

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

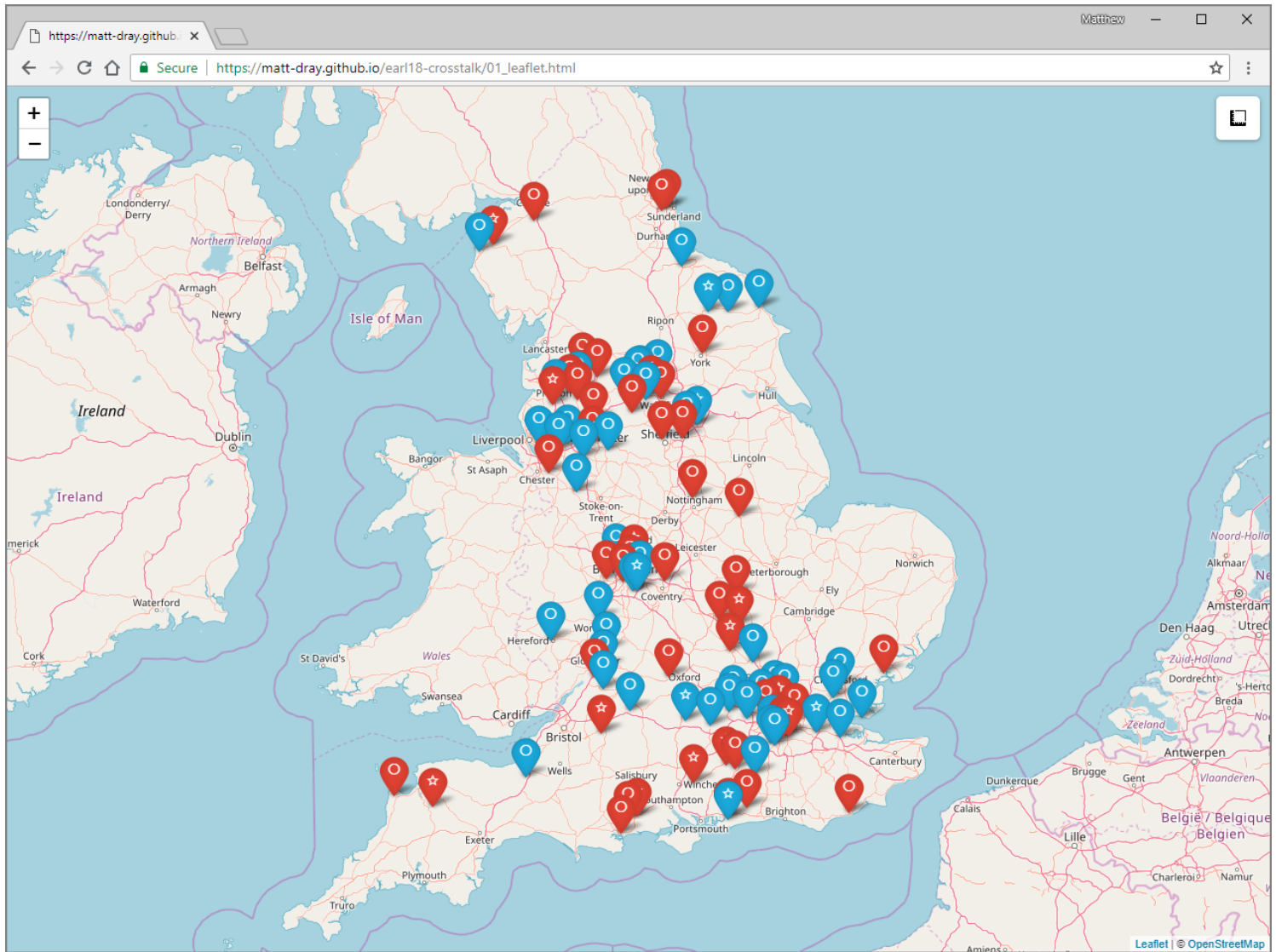
Cheap

Quick

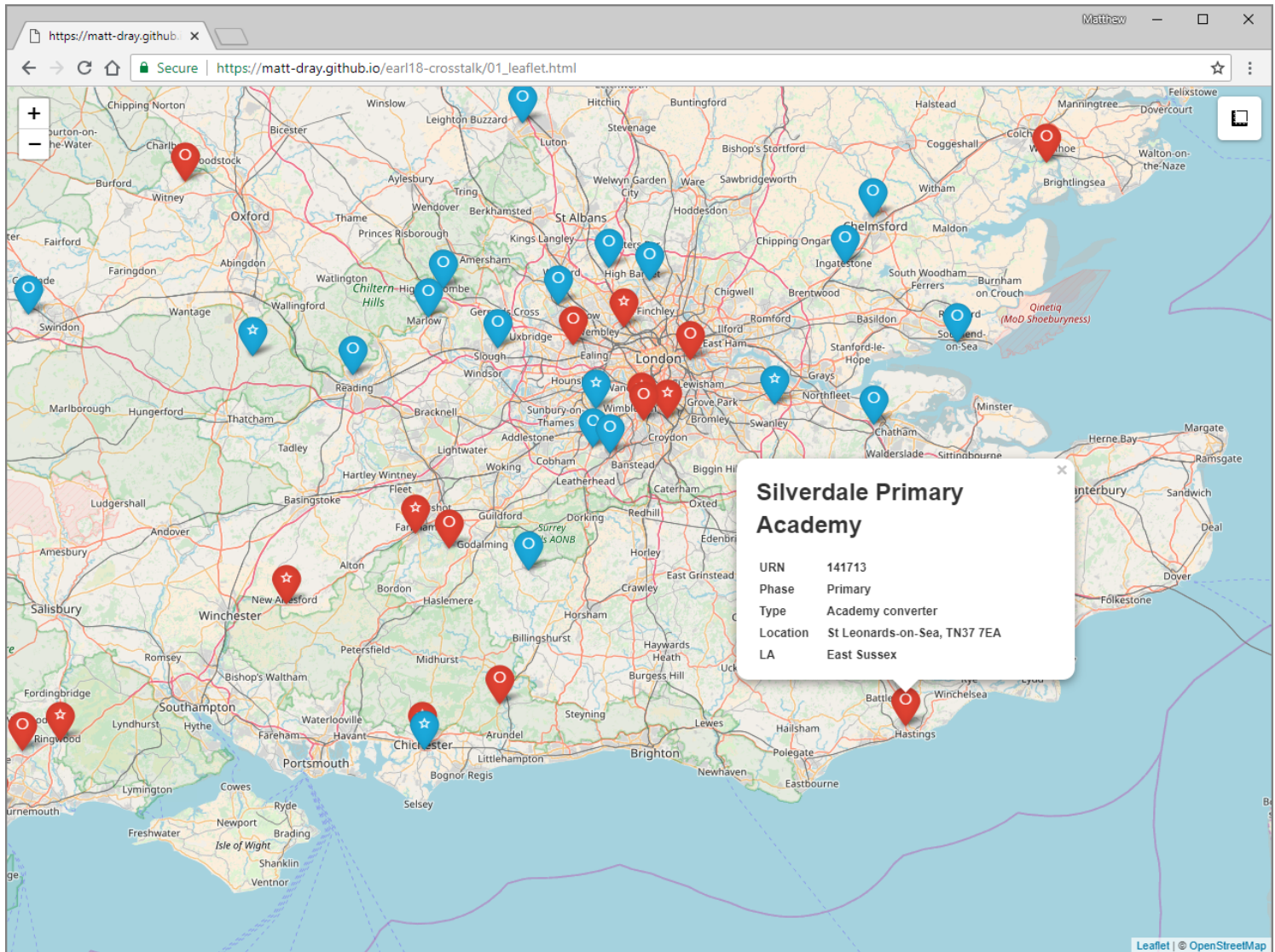
Reusable

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

Secure

https://matt-drax.github.io/earl18-crosstalk/02_leaflet-flexdash.html

Leaflet + Flexdashboard

Matt Dray

Source Code

About

Interactive map

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

Demo available [here](#)

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

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



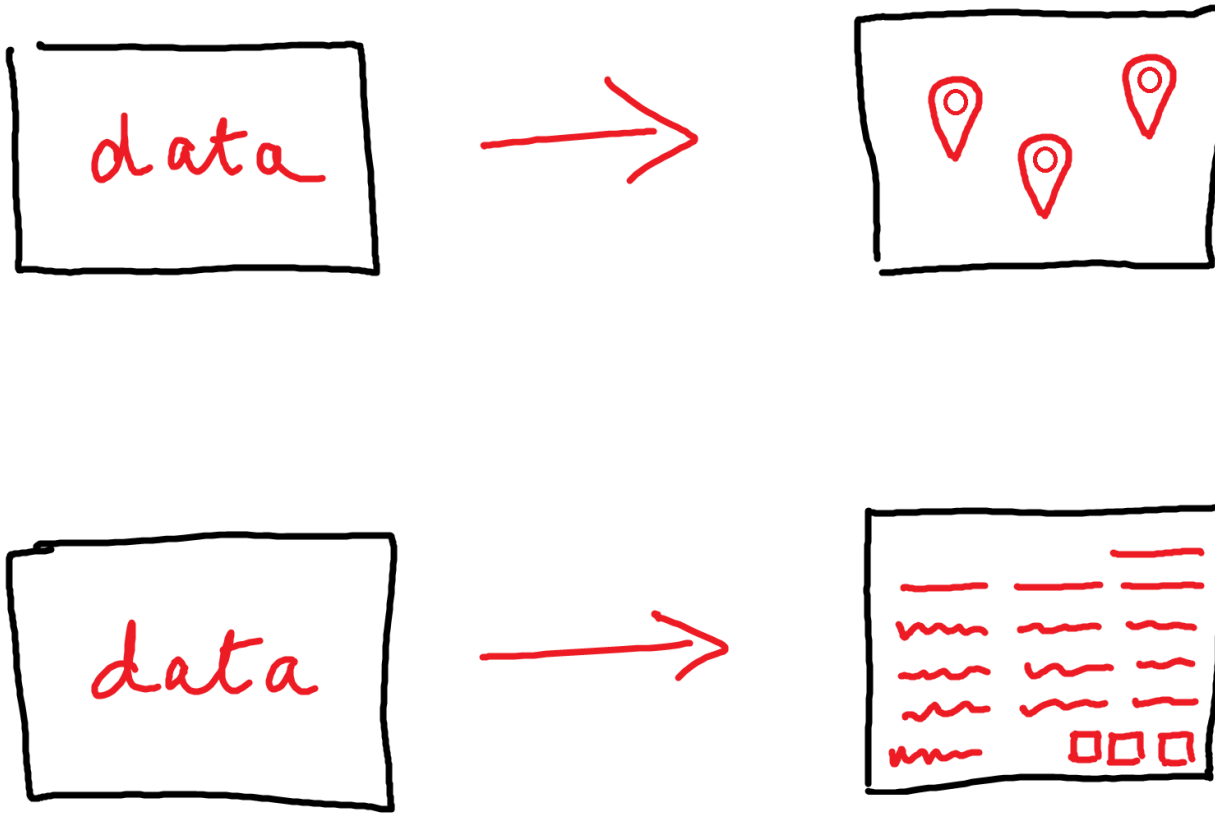
tabular data
searchable



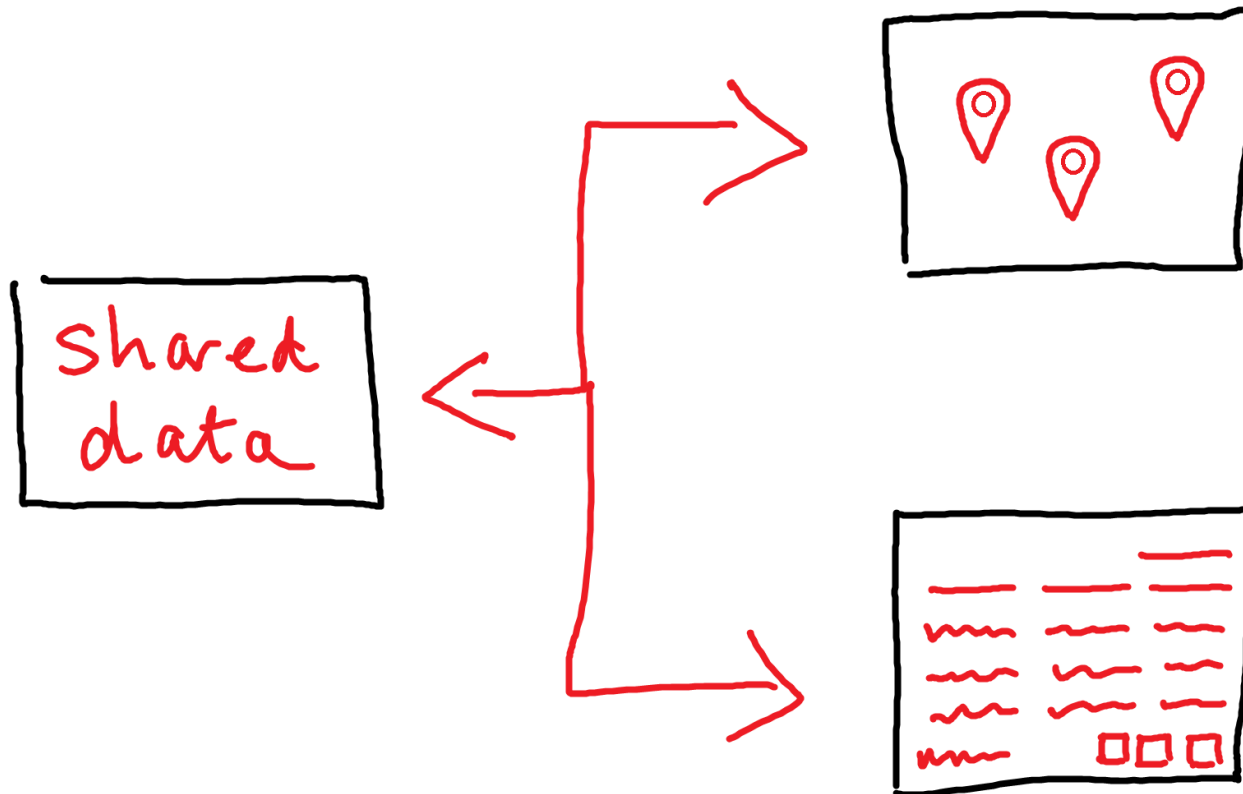
download option
linked table and map

What now?

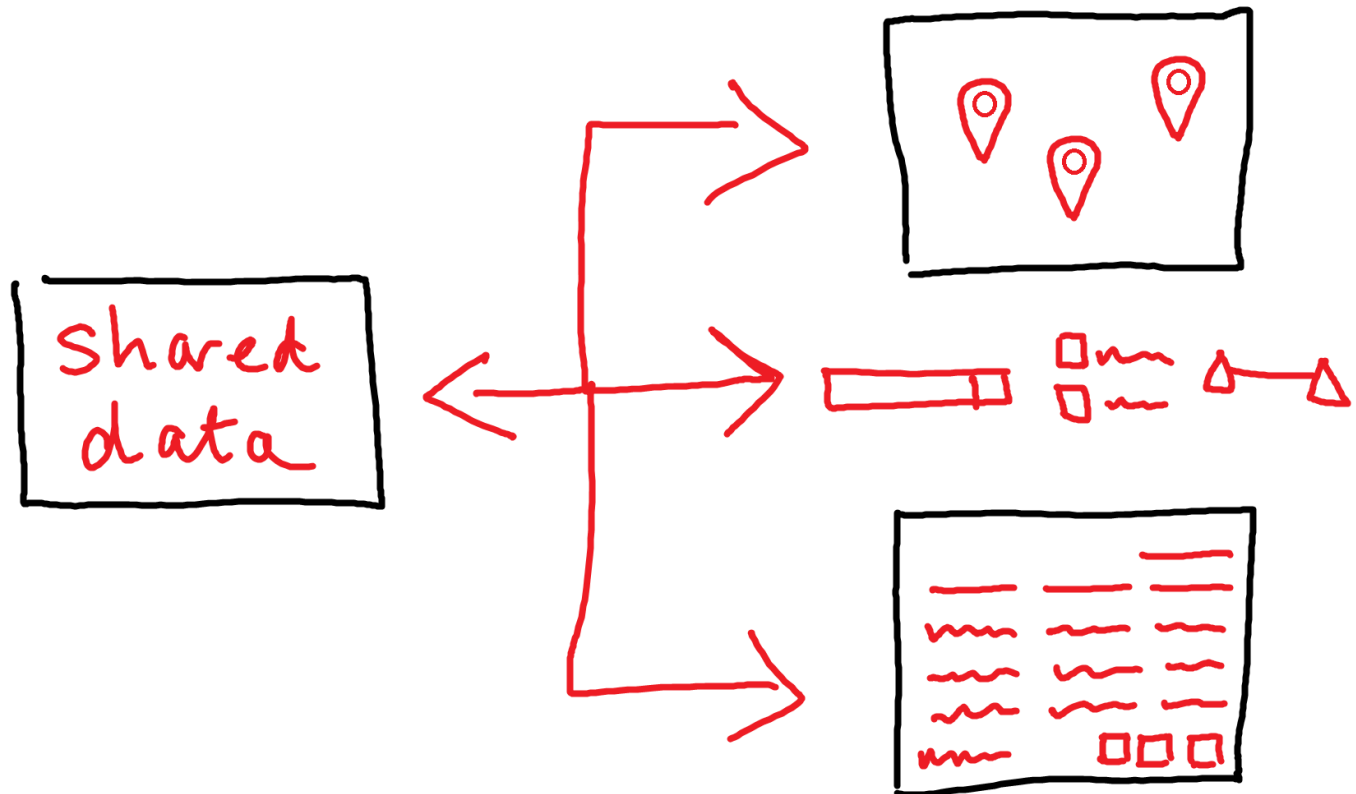
Current model



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

htmlwidgets must be **made Crosstalk-compatible**

Aggregate and summary views not yet available

You can't use 'large' datasets

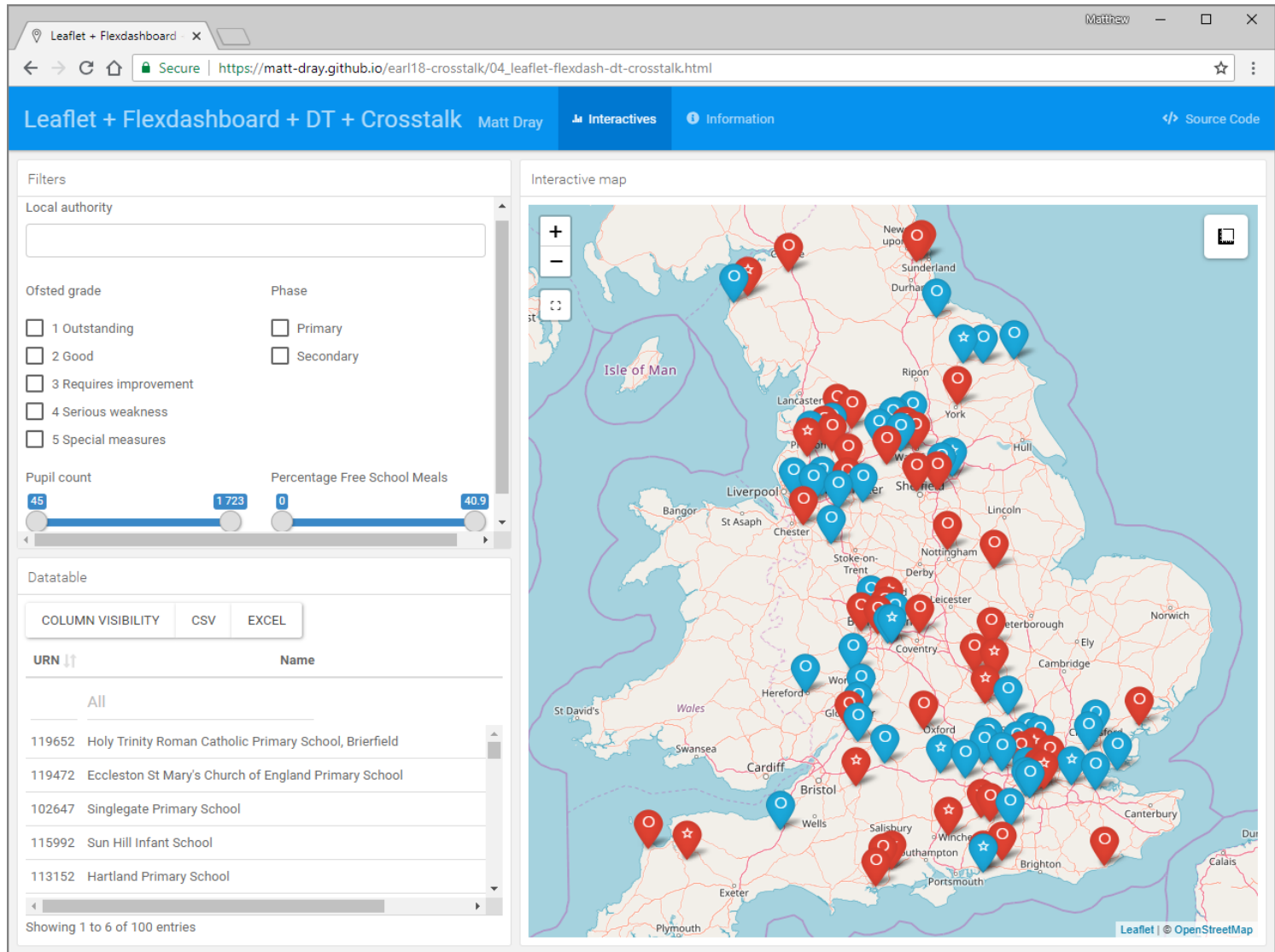
Okay, Solution 4

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

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

Leaflet + Flexdashboard

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
Phase

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

☒ Primary
☐ Secondary

Pupil count
Percentage Free School Meals

165 1 135 1 723 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

Leaflet | © OpenStreetMap

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. The presentation is available from 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

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