



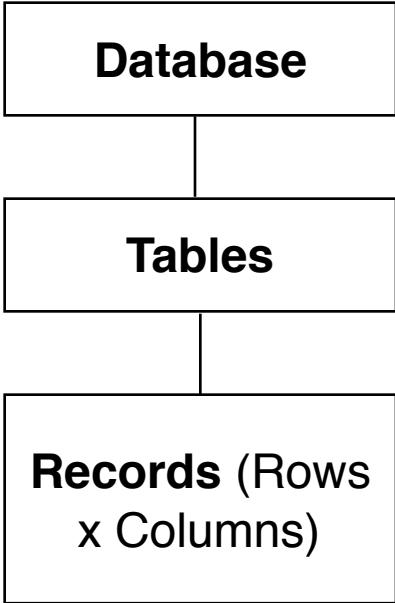
THE CRISP-DM MODEL AND INTERACTIVE TOOLS USED IN THE DATA CYCLE

Bernard Suen
Center for Entrepreneurship
Chinese University of Hong Kong

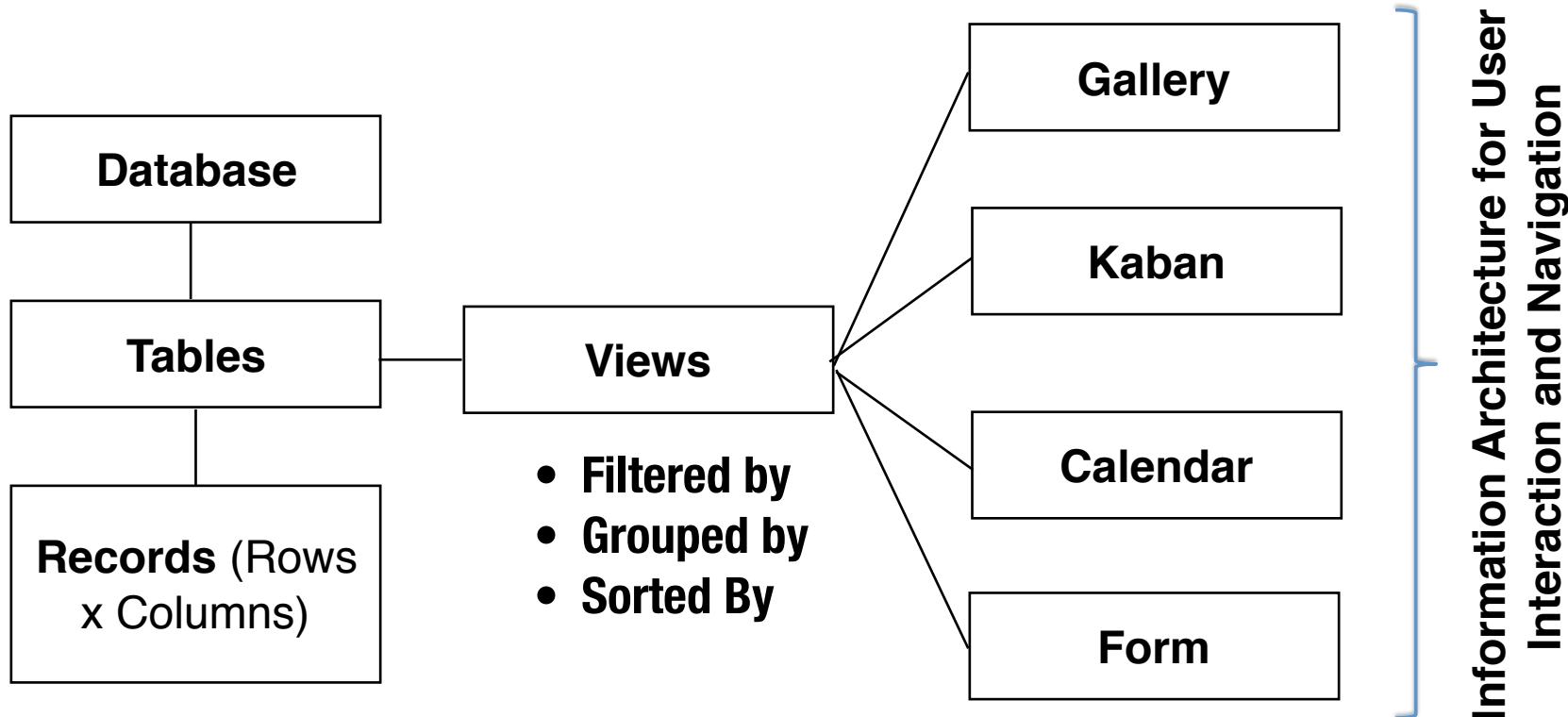


Center for
Entrepreneurship

QUICK RECAP OF PREVIOUS LESSON



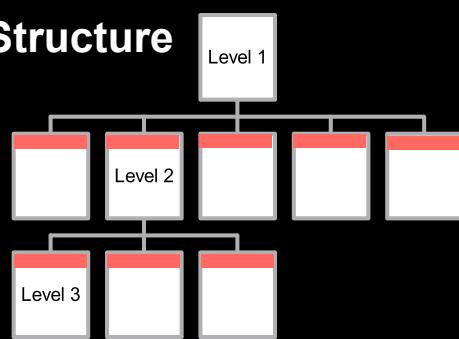
“A **database** is a collection of **tables** which relate to each other for storing and processing **records** that are defined by rows and columns (**fields**).”



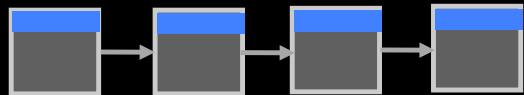
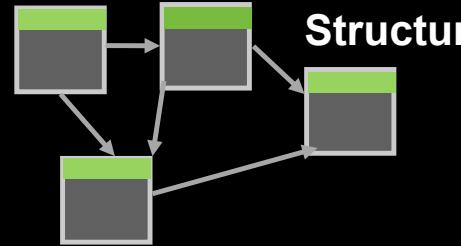
Information architecture combines the art and science of structuring, organizing, labeling, navigating, and searching information space.

Information Architecture

Hierarchical
Structure



Organic
Structure

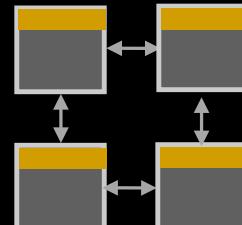
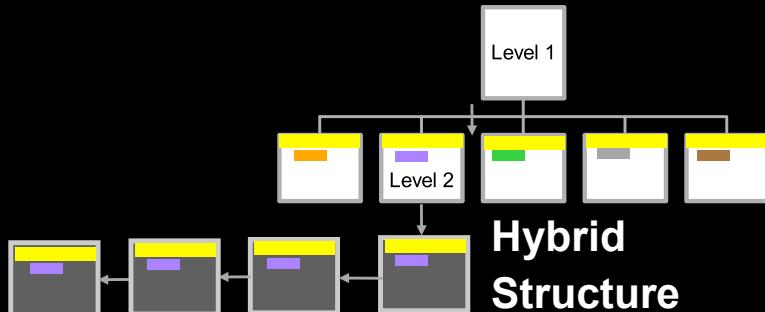


Sequential
Structure

Level 1

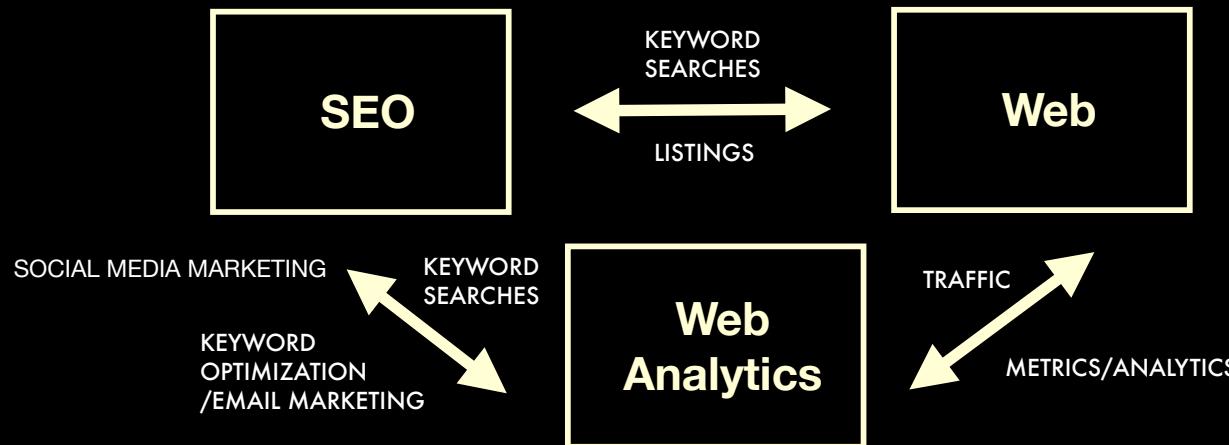
Level 2

Hybrid
Structure



Matrix
Structure

SEO and Web Analytics



- Web analytics tell you whether your web pages attract traffic (eye balls) or not.
- With feedbacks provided by web analytics, you make changes to your web pages, site structure, title, meta-tag, key word, and link strategies.

Keyword	Search Popularity	Relevance	Competition	Landing Page/Section

Source: Search Engine Optimization An Hour a Day by
Jennifer Grappone and Gradiva Couzin

KEYWORD RESEARCH USING AIRABLE


[Copy base](#)

Updated a year ago
Copied 680 times

4



Avoca Web Design

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Avoca Web Design is a small team based in Nelson, New Zealand. We love working with passionate people who help others, encourage innovation and believe in the progress of the Common Great.

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Content planning and delivery toolkit

#PRODUCT, DESIGN, AND UX #MARKETING AND SALES #CREATIVE PRODUCTION

The very base that we use internally with website clients to plan and deliver great website content and incorporate SEO keywords from the get go.

It's designed to let you enter existing content and review how well it's serving your message. You can copy keyword data directly from KWfinder or get the metrics from other keyword tools and then rank and match your SEO keywords to your content. If you decided you need to

Pages

- [Page overview](#)
- [Page SEO & Conte...](#)
- [Content Review Sta...](#)
- [301 Redirect List](#)
- [Blog Posts / Content ...](#)
- [Content Overview](#)
- [Unpublished Content](#)
- [Published Content](#)
- [Content Re...](#)

[Explore the base →](#)

SEO Keywords

- [Alphabetical List](#)
- [Sorted By Monthly ...](#)
- [Sorted by Keyword ...](#)
- [Unassigned Keywor...](#)

6 records

Page Name
Homepage
About us
Our Services
Green Widgets
Red Widgets
Contact

Templates

Use these starter bases to get a jump start on your project. For inspiration from community-published bases, check out Universe.



Search templates

CATEGORIES

[Featured](#)[Content production](#)[Creative](#)[Event Planning](#)[Everyday Life](#)[Groups, Clubs & Hobbies](#)[HR & Recruiting](#)[Legal](#)[Local Business](#)[Marketing](#)[Nonprofit](#)[Personal](#)[PR & Communications](#)

Content Marketing Management

[Use template](#)

#CONTENT PRODUCTION #MARKETING

Streamline your content marketing strategy with this content marketing management template! Ideal for content writers and marketing managers, this content marketing template can help you brainstorm new content, align your content with your product's key audience personas, manage the marketing campaigns you implement to support your content, and track your content's success.

This template lets you easily track all of your content ideas in one place so you can just focus on creating great content. And because it's built from the ground up to be collaborative, content curation with your team for social media campaigns and blog content has never been easier.

This template is flexible enough to be the single source of truth for your marketing team's entire content strategy. Track the best keywords to optimize your content for search engine results, create an editorial calendar to track assignments and deadlines, and once

<https://airtable.com/templates/marketing/expbu4X6qxpt0WVkE/content-marketing-pipeline>

WHY DO WE NEED CONTENT MANAGEMENT SYSTEM?

Data entities and taxonomy help build the information architecture of the website while the menu items, buttons, and links set the structure for navigation and interaction.

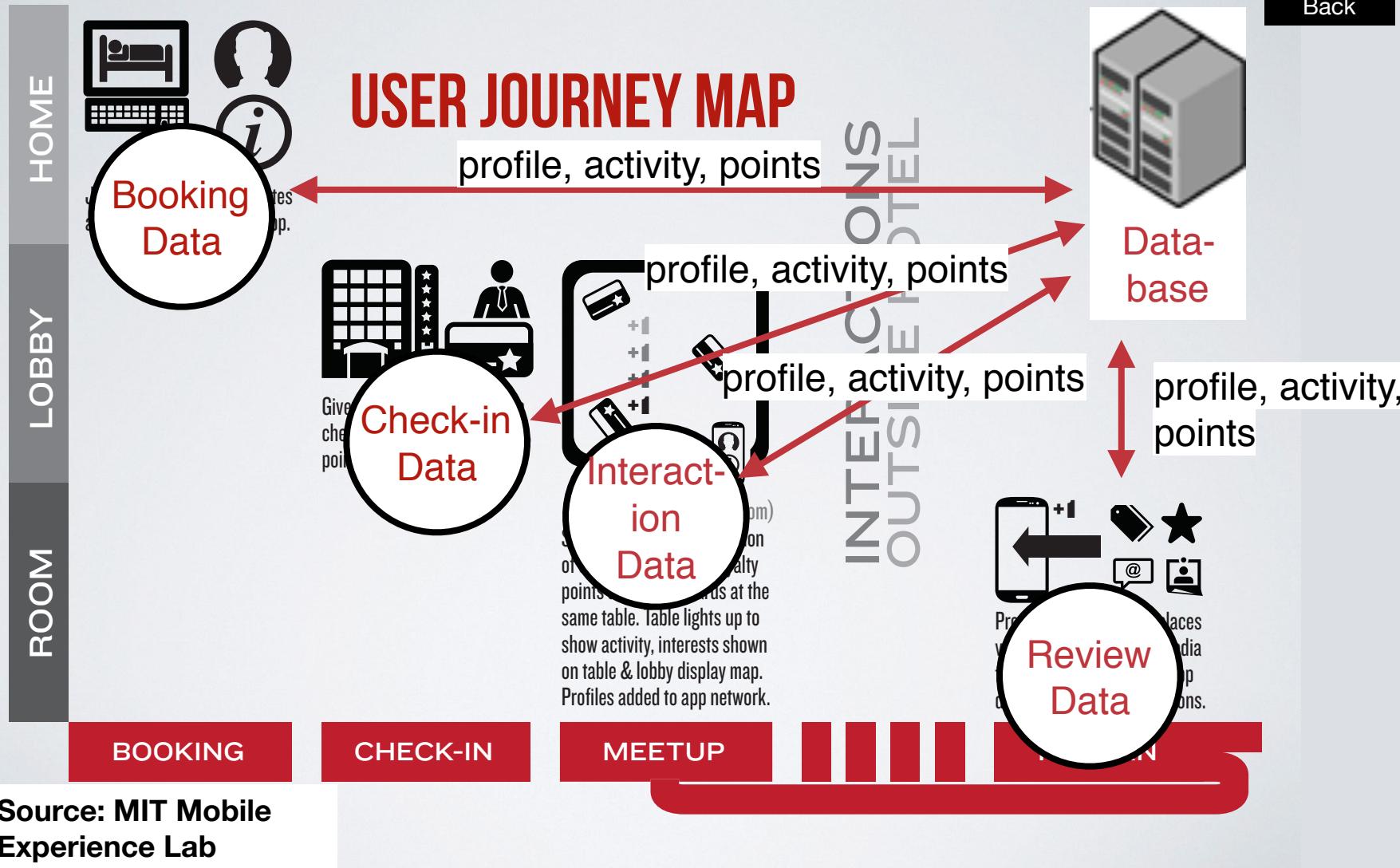
SEO relies on the architecture to build the right content (with proper keywords found in the content Title, Body, Links, etc) to increase web traffic and user engagement!

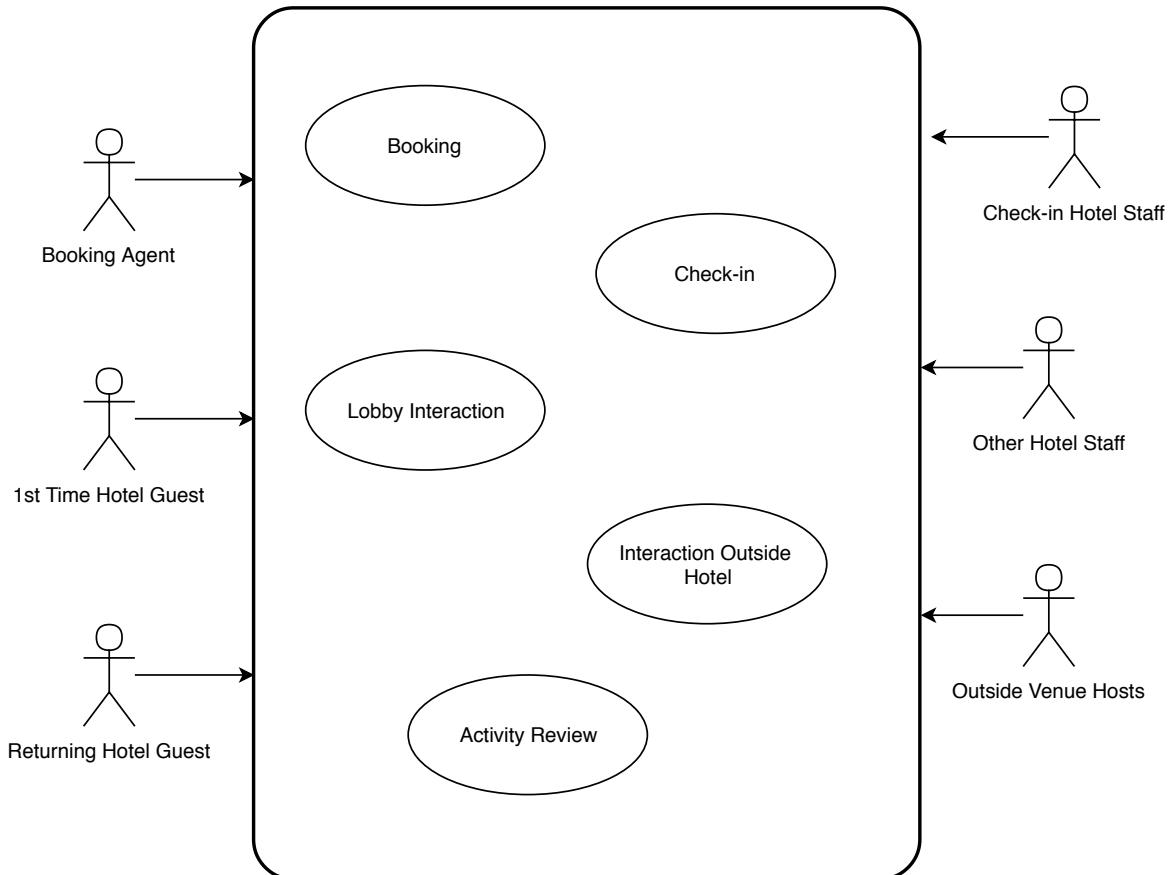
Web analytics provides the feedback to track the results to see if the content and design are working well or not.

Why do we need Content Management System?

**To Track Application Development,
Content Production and
Consumption**

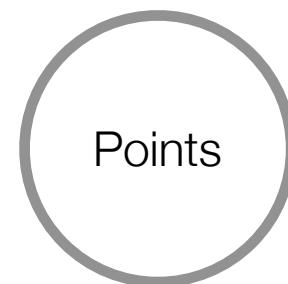
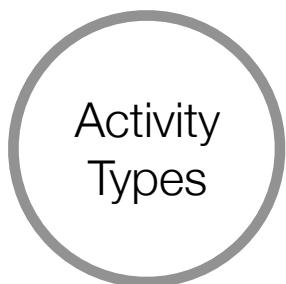
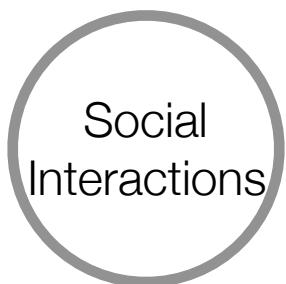
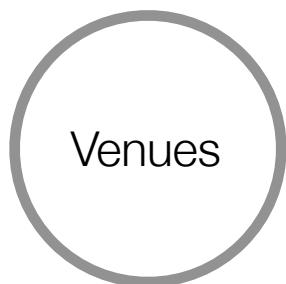
Back





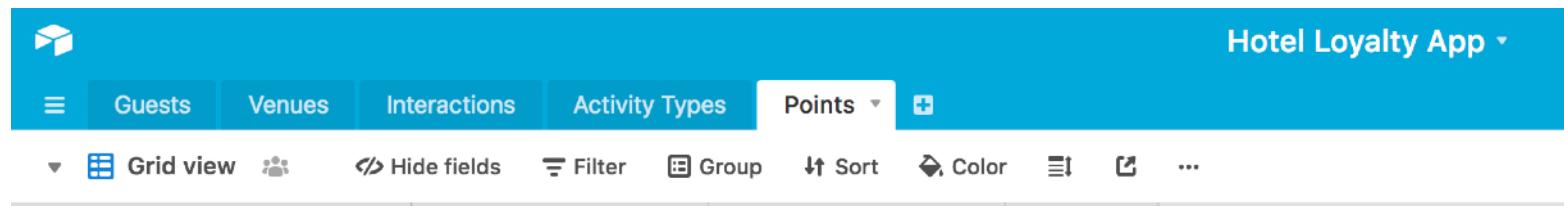
Use Cases of a Hotel Loyalty App

Data Entities to be Tracked

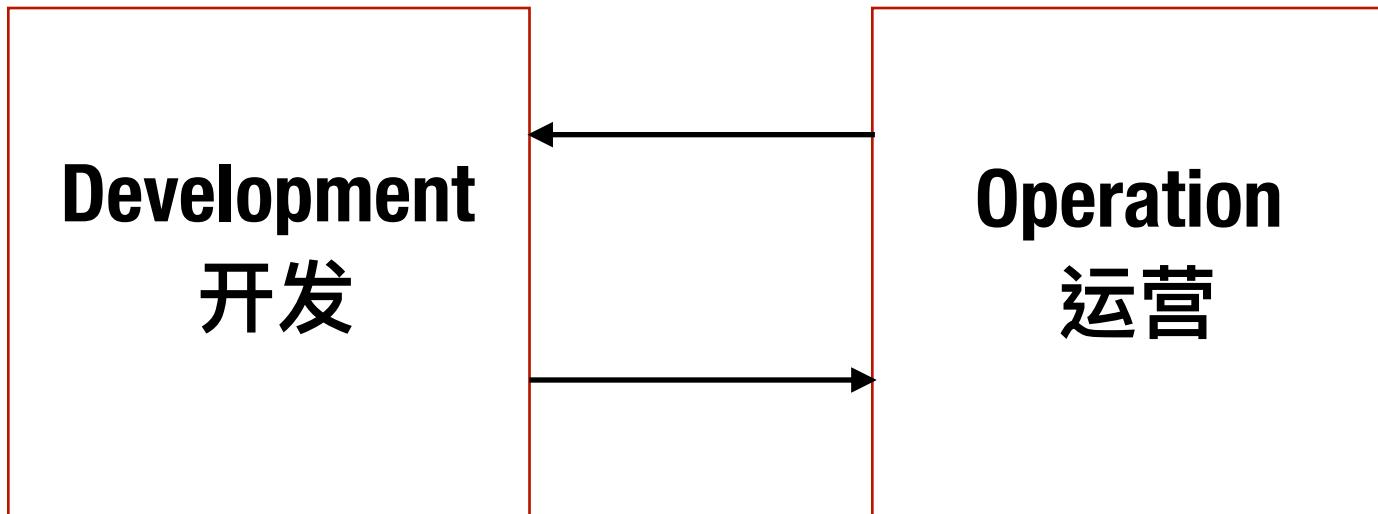


- e.g.
 - 1st time guests
 - Returning guests
- e.g.
 - Starbuck
 - Bar inside hotel
 - Boston Metropolitan Museum
- e.g.
 - Add friends
 - Take pictures
 - Share rides
 - Split bills
- e.g.
 - Museum tour
 - Bar hopping
 - Scenic picture taking
 - Business meeting
- e.g.
 - Revisit
 - Dine in hotel
 - Shop in hotel
 - Initiate contact
 - Give reviews

Tracking Data Entities



Product Management 产品经理



Where does the data come from?

Source: Elements of User Experience
by Jesse James Garrett

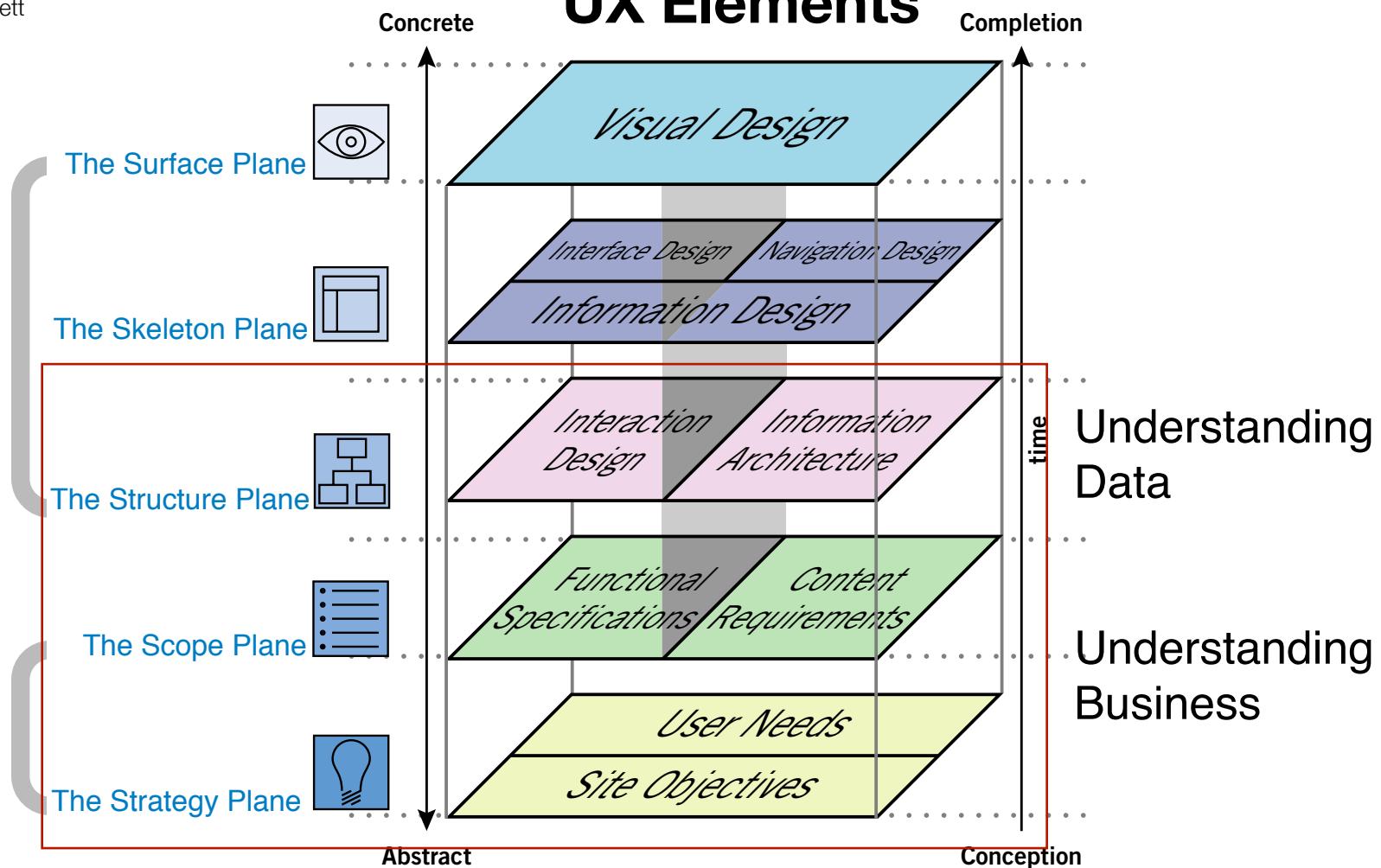
Solution Space

how and
how much

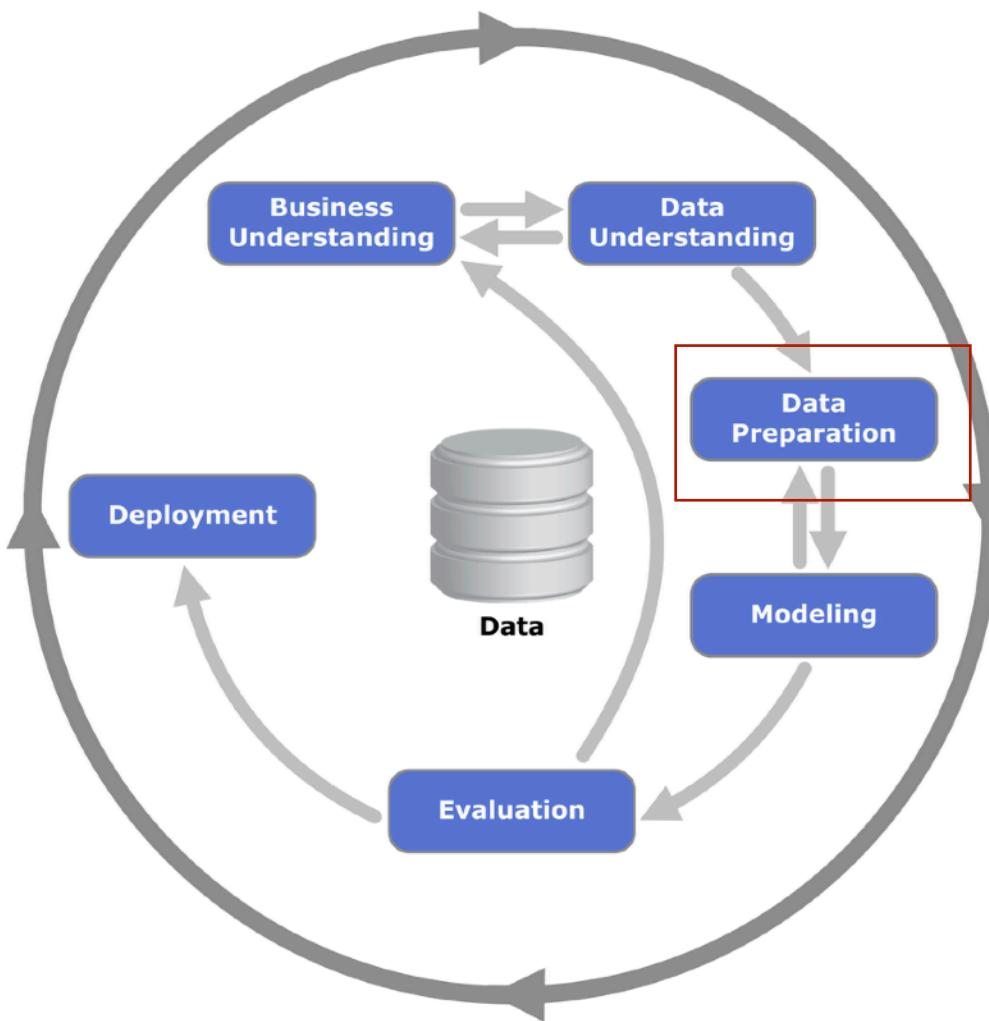
Problem Space

who, what,
and why

UX Elements



THE CROSS-INDUSTRY PROCESS FOR DATA MINING (CRISP-DM)



Our Focus Today

Data Collection

Data Cleaning

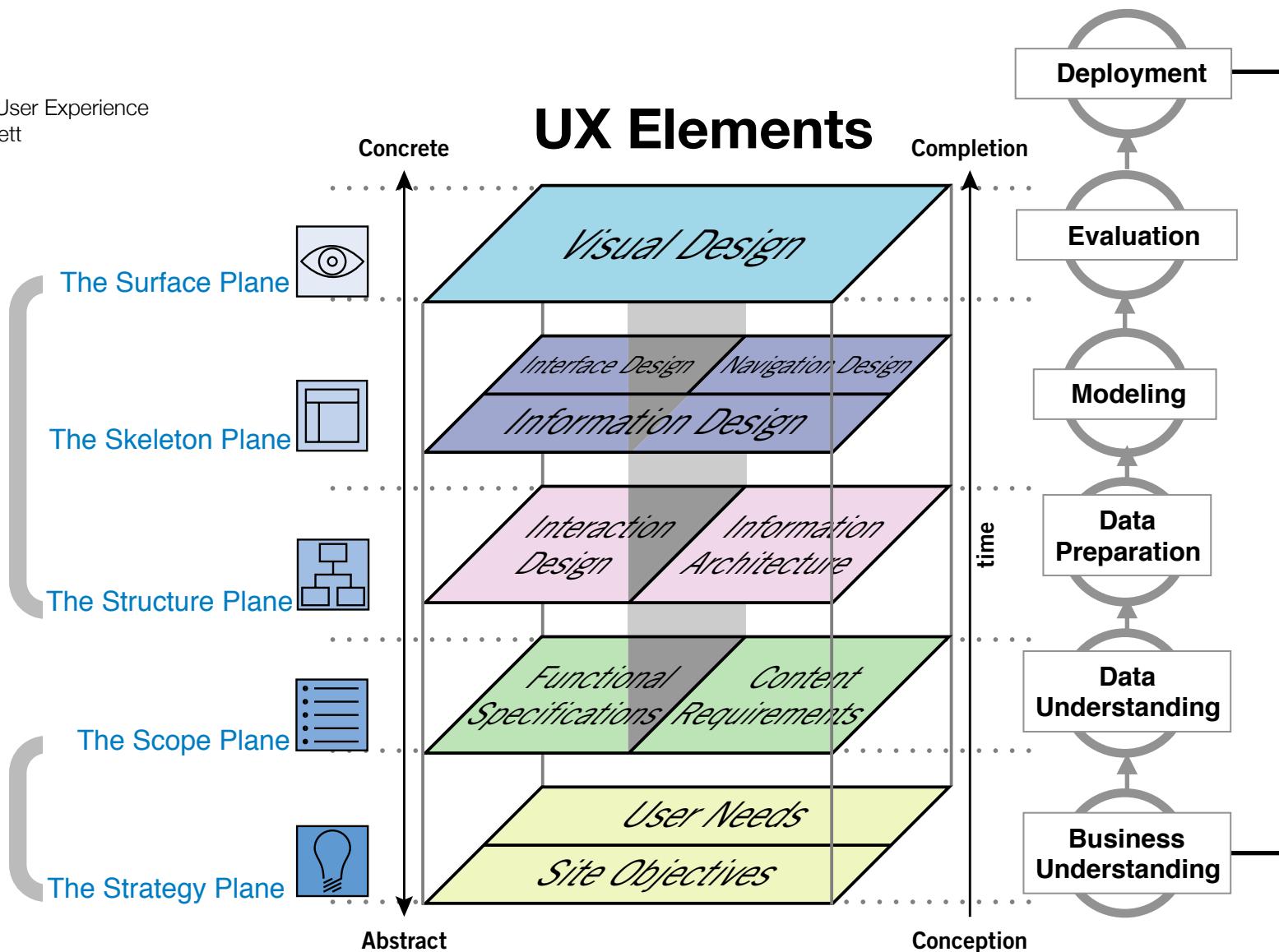
Source: Elements of User Experience
by Jesse James Garrett

Solution Space

how and
how much

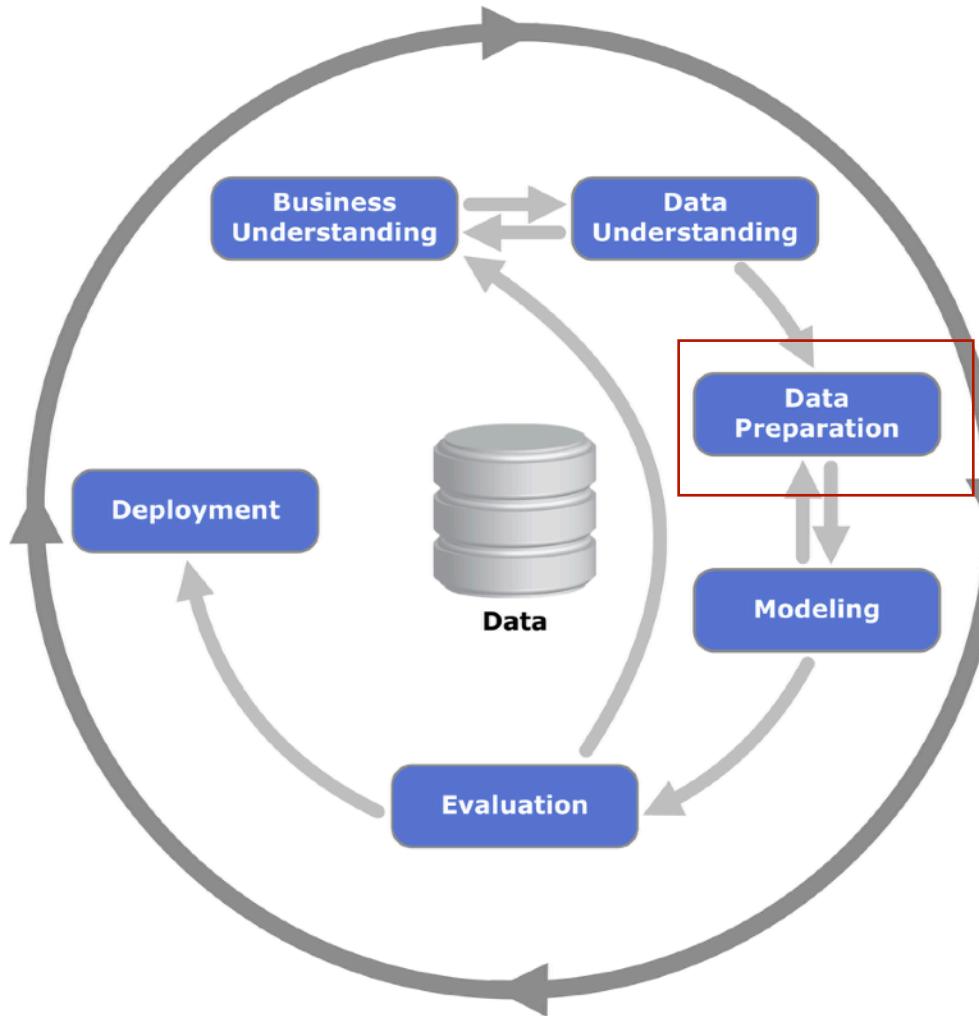
Problem Space

who, what,
and why



UX Driven Data Driven

Design Thinking	Computational Thinking	Description
Empathy	Decomposition	Collect and analyse <u>stories and data</u> to understand the stakeholders and discover their needs.
Definition	Patterns	Synthesise recurring <u>persona types, contexts, artefacts</u> , and <u>use case</u> patterns to formulate problem (who, what, and why).
Ideation	Abstraction	Develop socio-cultural and technical systems to reshape user stories and data flow.
Prototyping	Algorithm	Build <u>experience prototype</u> and <u>computational models</u> to represent future scenarios for validation.
Testing & Implementation	Automation & Evaluation	Continuous testing, improvement and automation to evaluate <u>functional, emotional, social, economic</u> and <u>environmental</u> impacts (how and how much).



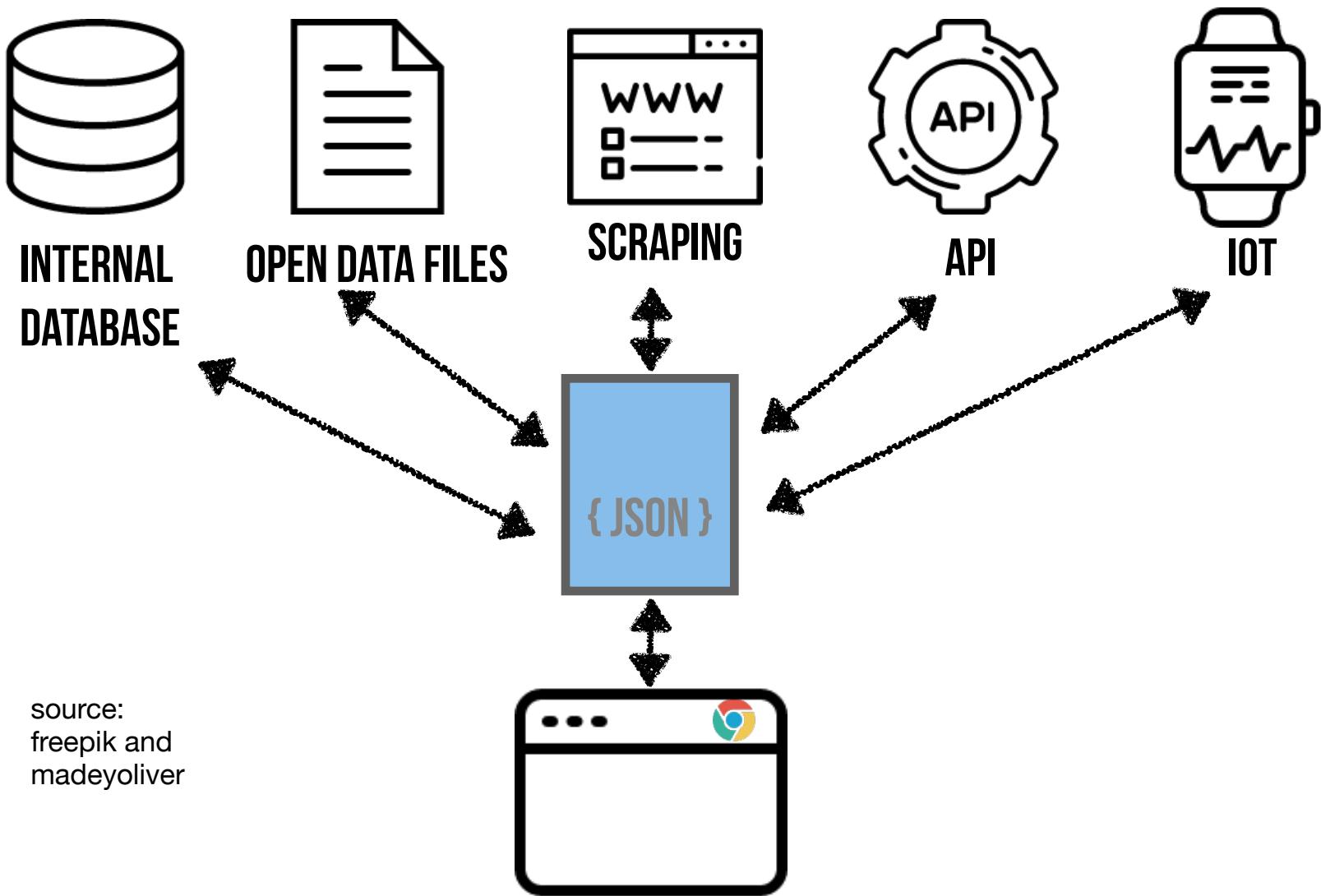
Our Focus Today

Data Collection
Data Cleaning

Exploratory Data Analysis

https://en.wikipedia.org/wiki/Exploratory_data_analysis

Explore Multiple Data Sources



RISE OF THE SMART CITIES & OPEN DATA

<https://www.youtube.com/watch?v=bANfnYDTzxE>

香港智慧城市 Hong Kong Smart City 藍 Blueprint 圖



<https://www.youtube.com/watch?v=frPFDAvc15Q>



National Data

National Bureau of
Statistics of China

NBS

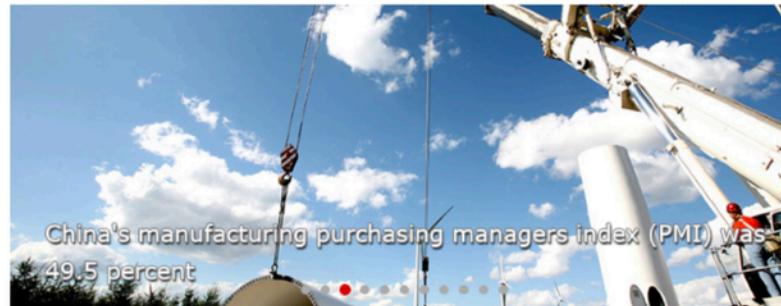
[Home](#) [Monthly](#) [Quarterly](#) [Annual](#) [Regional ▾](#) [Visualization](#) [Publications](#) [Favorites](#) [Help](#)

Latest

Release(August.31,2019)

In August 2019, China's manufacturing purchasing managers index (PMI) was 49.5 percent

China's non-manufacturing purchasing manager index was 53.8 percent



22

Release Schedule

Today : No release today.

Tomorrow : No release tomorrow.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
22	23	24	25	26	27	28

Browse Topics

[Growth Rate of Industrial Value Added](#)[Output and Growth Rate of Major In...](#)[Growth Rate of Industrial Value-add...](#)[Main Economic Indicator of Industry...](#)[Investment in Fixed Assets \(Excludi...](#)[Investment in Fixed Assets by Regi...](#)[Investment in Fixed Assets \(Excludi...](#)[Statistical Communards](#)[Investment in Real Estate Develop...](#)[Growth of Floor Space of Commerci...](#)[Size of Development and Growth of...](#)[Total Retail Sales of Consumer Goods](#)[Retail Sales of Enterprises above D...](#)[Consumer Price Indices by Categor...](#)[Consumer and Retail Price Indices ...](#)[Monthly](#)[Quarterly](#)[Annual](#)[Output of Energy Products](#)[Producer Price Indices for Manufact...](#)[Purchasing Price Indices for Manuf...](#)[Producer Price Indices for Manufact...](#)[Sales Price Indices of Residential B...](#)[Passenger and Freight Traffic](#)[Business Volume of Postal and Tele...](#)

Data Map



<http://data.stats.gov.cn/english/>



DATA TOPICS IMPACT APPLICATIONS DEVELOPERS CONTACT

The home of the U.S. Government's open data

Here you will find data, tools, and resources to conduct research, develop web and mobile applications, design data visualizations, and [more](#).

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SEARCH OVER [236,216 DATASETS](#)

Health Care Provider Charge Data



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Climate



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Science &
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<https://www.data.gov/>

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Open Data for All New Yorkers

Where can you find public Wi-Fi in your neighborhood? What kind of tree is in front of your office? Learn about where you live, work, eat, shop and play using NYC Open Data.

Search Open Data for things like 311, Buildings, Crime



<https://opendata.cityofnewyork.us/>

LONDON DATASTORE

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Blog

Data 

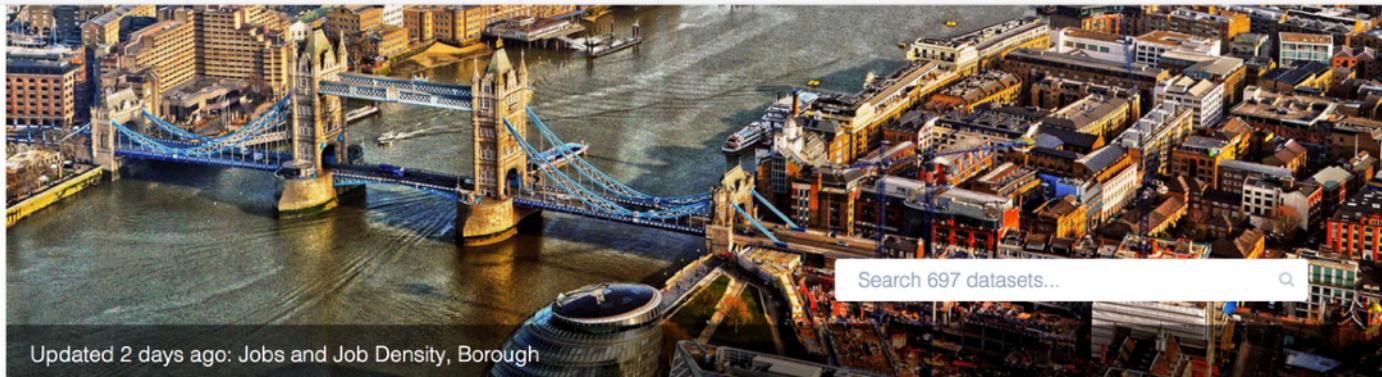
Apps & Analysis 

Developers 

Boroughs 

City Data Strategy 

More 



JOBs AND ECONOMY



TRANSPORT



ENVIRONMENT



COMMUNITY SAFETY



HOUSING



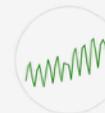
COMMUNITIES



HEALTH



LONDON AS A WORLD CITY



GLA PERFORMANCE

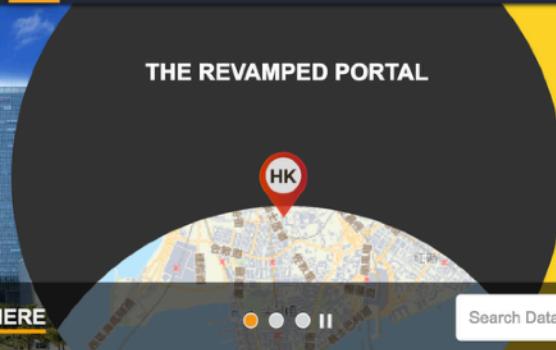


<https://data.london.gov.uk/>

Welcome to the Datastore

The London Datastore is a free and open data-sharing portal where anyone can access data relating to the capital. Whether you're a citizen, business owner, researcher or developer the site provides over 700 datasets to help you understand the city and develop solutions to London's problems. Please do have a look around and [let us know](#).

THE REVAMPED PORTAL



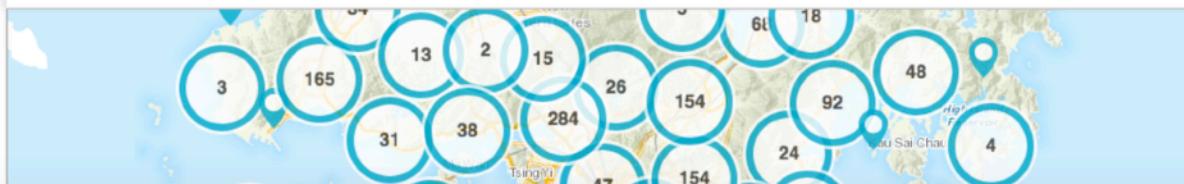
POPULAR DATA
GEOSPATIAL DATA
FEATURED DATASETS

New to The Site? **START HERE**

Search Data e.g. population 

BROWSE DATASETS

<  City Management  Climate and Weather  Commerce and Industry  Development  Education  Employment and Labour >



3 165 13 2 15 26 18 60 154 92 48 4 31 38 284 47 154 24

<https://data.gov.hk/en/>

OPEN DATA CLASS EXERCISES

- **Converting CSV to JSON (<https://shancarter.github.io/mr-data-converter/>)**
- **Converting JSON to CSV (<https://json-csv.com/>)**
- **Importing CSV into Airtable**

Retrieving Data Through API

GROWTH STRATEGY

The Strategic Value of APIs

by Bala Iyer and Mohan Subramaniam

JANUARY 07, 2015

McKinsey&Company
Digital McKinsey

How We Help Clients Our Insights Careers Our People Contact Us

Article
October 2017

Management's next frontier: Making the most of the ecosystem economy

By Jürgen Metzert and Anand Swaminathan

API經濟來了：從開放創新到Open API

by 《數位時代》整合行銷部 2014.11.04



McKinsey&Company
Digital McKinsey

How We Help Clients Our Insights Careers Our People Contact Us

What it really takes to capture the value of APIs

≡ Deloitte.
Insights

Article

API economy

From systems to business services

IBM Cloud 雲端平台 > 瞭解雲端

API 經濟

在您的營運模式中加入 API，
藉此催化創新並觸角伸向新對象

[觀賞影片 \(01:25\)](#)[閱讀 API 入門電子書](#)

關於 IBM

參加評估

API (e.g. REST)



BACK-END TECHNOLOGY

后台

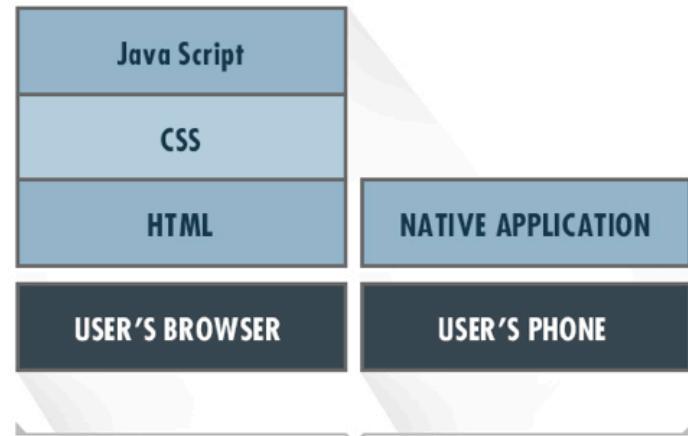
WHAT IS YOUR “CLOUD” AND “STACK” STRATEGY?

云架构及前端和后端的全栈策略

{ JSON }



THE INTERNET



FRONT-END TECHNOLOGY

前台



{World of Internet}



https://www.youtube.com/watch?v=lvlnf9HW_Jw



Airtable RESTful API

INTRODUCTION

The [Project Tracker](#) API provides an easy way to integrate your [Project Tracker](#) data in Airtable with any external system. The API closely follows REST semantics, uses JSON to encode objects, and relies on standard HTTP codes to signal operation outcomes.

The API documentation below is specifically generated for your base. We recommend that you use the [graphical Airtable interface](#) to add a few records of example data for each table. These records will be displayed in the documentation examples generated below.

The ID of this base is [appM38HX1EVhxmnqx](#).

Please note: if you make changes to a field (column) name or type, the API interface for those fields will change correspondingly. Therefore, please make sure to update your API implementation accordingly whenever you make changes to your Airtable schema from the graphical interface.

Official API client:

- JavaScript: [airtable.js](#) (Node.js + browser)

Community-built API clients:

- Ruby: [airrecord](#)
- .NET: [airtable.net](#)

RATE LIMITS

The API is limited to 5 requests per second. If you exceed this rate, you will receive a 429 status code and will need to wait 30 seconds before subsequent requests will succeed.

The [official JavaScript client](#) has built-in retry logic.

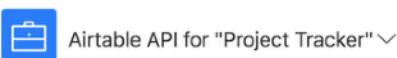
If you anticipate a higher read volume, we recommend using a caching proxy. This rate limit is the same for all plans and increased limits are not currently available.

curl

JavaScript

 show API key

Airtable RESTful API



Open base...

List flaskdemo records

To list records in `flaskdemo`, issue a **GET** request to the `flaskdemo` endpoint.

Returned records do not include any fields with "empty" values, e.g. `"", [], or false.`

You can use the following parameters to filter, sort, and format the results:

fields
`array of strings`
optional
Only data for fields whose names are in this list will be included in the result. If you don't need every field, you can use this parameter to reduce the amount of data transferred.

For example, to only return data from `fame` and `lname`, send these two query parameters:

`fields=`
`fields=fame`
`fields=lname`

filterByFormula
`string`
optional
A [formula](#) used to filter records. The formula will be evaluated for each record, and if the result is not `0, false, "", NaN, [], or #Error!` the record will be included in the response.

If combined with `view`, only records in that view which satisfy the formula will be returned.

For example, to only include records where `fame` isn't empty, pass in:
`NOT({fame} = '')`

maxRecords
`number`
optional
The maximum total number of records that will be returned in your requests. If this value is larger than `pageSize` (which is 100 by default), you may have to load multiple pages to reach this total. See the Pagination section below for more.

pageSize
`number`
optional
The number of records returned in each request. Must be less than or equal to 100. Default is 100. See the Pagination section below for more.

[curl](#) [JavaScript](#)

show API key

EXAMPLE REQUEST

```
curl "https://api.airtable.com/v0/appM38HXLEVhxmnqx/flaskdemo?maxRecords=3&view=Grid%20view" \
-H "Authorization: Bearer keyTcsTzckqyBT1k8"
```

EXAMPLE RESPONSE

```
{
  "records": [
    {
      "id": "recp0HXSrfrMIVQia",
      "fields": {
        "fame": "John",
        "lname": "Chan",
        "student_id": "12349",
        "date_of_birth": "2009-02-21"
      },
      "createdTime": "2019-09-19T14:04:24.000Z"
    },
    {
      "id": "recASxs4aPaHLejj3",
      "fields": {
        "fame": "Emily",
        "lname": "Wong",
        "student_id": "67891",
        "date_of_birth": "2008-04-03"
      },
      "createdTime": "2019-09-19T14:04:24.000Z"
    },
    {
      "id": "rec8vF2VbIg0Tdx3F",
      "fields": {
        "fame": "Mary",
        "lname": "Lu",
        "student_id": "99999",
        "date_of_birth": "2001-08-22"
      },
      "createdTime": "2019-09-19T14:32:08.000Z"
    }
  ]
}
```

Class Exercise Using Airtable API Data

- **Viewing Airtable API Data in JSON Format (<https://jsonformatter.org/json-viewer>)**



A web scraping tool that is easy to use

ParseHub is a free web scraping tool. With our advanced web scraper, extracting data is as easy as clicking the data you need.

[Download our free app](#)



<https://www.parsehub.com/>



Open a website

Download our [desktop app](#). Choose a site to scrape data from.



Click to select data

Get data from multiple pages. Interact with AJAX, forms, dropdowns, etc.



Download results

Access data via JSON, Excel and [API](#). Data is collected by our servers.



Welcome!

Beginner Tutorials

1. Start Here: Create your first project
 2. Extract text from a web page
 3. Extract data from many pages (pagination)
 4. Run project & download Excel & JSON data
 5. Use the REST API

Advanced Tutorials

1. Collect data on a schedule
 2. Enter text into a search box
 3. Get data from behind a log-in
 4. Infinite scrolling pages
 5. Enter URLs for ParseHub to crawl

API Docs

Use our REST API and
web-hooks.

[View API >](#)

[More Tutorials](#)

Browse 80 + tutorials, videos & examples.

[View Tutorials >](#)

Contact Us

Need help with your project?
Reach out.

Contact >

Product Demo

Get a custom product walk-through.

[Book a demo](#)

[Book a demo](#)

CSV/Excel

100%



about:parsehubupdater

about:parsehubupdater

parsehub

Double tap ⌘ to view all ParseHub hotkeys.

Connecting to the Parsehub server.

If this persists for more than a few seconds, update your ParseHub extension and restart Firefox.



A preview of your data will appear here

CSV/Excel JSON CSV/Excel Wide (beta)

Visuals enabled ⓘ

API Tutorials Contact

Welcome!

New Project

My Projects

Tutorials

Beginner Tutorials

1. Start Here: Create your first project
2. Extract text from a web page
3. Extract data from many pages (pagination)
4. Run project & download Excel & JSON data
5. Use the REST API

Advanced Tutorials

1. Collect data on a schedule
2. Enter text into a search box
3. Get data from behind a log-in
4. Infinite scrolling pages
5. Enter URLs for ParseHub to crawl

API Docs

Use our REST API and
web-hooks.

[View API >](#)

More Tutorials

Browse 80 + tutorials, videos &
examples.

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Contact Us

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Reach out.

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Product Demo

Get a custom product
walk-through.

[Book a demo](#)

CSV/Excel JSON

API

Tutorials

Contact

Visuals enabled 



parsehub

New Project

My Projects

Tutorials



API Docs

Use our REST API and web-hooks.

[View API >](#)

More Tutorials

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Need help with your project?
Reach out.

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Product Demo

Get a custom product walk-through.

[Schedule >](#)

Sample is disabled when working on interactive templates. Use [Test Run](#) instead.



More Tutorials Can be Found Below

<https://www.youtube.com/channel/UCRfbcJQu9HZvc7uks2wmGzw/playlists>

CLEANING THE DATA

The 3C of Data Cleaning

- **Completeness**
- **Consistency**
- **Correctness**



A free, open source,
powerful tool for working
with messy data



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Documentation
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Blog

Enhanced with Java profiler



Welcome!

OpenRefine (formerly Google Refine) is a powerful tool for working with messy data: cleaning it; transforming it from one format into another; and extending it with web services and external data.

OpenRefine is available in English, Chinese, Spanish, French, Russian, Portuguese (Brazil), German, Japanese, Italian, Hungarian, Hebrew, Filipino, Cebuano, Tagalog

OpenRefine is supported by:



Introduction to OpenRefine

1. Explore Data

OpenRefine can help you explore large data sets with ease. You can find out more about this functionality by watching the video below and going through [these articles](#)

The screenshot shows a data grid titled "Google Refine 2.0 - Introduction (1 of 3) (video v...)" with 3200 rows. The columns are: Contract ID, Contractor Name, Type of Contract, Date of Award, Start Date, End Date, and Total value. The data includes entries like ASAP SOFTWARE EXPRESS INC DELL MARKETING LP, Microsoft Enterprise Agreement, and Cisco SmartNet.

Contract ID	Contractor Name	Type of Contract	Date of Award	Start Date	End Date	Total value
1. 1980	ASAP SOFTWARE EXPRESS INC DELL MARKETING LP	Microsoft Enterprise Agreement	04/01/2009	04/01/2009	08/30/2011	
2. 1981	AMERICAN BUSINESS DISTRIBUTION INCORPORATED	Homely Service Deal Maintenance	04/01/2009	04/01/2009	03/31/2010	
3. 1981	GOVCONNECTION INCORPORATED	Cisco SmartNet	05/01/2009	05/01/2009	04/30/2011	
4. 1982	ITS CORPORATION	Time & Materials	12/01/2008	01/01/2009	12/02/2011	
5. 1982	BONET INTERNATIONAL CORPORATION	Homely Service Deal CAA	05/04/2009	05/05/2009	07/31/2009	
6. 1983			01/29/2010	01/29/2010	01/30/2010	

<http://openrefine.org/download.html>

Google refine

More Tutorials Can be Found Below

<https://www.youtube.com/user/GoogleRefine/playlists>

<http://d3-media.blogspot.hk/2013/11/how-to-refine-your-data.html>

Exploratory Data Analysis

Using Airtable for Aggregation Modeling (Max, Min, Sum)



<https://www.youtube.com/watch?v=ksFiYFfO8vM>

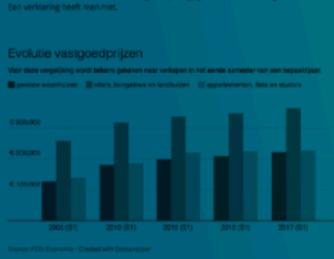
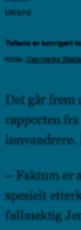
Datawrapper

<https://www.datawrapper.de>

Enrich your stories with charts, maps and tables.

 START CREATING

Det går frem av rapporten fra «Danmarks Statistik» over utdanning, jobb og økonomi for innvandrere. I gruppen med de minste utdanningsnivåene er det palestinerne



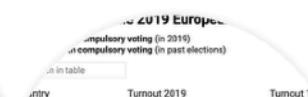
does its survey, which kept some workers at home. Additionally, the "retail apocalypse" of announced store closings meant that more jobs than normal left the economy during the month. This month, the disappointing March number was revised down from 98,000 to 79,000. But the April jobs report provides a bounce back in part because of warmer weather and fewer layoffs. The Labor Department reported gains in hospitality, mining, healthcare, and finance. Including the revisions for the February and March reports, an average of 174,000 jobs were added per month over the last three months.

Monthly Changes in U.S. Employment (Non-Farm), 2006-2017



3. An interest-rate hike in June now looks more likely.

In the past, the Fed has indicated that sustained growth in the U.S. labor market is



Login

We're glad to see you again. Login to access your charts, and create new ones.

 Remember login?[Can't recall your password?](#)

Alternatively you can sign in via: [!\[\]\(fee2cf1b4e911a36481719eb4dba7ae3_img.jpg\) Facebook](#) [!\[\]\(b5e405397f6ca039d616a49c18b384fb_img.jpg\) Github](#) [!\[\]\(bcd64d00e161fa97d5f930d4e5e316ee_img.jpg\) Google](#) [!\[\]\(140e541a585aaaf73b7b3259c295aeb4_img.jpg\) Twitter](#)

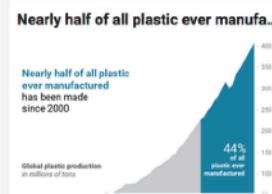
Create a new account

Datawrapper helps you to publish your charts and maps in no time. Give it a try, registration takes less than a minute.

Recently edited

[Insert title here]

[Insert title here]



Recently published

You have not published any charts yet.

Datawrapper River

Browse our free collection of reusable charts and maps, or open your own charts for reuse. Read more in our [blog post](#) or in the [FAQs](#).

More of Greenland's ice melted in the summers of 2000-2019 than in the ones between 1979-1999
by Lisa Charlotte Rost, Datawrapper (a month ago)

Daily national approval/opinion ratings (2017-2019)
(11 hours ago)

Global Carbon Emissions (Copy) (4 days ago)

How densely populated is Europe? (a month ago)

Changelog

AUGUST 16 / MAPS

Added Regional Electoral Districts for Saxony and Brandenburg, **Germany**.

AUGUST 14 / MAPS

Added Circuit Courts for **USA**.

AUGUST 13 / PIE CHART

Pies and donuts now take up full width when displayed on mobile.

AUGUST 13 / LINE CHART, AREA CHART, SCATTERPLOT

Renamed "x-axis" to "horizontal axis" and "y-axis" to "vertical axis", because everyone confuses them with each other sometimes.

1 Upload Data**2 Check & Describe****3 Visualize****4 Publish & Embed**

How do you want to upload your data?



Copy & paste
data table



XLS/CSV
upload



Import Google
Spreadsheet

Link external
dataset

Paste your copied data here...

Copy & paste your data

Select your data (including header row/column) in Excel or LibreOffice and paste it in the text field on the right. You can also upload a CSV or Excel file from your computer.

If you just want to try Datawrapper, here's a list of some example datasets you can use:

Select a sample dataset

Proceed

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1 Upload Data**2 Check & Describe****3 Visualize****4 Publish & Embed****How do you want to upload your data?**Copy & paste
data tableXLS/CSV
uploadImport Google
SpreadsheetLink external
dataset**Copy & paste your data**

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If you just want to try Datawrapper, here's a list of some example datasets you can use:

Select a sample dataset

Proceed ➔

Country, Turnout
Romania (2016), 39.8
Kosovo (2017), 40
Slovenia (2017), 43.6
United Kingdom (2017), 68.7
Germany (2017), 76.2
Belgium (2014), 88.5
Luxembourg (2013), 91.4
Malta (2017), 92.1

1 Upload Data ▾**2** Check & Describe**3** Visualize**4** Publish & Embed

Make sure the data looks right

Please make sure that Datawrapper interprets your data correctly. In the table `number` columns should be shown in blue, `dates` in green and `text` in black. A `red` cell indicates missing data or a problem in your dataset that needs to be fixed.

 First row as label

Output locale

Defines decimal and thousand separators as well as translation of month and weekday names.

English (en-US) ▾

Click on table header to edit column properties

Sort view by... ▾

Search data table

	A	B
1	Country	Turnout
2	Romania (2016)	39.8
3	Kosovo (2017)	40.0
4	Slovenia (2017)	43.6
5	United Kingdom (2017)	68.7
6	Germany (2017)	76.2
7	Belgium (2014)	88.5
8	Luxembourg (2013)	91.4
9	Malta (2017)	92.1

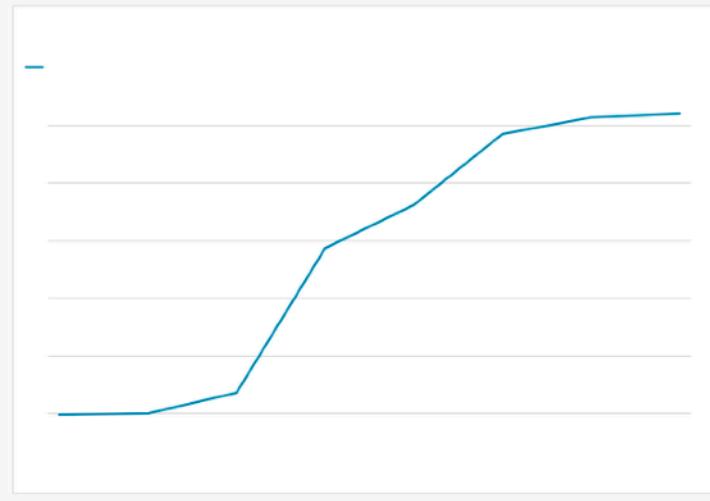
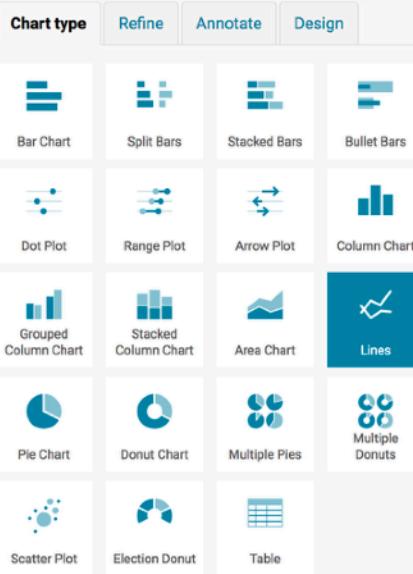
[◀ Back](#)[Proceed ▶](#)[Swap rows and columns \(transpose\)](#)[Add column...](#)[Revert changes...](#)

1 Upload Data

2 Check & Describe

3 Visualize

4 Publish & Embed



Archived chart types:

Hint: In case the visualization doesn't look like you expected,
you should try to transpose the data

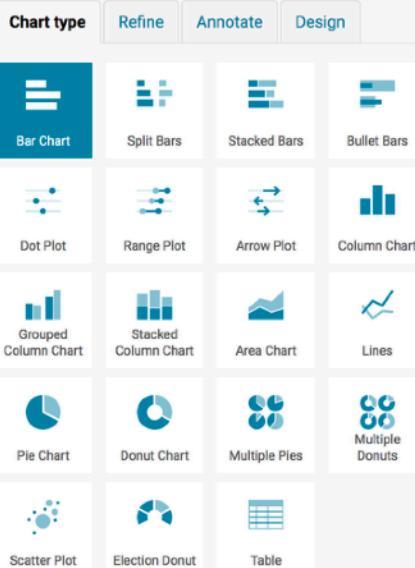
[Back](#)[Proceed](#)

1 Upload Data ✓

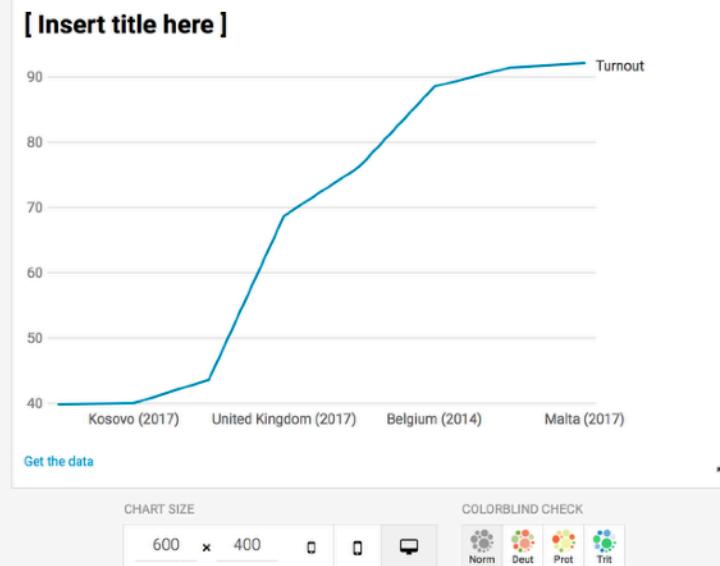
2 Check & Describe ✓

3 Visualize

4 Publish & Embed



Archived chart types:



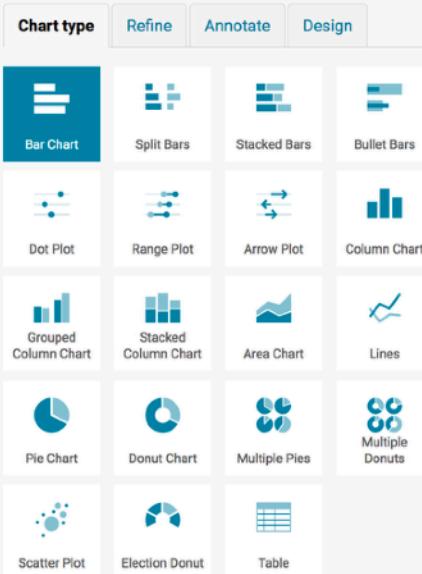
Hint: In case the visualization doesn't look like you expected,
you should try to [transpose the data](#)

1 Upload Data ✓

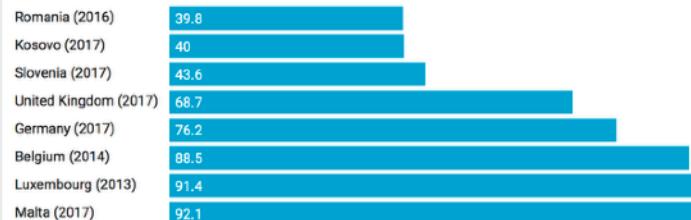
2 Check & Describe ✓

3 Visualize

4 Publish & Embed



[Insert title here]



Get the data

CHART SIZE
600 x 268

COLORBLIND CHECK
Norm Deut Prot Trit

Archived chart types:

Hint: In case the visualization doesn't look like you expected,
you should try to transpose the data

Back Proceed

Sort by keep order smallest first
 largest first

Labels & Values

Display labels in separate line

Swap labels and values

Hide values

Label alignment: left right

Value alignment: left right

Number format:

Display grid lines

Appearance

Base color: 

Show color key

 Turnout

Separate rows with dotted line

Thicker bars

Bar background

Custom range: -

[« Back](#)

[Proceed »](#)

[Insert title here]

Turnout

Romania (2016)

39.8

Kosovo (2017)

40

Slovenia (2017)

43.6

United Kingdom (2017)

68.7

Germany (2017)

76.2

Belgium (2014)

88.5

Luxembourg (2013)

91.4

Malta (2017)

92.1

[Get the data](#)

CHART SIZE

600  352   

COLORBLIND CHECK



Your dataset contains more columns than the chosen chart type can display. You can switch the column to show in the [Refine](#) tab, or choose a different chart type.

Chart type Refine Annotate Design

Annotate your chart

Title hide

Description

Notes

Data source Who published the data?
Link to data source

Byline Who created the chart?

Highlight elements

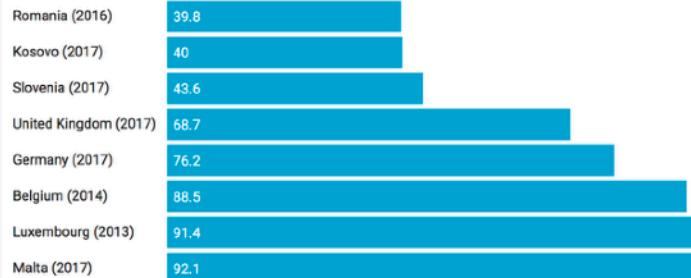
Highlight the most important elements (optional)

- select element -

[Back](#) [Proceed >](#)

Demo Bar Graph

Turnout



[Get the data](#)

CHART SIZE

600 352

COLORBLIND CHECK



Your dataset contains more columns than the chosen chart type can display. You can switch the column to show in the [Refine](#) tab, or choose a different chart type.

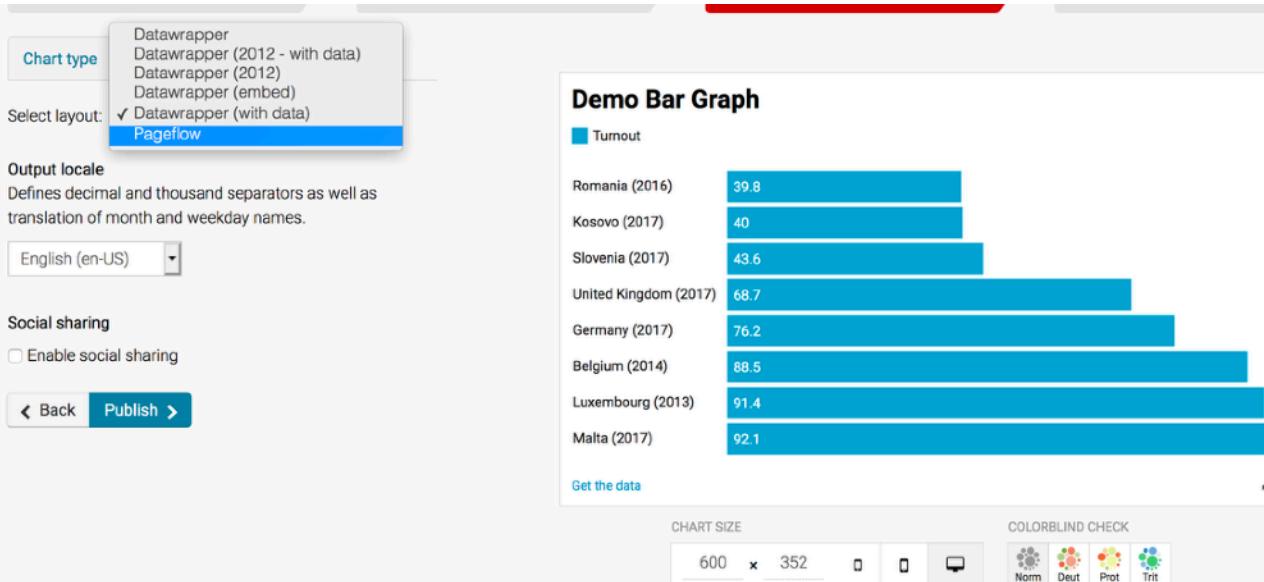
X

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Your dataset contains more columns than the chosen chart type can display. You can switch the column to show in the **Refine** tab, or choose a different chart type. X

1 Upload Data**2** Check & Describe**3** Visualize**4** Publish & Embed

To share or embed your chart you need to publish it. It will only be visible to people who know the chart URL.



Publish chart

Click here if you want to embed your chart in your website or CMS.

Export or duplicate chart

The best and easiest way to use a Datawrapper chart is to embed it directly into your website or CMS. You can also [upgrade your account](#) to download your chart as an image or PDF file to use it in different contexts.



DUPLICATE

Demo Bar Graph

Turnout



Embed

1 Upload Data**2** Check & Describe**3** Visualize**4** Publish & Embed

This chart has been published! If you make changes to the chart you will need to re-publish them.

[Re-publish chart](#)

Congratulations, your chart can now be shared and embedded on your site.

Share & Embed

[Share via URL](#) fullscreen normal size
[//datawrapper.dwcdn.net/pJTxD/1/](http://datawrapper.dwcdn.net/pJTxD/1/)

[Copy Embed code](#) responsive iframe iframe
<iframe title="Demo Bar Graph" ari
[copy](#)

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Export or duplicate chart

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Demo Bar Graph

Turnout



Embed

END OF MORNING SESSION