DQLab

Data Visualization using R (Case Jawa Tengah)

Feris Thia (feris@phi-integration.com)

Agenda

- What and why visualization?
- Flexdashboard and Shiny
- Creating interactivity with real dataset.

Data Visualization Introductory

What is Data Visualization?

- Organizing element of visual (shape, color, size, distance, etc) that represent data into information that will help human in decision making

Why Data Visualization?

- From graph plotting to map, human understand visual faster than words because of the way human process information
- Thus it will help human understand and make decision better, especially when face with huge amount of data
- Technology advance
- Numbers are not enough

Ancombe's Quartet

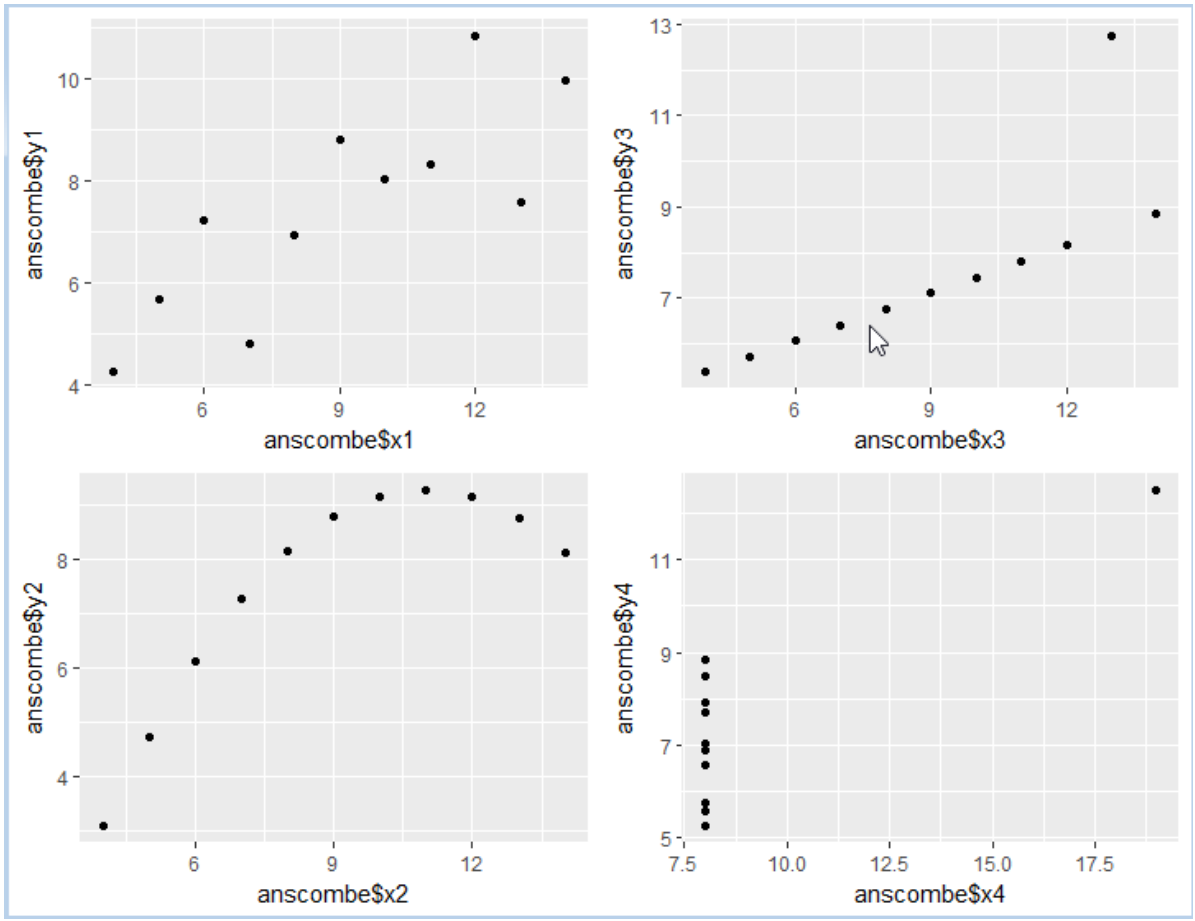
I		II		III		IV	
x	y	x	y	x	y	x	y
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

	1	2	3	4
Mean X	9.000	9.000	9.000	9.000
Standard Deviation X	3.317	3.317	3.317	3.317
Mean Y	7.501	7.501	7.500	7.501
Standard Deviation Y	2.032	2.032	2.030	2.031
Correlation	0.816	0.816	0.816	0.817

Summary Statistics for Anscombe's Quartet

Source: https://john-poppelaars.blogspot.co.id/2015/05/there-is-more-to-analytics-than-just.html

Anscombe's Quartet Visualized!



A very different datasets!

Practical Hands On

What will we use

- Dataset
  - data_kemiskinan_jateng.xlsx
- Contoh Dashboard
  - flex_dashboard_jateng_awal.Rmd
- Development Tools
  - R 3.5.1 (R-3.5.1-win.exe)
  - Editor (RStudio 1.1.463)

Dataset, Dashboard & Challenge

Jumlah Kemiskinan di Jateng

Nama Kabupaten

Tahun Pendatan

	A	B	C	D	E
1	kabupaten	tahun	jumlah	latitude	longitude
2	Kabupaten Cilacap	2012	260.90	-7.7333330	109.0000000
3	Kabupaten Cilacap	2013	255.70	-7.7333330	109.0000000
4	Kabupaten Cilacap	2014	239.75	-7.7333330	109.0000000
5	Kabupaten Cilacap	2015	243.47	-7.7333330	109.0000000
6	Kabupaten Cilacap	2016	240.24	-7.7333330	109.0000000
7	Kabupaten Banyumas	2012	303.90	-7.4832133	109.1404380
8	Kabupaten Banyumas	2013	296.80	-7.4832133	109.1404380
9	Kabupaten Banyumas	2014	283.48	-7.4832133	109.1404380
10	Kabupaten Banyumas	2015	285.85	-7.4832133	109.1404380
11	Kabupaten Banyumas	2016	283.90	-7.4832133	109.1404380
12	Kabupaten Purbalingga	2012	181.30	-7.3907470	109.3638000
13	Kabupaten Purbalingga	2013	181.10	-7.3907470	109.3638000
14	Kabupaten Purbalingga	2014	176.04	-7.3907470	109.3638000
15	Kabupaten Purbalingga	2015	176.49	-7.3907470	109.3638000
16	Kabupaten Purbalingga	2016	171.78	-7.3907470	109.3638000
17	Kabupaten Banjarnegara	2012	164.00	-7.4027060	109.6813960
18	Kabupaten Banjarnegara	2013	166.80	-7.4027060	109.6813960

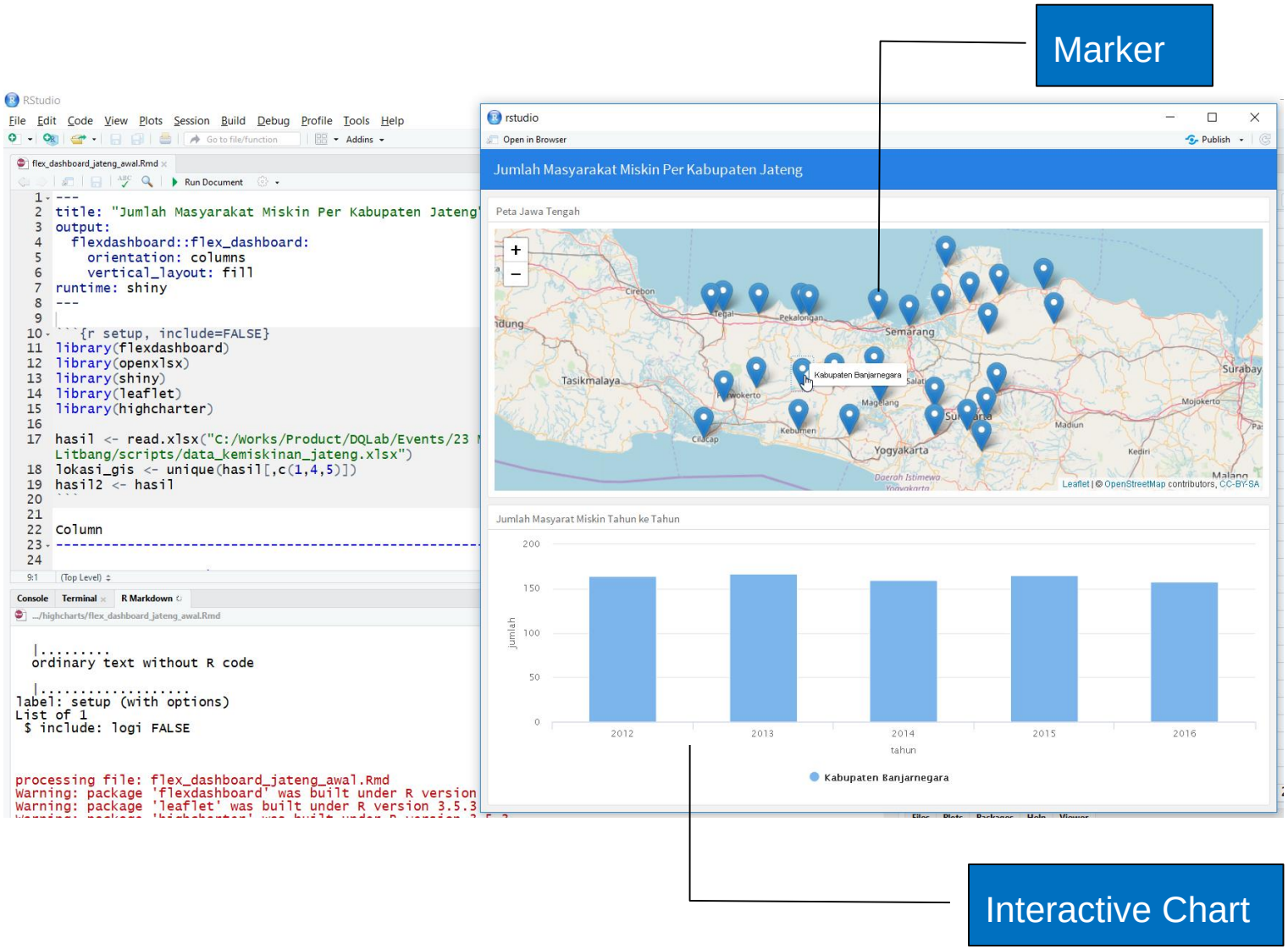
Jumlah Penduduk Miskin (dalam ribu)

Lokasi GIS

Sumber Data Asli

- Open Data Provinsi Jawa Tengah - Jumlah Penduduk Miskin Jawa Tengah http://data.jatengprov.go.id/dataset/jumlah-penduduk-miskin-menurut-kabupaten-kota-di-provinsi-jawa-tengah-ribu-2012-2016
- Github GIS Data from Andhika Nugraha https://github.com/benangmerah/wilayah/blob/master/datasources/daftar-nama-daerah.csv

Dashboard Interaktif Awal



Challenge

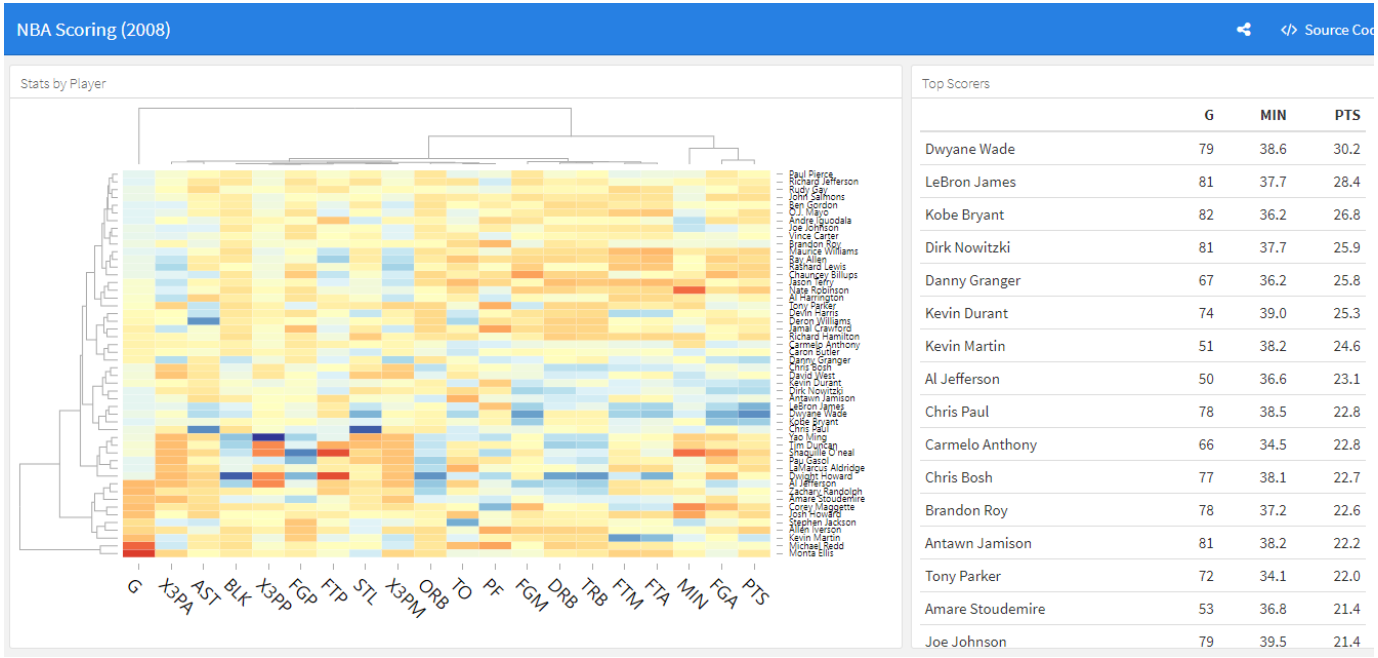
- Pengembangan dari dashboard tersebut sehingga memiliki susunan informasi yang lebih baik.
- Contoh: Penggunaaan indikator warna pada “marker” sehingga mencerminkan pendapatan di bawah / di atas rata-rata.
- Pengembangan sebebas dan sekreatif mungkin.

Flexdashboard

An introductory concept with best practices

Flexdashboard

- Is a package in RStudio that use to render charts in an integrated environment, extensible and can produce interactive dashboard.
- Part of R markdown.
- http://rmarkdown.rstudio.com/flexdashboard/



	G	MIN	PTS
Dwyane Wade	79	38.6	30.2
LeBron James	81	37.7	28.4
Kobe Bryant	82	36.2	26.8
Dirk Nowitzki	81	37.7	25.9
Danny Granger	67	36.2	25.8
Kevin Durant	74	39.0	25.3
Kevin Martin	51	38.2	24.6
Al Jefferson	50	36.6	23.1
Chris Paul	78	38.5	22.8
Carmelo Anthony	66	34.5	22.8
Chris Bosh	77	38.1	22.7
Brandon Roy	78	37.2	22.6
Antawn Jamison	81	38.2	22.2
Tony Parker	72	34.1	22.0
Amare Stoudemire	53	36.8	21.4
Joe Johnson	79	39.5	21.4

Getting Started

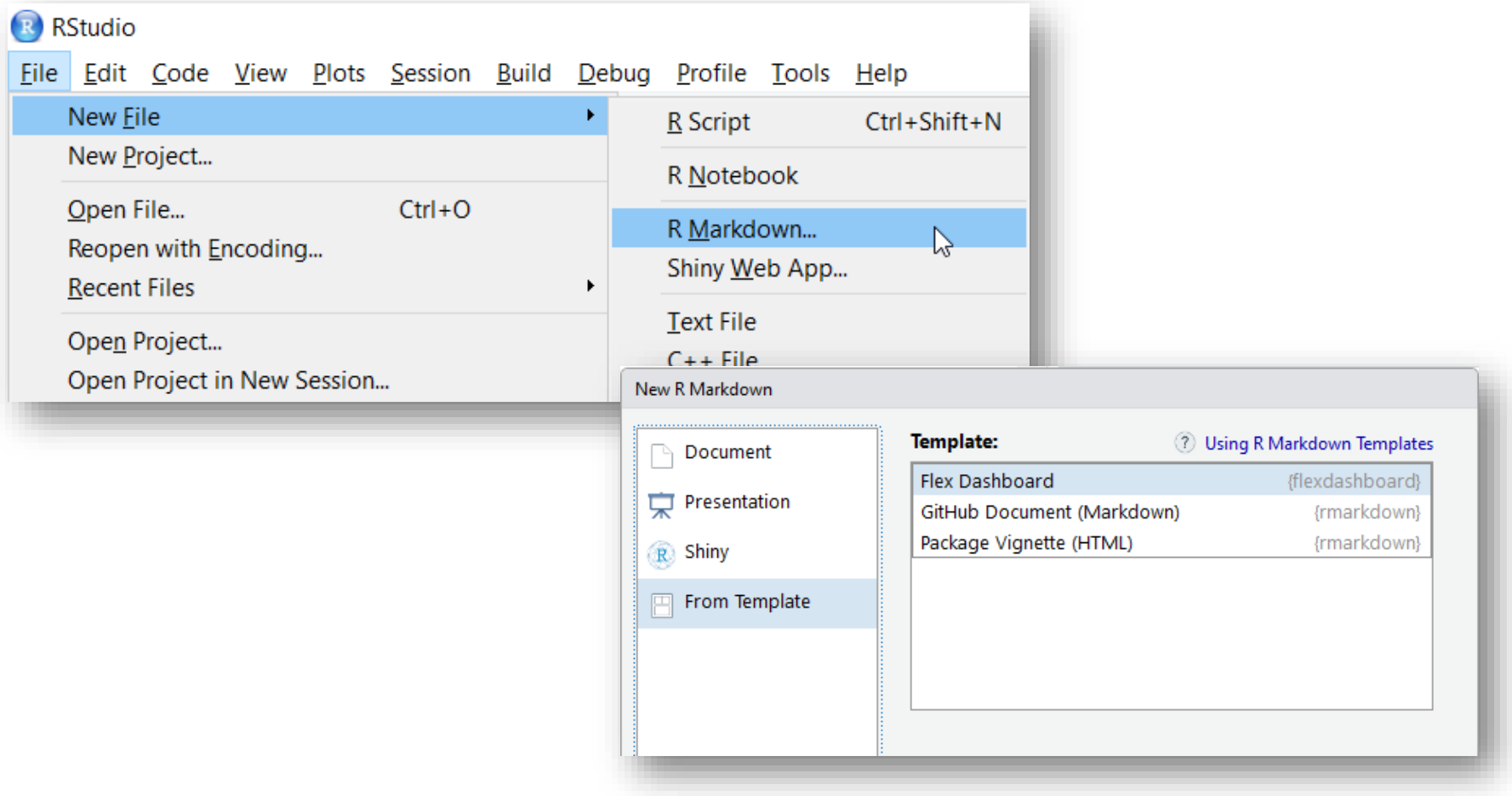
- Setup / Installation in RStudio

```
install.packages("flexdashboard")

install.packages(“shiny")
```

Getting Started

- Create New Dashboard



Layout – Row Based

```
---
title: "Single Column (Fill)"
output:
  flexdashboard::flex_dashboard:
    vertical_layout: fill
---

### Chart 1

```{r}

```

Chart 2

```{r}

```
```

Page organization

- Each Level 1 Header (#) begins a new page in the dashboard.
- Each Level 2 Header (##) begins a new column.
- Each Level 3 Header (###) begins a new box.

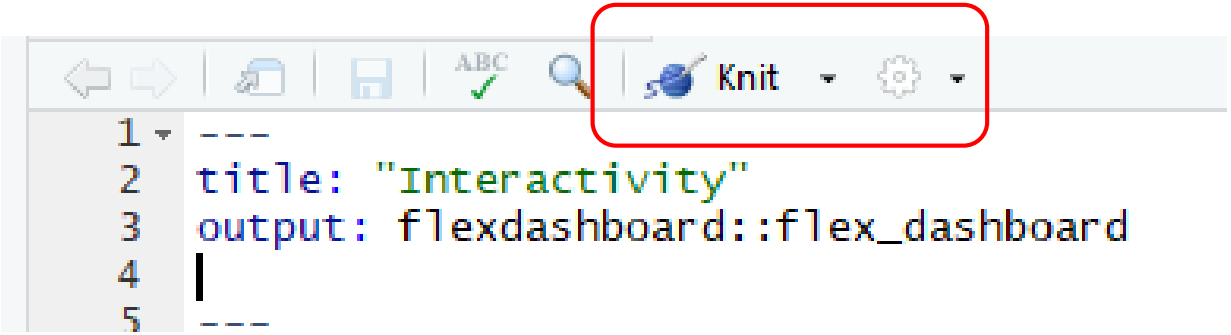
Flexdashboard - Shiny

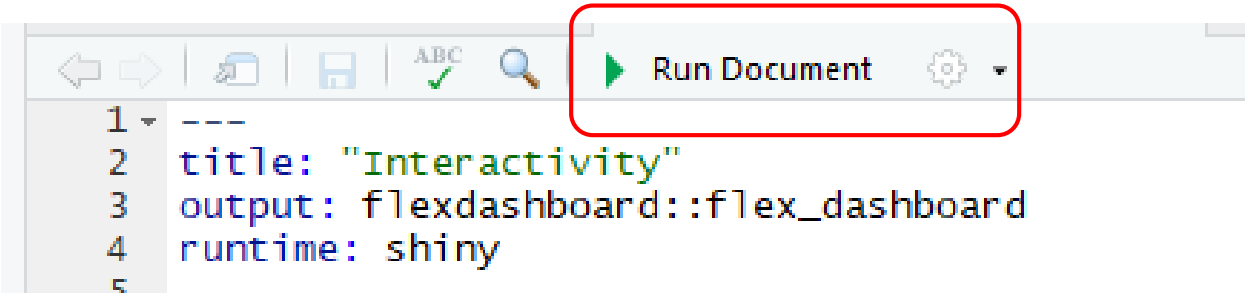
An interactive dashboard with flexdashboard markdown

Interactive Document with Shiny R markdown

- add runtime: shiny to the document's YAML header.
- add Shiny widgets and Shiny render functions to the file's R code chunks

From Knit to Run Document





Reactive Elements (Input – Output Functions)

- Input
  - Display controls with a value or list of values
  - Usually presented within a sidebar, we can add an input sidebar to a flexdashboard by adding the **{.sidebar}** attribute to a column
- Output
  - Any plot or data that are produced from R operations
  - React to changes in input, displaying updated output

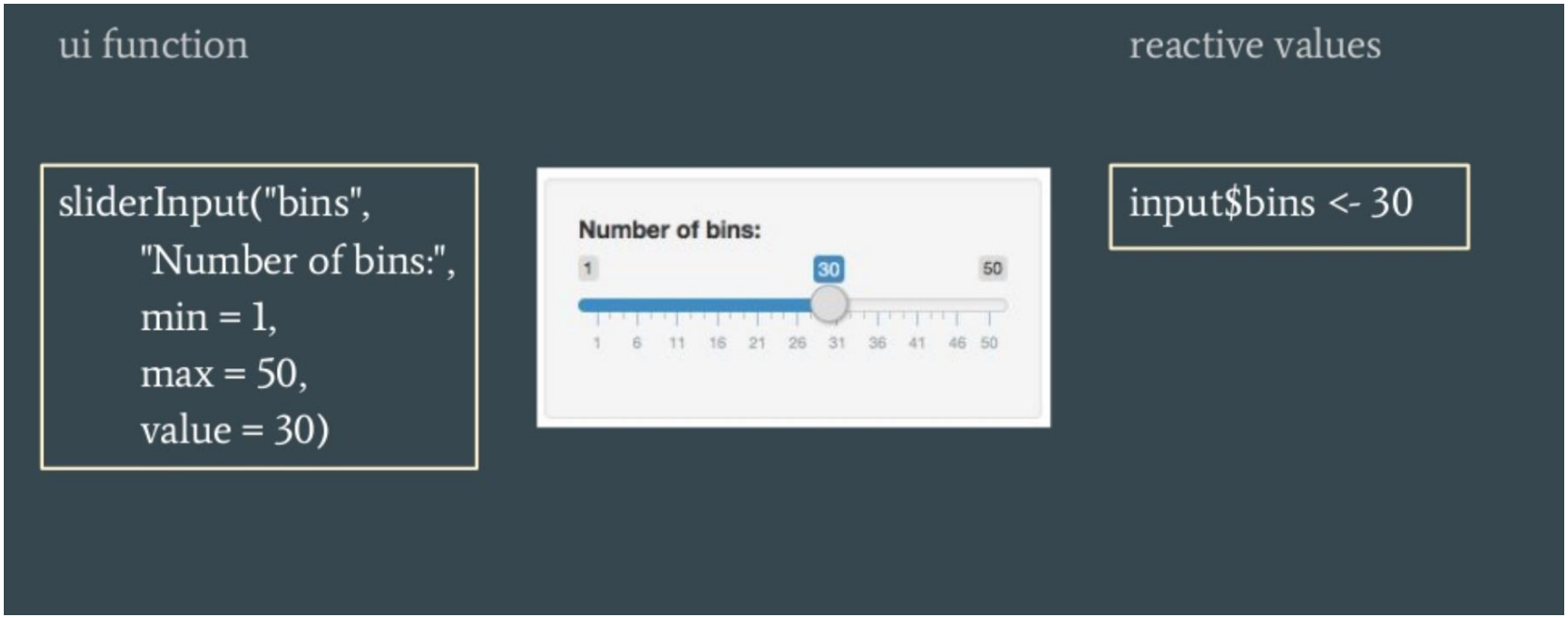
Shiny Input Rendering Functions

No	R Function	Input Type
1	selectInput	A box with choices to select from
2	sliderInput	A slider bar
3	radioButtons	A set of radio buttons
4	textInput	A field to enter text
5	numericInput	A field to enter numbers
6	checkboxInput	A single check box
7	dateInput	A calendar to aid date selection
8	dateRangeInput	A pair of calendars for selecting a date range
9	fileInput	A file upload control wizard

Shiny Output Rendering Functions

No	R Function	Output Type
1	renderPlot	R graphics output
2	renderPrint	R printed output
3	renderTable	Data frame, matrix, other table like structures
4	renderText	Character vectors

Function, Control and Variable Interaction



Source: https://www.slideshare.net/WendyChen56/a-tour-of-building-web-applications-with-r-shiny

THANK YOU

www.phi-integration.com