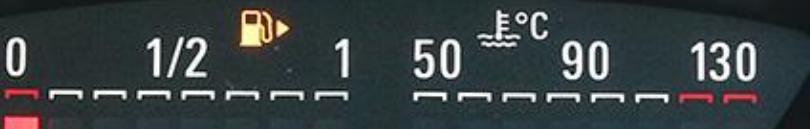


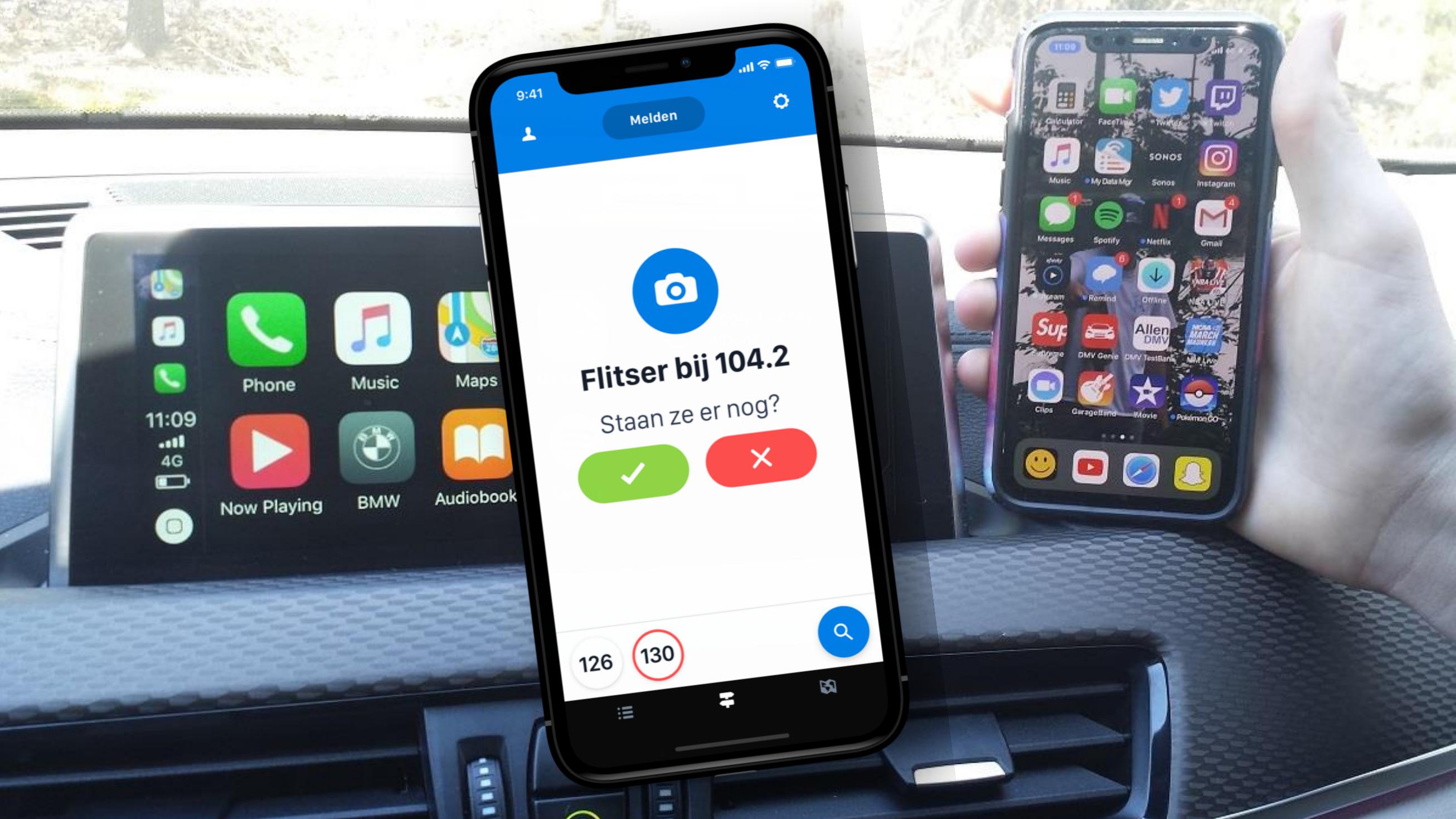
# **Storytelling & interactive reporting**

**with Power BI bookmarks and drillthrough**











# Marc Lelijveld

Data & Analytics Consultant  
Macaw Netherlands

-  [Marc.Lelijveld@macaw.nl](mailto:Marc.Lelijveld@macaw.nl)
-  [@MarcLelijveld](https://twitter.com/MarcLelijveld)
-  [linkedin.com/in/MarcLelijveld](https://linkedin.com/in/MarcLelijveld)
-  [Data-Marc.com](https://Data-Marc.com)





# Blogging about everything related to Data and AI based on Microsoft technology

EDIT

Don't let date columns ruin  
query folding in Power BI

EDIT

Inform your end-users by  
embedding dataflow refresh  
triggers in your Power BI

EDIT

Top N & query folding to  
improve report building!

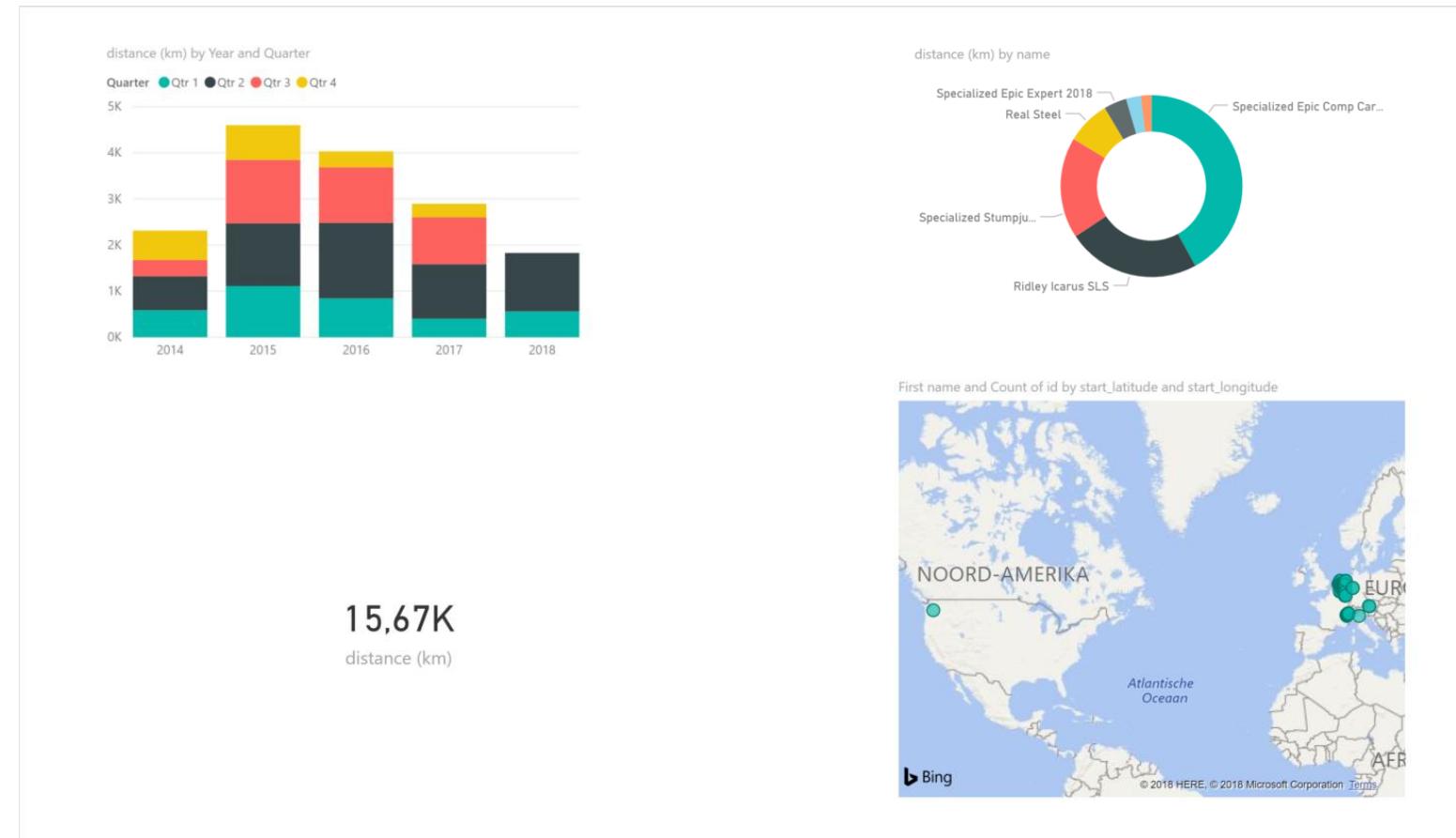
- **Why storytelling?**
- **Practical use & tips**
- **Storytelling features**
- **Demo!**



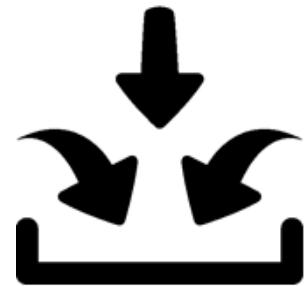
# Why storytelling?



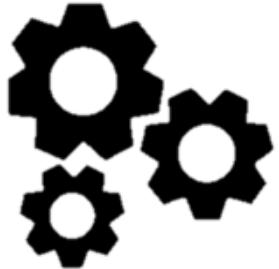
# Classic reports



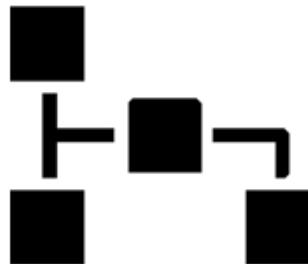
# What we used to do



Collect



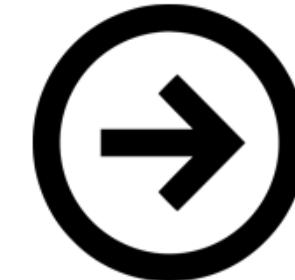
Transform



Model



Analyze



Define

# Storytelling, How and why?

```
("input")?"val":"html";e=="Text",r.resetText||n.data("resetText",n[i]()),n[i](r[e]);|this.opt  
e=="loadingText"?n.addClass(t).attr(t,t).removeClass(t).removeAttr(t)||{}},t.prototype.to  
.closest('button').find('.active'),removeClass("active"),this.$e  
e.fn.button;e.fn.button=function(n){return this.each(function(){var r=e(this),i=r.data("bu  
.data("button"),i=new t(this,s),n=="toggle"?i.toggle():n&&i.setState(n)}),e.fn.button.defau  
.button.Constructor=t,e.fn.button.noConflict=function(){return e.fn.button=n,this},e.documen  
[data-toggle="button"],function(t){var n=e(t.target);if(n.hasClass("btn"))(n=n.closest(".bt  
,!function(e){use strict;var t=function(t,n)(this.$element=e),this.$indicators=this.$ele  
.options=n,this.options.pause="hover"&&this.$element.on("mouseenter",e.proxy(this.pause,[  
this])),t.prototype={cycle:function(t){return t||(this.paused=1),this.interval&&clearInterval  
,interval&&this.paused&&(this.interval.setInterval(e.proxy(this.next,this),this.options.int  
(return this.$active=this.$element.find(".item.active"),this.$items=this.$active.parent().ch  
.$active),to:function(t){var n=this.getActiveIndex(),r=this;if(t>this.$items.length-1)t=0  
this.$element.one("slid",function(t){r.to(t);n=t?this.pause():cycle();this.slide(t==?next?  
t):(return t||(this.paused=1)),this.$element.find(".next,.prev").length&&support.transiti  
support.transition.end,this.cycle(0),clearInterval(this.interval),this.interval=null,th  
return;return this.slide(next)},prev:function(){if(this.sliding)return;return this.slide(  
r=this.$element.find(".item.active"),i=i||r[t]),s=this.interval,o=t==?next:left:right,  
this.sliding=0,s&&this.pause(),i>length?1:this.$element.find(".item")|u(),f=e.Event("sl  
if(i.hasClass("active"))return;this.$indicators.length&&(this.$indicators.find("active").re  
("slid",function(t){e(a,$indicators.children().getActiveIndex());t&&t.addClass("act  
,$element.hasClass("slide")))(this.$element.trigger(f);if(f.isDefaultPrevented())return;i.ad  
,i.addClass(o),this.$element.one(e.support.transition.end,function(){i.removeClass([t,o].jo  
removeClass("active",o).join(" ")),a.sliding=1,setTimeout(function(){a.$element.trigger("c  
f);if(f.isDefaultPrevented())return;r.removeClass("active"),i.addClass("active"),this.$slid  
return s&&this.cycle(t),this);var n=e.fn.carousel;e.fn.carousel=function(n){return this.eac  
("carousel"),s=e.extend({},e.fn.carousel.defaults,typeof n=="object"||n,typeof n=="string"  
t(this,s),typeof n=="number"?i.to(n):i||o||[]).s.interval&&i.pause().cycle()},e.fn.carousel  
pause:"hover"},e.fn.carousel.Constructor=t,e.fn.carousel.noConflict=function(){return e.fn.c  
.carousel.data-api","[data-slide],[data-slide-to]",function(t){var n=e(this),r,i=n.attr("  
.replace(/.*/(?=\")s\":\"/,""),s=e.extend({},i.data(),n.data()),o;i.carousel(s),(o,n.attr("c  
.pause).to(o).cycle(),t.preventDefault()})(window.jQuery),!function(e){use strict};var t  
.options=e.extend({},e.fn.collaps.defaults,n),this.options.parent&&(this.parent=e(this.opt  
.toggle());t.prototype={constructor:t,dimension:function(){var e=this.$element.hasClass("wid  
show:function(){var t,n,r,i;if(this.transitioning||this.$element.hasClass("in"))return;t=t[i]  
t].join("-"),r=this.$parent&&this.$parent.find(> .accordion-group > .in");if(r&&r.length)i  
,transitioning{return;r.collapse("hide"),i|r.data("collapse",null)}this.$element[t](0),this.  
"shown"),e.support.transition&&this.$element[t](0),this.$element.trigger("shown");i  
.hasClass("in"))return;t=this.dimension(),this.reset(this.$element[t]()),this.transition("re  
this.$element[t](0)),reset:function(e){var t=this.dimension();return this.$element.removeClass(  
offsetWidth>this.$element[e==null?"addClass":"removeClass"]("collapse"),this).transition:  
(n.type=="show"?i.reset(),i.transitioning=0,i.$element.trigger(r);this.$element.trigger(n
```



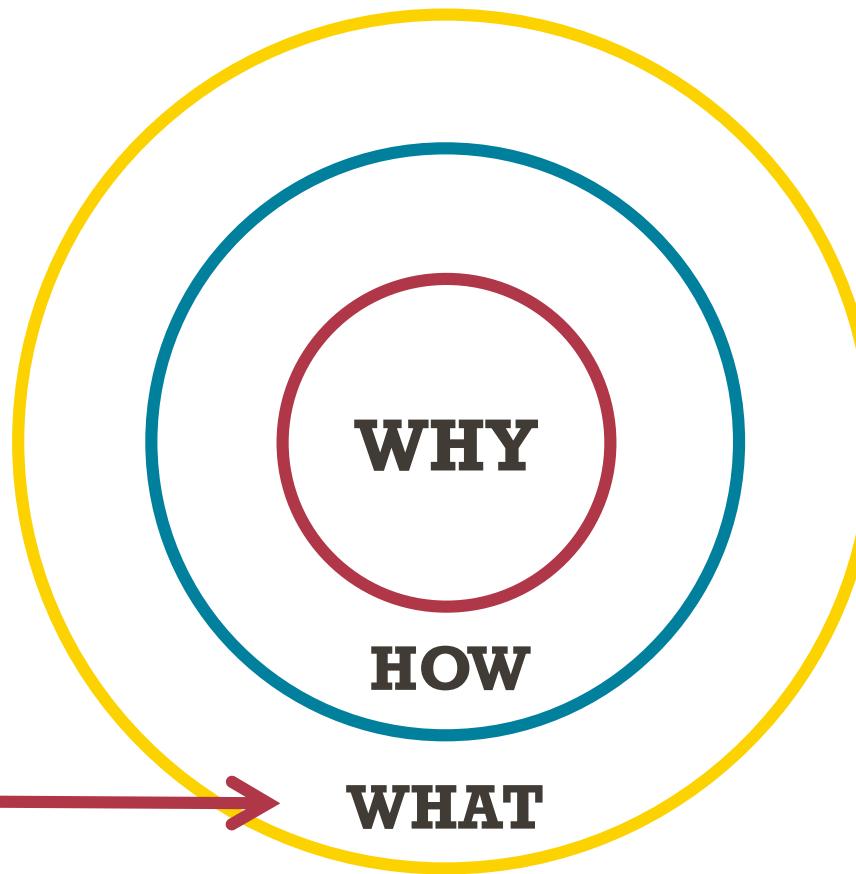
How = Usage of data

Why = Business understanding

# What as a starting-point

We are good at:

We should do:

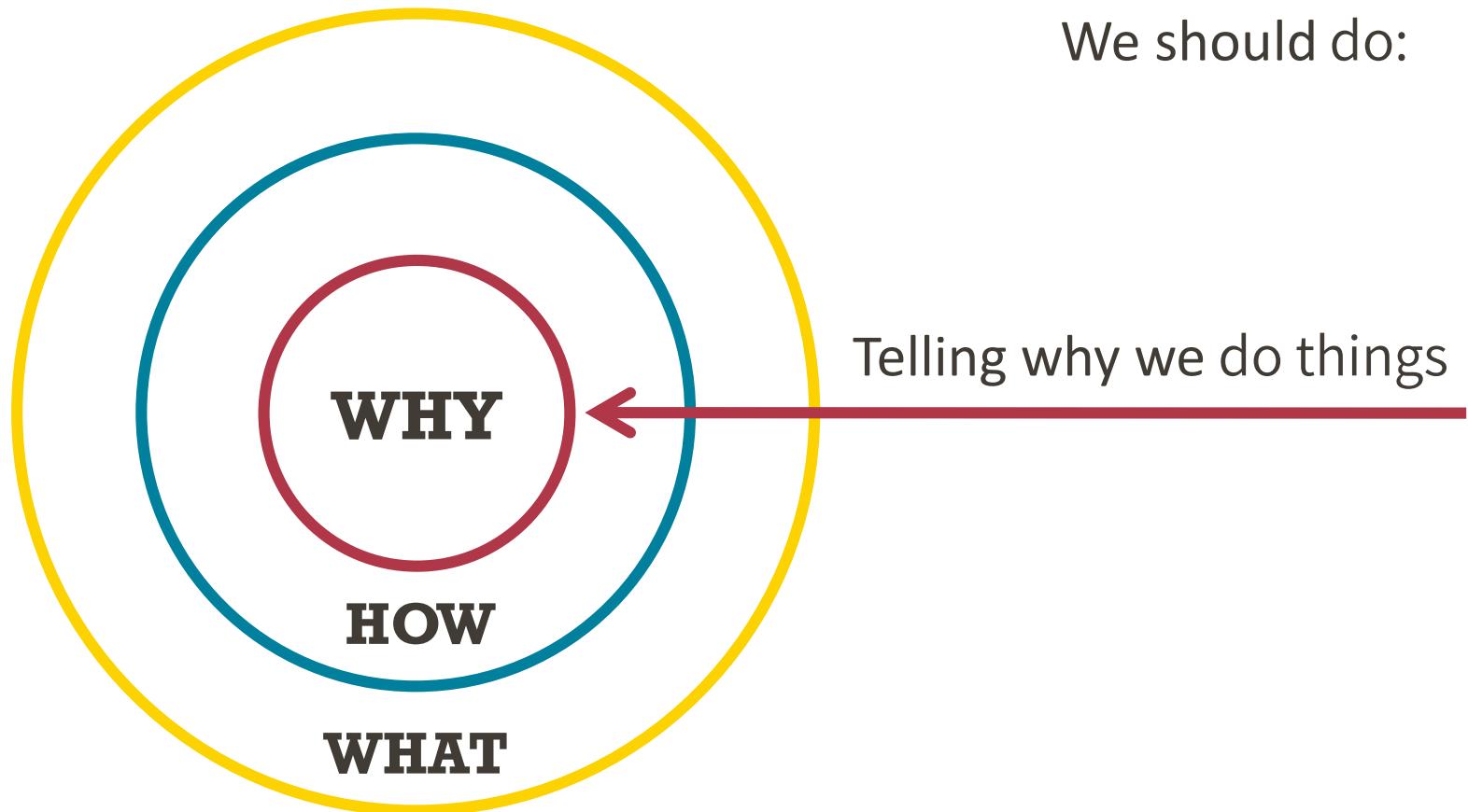


Telling what we do

# Why as a starting-point

We are good at:

We should do:



# The definition of storytelling

Data storytelling is the process of translating data analyses into layman's terms in order to influence a **business decision** or **action**.

Once upon a time... <sob>



# Goals of storytelling

- Transfer of information which is interpreted correctly
- The origin of the question
- Possibility to answer the next question
- Motivation for data-driven decisions
- Connected to business processes

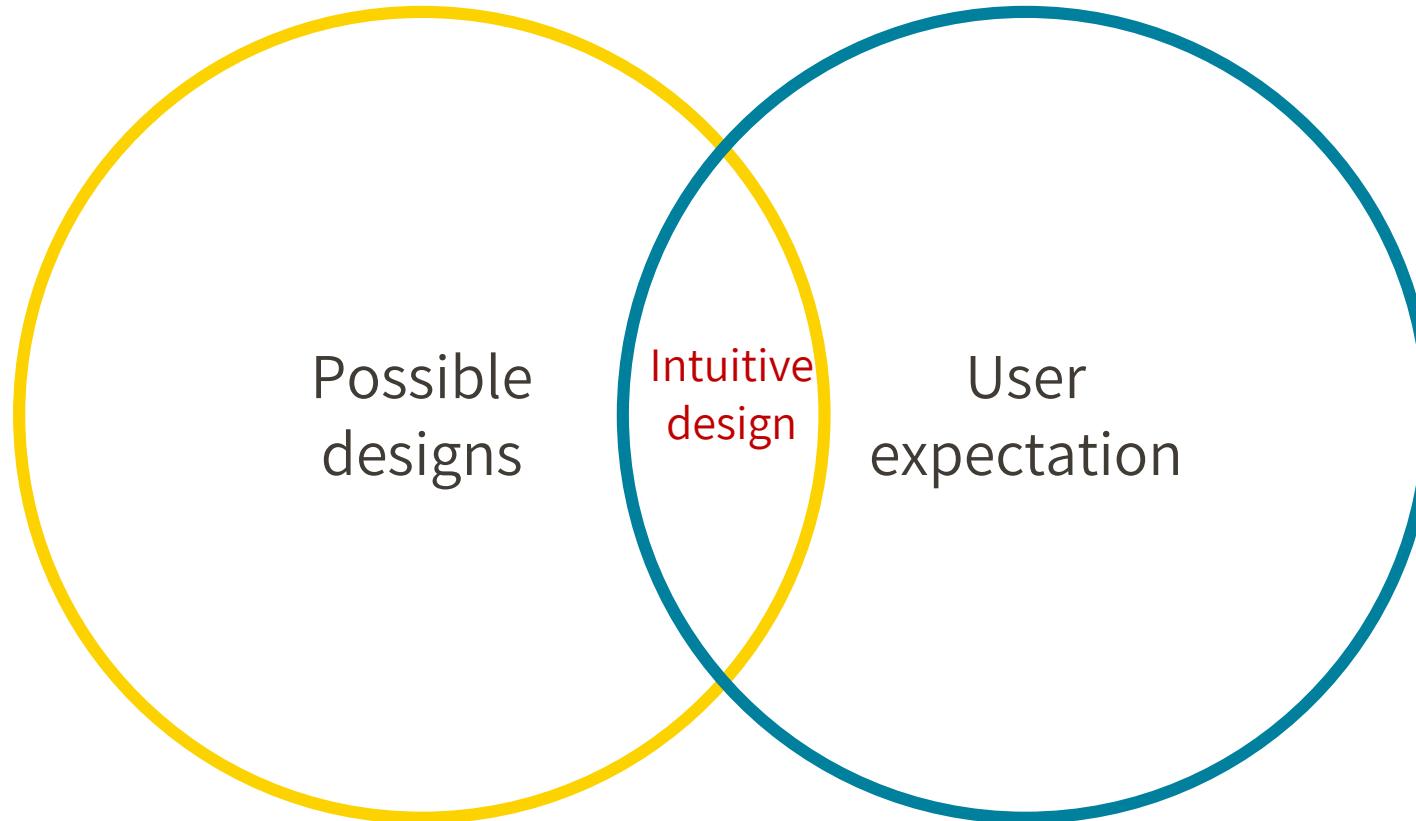


# Practical use & some additional features

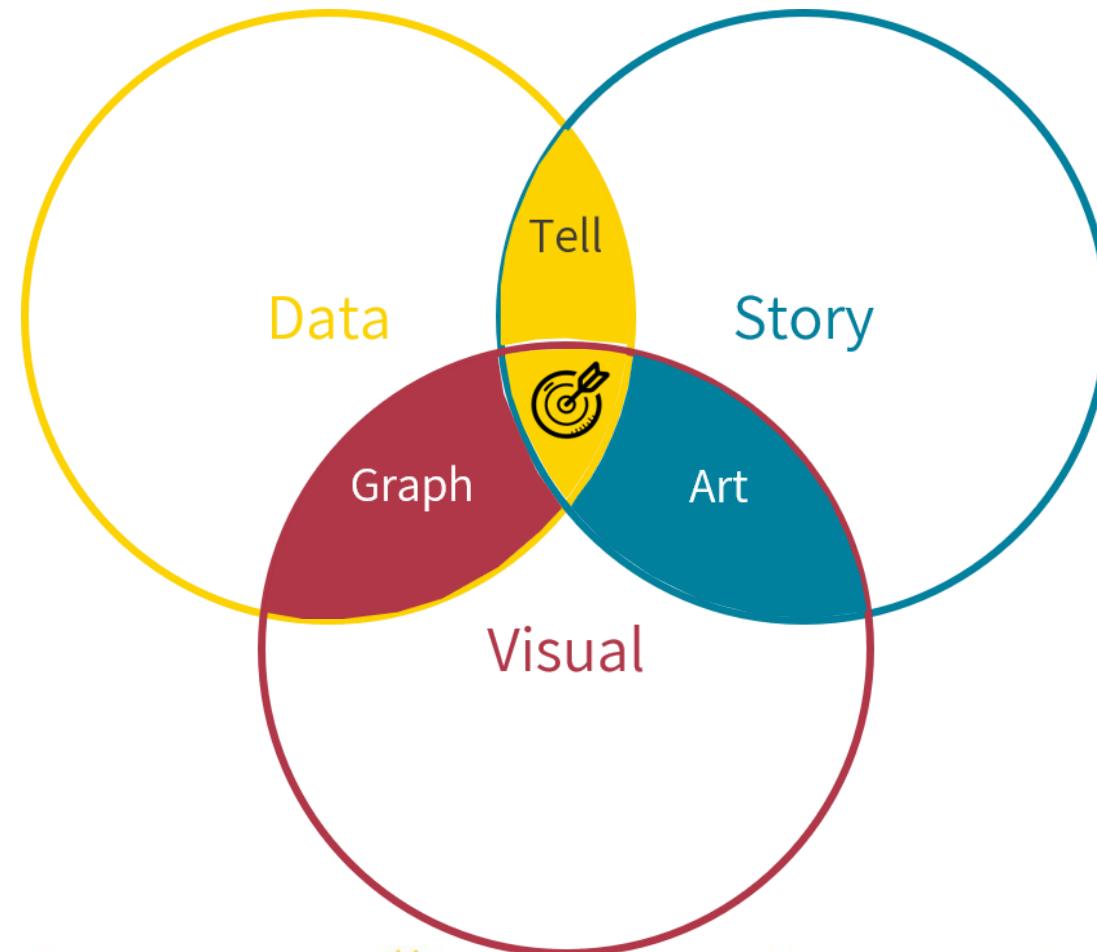
# Add context



# Make it intuitive



# Find the right balance



# Define your type of storytelling



Describe



Declare



Explore

# Define your route (click-path)



# Think about your start & end-point



# Remove all bullshit!



# Visualization

Export von Bananen in Tonnen von 1994-2005

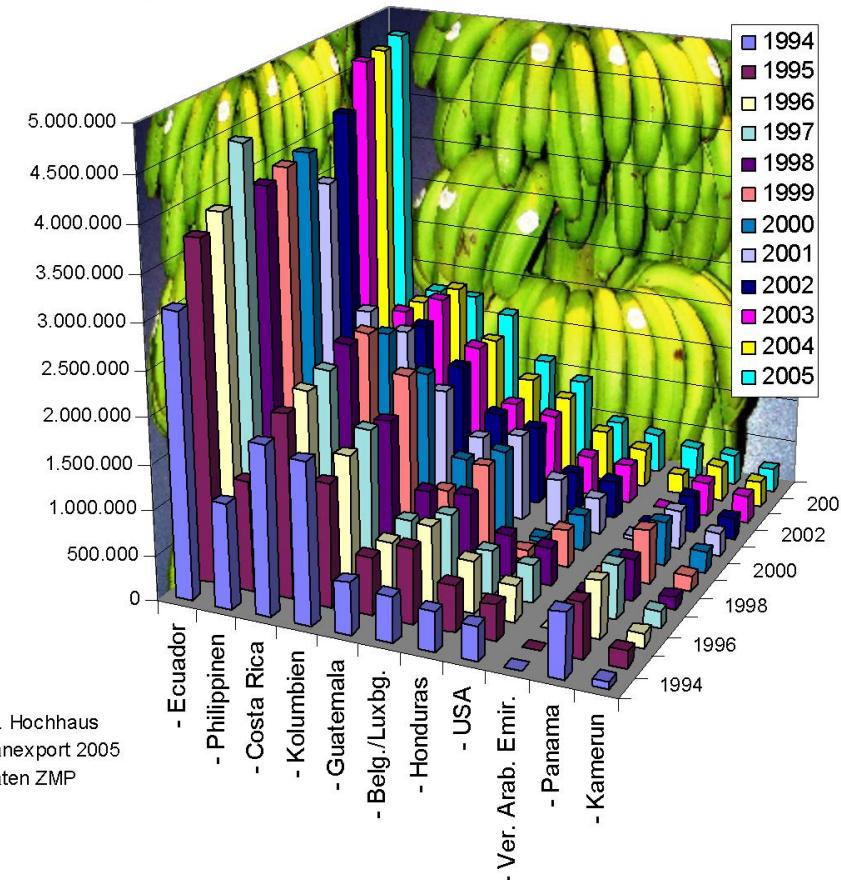
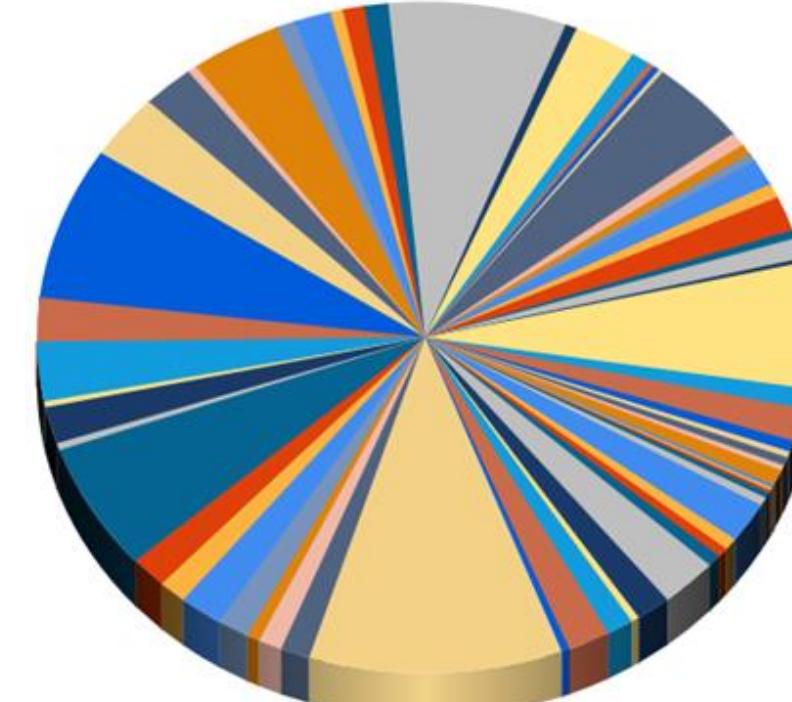
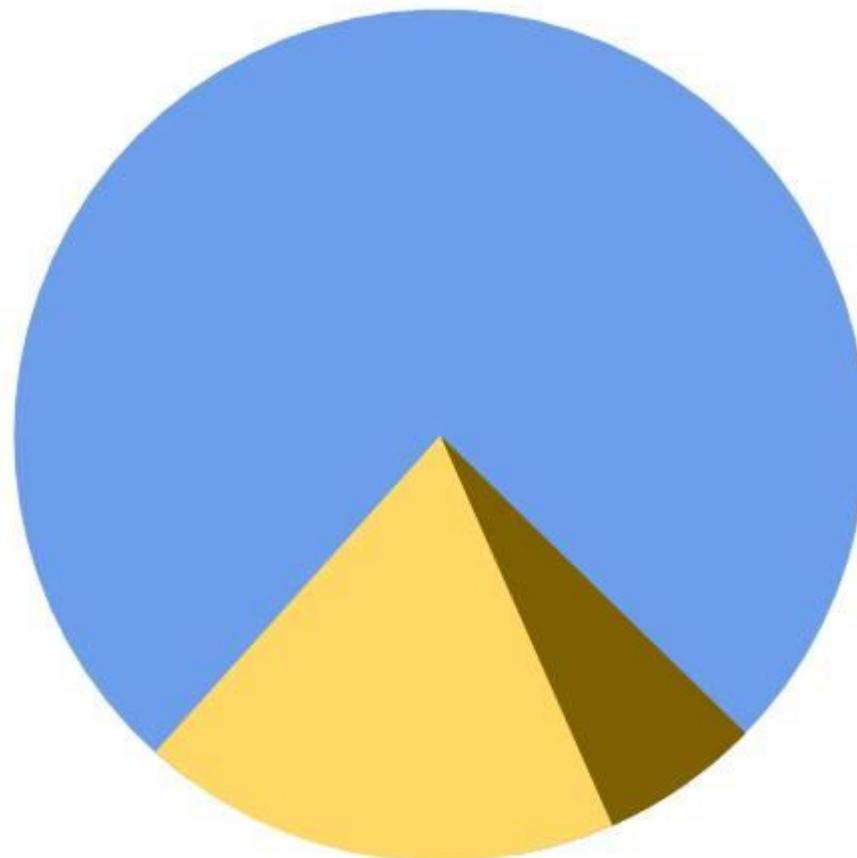


Chart Title



Ohio	Alabama
Virginia	Washington
New Hampshire	Montana
Massachusetts	Oregon
Michigan	Wyoming
New York	Connecticut
Rhode Island	Manitoba
Connecticut	Brunswick
Indiana	Idaho
Maine	New South Wales
California	South Australia
Nevada	Victoria
Colorado	Queensland
New Mexico	Hamburg
Utah	Hessen
Arizona	Saarland
Minnesota	Bayern
Missouri	Nordrhein-Westfalen
Texas	Brandenburg
South Dakota	England
Illinois	Essonne
Wisconsin	Seine (Paris)
Quebec	Loiret
Alberta	Seine Saint Denis
Ontario	Seine et Marne
British Columbia	Val d'Oise
Tennessee	Hauts de Seine
South Carolina	Gers
Florida	Pas de Calais
Mississippi	Val de Marne
Georgia	Nord
Kentucky	Garonne (Haute)
North Carolina	Loir et Cher

# Visualization



Sky

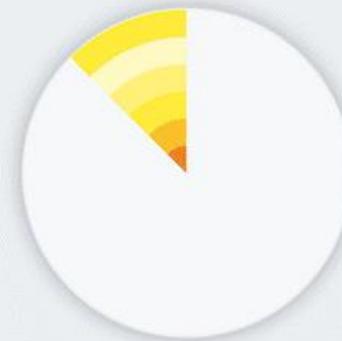


Sunny side of pyramid



Shady side of pyramid

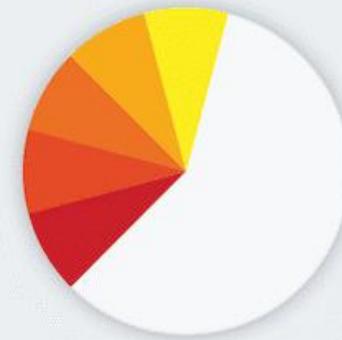
# Color usage



MONOCHROMATIC



COMPLEMENTARY



ANALOGOUS



TRIADIC



MARIO KART

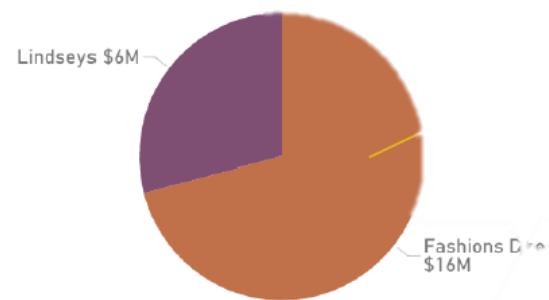
DELUXE

TM

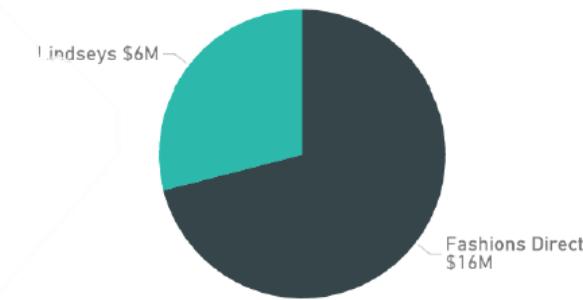
1	King Boo	45
2	Lakitu	32
3	Villager	30
4	Shy Guy	27
5	Iggy	23
6	Ludwig	21
7	Roy	16
8	Peach	15
9	Cat Peach	14
10	Villager	10
11	Luigi	7
12	Mario	6

# Consistency

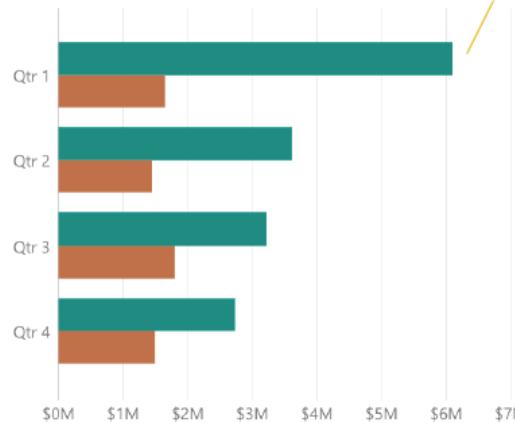
This Year Sales by Chain



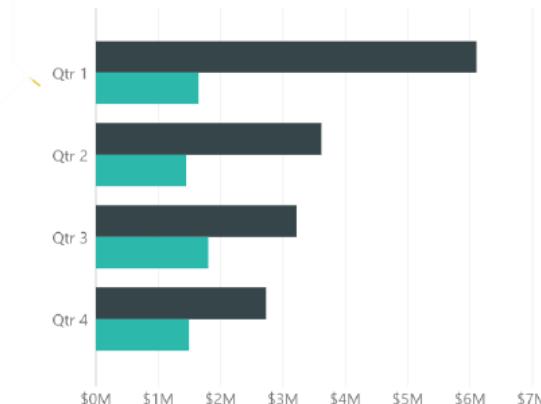
This Year Sales by Chain



This Year Sales by Quarter and Chain



This Year Sales by Quarter and Chain



Ask a question about your data

Total Volume  
IN 2014

50K

Market Share  
LAST 12 MONTHS

32.86%

Our Total Volume  
IN 2014

16K

Sentiment

68

Sentiment Gap

### % Units Market Share vs. % Units Market Share Rolling 12 Months BY MONTH



### Total Units Overall BY SEGMENT



### Total Units YTD Variance % BY MONTH, MANUFACTURER



### Total Units YTD BY MANUFACTURER, REGION



### Total Units for 2014 BY MONTH, MANUFACTURER



### Industry % Market Share YOY Change BY ROLLING PERIOD, REGION



1/2/2015

6/30/2015

Consumer

Corporate

Home Office

Small Business

Furniture

Office Supplies

Technol...

Central

East

South

West

1,898,401

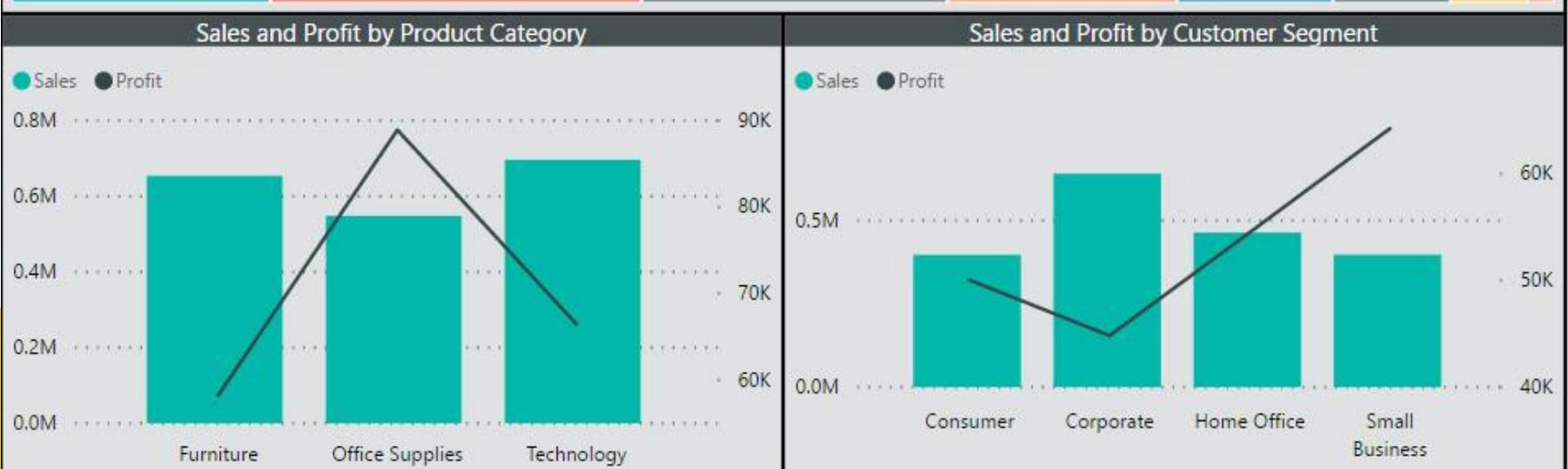
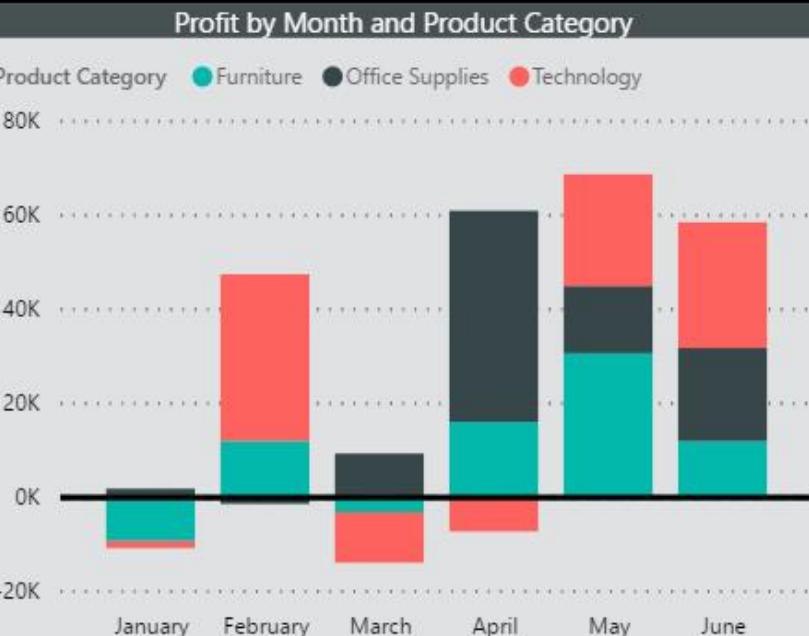
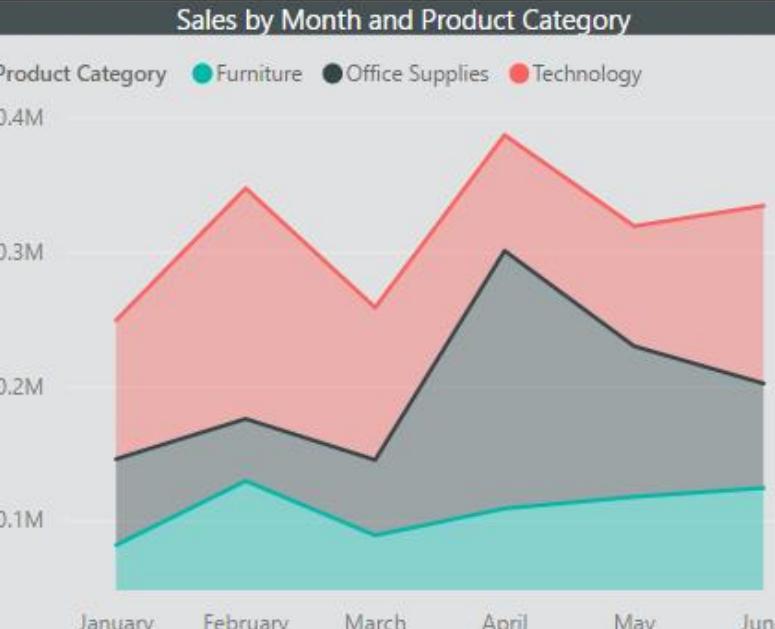
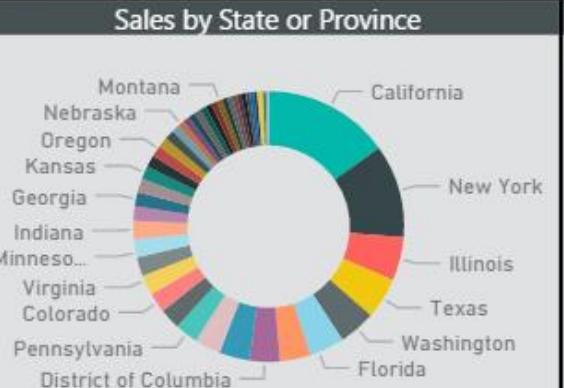
Sales

213,611

Profit

24,879

Quantity ordered new



A photograph of a mountain biker from behind, wearing a blue jacket, black shorts, and a white helmet, standing on a rocky ledge. A white mountain bike with red water bottles is leaning against the rock. The background features a majestic range of mountains with patches of snow and ice under a bright blue sky.

**Send your users  
on an adventure!**

# Storytelling features



# Provide easy navigation



**MEDIA DISCUSSION****CALLOUT PAGES**

Opiod Crisis Investigation

Media Discussion

Reimbursements by State

Take Action

**Published Date**

Last 1 Years

4/18/2017 - 4/17/2018

**Source****Reimbursements by Product**

● Medicaid Amount Reimbursed ● Non Medicaid Amount Reimbursed



Labeler Name	Medicaid Amount Reimbursed
Purdue Pharma	\$65,537,207
Rhodes Pharmaceuticals	\$13,386,981
Alvogen	\$11,685,277
Kvk-Tech	\$10,564,303
Aurobindo Pharma	\$4,453,260
Amneal Pharmaceuticals	\$3,724,979
Ranbaxy Pharmaceuticals	\$3,554,774
Zydus Pharmaceuticals	\$3,484,614
Epic Pharma	\$1,801,086
Sun Pharmaceutical Industries	\$1,630,451
Mayne Pharma	\$1,007,351
Par Pharmaceutical	\$804,096
Lubrizol Valley Technologies	\$470,072



An Osteoarthritis Drug May Be the Answer to America's Opioid Crisis futurism.com • Mar. 2, 2018 A drug developed to treat osteoarthritis pain has shown promise as a method of preventing opioid tolerance and physical dependence. With the opioid epidemic still



A telling anecdote about Trump and the opioid abuse crisis vox.com • Mar. 2, 2018 originally from prescription opioids but increasingly now from heroin and fentanyl ? have emerged as an increasingly grave social issue, steadily worsening over

WATCH LIVE: White House to highlight administration anti-opioid efforts fox61.com • Mar. 2, 2018

The White House is hosting a summit to highlight Trump administration efforts to combat the opioid crisis. First lady Melania Trump is scheduled to

**here & Now**

White House To Give Status Update On Opioid Emergency wypr.org • Mar. 2, 2018 ET Since President Trump declared the opioid epidemic a national public health



Wyoming Prepares To Grapple With Opioid Crisis www.wbur.org • Mar. 2, 2018 discuss the country's opioid epidemic. Rural coal mining states like West Virginia and

White House to host opioid summit and highlight Trump administration's efforts www.pbs.org • Mar. 2, 2018 The White House is hosting a summit to highlight Trump administration efforts to



# Be dynamic

# KPI BREAKDOWN



REGION

All

COUNTRY

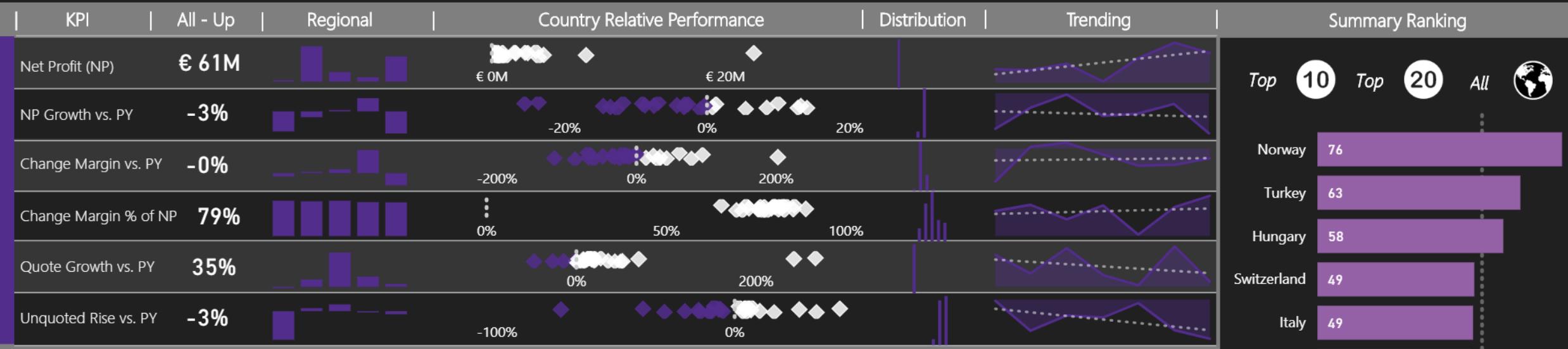
All



Select for FAQ

DecisiveData  
insights for decisions

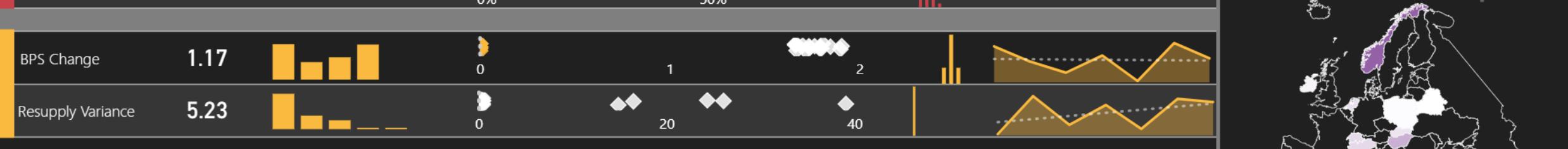
FINANCIAL



MARKET



SUPPLY



Date

6/1/2017 12/1/2017

Summary Ranking

0 91

NP Growth vs PY

-30% 16%

Quote Growth

-55% 281%

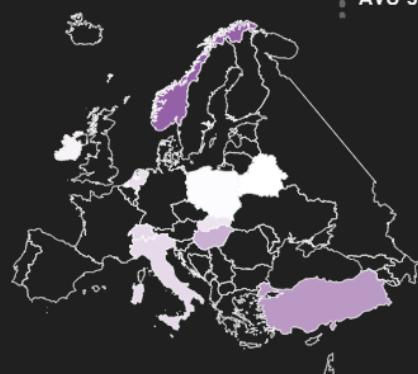
Market Change Shape

-7% 16%



Filters

Top 10	Top 20	All
Norway	76	
Turkey	63	
Hungary	58	
Switzerland	49	
Italy	49	
Netherlands	48	
Slovakia	46	
Ireland	43	
Poland	41	
Belarus	40	Avg 51



# Have a guided experience



## REIMBURSEMENTS BY STATE

CALLOUT

PAGES

Opiod Crisis Investigation

Media Discussion

Reimbursements by State

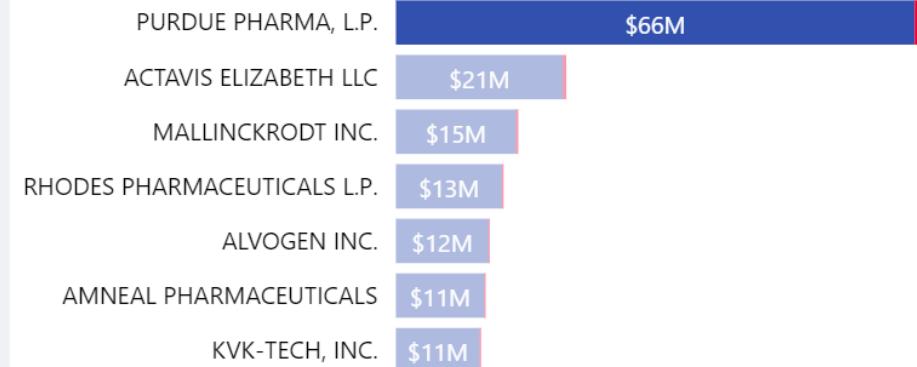
Take Action

Opioid Type

All

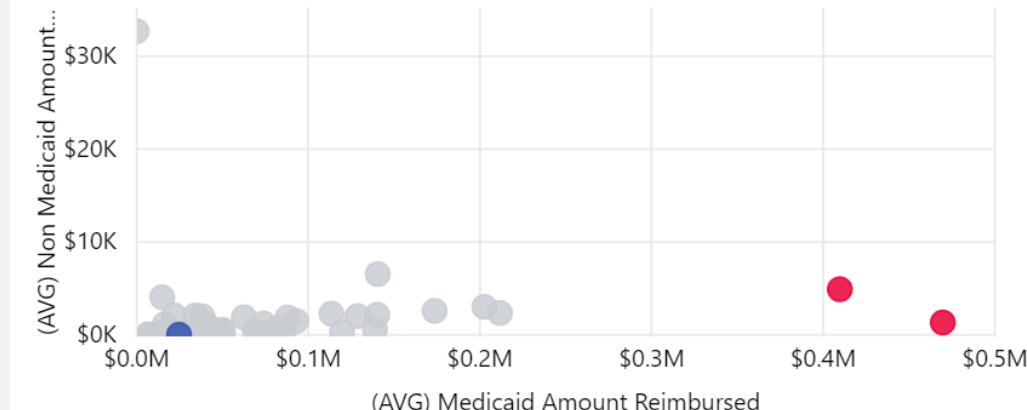
### Medicaid Amount Reimbursed and Non Medicaid Amount Reimbursed by Labeler Name

● Medicaid Amount Reimbursed ● Non Medicaid Amount Reimbursed



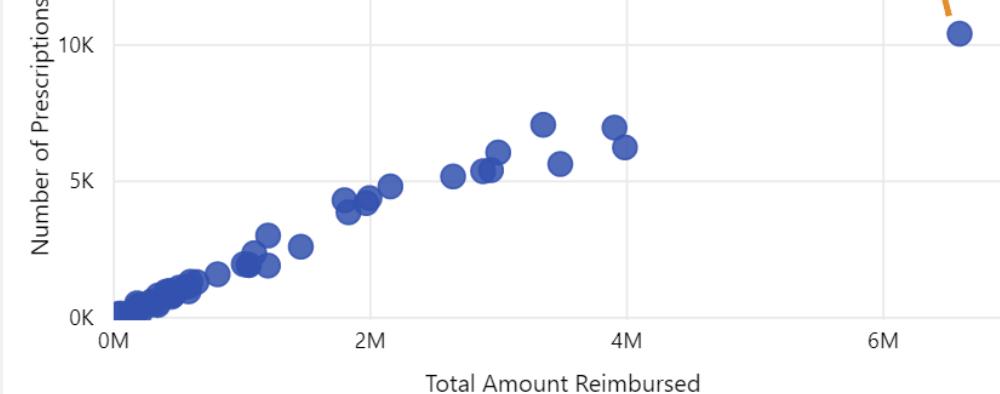
### (AVG) Medicaid Amount Reimbursed and (AVG) Non Medicaid Amount Reimbursed by...

● Missouri & North Carolina ● Other ● South Carolina



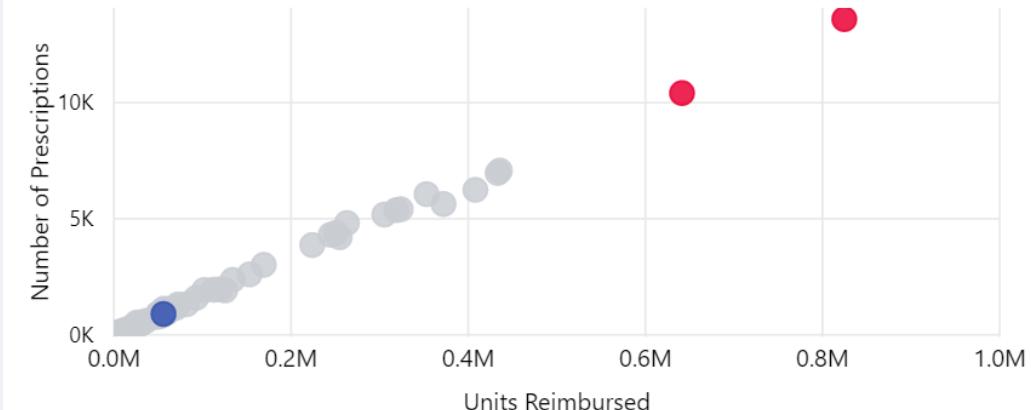
**Missouri and North Carolina** are at the centre of a lawsuit involving mis-marketing of OxyContin. Purdue settled a lawsuit in 2007 with South Carolina.

### Total Amount Reimbursed and Number of Prescriptions by State



### Units Reimbursed and Number of Prescriptions by State and State (groups)

● Missouri & North Carolina ● Other ● South Carolina





# Have an interactive experience

Dutch Painting

See Also  
POLYCHROME • 1640s



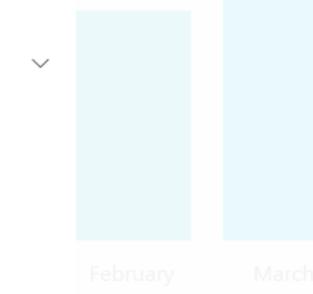
Landscape with a Windmill (1646)

Jacob van Ruisdael  
ON VIEW IN GALLERY 203

SAVE ARTWORK

Item

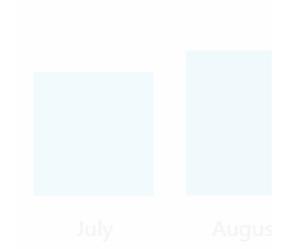
- Slicer 1
- CategoryName
- Beverages
  - Condiments
  - Confections
  - Dairy Products
  - Grains/Cereals
  - Meat/Poultry
  - Produce
  - Seafood



Slicer 2

- Country
- Argentina
  - Austria
  - Belgium
  - Brazil
  - Canada
  - Denmark
  - Finland
  - France
  - Germany
  - Ireland
  - Italy
  - Mexico
  - Norway
  - Poland
  - Portugal
  - Spain

Bar Chart



Slicer 3

- City
- Aachen
  - Albuquerque
  - Anchorage
  - Århus
  - Barcelona
  - Barquisimeto
  - Bergamo
  - Berlin
  - Bern
  - Boise
  - Bräcke
  - Brandenburg
  - Bruxelles
  - Buenos Aires
  - Butte
  - Caminas



Item

Item

Item

Item



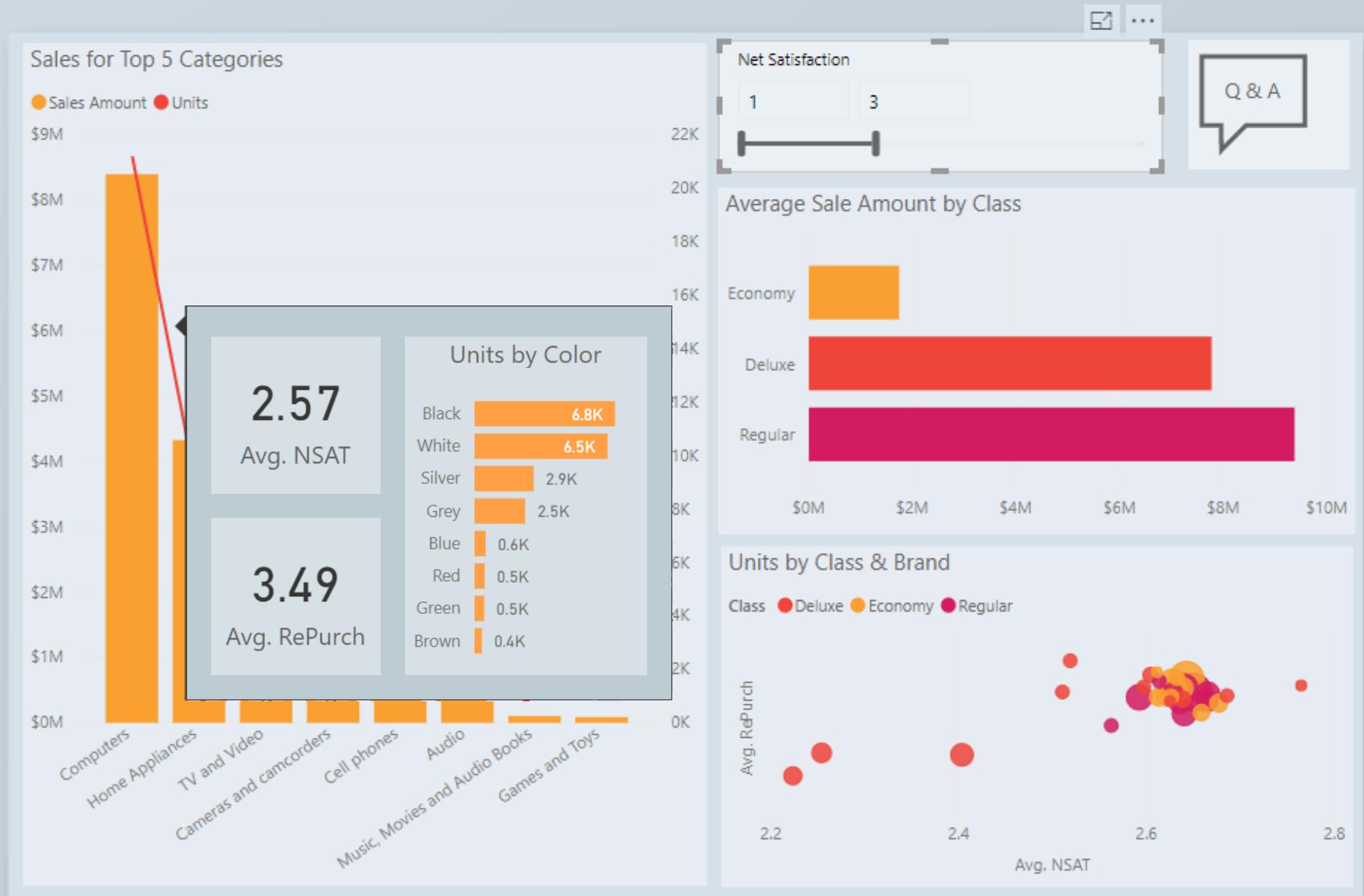
Chart



# Ensure consistent context



# Progressive disclosure

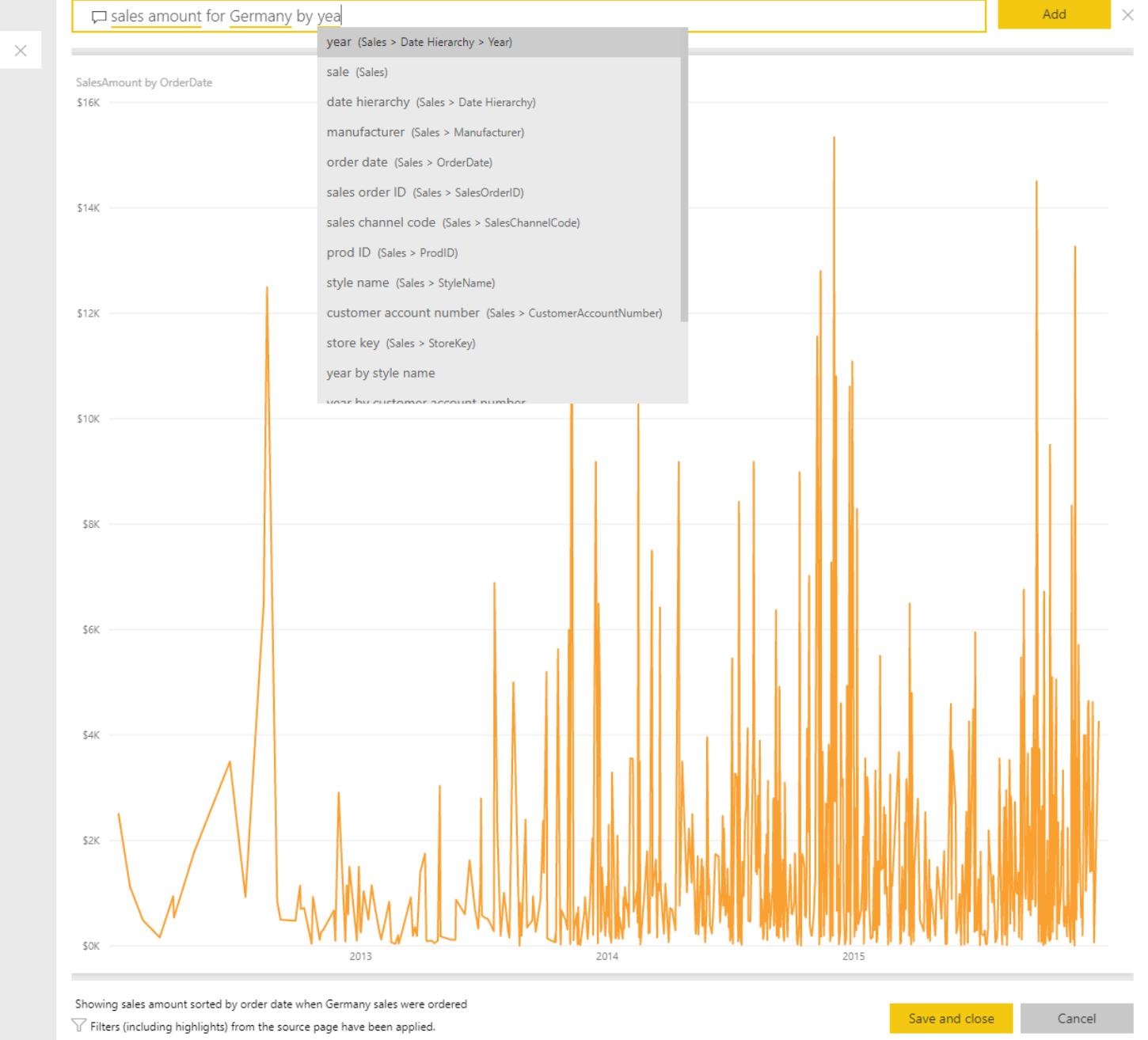


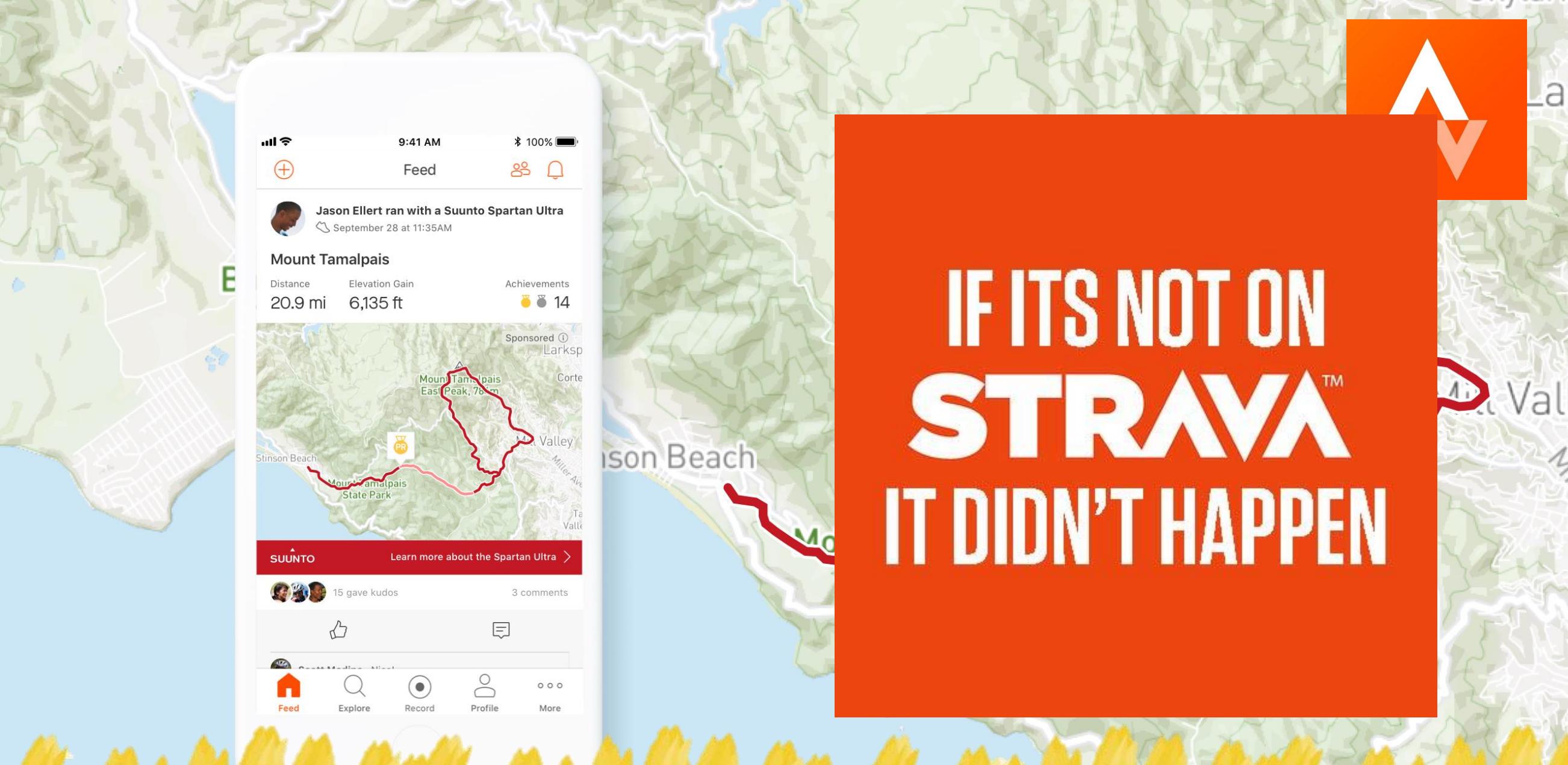


**Let them ask questions**

## SUGGESTED QUESTIONS

sales amount for Germany





# Background, theme & wallpaper



# Demo strava data – part 1

- Choose a lay-out for your report for be consistent in your presentation
- Create background to limit the amount of objects
- Create theme file and apply your corporate identity
- Add a wallpaper for further customizing the lay-out

# Conditional formatting

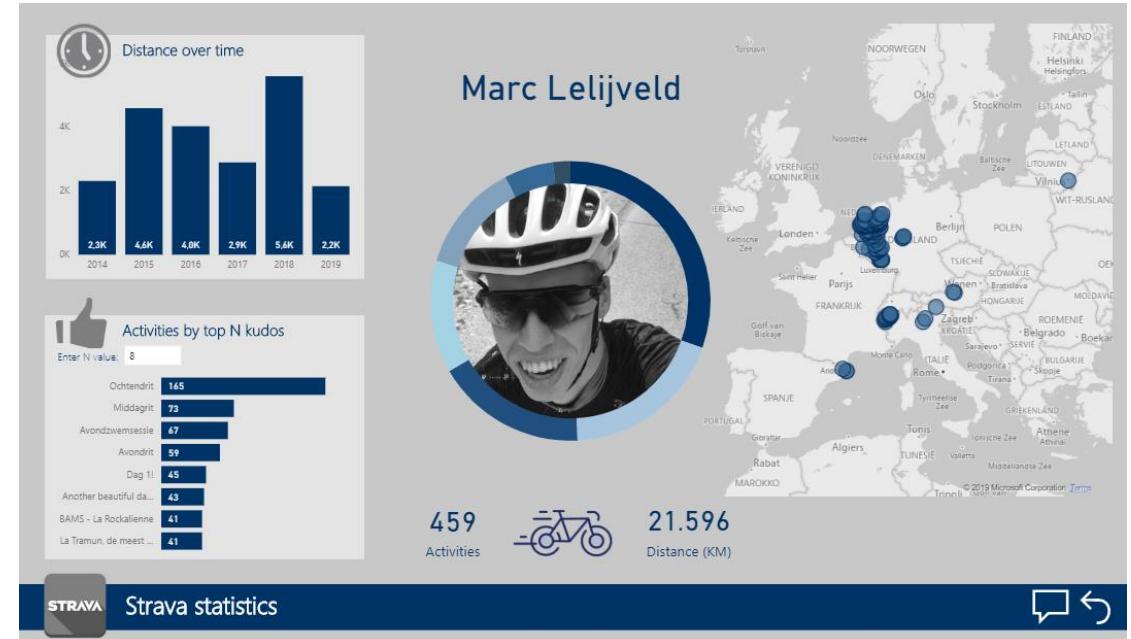
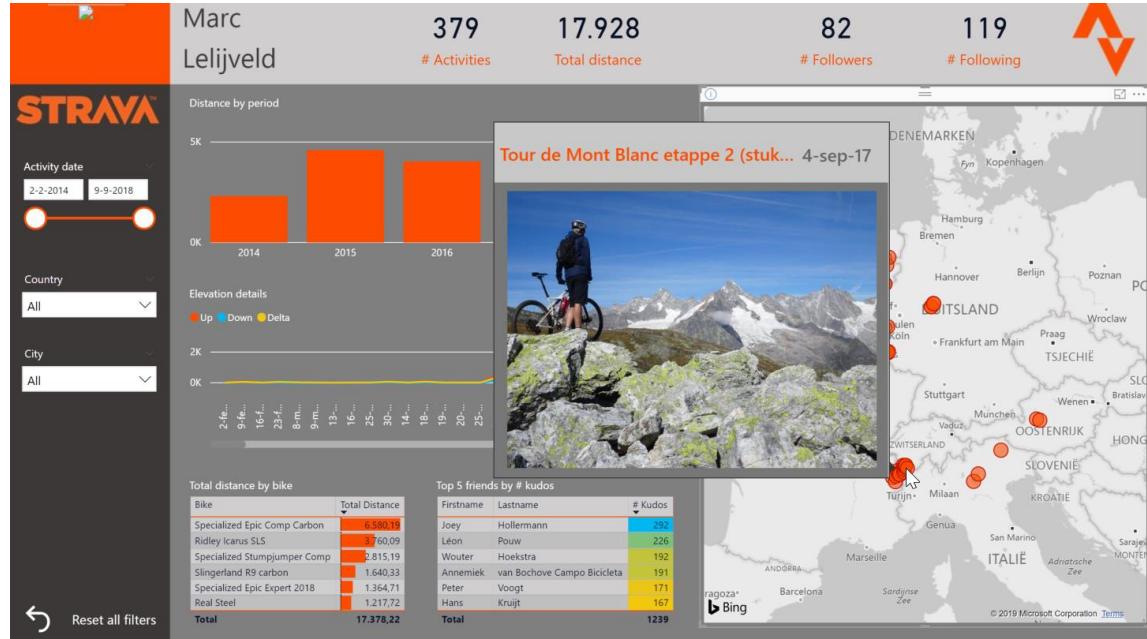
# Demo strava data – part 2

- Tables and matrixes look boring and like classic reports!
- Databars, text color and cell color!
- Based on cell value or other measure.

# I'm going to tell you a story



# Demo strava data - part 3 (final)



# Recap

- Storytelling is not a science; it is an **art**!
- **Understand** your end-user. Facilitate them with data.
- Send your users on an adventure and make them part of **your** story!
- Add your **identity** (corporate or your own) .
- Power BI is full of great features, **make boring data shine!**

# Download for free!

[Https://bit.ly/cheatsheetpbi](https://bit.ly/cheatsheetpbi)



**Marc Lelijveld**  
Data & Analytics Consultant  
Macaw Netherlands

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- 🐦 @MarcLelijveld
- linkedin.com/in/MarcLelijveld
- 🌐 Data-Marc.com



**Power BI Cheat Sheet**

**Power Query**

**Tips & Tricks**

- Give every step an explanatory name and merge steps of the same type, for better manageability.
- Give queries and columns user-friendly names (this is also necessary to utilize Q&A).
- Make sure that each column has the correct data type. Making the model smaller and faster.
- Remove columns you are not going to use in your report. Prefer 'Remove Other Columns' above the 'Remove Column' option, for lower risk that structural changes in your data source break the query.
- Maximize the use of Query Folding for faster and more efficient queries. With Query Folding, multiple available Query Folds are merged as one query and then sent to the source, if 'View Native Query' is not available. Query Folding has stopped before that step.
- Structure your queries in folders. For example Facts, Dimensions, Functions, Misc.
- You can copy and paste Queries easily between files. Dependencies will be included (parameters/functions), and Data Sources will be automatically listed.
- Turn off 'Enable Load' for queries/tables that you don't need in the Data Model.
- Re-use Power Query code and lower impact on your data source by using Power BI dataflows.
- Turn on the Formula Bar so you get familiar with Power Query (M) code.
- In general, prefer 'Import' over 'DirectQuery'. Unless the amount of data is too large to import, or when there are other requirements (like real-time insights).
- Automatically beautify all column names in a query, e.g. "CustomerName" → "Customer Name". By using the Power Query function Alex Powers shared on his GitHub repo: <http://bit.ly/PQSplitByCase>. Note: it also has a function to replace underscores in all column names automatically.

**Code examples** (don't forget that Power Query / M is case-sensitive!)

- if T > 0 then A else B
- try A/B otherwise 0
- #table({ "X", "Y"}, {1,2}, {3,4})
- Date.Time.LocalNow()
- Date.From([Date Time.LocalNow()])
- Excel.Workbook(Web.Contents("url://filename.xlsx"), null, true)

**Resources**

- Power Query M Formula Reference: <http://bit.ly/PQMReference>.
- Notepad++ Power Query support by Lars Schreiber: <http://bit.ly/PQinNotepad>.

**Data Model**

**Tips & Tricks**

- Always use a separate Date table in your data model. Mark it as a Date Table.
- Only use DAX Calculated Columns when it's not possible to create it using Power Query. This improves clarity and manageability of your report as transformations are located where you expect them. And, it also improves query speed of the model and reduces refresh duration.
- Give measures a prefix (%\_#, €\_).
- Use standard abbreviations like YTD, LY, PY, PP as a suffix, to keep the base fields together.
- Hide columns that are needed but are irrelevant for the user.
- Hide the key at the many side of a many-to-one relation (e.g. [OrderDate] in the 'Revenue' table).
- Think about using the new Filter Pane, as this provides options to hide or lock filters for end users.
- For each measure column in your data model, make a DAX Calculated Measure instead of using the 'Default Measure column', then hide the original column. This way all measures will have the same icon. And it enables you to easily change the calculation in the future (e.g. adding a filter condition). Also, it is easier to reference this measure in other DAX calculations.
- Always use the table name when you refer to a column, for example: 'Product'[Category].
- Use ImaScope to get the right hierarchy level in DAX (read all about it in Kasper de Jonge's blog: <https://bit.ly/KasperOnDaxScope>).
- In DAX: (un)comment DAX lines by pressing Alt + Shift + A or CTRL + /, and Shift + Enter for line breaks.
- Use aggregations to keep your model small and performant, and still have all detailed data available.
- Use Tabular Editor to make changes to your Power BI file (currently unsupported by Microsoft). Also, make sure to check-out its best-practices analyzer.
- In the improved model diagram, break-out complex models by subject area in separate diagrams.
- Bulk edit fields in the improved model diagram, and group measures or attributes in display folders.
- Combine historical data with live data by using composite models.

**Resources**

- Increase the readability of your DAX calculations: <https://www.daxformatter.com>.
- Practical DAX use cases, with incredible explanations: <https://www.daxpatterns.com>.
- Use DAX Studio to analyze and tune your calculations: <http://daxstudio.org>.
- Find all about DAX expressions: <https://daxguide.com>.
- Download Tabular Editor: <https://tabulareditor.github.io>.
- Show the last refresh date of your dataset: <https://bit.ly/KasperOnBIRefreshDate>.

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