The Lorem Ipsum of data visualisation

How to design data-driven wireframes

Martin von Lupin
@martinvonlupin
I’m UX/UI Designer at data visualisation studio Small Multiples in Sydney
How to create wireframes for data-driven products?
Wireframes

Placeholder elements like “Lorem Ipsum” paragraph
Wireframes

Placeholder elements like “Lorem Ipsum” paragraph

Lorem ipsum dolor sit amet, ad quo rebum illud, mei te facete disputationi, ex eum latine patrioque.
Wireframes

Placeholder elements like “Lorem Ipsum” paragraph

Name Name

Occupation occupation

Lorem ipsum dolor sit amet, ad quod remum illud, mei te facete disputationi, ex eum latine patrioque.

Name Name

Occupation occupation

Lorem ipsum dolor sit amet, ad quod remum illud, mei te facete disputationi, ex eum latine patrioque.
Wireframes

Placeholder elements like “Lorem Ipsum” paragraph

Full list of team members

Name Name
Occupation occupation
Lorem ipsum dolor sit amet, ad quo rebum illud, mei te facete disputationi, ex eum latine patrioque.

Name Name
Occupation occupation
Lorem ipsum dolor sit amet, ad quo rebum illud, mei te facete disputationi, ex eum latine patrioque.

Name Name
Occupation occupation
Lorem ipsum dolor sit amet, ad quo rebum illud, mei te facete disputationi, ex eum latine patrioque.
Placeholder elements like “Lorem Ipsum” paragraph
Design

Replacing placeholders with meaningful but random content
Design

Replacing placeholders with meaningful but random content.
Development

Final developed version using real content

Full list of team members

Harry Morris
Creative developer
Full stack web development | UX/Visual Design. Bachelor of Design Computing from the University of Sydney.

Steph Grace
Design Practice Lead
User Experience | UX Research | Interaction Design | Information Architecture. Bachelor of Design...

Andrea Lau
Director/Founder
User Experience | Data Visualisation | Interaction Design | Development | Project Management. Bachelor of...
Development

Final developed version using real content

Harry Morris
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User Experience | Data Visualisation | Interaction Design | Development | Project Management. Bachelor of...
Wireframes contain the **basic structure** of a page very early in the process using placeholders.
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Meaningful **content** is added later in the design phase.
Wireframes contain the basic structure of a page very early in the process using placeholders.

Meaningful content is added later in the design phase.
What if content is fundamental for the basic structure?
What if content data is fundamental for the basic structure?
What is the *Lorem Ipsum* of data visualisation?
Let’s put data into our wireframes!
Content strategies

Placeholder content

Meaningful but random content

Real content

Name Name
Occupation occupation
Lorem ipsum dolor sit amet, ad quos rembium illud, mei te facete disputationi, ex eum latine patrioque.

Jaclynn Bradley
Chief Design Engineer
Lorem ipsum dolor sit amet, ad quos rembium illud, mei te facete disputationi, ex eum latine patrioque.

Harry Morris
Creative developer
Full stack web development | UX/Visual Design. Bachelor of Design Computing from the University of Sydney.
Final design of a chart

July statistics

69.2  23.3  120
Average for last 30 days  Minimum  Maximum
How to design wireframes...

Wireframes

... to get to this?

Final design

July statistics

69.2  23.3  120
Average for last 30 days  Minimum  Maximum
July statistics

123  123  123
Average for last 30 days  Minimum  Maximum

Barchart last 30 days
Average line
Meaningful data

Random but meaningful data.

All elements are there and chart and numbers make sense.
Real data

Real data is applied to the chart and stats.

Difference in values larger than expected.

Several days share the minimum value.

**July statistics**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average for last 30 days</td>
<td>35.1</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>130.9</td>
</tr>
</tbody>
</table>

Several days share the minimum value.
Strategies for data visualization wireframes

- Placeholder data
- Meaningful but random data
- Real data

**July statistics**
- 123 Average for last 30 days
- 123 Minimum
- 123 Maximum

- Barchart last 30 days
  - Average line

**July statistics**
- 70.6 Average for last 30 days
- 50.0 Minimum
- 90.0 Maximum

**July statistics**
- 35.1 Average for last 30 days
- 0 Minimum
- 130.9 Maximum
Strategies for datavis wireframes

- **Placeholder data**
- **Meaningful but random data**
- **Real data**

### July statistics

- **Placeholder data**
  - 123 (Average for last 30 days)
  - 123 (Minimum)
  - 123 (Maximum)
  - Bar chart for last 30 days
  - Average line

- **Meaningful but random data**
  - 70.6 (Average for last 30 days)
  - 50.0 (Minimum)
  - 90.0 (Maximum)

- **Real data**
  - 35.1 (Average for last 30 days)
  - 0 (Minimum)
  - 130.9 (Maximum)
Visualising geo-referenced frog recordings in Australia
Visualising geo-referenced frog recordings in Australia

Project brief

Interactive map of Australia with locations of all frog recordings from citizen science project “FrogID”.

Filter locations by
○ frog species
○ date range
○ by LGA
Why using real data for wireframes?

1. Visualisations are fundamental for interaction
2. Real data is available
Example of using real data

Real data all the way!

Data in map, sidebar, bar chart and summary are all for real.
Frog species

- **Common Eastern Froglet**
  - *Crinia signifera*
  - Records: 10,575

- **Striped Marsh Frog**
  - *Limnodynastes peronii*
  - Records: 8,819

- **Peron’s Tree Frog**
  - *Litoria peronii*
  - Records: 8,135

- **Eastern Dwarf Tree Frog**
  - *Litoria fallax*
  - Records: 6,145

- **Spotted Marsh Frog**
  - *Limnodynastes tasmaniensis*
  - Records: 4,202

- **Green Tree Frog**
  - *Litoria caerulea*
  - Records: 3,676

- **Red Tree Frog**
  - *Litoria rubella*
  - Records: 2,987

- **Brown Tree Frog**
  - *Litoria ewingii*
  - Records: 2,771

- **Eastern Banjo Frog**
  - *Limnodynastes dumerilii*
  - Records: 2,769

- **Eastern Sign-bearing Froglet**
  - *Crinia parinsignifera*
  - Records: 2,355

**Total records:** 89,235

**Unique species:** 186

**Unique users:** 8,744
Real data time!!!
Example of using real data

Surprise! There are clusters of locations that challenge the design.
Looks awesome!
Why not **always** use real data when designing wireframes?
Sometimes, there is no real data available.
Strategies for datavis wireframes

Placeholder data

July statistics
123
Average for last 30 days
123
Minimum
123
Maximum

Barchart last 30 days
Average line

Meaningful but random data

July statistics
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Real data

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Strategies for datavis wireframes

**Placeholder data**

**Meaningful but random data**

**Real data**

### July statistics

- **Average for last 30 days**: 70.6
- **Minimum**: 50.0
- **Maximum**: 90.0

**Barchart last 30 days**: Average line

### July statistics

- **Average for last 30 days**: 35.1
- **Minimum**: 0
- **Maximum**: 130.9
Visualising clusters of NSW government agencies and their projects
Visualising clusters of NSW government agencies and their projects

Project brief

Interactive online visualisation of NSW government projects. Show alignment with the three priorities of the digital strategy.

Arrange projects by
○ Government cluster
○ Priority
○ Budget
Clusters of NSW government projects

- 30 projects
- 3 strategies
- 3 budget groups (major, medium, small)
Digital government at a glance

Digital Government Projects

Customer experience

Digital on the inside

Data

Lorem ipsum
Lorem ipsum 10 clusters
dsine dolor 3 priorities lorem ipsum budget by circle area. Lorem ipsum 3 projects sine dolor ordered by budget sum.

less $  more $
Digital government at a glance

**Major projects**
Project budget more than $10,000,000

**Medium**
Project budget more than $1,000,000

**Small projects**
Project budget less than $1,000,000
Digital government at a glance

Births
Cluster: Finance, Services and Innovation
Agency: Service
Priority: Digital on the inside
Budget: $10,500,000
Supporting clusters:
Industry, Premier and Cabinet, Treasury

Project excerpt:
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Find out more >

less $ = more $

- Customer experience
- Data
- Digital on the inside

By cluster

Major projects
Project budget more than $10,000,000

Find out more >

Medium
Project budget more than $1,000,000

Small projects
Project budget less than $1,000,000
Digital government at a glance

Lorem ipsum
Lorem ipsum 10 clusters
sine dolor 3 priorities lorem ipsum budget by circle area. Lorem ipsum 3 projects sine dolor ordered by budget sum.

Digital Government Projects

Customer experience

Digital on the inside

Data

less $ ● more $

● Customer experience
● Data
● Digital on the inside
Digital Government Projects
More projects
(not 30 but 150+)
More projects
(not 30 but 150+)

Unknown budget
(pattern)
More projects (not 30 but 150+)

Unknown budget (pattern)

Huge difference in budget (bubble size)
Clusters of NSW government projects

Projects with small budgets are too small to be clickable.

Projects with large budgets attract too much attention.
Clustering of NSW government projects

Changing the scaling of circle sizes: Linear vs logarithmic.

Linear scaling emphasises outlier.
Clusters of NSW government projects

Changing the scaling of circle sizes: Linear vs logarithmic.

Logarithmic scaling brings outliers closer together.
Clusters of NSW government projects

Small projects appear larger and large projects appear smaller.
Clusters of NSW government projects

Get your key parameters right

Total number: 30

150 projects

Minimum budget: $250K

$15K

Maximum budget: $10.5M

$273M

Push for detailed information about key parameters in order to generate random but meaningful data.
Strategies for datavis wireframes

Placeholder data

Meaningful but random data

Real data

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Barchart last 30 days
Average line

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Strategies for datavis wireframes

**Placeholder data**

**Meaningful but random data**

**Real data**

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Barchart last 30 days
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Portal for data on poverty and inequality in Australia
Portal for data on poverty and inequality in Australia

Project brief

Create a website that showcases existing figures and charts about poverty and inequality in Australia. Include filters to let the user explore figures by theme.
Portal for data on poverty and inequality in Australia

Placeholder elements used for charts; only one actual chart shown to communicate look and feel.
Portal for data on poverty and inequality in Australia

Placeholder elements used for charts; only one actual chart shown to communicate look and feel.
Strategies for datavis wireframes

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Strategies for datavis wireframes

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Meaningful but random data

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Real data

- July statistics
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Visualising and comparing large amounts of genomic information
Visualising and comparing large amounts of genomic information

Project brief

Explore network of chromosomes, mRNAs, microRNAs and proteins to support study of neurodegenerative diseases like Alzheimer’s.
How would you create wireframes for something that complex?
You don’t.
Visualising and comparing large amounts of genomic information

Sketches + detailed annotations to communicate visuals, interactions and insights.
1. 'Realms': Visualisation layers containing Genome (G), miRNA (R), Proteome (P) can be independently turned on or off
2. Search across realms by entity ID
3. Filters: build criteria based on research goals to determine what entities and connections to show
4. Presets: add research data and/or reference or example data sets to the visualisation
5. Interactive visualisation
   a. Entities from the same realm are grouped together
   b. Each realm occupies a defined, non-overlapping region
   c. Unified symbology for entities to reduce complexity
6. Display detailed information on selected entity
Flat concentric circles

Dense arrangement inspired by nature
Strategies for data visualization wireframes

**Placeholder data**

**Meaningful but random data**

**Real data**

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<td></td>
</tr>
</tbody>
</table>

Bar chart: last 30 days, Average line

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If data visualisation is fundamental for the structure or interaction use
If you don’t have real data use...

Placeholder data

Meaningful but random data

Real data

**July statistics**

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</tr>
</tbody>
</table>
If data visualisation is not fundamental for the structure or interaction use
How to build wireframes that contain random or real data?
Import graphics

Create charts using external software.

Maps for FrogID project were screenshots taken from QGIS.
Import graphics

Create charts using external software.

Maps for FrogID project were screenshots taken from QGIS.
Sketch + Data Populator
Populate with JSON

Please select the JSON file you'd like to populate your design with and configure the options.

JSON File

/Users/martin1/Documents/55_fn

Browse

Data Path

Root Level

Data Options

- Randomize data order
- Trim overflowing text (area text layers)
- Insert ellipsis after trimmed text

Default Substitute

e.g. No Data

Layout Options

- Create grid

Rows 2 Margin 10
Columns 2 Margin 10

[1
2
3
"Latin": "Crinia signifera",
4
"Clean count": "10,575",
5
"Common": "Common Eastern Froglit"
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
]

Reload

Cancel

Populate
<table>
<thead>
<tr>
<th>Common Eastern Froglet</th>
<th>Rattling Froglet</th>
<th>Motorbike Frog</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Crinia signifera</em></td>
<td><em>Crinia glauerti</em></td>
<td><em>Litoria moorei</em></td>
</tr>
<tr>
<td>10,575</td>
<td>2,317</td>
<td>1,151</td>
</tr>
<tr>
<td>Striped Marsh Frog</td>
<td>Roth’s Tree Frog</td>
<td>Bumpy Rocket Frog</td>
</tr>
<tr>
<td><em>Limnodynastes peronii</em></td>
<td><em>Litoria rothii</em></td>
<td><em>Litoria inermis</em></td>
</tr>
<tr>
<td>8,819</td>
<td>1,896</td>
<td>1,110</td>
</tr>
<tr>
<td>Peron’s Tree Frog</td>
<td>Whistling Tree Frog</td>
<td>Cane Toad</td>
</tr>
<tr>
<td><em>Litoria peronii</em></td>
<td><em>Litoria verreauxii</em></td>
<td><em>Rhinella marina</em></td>
</tr>
<tr>
<td>8,135</td>
<td>1,637</td>
<td>1,027</td>
</tr>
<tr>
<td>Eastern Dwarf Tree Frog</td>
<td>Slender Tree Frog</td>
<td>Quacking Frog</td>
</tr>
<tr>
<td><em>Litoria fallax</em></td>
<td><em>Litoria adelaidensis</em></td>
<td><em>Crinia georgiana</em></td>
</tr>
<tr>
<td>6,145</td>
<td>1,542</td>
<td>980</td>
</tr>
<tr>
<td>Spotted Marsh Frog</td>
<td>Tusked Frog</td>
<td>Broad-palmed Rocket Frog</td>
</tr>
<tr>
<td><em>Limnodynastes tasmaniensis</em></td>
<td><em>Adelotus brevis</em></td>
<td><em>Litoria latopalmata</em></td>
</tr>
<tr>
<td>4,202</td>
<td>1,521</td>
<td>976</td>
</tr>
<tr>
<td>Green Tree Frog</td>
<td>Bleating Tree Frog</td>
<td>Striped Rocket Frog</td>
</tr>
<tr>
<td><em>Litoria caerulea</em></td>
<td><em>Litoria dentata</em></td>
<td><em>Litoria nasuta</em></td>
</tr>
<tr>
<td>3,676</td>
<td>1,477</td>
<td>822</td>
</tr>
<tr>
<td>Red Tree Frog</td>
<td>Marbled Frog</td>
<td>Western Banjo Frog</td>
</tr>
<tr>
<td><em>Litoria rubella</em></td>
<td><em>Limnodynastes convexiusculus</em></td>
<td><em>Limnodynastes dorsalis</em></td>
</tr>
<tr>
<td>2,987</td>
<td>1,420</td>
<td>811</td>
</tr>
<tr>
<td>Brown Tree Frog</td>
<td>Tyler’s Tree Frog</td>
<td>Giant Burrowing Frog</td>
</tr>
<tr>
<td><em>Litoria ewingii</em></td>
<td><em>Litoria tyleri</em></td>
<td><em>Cyclorana australis</em></td>
</tr>
<tr>
<td>2,771</td>
<td>1,332</td>
<td>710</td>
</tr>
<tr>
<td>Eastern Banjo Frog</td>
<td>Graceful Tree Frog</td>
<td>Ornate Burrowing Frog</td>
</tr>
<tr>
<td><em>Limnodynastes dumeriili</em></td>
<td><em>Litoria gracillenta</em></td>
<td><em>Platyplectrum ornatum</em></td>
</tr>
<tr>
<td>2,769</td>
<td>1,298</td>
<td>704</td>
</tr>
<tr>
<td>Eastern Sign-bearing Froglet</td>
<td>Northern Sedge Frog</td>
<td>Dusky Toadlet</td>
</tr>
<tr>
<td><em>Crinia parinsignifera</em></td>
<td><em>Litoria bicolor</em></td>
<td><em>Uperoleia fusca</em></td>
</tr>
<tr>
<td>2,355</td>
<td>1,184</td>
<td>668</td>
</tr>
</tbody>
</table>
Sketch

+ 

Chippencharts
Create your random bar chart with 106 selected layers
This is for a bar chart where random values are applied to the layers of your selection.

Define extrema of bars
20 138 (max)

Specify the desired trend
- Random
- Trend going up ↑ (linear)
- Trend going up ↑ (natural)
- Trend going down ↓ (linear)
- Trend going down ↓ (natural)

Vertical or horizontal?
- Automatic (vertical detected)
- Force horizontal

Please make sure proportional scaling is disabled

Cancel  Run
35 vertical bars with random data (20px-100px)
Strategies for datavis wireframes

Placeholder data

Meaningful but random data

Real data

July statistics

123
Average for last 30 days

123
Minimum

123
Maximum

Barchart last 30 days
Average line

July statistics

70.6
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July statistics

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Minimum

130.9
Maximum
Example of using real data

Real data in datavis wireframes is great for:

- Testing the design
- Spotting challenges very early and communicating with the team
- Having educated conversations with clients
Using real data in wireframes is fun and the clients love it.
Thanks.

Martin von Lupin
@martinvonlupin
Let’s have a chat!

Martin von Lupin
@martinvonlupin