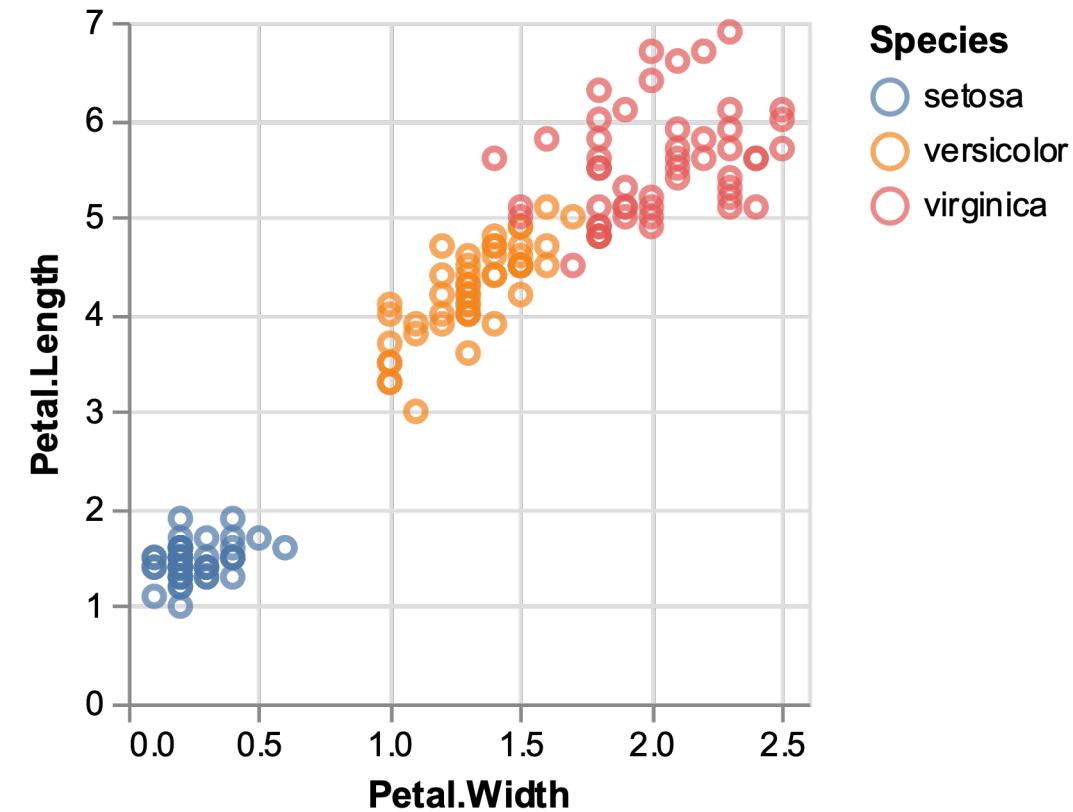
Vega-Lite

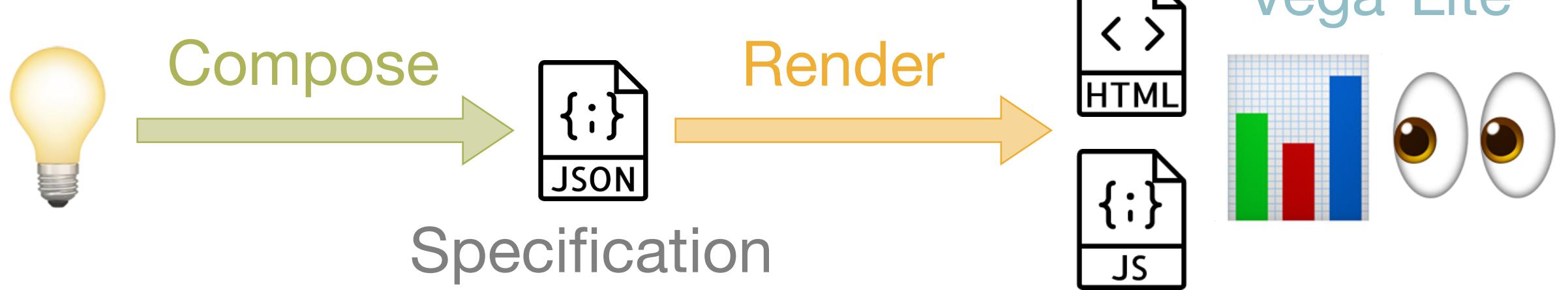
data transform
encoding mark



Vega-Lite

```
{  
  "data": {"values": [{"Petal.Width = 0.1, ...}, ...]},  
  "mark": "point",  
  "encoding": {  
    "x": {  
      "field": "Petal\\.Width",  
      "type": "quantitative",  
      "title": "Petal.Width"  
    },  
    "y": {  
      "field": "Petal\\.Length",  
      "type": "quantitative",  
      "title": "Petal.Length"  
    },  
    "color": {"field": "Species", "type": "nominal"}  
  }  
}
```





vegawidget

CRAN 0.2.1

lifecycle maturing



Ian Lyttle



Alicia Schep



Stuart Lee

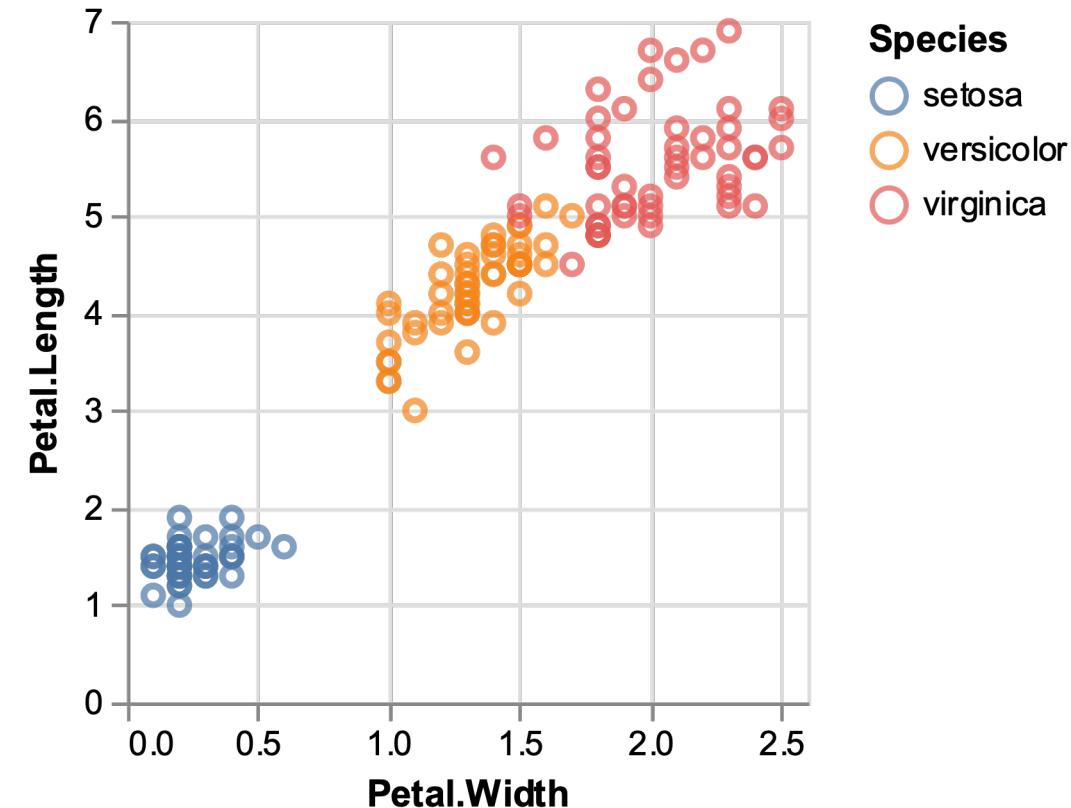
- htmlwidget
 - renders Vega(-Lite) specifications
 - provides access to interactivity
- intended as low-level package
 - use **vegawidget** to render
 - use other packages to compose

<https://vegawidget.github.io/vegawidget>



vegawidget

```
list(  
  data = list(values = iris),  
  mark = "point",  
  encoding = list(  
    x = list(  
      field = "Petal\\.Width",  
      type = "quantitative",  
      title = "Petal.Width"  
    ),  
    y = list(  
      field = "Petal\\.Length",  
      type = "quantitative",  
      title = "Petal.Length"  
    ),  
    color = list(field = "Species", type = "nominal")  
  )  
) %>%  
as_vegaspec()
```





vegawidget

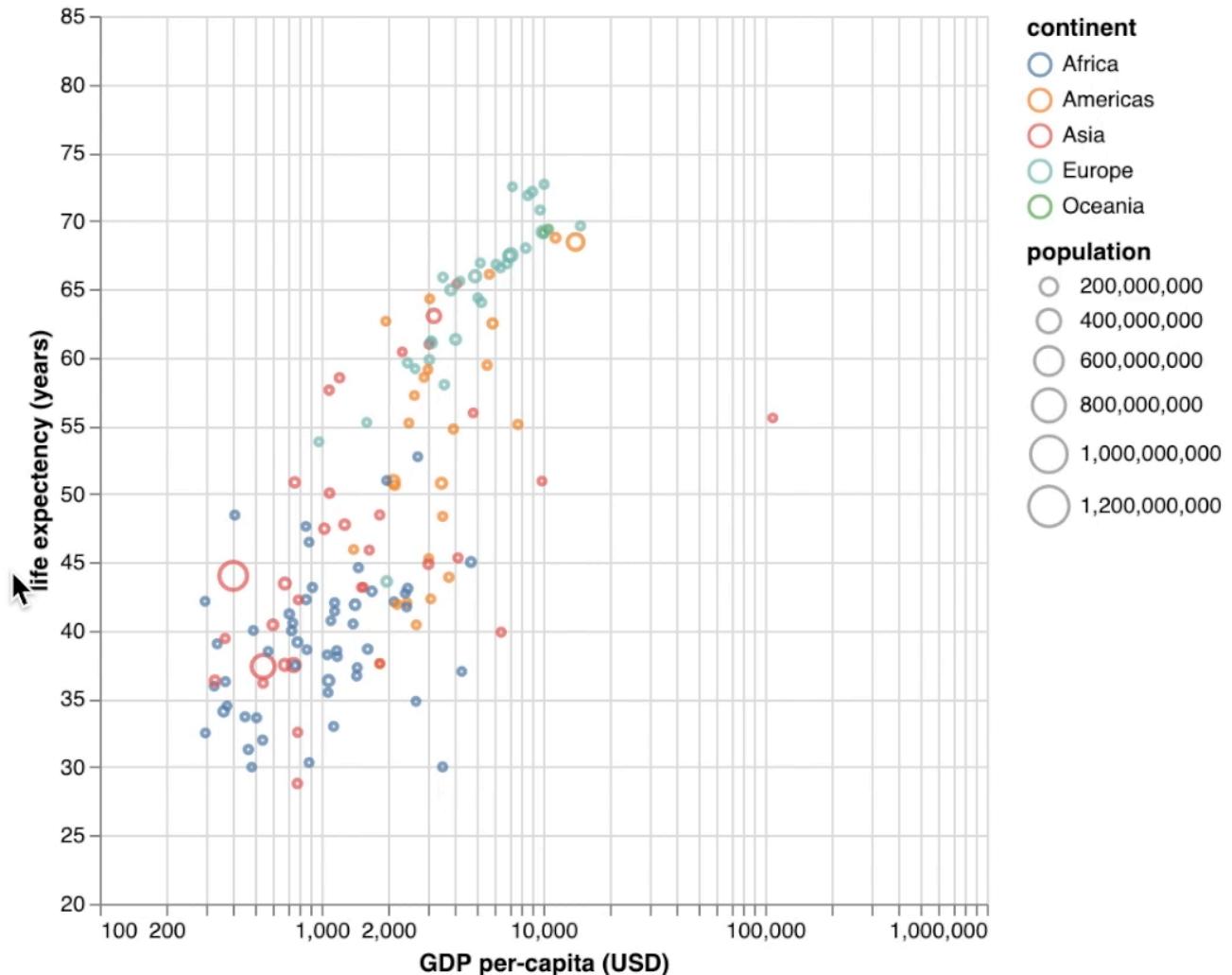
Interactivity

Vega gives access (via JS) to its:

- data
- signals (reactive variables)
- events

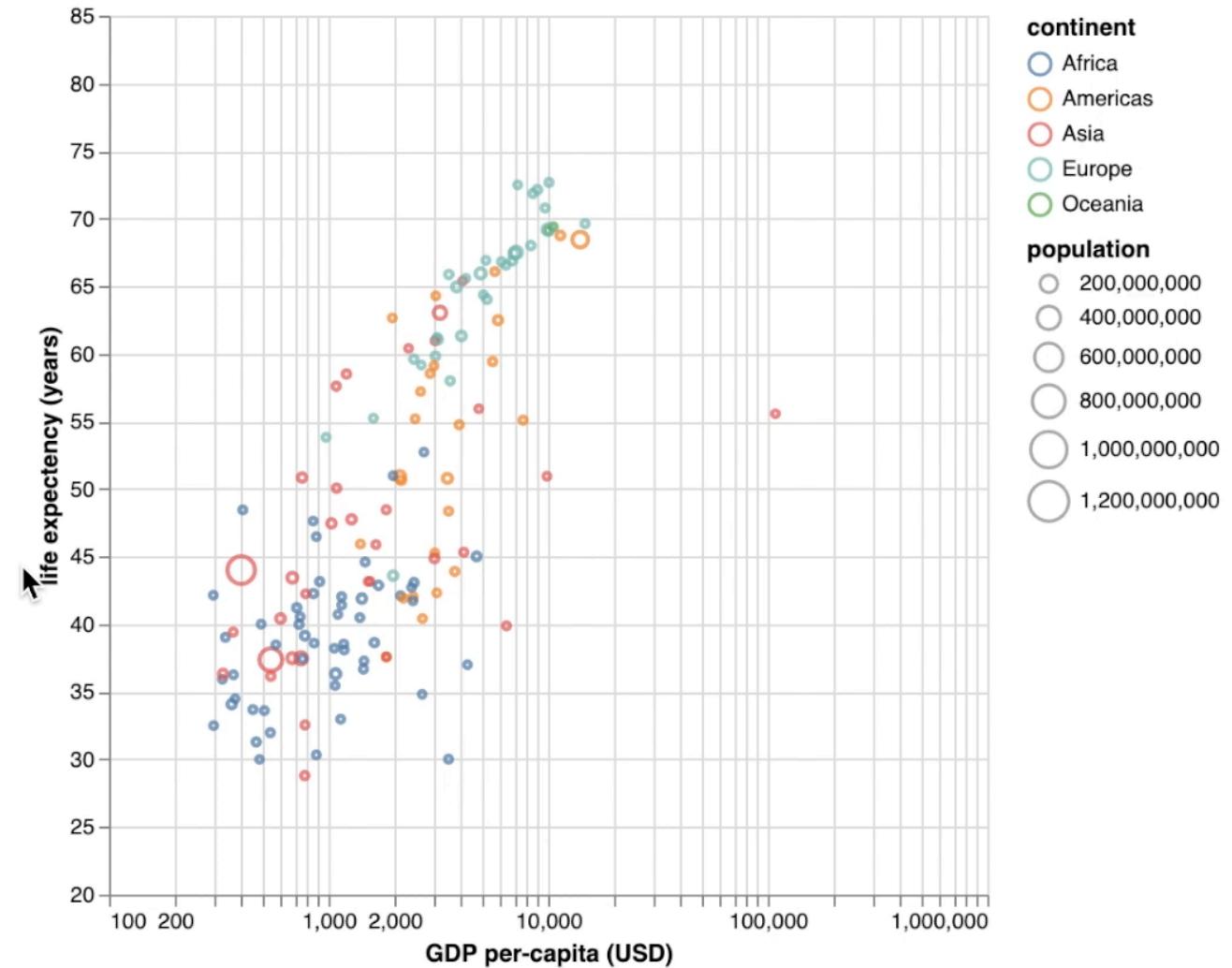
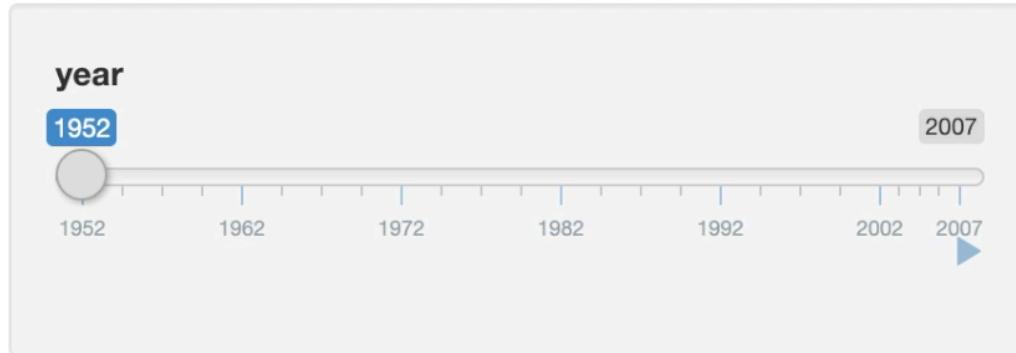
vegawidget gives access via Shiny

Shiny app by **Stuart Lee**





vegawidget



altair

CRAN not published

lifecycle maturing



Ian Lyttle



Haley Jeppson



Alicia Schep

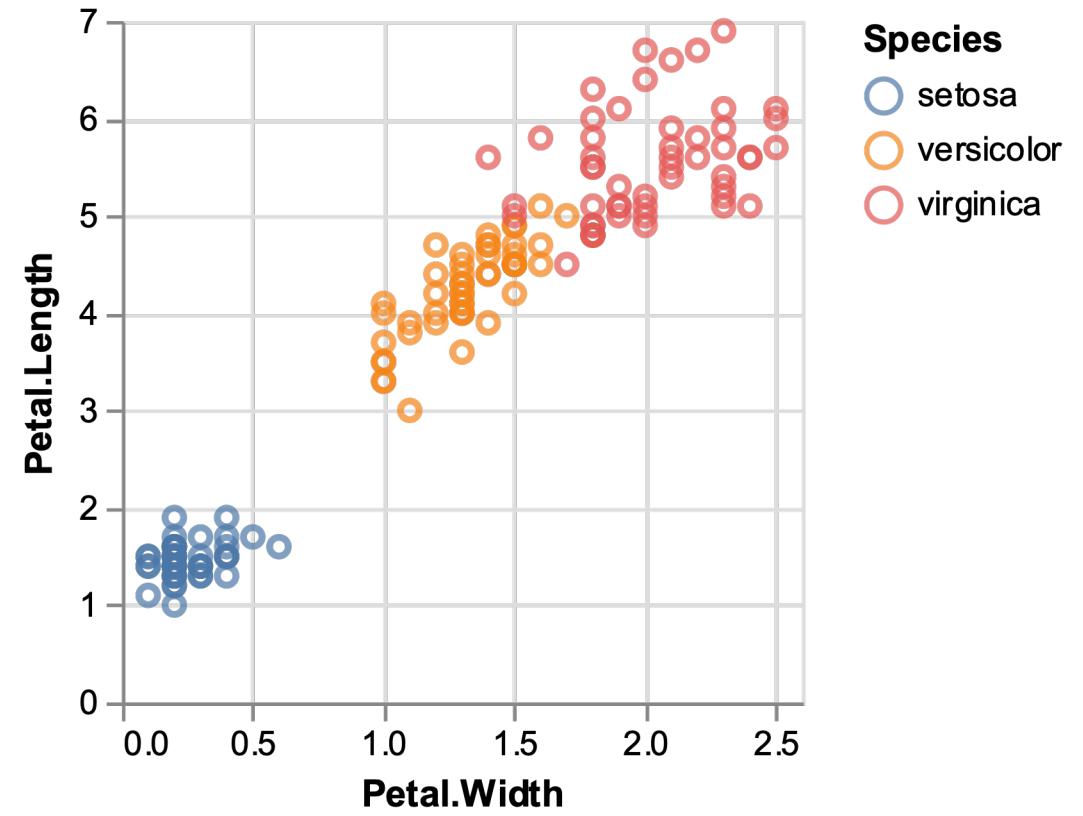
- wraps Python Altair (via reticulate)
 - by Jake VanderPlas, Brian Granger
 - covers entire Vega-Lite API
 - concise syntax
 - <https://altair-viz.github.io>
- altair example-gallery
 - reproduces entire Altair gallery

<https://vegawidget.github.io/altair>



altair

```
alt$Chart(iris)$  
  mark_point()$  
  encode(  
    alt$x(  
      "Petal\\.Width:Q",  
      title = "Petal.Width"  
    ),  
    alt$y(  
      "Petal\\.Length:Q",  
      title = "Petal.Length"  
    ),  
    color = "Species:N"  
  )$  
  properties(width = 300, height = 300)
```



vlbuildr

CRAN not published

lifecycle experimental



Alicia Schep

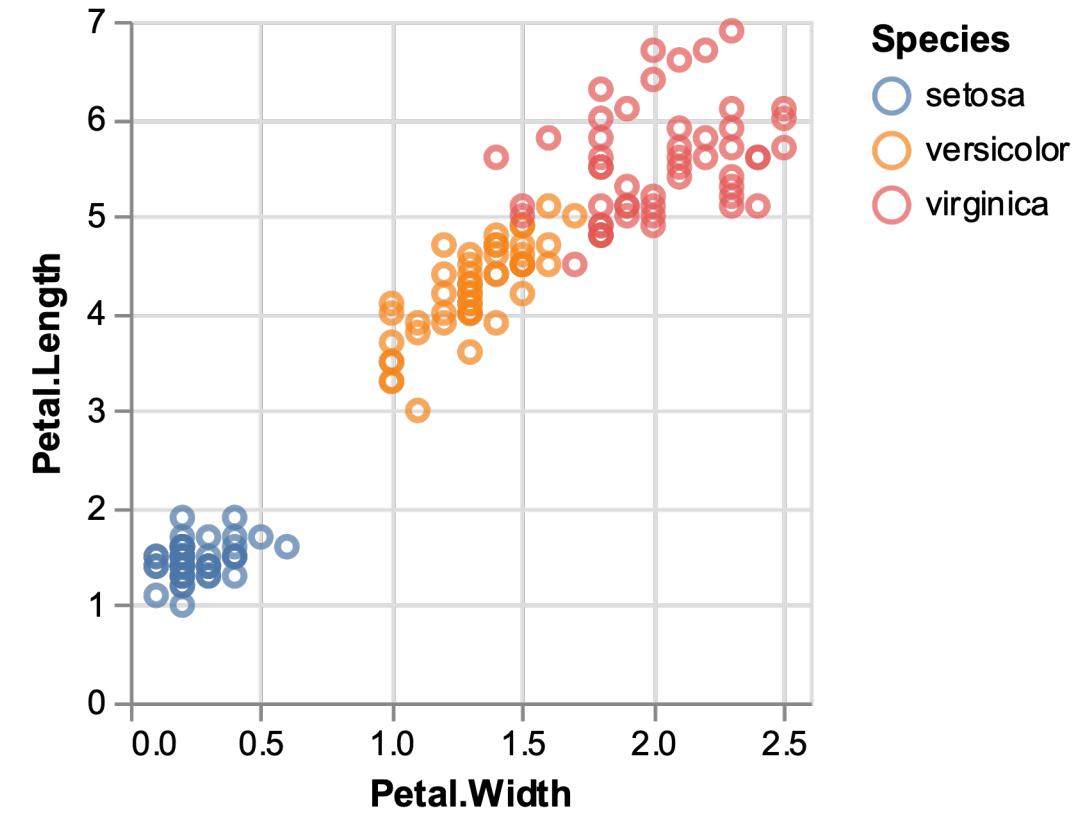
- API heavily inspired by vegalite (R)
- builds API semi-automatically based on the Vega-Lite schema
 - inspired by Altair (Python), vega-lite-api (JS)
- **compose Vega-Lite specs using %>%**

<https://vegawidget.github.io/vlbuildr>



vlbuildr

```
vl_chart() %>%
  vl_add_data(values = iris) %>%
  vl_mark_point() %>%
  vl_encode_x(
    field = "Petal\\.Width:Q",
    title = "Petal.Width"
  ) %>%
  vl_encode_y(
    field = "Petal\\.Length:Q",
    title = "Petal.Length"
  ) %>%
  vl_encode_color("Species:N")
```



ggvega

CRAN not published

lifecycle experimental



Haley Jeppson



Wenyu Yang



Ian Lytle

- translate from **ggplot2** to Vega-Lite
- supported by Google Summer of Code
- obvs. inspired by **plotly**, **Carson Sievert**
- ggplot2 & Vega-Lite are **declarative**
 - “what” not “how”
- ggvega translates only the declarations
- build & deploy Vega-Lite templates

<https://vegawidget.github.io/ggvega>

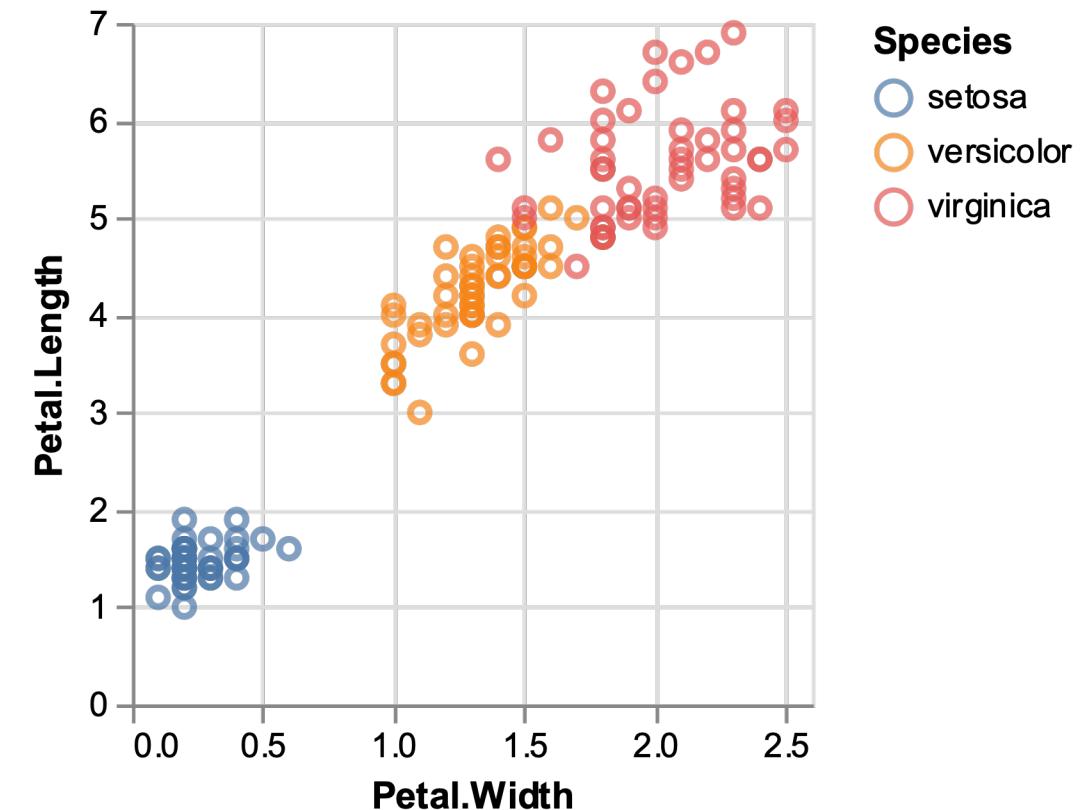


ggvega

lifecycle experimental

```
library("ggplot2")
library("ggvega")

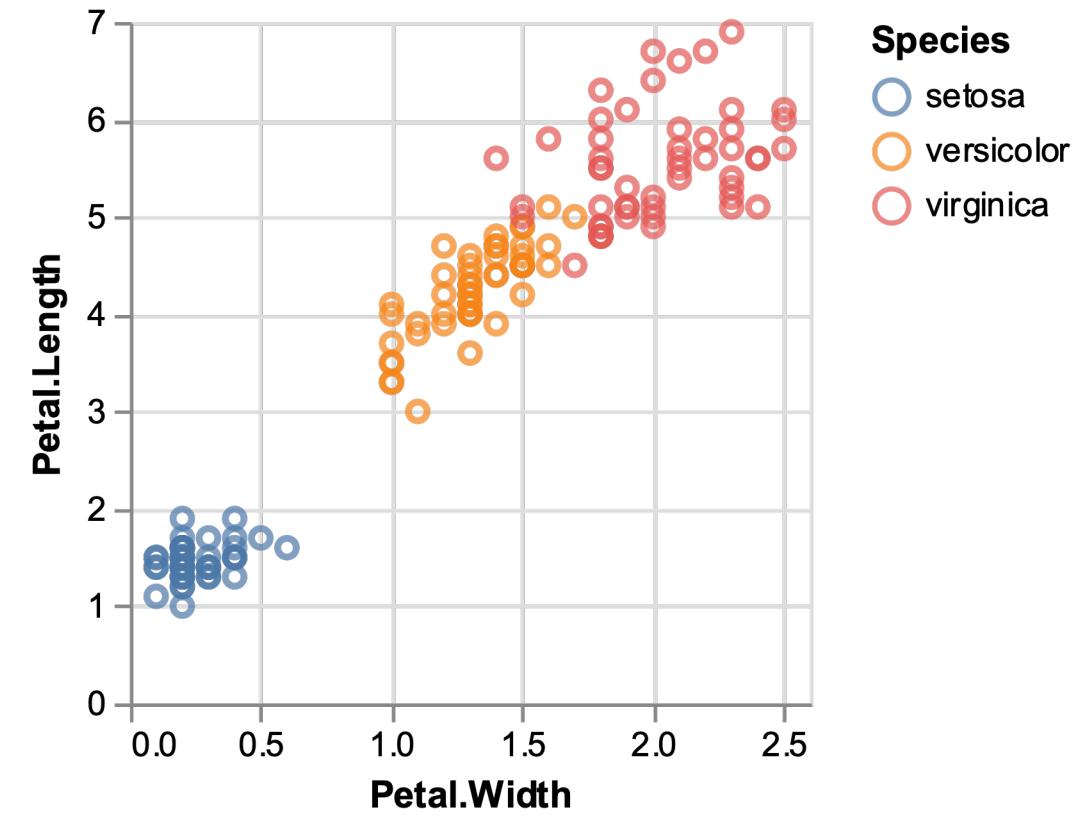
plot <-
  ggplot(iris) +
  geom_point(
    aes(
      x = Petal.Width,
      y = Petal.Length,
      colour = Species
    )
  )
as_vegaspec(plot)
```



Mix-and-Match

```
library("ggplot2")
library("ggvega")
library("vlgui")

plot <-
  ggplot(iris) +
  geom_point(
    aes(
      x = Petal.Width,
      y = Petal.Length,
      colour = Species
    )
  )
as_vegaspec(plot)
```

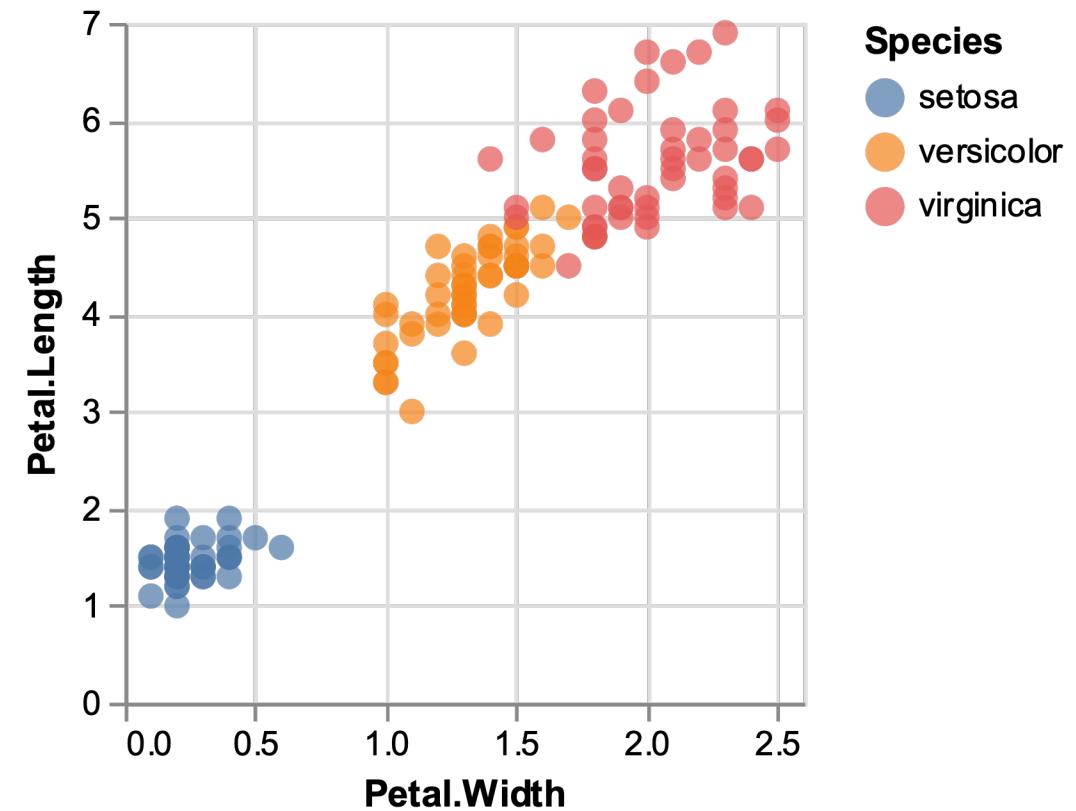


Mix-and-Match

```
library("ggplot2")
library("ggvega")
library("vlgui")

plot <-
  ggplot(iris) +
  geom_point(
    aes(
      x = Petal.Width,
      y = Petal.Length,
      colour = Species
    )
  )

as_vegaspec(plot) %>%
  vl_encode_fill("Species:N")
```



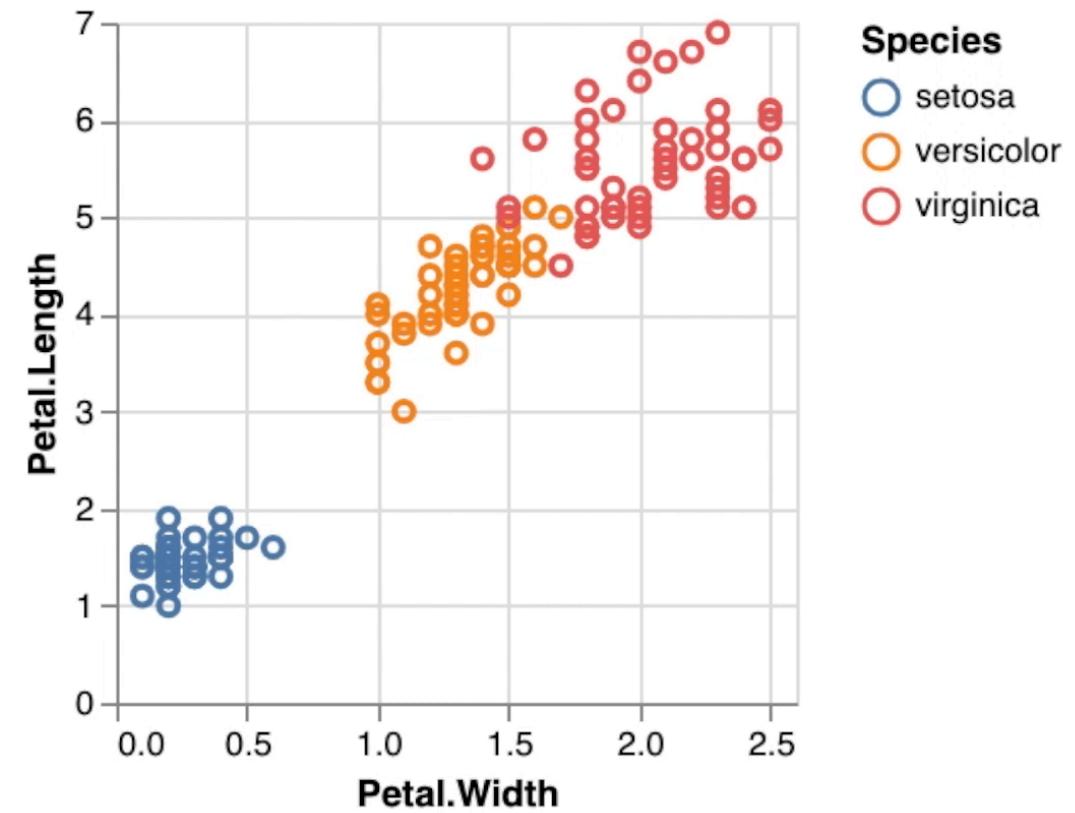
Add interactivity

```
# experimental syntax
# - vl_at_last_layer() defined separately

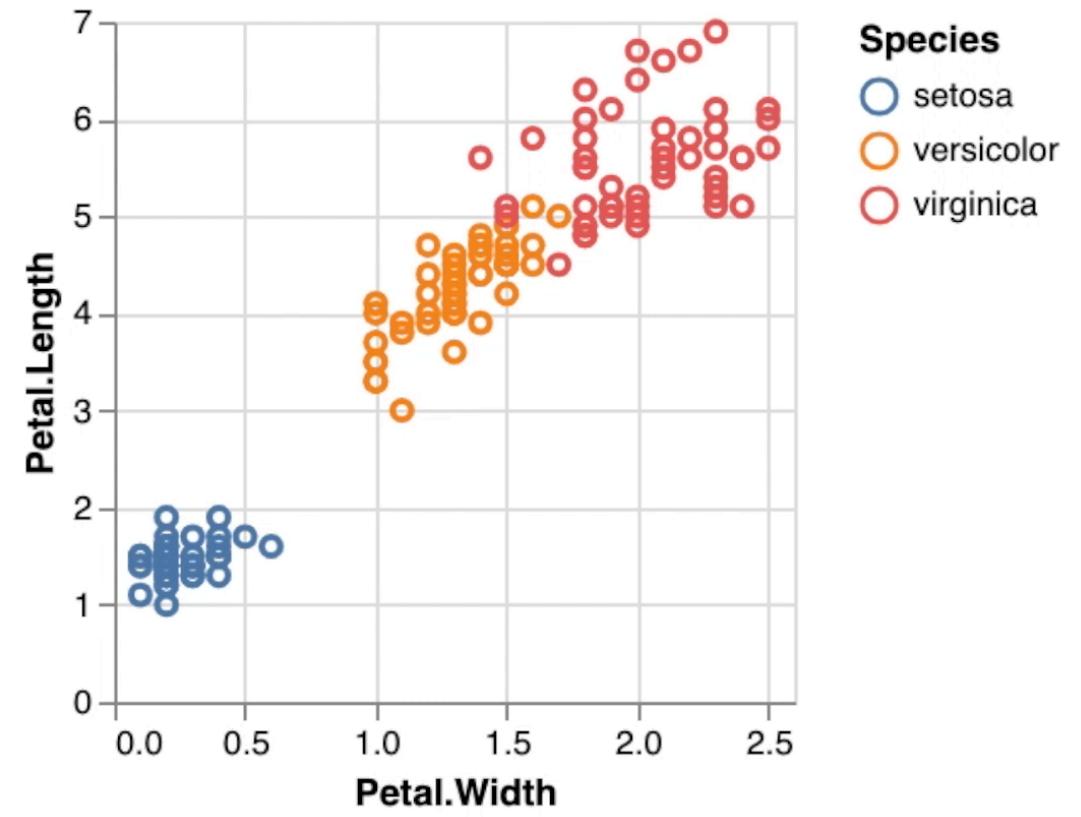
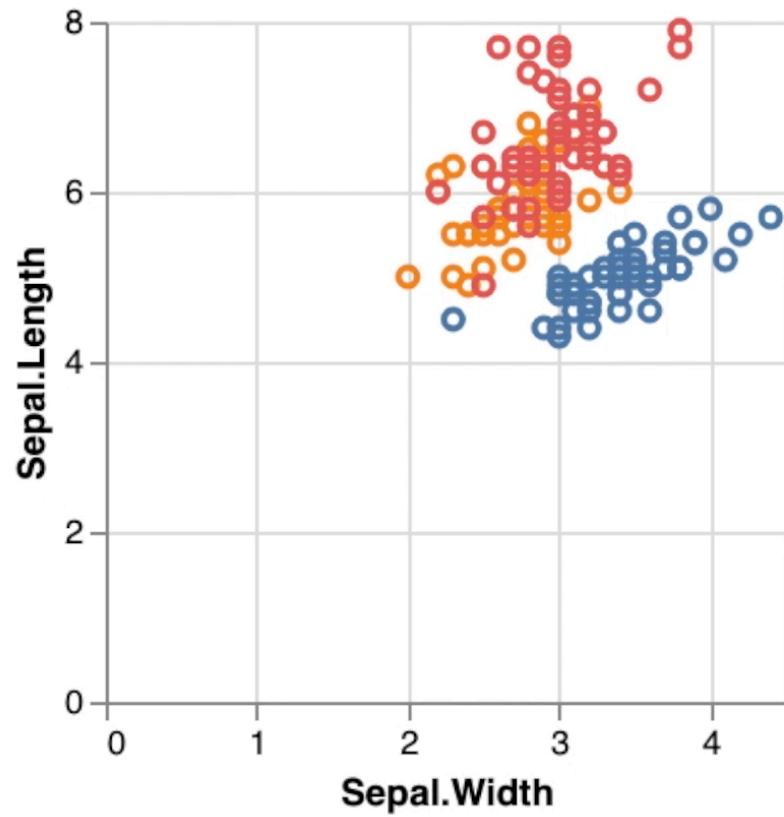
vl_petal <-
  as_vegaspec(gg_petal) %>%
  vl_at_last_layer({
    . %>%
    vl_encode_opacity(value = 0.3) %>%
    vl_add_interval_selection("brush") %>%
    vl_condition_opacity(
      selection = "brush",
      value = 1
    )
  })

# do the same with vl_sepals

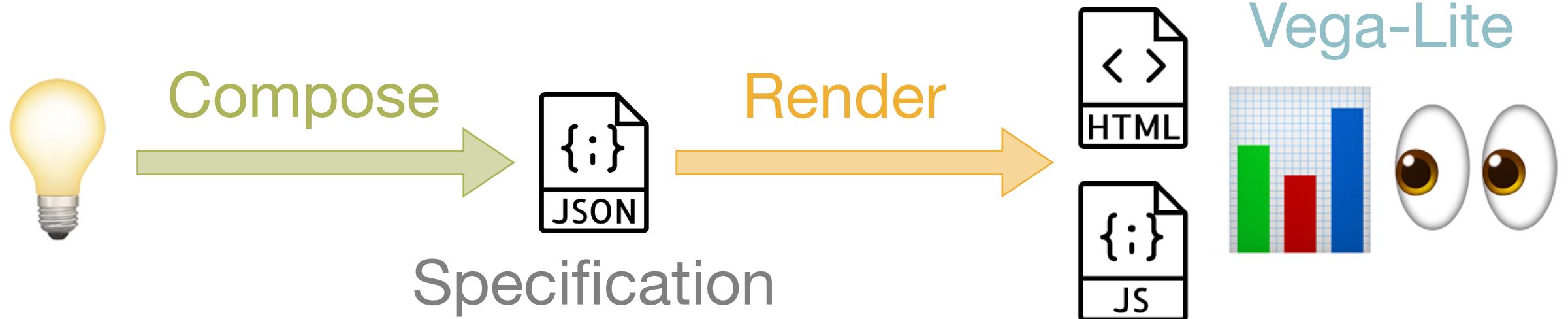
# concatenate
vl_hconcat(vl_sepals, vl_petal)
```



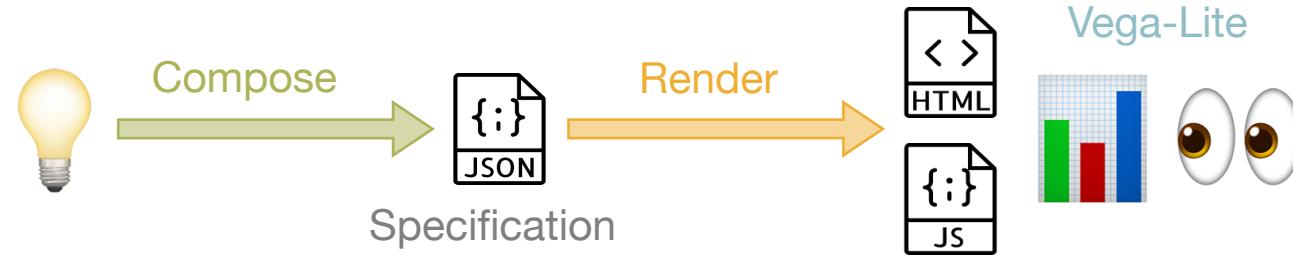
Add interactivity



Summary



Summary



- interactive grammar-of-graphics
- JavaScript, rendered in the browser



- htmlwidget, **render** Vega-Lite specifications
- provides interactive access to Vega-Lite charts



- **compose** Vega-Lite specifications



vegawidget



Ian Lyttle
@ijlyttle



Haley Jeppson
@heyhayhay__



Alicia Schep
@AliciaSchep



Wenyu Yang
@iuysa1



Stuart Lee
 @_StuartLee



Heike Hofmann
@heike_hh



vegawidget

Composing and Rendering Interactive Vega(-Lite) Charts

vegawidget organization

<https://github.com/vegawidget>

📌 packages with pkgdown sites

<https://vegawidget.rbind.io>

Vega-Lite (JS)

<https://vega.github.io/vega-lite>

Altair (Python)

<https://altair-viz.github.io>