

# Crosstalk

## Shiny-like without Shiny

**EARL**  
CONFERENCE

**Matt Dray | Dept for Education | #EARL2018**

# TL;DR\*

Need to create a small interactive app without a server or Shiny?

Try the `crosstalk` package.

\*Too long; didn't read

# **Am I talking about a real policy?**

Nope, sorry.

Schools in this example were chosen randomly.

# The ask

Visualise school locations to help make a policy decision

# The ask

Visualise school locations to help make a policy decision

Shareable

# The ask

Visualise school locations to help make a policy decision

Shareable

Cheap

# The ask

Visualise school locations to help make a policy decision

Shareable

Cheap

Quick

# The ask

Visualise school locations to help make a policy decision

Shareable

Cheap

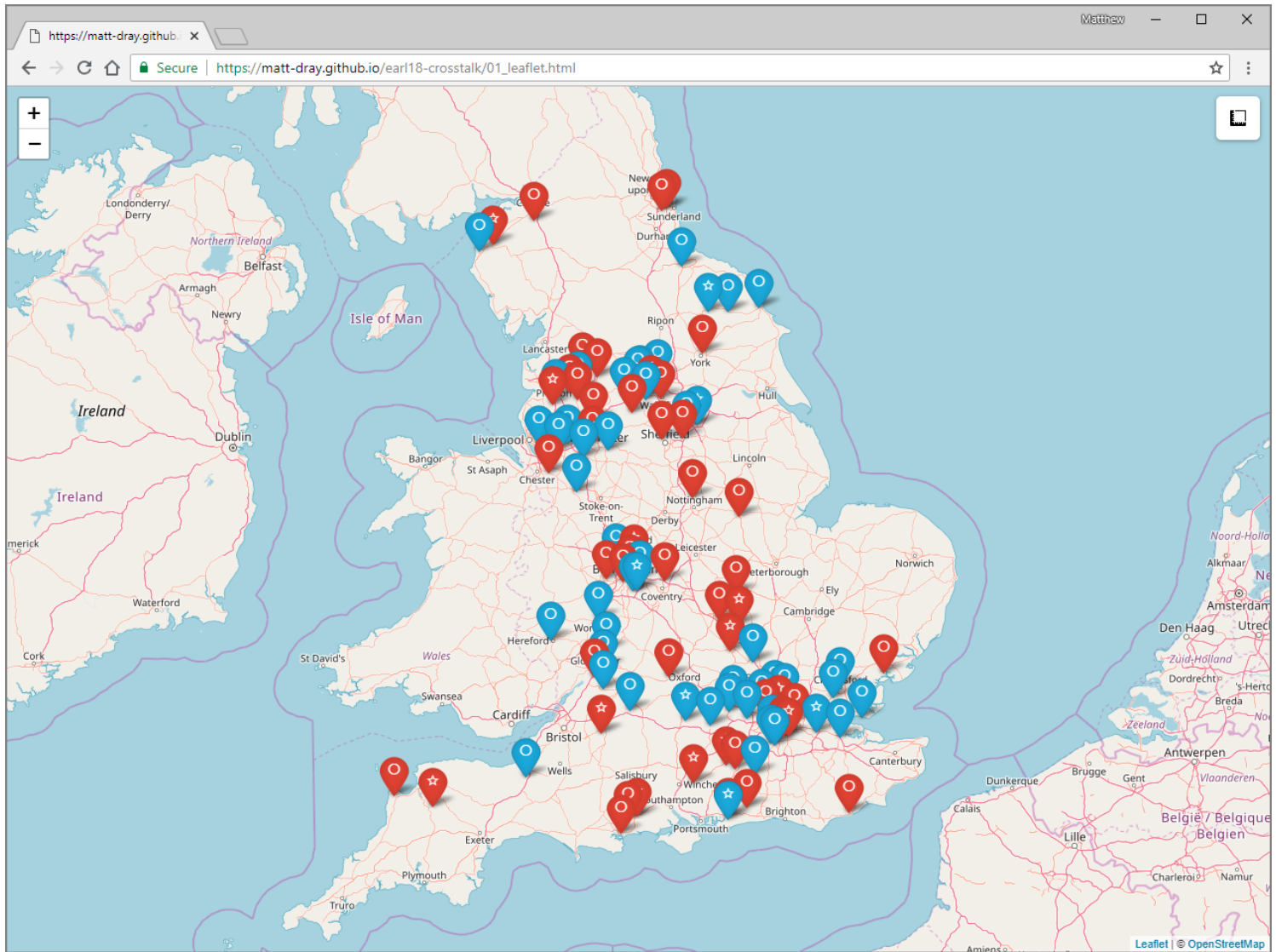
Quick

Reusable

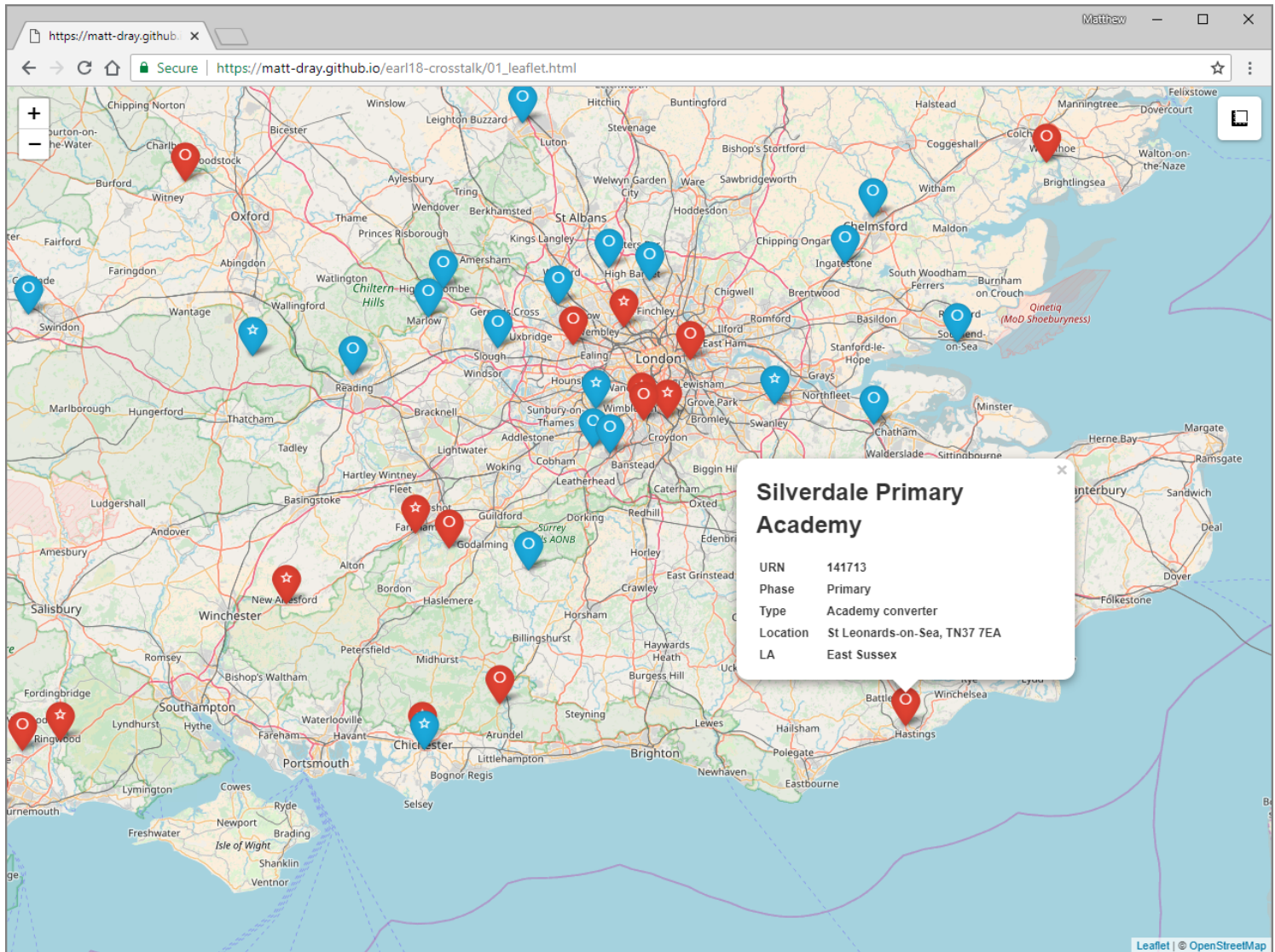


# Solution 1

leaflet interactive map



Demo available [here](https://matt-drax.github.io/earl18-crosstalk/01_leaflet.html)



Demo available [here](#)

# Solution 1



interactive

intuitive

# Solution 1



interactive

intuitive



documentation

# Solution 2

leaflet interactive map  
in a flexdashboard

Leaflet + Flexdashboard

Matthew

[https://matt-dray.github.io/earl18-crosstalk/02\\_leaflet-flexdash.html](https://matt-dray.github.io/earl18-crosstalk/02_leaflet-flexdash.html)

Leaflet + Flexdashboard

Matt Dray

Source Code

About

## How to

- click to grab and drag the map around
- zoom with the '+' and '-' buttons (top-left) or with your mouse's scroll wheel
- click a marker to reveal a popup with information about that school

## Blurb

This example was shown as part of the talk *Crosstalk: Shiny-like without Shiny* at the [Enterprise Applications of the R Language \(EARL\) conference in London, September 2018](#).

Self-service interactive tools have great power to support decisions by policy-makers. Shiny apps are a natural fit for this, but it's not always easy to share them within the public sector. This is due to issues like a lack of server space, highly sensitive data and users who aren't R-savvy.

We've approached this problem in the UK's Department for Education by

Interactive map

Demo available [here](https://matt-dray.github.io/earl18-crosstalk/02_leaflet-flexdash.html)

# Solution 2



documentation

self-service



# Solution 2



documentation

self-service



tabular data

searchable

# Solution 3

leaflet interactive map  
in a flexdashboard  
with a DT interactive table



Leaflet + Flexdashboard

Matthew

[https://matt-dray.github.io/earl18-crosstalk/03\\_leaflet-flexdash-dt.html](https://matt-dray.github.io/earl18-crosstalk/03_leaflet-flexdash-dt.html)

Leaflet + Flexdashboard + DT

Matt Dray

Source Code

About

### Interactive map

You can:

- click to grab and drag the map around
- zoom with the '+' and '-' buttons (top-left) or with your mouse's scroll wheel
- click a marker to reveal a popup with information about that school

### Datatable

You can:

- filter each column by typing in the boxes under each column header
- sort the columns (ascending and descending) by clicking on the column header
- see how many entries remain after filtering in the bottom-left where it

Interactive table

Search:

sch_urn	sch_name	sch_type
136478	The West Grantham Academy St John's	Academy converter
115238	St John Payne Catholic School, Chelmsford	Voluntary aided school
119790	Our Lady and St John Catholic College	Voluntary aided school

Showing 1 to 3 of 3 entries (filtered from 100 total entries)

Interactive map

Demo available [here](https://matt-dray.github.io/earl18-crosstalk/03_leaflet-flexdash-dt.html)

# Solution 3



tabular data

searchable

# Solution 3



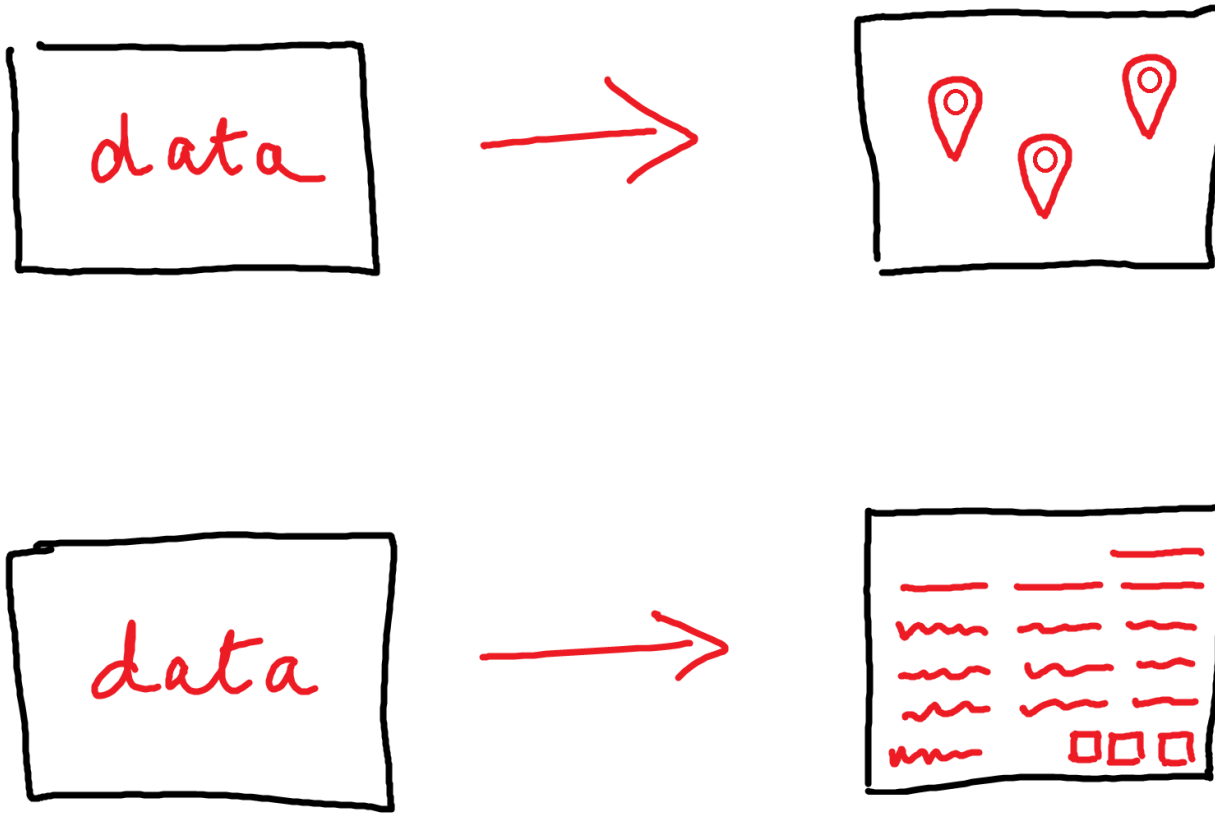
tabular data  
searchable



download option  
linked table and map

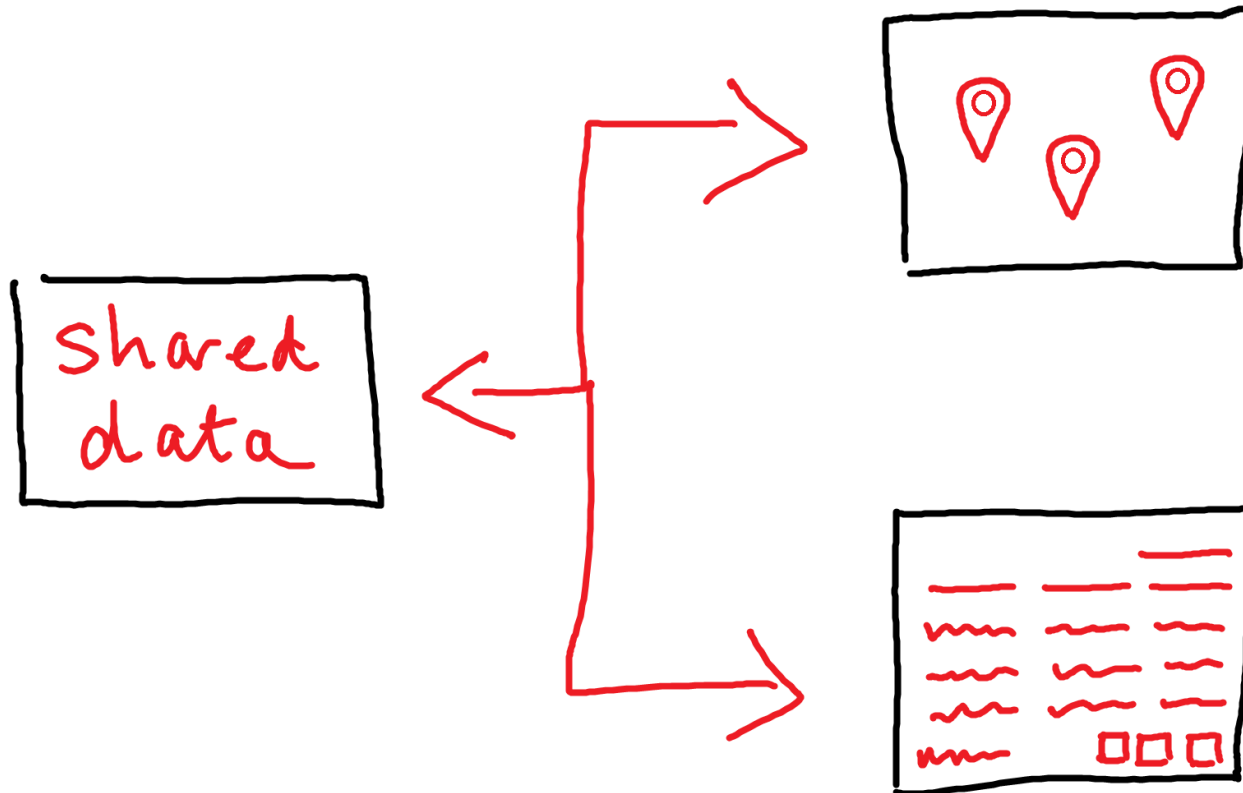
**What now?**

# Current model

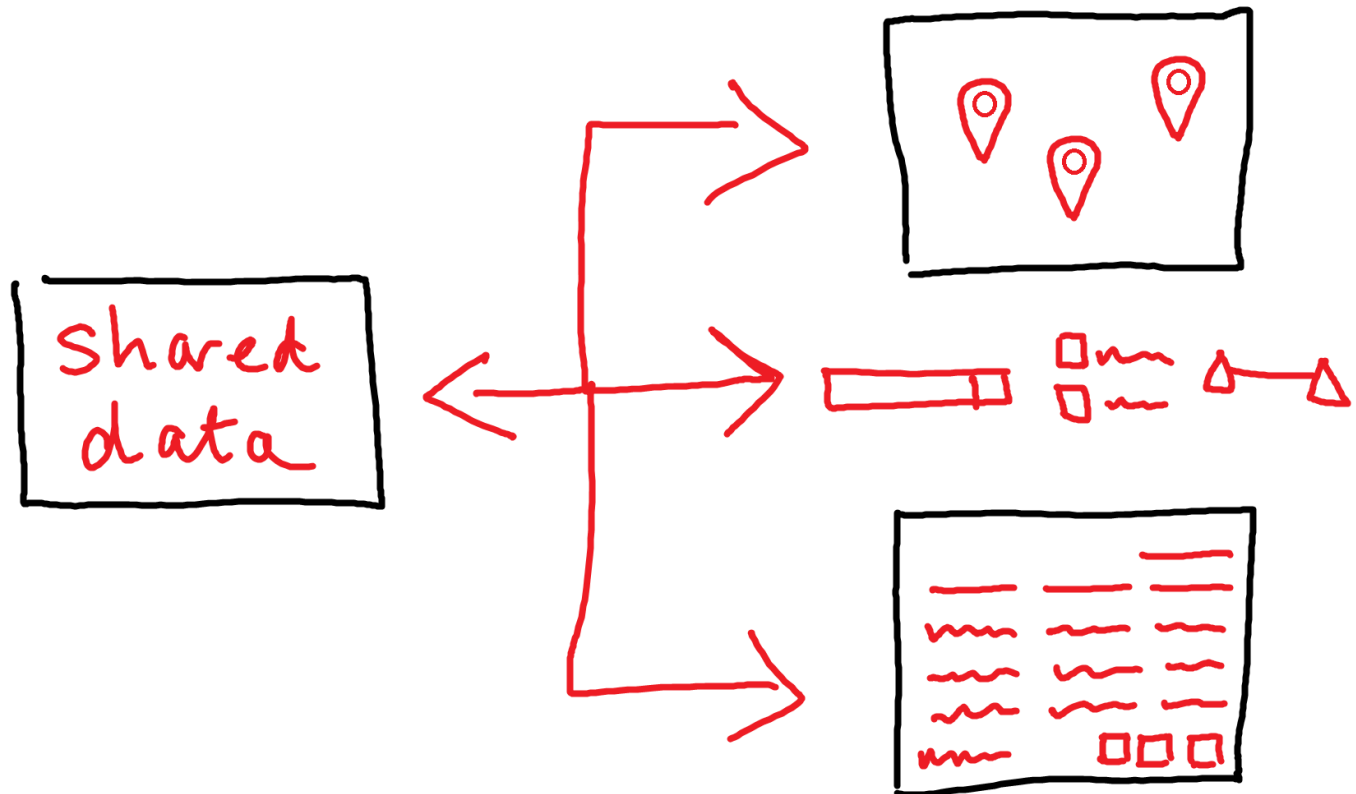




# Ideal model



# Ideal model



# Crosstalk by Joe Cheng



You can make:

static HTML documents  
that **do not require Shiny** or  
any kind of server support  
and yet they can have  
**interactivity between  
widgets**

# A small code change

## Before

```
data <- readRDS("data/some_data.RDS") # get data  
datatable(data) # interactive table  
leaflet(data) %>% addTiles() %>% addMarkers() # map
```

# A small code change

## Before

```
data <- readRDS("data/some_data.RDS") # get data  
datatable(data) # interactive table  
leaflet(data) %>% addTiles() %>% addMarkers() # map
```

## After

```
data <- readRDS("data/some_data.RDS")  
shared <- SharedData$new(data)  
datatable(shared)  
leaflet(shared) %>% addTiles() %>% addMarkers()
```

# **Limitations**

HTML widgets must be **made Crosstalk-compatible**

Aggregate and summary views not yet available

You can't use 'large' datasets

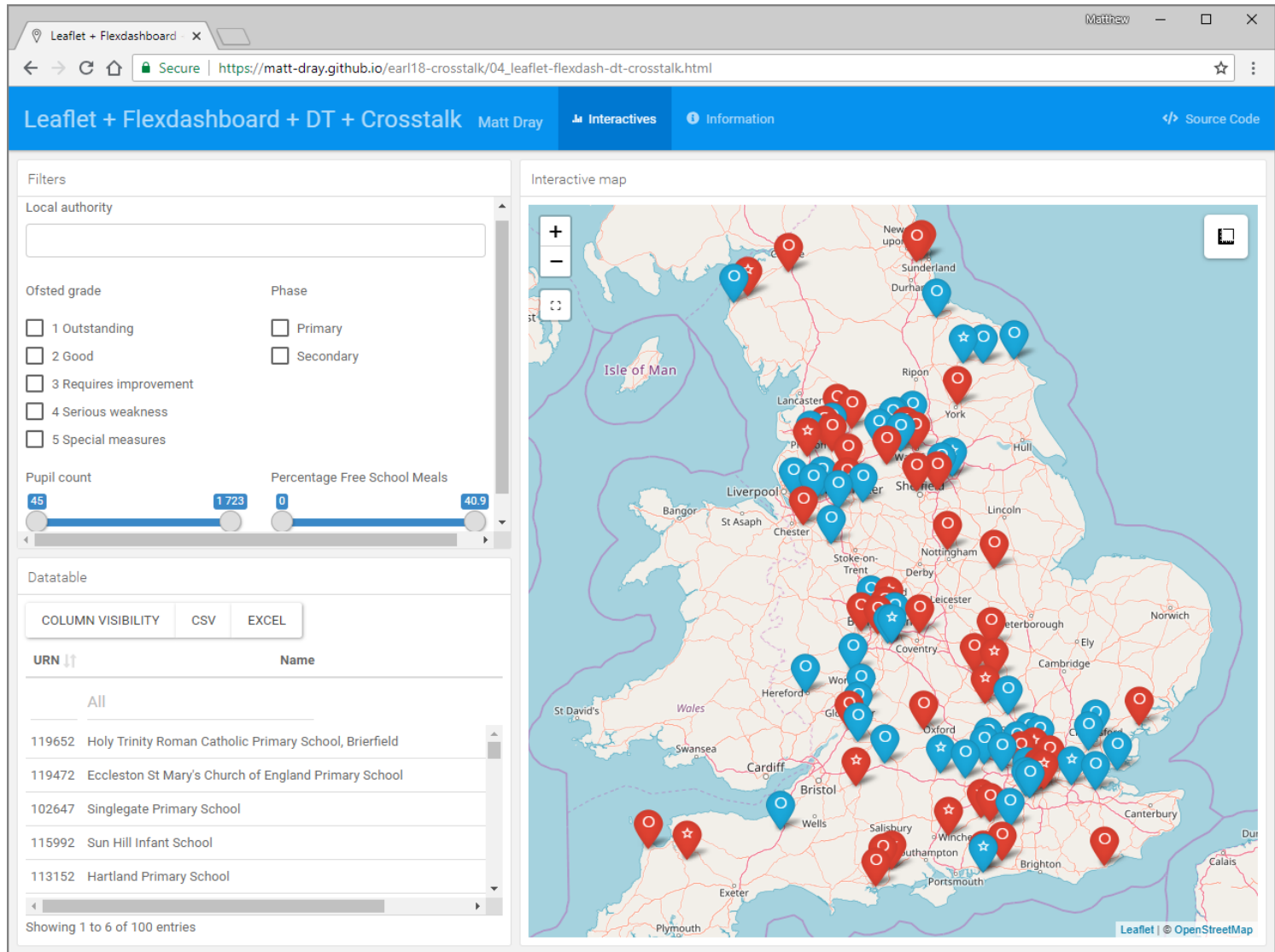
# Okay, Solution 4

leaflet interactive map

in a flexdashboard

with a DT interactive table

linked with crosstalk



Demo available [here](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html)



Leaflet + Flexdashboard

Matthew

[https://matt-dray.github.io/earl18-crosstalk/04\\_leaflet-flexdash-dt-crosstalk.html](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html)

Leaflet + Flexdashboard + DT + Crosstalk
Matt Dray
Interactives
Information
Source Code

Filters

Local authority

Manchester
Birmingham
Liverpool
Sheffield
York
Brent

Ofsted grade

☒ 1 Outstanding
☒ 2 Good
☐ 3 Requires improvement
☐ 4 Serious weakness
☐ 5 Special measures

Phase

☒ Primary
☐ Secondary

Pupil count

165
1,135
1,723

Percentage Free School Meals

0
12
27
40.9

Datatable

COLUMN VISIBILITY

CSV

EXCEL

URN	Name	Phase
All	All	A
101547	Our Lady of Grace RC Infant and Nursery School	Primary
105537	St Peter's Catholic Primary School	Primary
139465	Brookvale Primary School	Primary
132228	Yearsley Grove Primary School	Primary

Showing 1 to 4 of 4 entries (filtered from 100 total entries)

Interactive map

Demo available [here](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html)

Leaflet + Flexdashboard

Matthew

[https://matt-dray.github.io/earl18-crosstalk/04\\_leaflet-flexdash-dt-crosstalk.html](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html)

Leaflet + Flexdashboard + DT + Crosstalk
Matt Dray
Interactives
Information
Source Code

Filters

Local authority

Manchester
Birmingham
Liverpool
Sheffield
York
Brent

Ofsted grade

☒ 1 Outstanding
☒ 2 Good
☐ 3 Requires improvement
☐ 4 Serious weakness
☐ 5 Special measures

Phase

☒ Primary
☐ Secondary

Pupil count

165
1 135
1 723

Percentage Free School Meals

0
12
27
40.9

Datatable

COLUMN VISIBILITY

CSV

EXCEL

URN	Name	Phase
All	All	A
101547	Our Lady of Grace RC Infant and Nursery School	Primary
105537	St Peter's Catholic Primary School	Primary
139465	Brookvale Primary School	Primary
132228	Yearsley Grove Primary School	Primary

Showing 1 to 4 of 4 entries (filtered from 100 total entries)

Interactive map

Yearsley Grove Primary School

URN 132228  
Phase Primary  
Type Community school  
Location York, YO31 9BX  
LA York

Demo available [here](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html)

Leaflet + Flexdashboard

Matthew

[Secure | https://matt-dray.github.io/earl18-crosstalk/04\\_leaflet-flexdash-dt-crosstalk.html#interactives](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html#interactives)

Leaflet + Flexdashboard + DT + Crosstalk
Matt Dray
Interactives
Information
Source Code

Filters

Local authority

Ofsted grade

☐ 1 Outstanding
☐ 2 Good
☐ 3 Requires improvement
☐ 4 Serious weakness
☐ 5 Special measures

Phase

☐ Primary
☐ Secondary

Pupil count

45

1 723

0

40.9

Percentage Free School Meals

Datatable

COLUMN VISIBILITY

CSV

EXCEL

URN	Name	Phase
All	All	All
132228	Yearsley Grove Primary School	Primary
121671	Lady Lumley's School	Secondary
121665	Ryedale School	Secondary
121675	Graham School	Secondary

Showing 1 to 4 of 4 entries (filtered from 100 total entries)

Interactive map

Demo available [here](https://matt-dray.github.io/earl18-crosstalk/04_leaflet-flexdash-dt-crosstalk.html#interactives)

Leaflet + Flexdashboard

Matthew

Secure | https://matt-dray.github.io/earl18-crosstalk/04\_leaflet-flexdash-dt-crosstalk.html#information

Leaflet + Flexdashboard + DT + CrosstalkMatt DrayInteractivesInformationSource Code

Blurb

This example was shown as part of the talk *Crosstalk: Shiny-like without Shiny* at the [Enterprise Applications of the R Language \(EARL\)](#) conference in London, September 2018.

Self-service interactive tools have great power to support decisions by policy-makers. Shiny apps are a natural fit for this, but it's not always easy to share them within the public sector. This is due to issues like a lack of server space, highly sensitive data and users who aren't R-savvy.

We've approached this problem in the UK's Department for Education by sharing interactive HTML widgets – embeddable JavaScript visualisation libraries – within RMarkdown outputs. Interactivity is, however, limited because selections in one widget don't impact the data presented in another.

[Joe Cheng's Crosstalk package](#) overcomes this with shared data objects that react to user inputs, altering the content of multiple widgets on the fly. I'll explain how I used Crosstalk to develop a 'pseudo-app' for exploring schools data with the Leaflet

How to use

### Filters

You can:

- select one or more local authorities from the dropdown menu (remove them with your backspace key)
- select one or more Ofsted grades using the checkboxes
- select the phase of education with the checkboxes
- drag the slider to select a pupil count
- drag the slider to filter by the percentage of pupils receiving free school meals

### Interactive map

You can:

- click to grab and drag the map around
- zoom with the '+' and '-' buttons (top-left) or with your mouse's scroll wheel
- click a marker to reveal a popup with information about that school
- click the button showing a broken square (top-left under the zoom options) to select points on the map using a window that's draggable (click and hold the grid icon in the upper left) and resizable (click and drag the white boxes in each corner)

### Interactive table

You can:

- filter each column by typing in the boxes under each column header
- sort the columns (ascending and descending) by clicking on the column header

Tools

R v3.4.4 and RStudio v1.1.442 were used to build this tool.

The packages used were:

- Flexdashboard to create a frame for the content
- Leaflet for the interactive map
- DT for the interactive table
- Crosstalk for widget interactivity
- Ion icons and Font Awesome for icons

The code for this tool is available from [github.com/matt-dray/earl18-crosstalk](https://github.com/matt-dray/earl18-crosstalk). The presentation is available from [github.com/matt-dray/earl18-presentation](https://github.com/matt-dray/earl18-presentation).

Demo available [here](#)

# Solution 4



map and table linked

data filtering and brushing

downloads

# The ask

Visualise school locations to help make a policy decision ✓

# The ask

Visualise school locations to help make a policy decision ✓

Shareable ✓

# The ask

Visualise school locations to help make a policy decision ✓

Shareable ✓

Cheap ✓



# The ask

Visualise school locations to help make a policy decision ✓

Shareable ✓

Cheap ✓

Quick ✓

# The ask

Visualise school locations to help make a policy decision ✓

Shareable ✓

Cheap ✓

Quick ✓

Reusable ✓

# Impact

the maps have been added  
to a submission for the  
minister

policy and the external  
stakeholders have been  
extremely impressed

due to the positive  
feedback we are now using  
the same process for  
[another policy]



# TL;DR

Need to create a small interactive app without a server or Shiny?

Try the `crosstalk` package.

# Resources

## **This presentation**

Hosted online

GitHub repo

Made with Yihui Xie's [Xaringan](#) package

## **Demos**

Solutions [1](#), [2](#), [3](#) and [4](#)

GitHub repo

## **Crosstalk docs**

Site and GitHub repo

CRAN [manual](#) and [details](#)

Talk at [rstudio::conf 2017](#)

## **Examples**

[Gapminder example](#)

Demo [without](#) and [with](#) Crosstalk

# Matt Dray

 [matthew.dray@education.gov.uk](mailto:matthew.dray@education.gov.uk)

 [rostrum.blog](http://rostrum.blog) |  [twitter.com/mattdray](https://twitter.com/mattdray) |  [github.com/matt-dray](https://github.com/matt-dray)