# Web API

## What is it?

A web API (or API) is a software program that allows a computer to make its data available to other computers via the web. APIs allow businesses to make all kinds of data / information / services available to their customers.

## Companies to assist you

3Scale, Apigee, API Academy, Apiary, Mulesoft, wso2

## Influencers to follow

Mehdi Medjaoui, Aurélien Fache, Nicolas Grenié, Kin Lane.

## 3 companies using this technology

**SalesForce** – this software for customer relationship management has developed APIs allowing third-party applications to be integrated with it. Thus, SalesForce develops an ecosystem of partners and becomes a platform.

**SNCF** – its APIs provide "real time itineraries and timetables of SNCF trains to invent new mobility services"

**Groupe PSA** – On some Peugeot, Citroën and DS models, the on-board computer has APIs. These APIs provide 89 data points.

## What business impact?

- Outsourcing: A company may have access to a wide variety of services provided as APIs by service providers, rather than developing these services themselves or being obliged to host them on premises.

- Growth: a company can offer a service via an API: new customers, new markets, new business models.

## Resources needed

Organizational resources:
- IT service supporting a culture of sharing data
- liaison with the legal team to verify which data can be shared with third parties

Financial resources:
- licences for software services
- consulting fees for project development and maintenance

## Do's and don'ts

Do:
- take excellent care of the documentation of the API

- collect use cases: what do the users of your APIs do with it?

Don't:
- open your data without checking access or usage.

- conversely, restrict too much access to data for no objective reason.

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# Artificial intelligence (AI)

## What is it?

Artificial intelligence (AI) consists for a computer program to reproduce one of the capabilities of the human intellect, based on the analysis of a large volume of data ("big data"). "weak" AI can duplicate specific tasks, such as recognizing an object on an image. "strong" AI would reproduce human consciousness: it will not exist for a long time.

## Companies to assist you

DataGenius, mfglabs, Datalyo, nabla.com, Sicara, Quantmetry

## Influencers to follow

François Chollet, Benedict Evans, Zeynep Tufekci, Azeem Azhar, Cathy O'Neil, Gilles Babinet

## 3 companies leveraging AI

**Artefact** - this marketing analytics firm uses AI to better analyze customer data and develop targeted advertising campaigns.

**Climate Corp** - helps to predict how weather changes affect crops, which allows finely modulating fertilizer consumption.

**Stitchfix** - this online clothing sales company uses many techniques to 1) optimize their stocks 2) make relevant suggestions to customers.

## What business impact?

- Optimization (internal processes): replacement of "white-collar workers" such as data-entry clerks and other repetitive administrative tasks. Better control of the manufacturing process (savings in time, defects, waste, maintenance, etc.). Logistics optimization (warehouses, supply chain).
- Innovation (customer value): products can become "smart" thanks to AI: collision detection for a vehicle, taking a picture at the best moment, personalized recommendations, generating original designs, etc.

## Resources needed

Organizational resources:
- IT staff with a knowledge and interest for data-related skills (tools, frameworks...)
- business managers able to interface with data scientists

Financial resources:
- licences for software services
- consulting fees for project development and maintenance

## Do's and don'ts

Do
- start by modernizing your IS and ERPs to have quality data on which the AI can be exercised.
- proceed by tests and iterations (create POCs before launching on a large scale)

Don't
- be seduced by the "AI buzz" and create expensive gadgets. In many cases, traditional statistical analysis suffices.
- treat AI results as ground truth. AI has biases which need an interdisciplinary team to identify and debias.

# Big data

## What is it?

"Big data" designates the growth in volume of data observed since the 2000s, favored by the drop in computer costs of storage and processing. It is accompanied by a wider variety of available and exploitable data: text, sound, image and video.

Data science and AI are data analysis techniques adapted to the volume and variety of big data.

### Companies to assist you

Ippon, Dataiku, Quantmetry, Kynapse + consulting groups

### Influencers to follow

Benedict Evans, Azeem Azhar, Cathy O'Neil.

## 3 organizations leveraging this technology

**Humanroads** – this startup analyzes the curriculum and professional experience of students and professionals in very large volume to give informed advice on career paths.

**Le bon coin** – More than 30 million ads, and databases that exceed 10 terabytes. While providing almost instantaneous search results.

**Data.gouv.fr** – the French state offers nearly 40,000 datasets on public life, freely reusable by citizens and organizations.

## What business impact?

- Investments: big data starts as a cost: you have to invest in the right information systems to make big data possible. These data will be valued only once their uses are determined and deployed.
- Disruption: startups can move faster and cheaper on the collection, analysis and creation of services based on big data, shaking up traditional businesses.

## Resources needed

Organizational resources:
- a leadership able to take sound decisions of strong investments in information systems

Financial resources:
- the costs of modernizing an IS are very high.

## Do's and don'ts

Do
- conduct a data quality policy.
- associate closely management and IT department in the projects to define the end goals of big data.

Don't
- refer only to volume indicators. Big data is only useful if the data is reliable and rich.

# Data visualization

## What is it?

Data visualization (or "dataviz") refers to the graphical representation of a dataset, which facilitates the discovery of insights in this dataset, for business or communication purposes.

A good dataviz is characterized by the fidelity of the representation and the quality of its user experience (UX): it must engage the viewer in discovering interesting features in the dataset.

## Companies to assist you

Agencies: Dataveyes, Fathom, Tulp Interactive, Periscopic, visualisingdata.com

## Influencers to follow

Lynn Cherny, Elijah Meeks, Moritz Stefaner, Andy Kirk, Alberto Cairo, Kim Rees

## 3 organizations leveraging this technology

**Withings** - this manufacturer always accompanies their connected objects (watches, scales ...) with a mobile application to visualize and analyze the data collected.

**Bankin'** - This banking management app attracts customers by offering finer and readable budget visualizations than classic banking apps.

http://cartescolaire.paris – school zoning information is difficult to decipher (at least in France!). This visualization simplifies data mining for school zoning in Paris.

## What business impact?

- Enhanced customer value: connected objects are "smarts" thanks to the data they collect. This value is enhanced if the user can visualize the data in relation to the service (interactive dashboard, map, etc.).
- Internal control and business intelligence: analysis of data streams related to production can help understand better where efficiencies can be gained. Visualization makes data more intelligible, which helps analysts gain better insights, faster.

## Resources needed

Organizational resources:
- Staff trained in one of these platforms: Tableau, Qlik, Bime, PowerBi... and trained in literacy in design and data (eg, training by visualisingdata.com)

Financial resources:
- consulting / training fees
and
- license fees (Tableau, PowerBI...)

## Do's and don'ts

Do
- assess when a data visualization can bring value, and what level of investment to devote to it.
- know how to contract and manage a specialized dataviz agency.

Don't
- carry out a dataviz project without dedicated expertise, thinking that "everyone knows how to make a chart".
- use data visualizations as communication gimmicks.

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# The cloud

## What is it?

The cloud refers to services which are accessed via the web rather than installed on premises. Cloud services are billed for use, without purchasing the resource underlying the service (server, software). Since the rise of the cloud in 2006, services available in cloud mode have diversified: from the simple rental of storage space or computing power ("Infrastructure as a service") to access to a complete business application ("Software as a Service ").

### Companies to assist you

Ippon.Tech, Akka Technologies, OVH, Outscale, Microsoft Azure, AWS, Google Cloud

### Influencers to follow

Clément Vouillon, Octave Klaba, Marie Jung, David Linthicum, Rachel Delacour.

## 3 companies leveraging the cloud

Today, all businesses have embraced the cloud. We can distinguish 3 modes:
- public cloud: it is accessible publicly to any customer. This does not mean that everyone can see what others are doing on the cloud! Every customer has their private spaces on the cloud.
- private cloud: like a public cloud except that it is owned, managed and used by the company exclusively. It is not accessible to third parties.
- hybrid cloud: this is a private cloud where certain forms of (less confidential) operations can be delegated to a public cloud.

You will have noticed that the "web API" and "cloud" cards have the same text for the "business impact" category. Indeed, to a large extent, APIs and the cloud are the two ingredients of the same revolution: access to a variety of services via the web.

## What business impact?

- Outsourcing: A company can access a wide variety of cloud services provided by service providers rather than developing them themselves. Better focus on core competencies.
- Growth: a company can offer a service in cloud form: new customers, new markets, new business models, flexibility and speed of implementation.

## Resources needed

Organizational resources:
- an IT department ready to evolve on their missions and skills: piloting outsourced services rather than directly producing these services.

Financial resources:
- change from a capex model (fixed assets on the balance sheet) to opex (expenses or income in the income statement)

## Do's and don'ts

Do
- Identify use cases and business gains and associated costs

Don't
- think the cloud is cheap: billing using the cloud can be expensive, so the costs should be tracked with care.
- neglect technical and legal follow-up on the data processing chain.

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# GDPR

## What is it?

The General Regulation on Data Protection of the European Union strengthens and unifies the rights of European citizens on their personal data. Came into force on May 25, 2018, it establishes in particular the right to consent, forgetting, portability of data, regardless of the place of data processing. For example, a US company managing EU citizen data on its servers in the US must comply with the GDPR.

## Companies to assist you

Every consulting group has an offer on GDPR.

## Influencers to follow

Isabelle Falque-Pierrotin, La Quadrature du Net, Tariq Krim, Adrien Basdevant, Max Schrems

## 3 companies that leverage GDPR

**Qwant**– this search engine highlights its privacy features, to differentiate itself from Google.

**Dissident.ai** - this start-up offers a package of services, and makes the respect of personal data its main value proposition.

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## What business impact?

- Pre-emptive audit and compliance: GDPR requires to put in place an internal control to identify which datasets are collected, for what use. It is a beneficial rationalization on this ground, left a long time fallow.
- Differentiation by ethics. It becomes possible to showcase products & services performing on this dimension. Ex: Qwant.

## Resources needed

Organizational resources:
- transversal project management (IT, legal, ...).
- business needs to get acculturated (marketing in particular).

Financial resources:
- consulting fees with legal specialists.
- training costs for staff.

## Do's and don'ts

Do
- set up permanent processes for managing access to data, in conjunction with the mission on data quality ("governance"). This way, GDPR will help foster better accessibility and management of data flows.

Don't
- maket he GDPR a bureaucratic constraint: it must be used as a lever to secure existing practices and create new forms of value.

# IoT

## What is it?

The Internet of Things (IoT) refers to objects connected to the Internet, able to receive or transmit data for the realization of a service. This service can be additional to the initial function of the object (in this case we speak of "smart objects" or "augmented objects"). IoT impacts everyday consumer goods (accessories, appliances, etc.) but also industry and services (connected machines, robotics, etc.)

## Companies to assist you

Sigfox, Orange, PTC, 3DS, many consulting companies.

## Influencers to follow

Nicolas Lesconnec, Benjamin Cabé, Cedric Hutchings.

## 3 organizations leveraging IoT

iRobot - Selling **Roomba**, a robot vacuum cleaner that moves around the house by detecting spaces and walls thanks to its sensors. It sends its data via wifi on a mobile app.

Enedis– with **Linky**, a connected electricity meter. This would allow price modulation and offer services based on consumption.

**PTC** - solution provider of Industrial IoT (IIoT). PTC equips manufacturing companies with connected objects and software for better control of production.

## What business impact?

- Innovation (customer value): IoT makes it possible to augment products with services. These services can become central to the value proposition. With plenty of connectors, a car is now a "computer on wheels", meaning that it is the connected services that give value to the car , rather than its body or engine.
- Product Lifecycle Management: Connected objects enable end-to-end monitoring, from raw materials to after-sales service.

## Resources needed

Organizational resources:
- transversal project management (IT, legal,, business units...): what are the opportunies? Internally and customer facing?

Financial resources:
- R&D
- consulting fees

## Do's and don'ts

Do
- conduct a robust market study to ensure that the service provided by the connected object brings value to the customer.

Don't
- don't contribute to the « Internet of Shit » : gadget applications, badly secured.

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# Machine learning (ML)

## What is it?

Machine learning (ML) is a family of statistical methods at the heart of artificial intelligence. ML requires powerful computing capacities, which became widely available in the 2000s. It performs greatly at predicting or classifying on a variety of datasets (image, sound...): "Is this sign a stop sign or a red light?" "Is this face of a man? What age?". A major condition for ML to be accurate: having enough images, text ... to "train" the algorithm before using it.

## What business impact?

- **Diagnosis / decision-making / recommendations**: where a human is slow and commits errors, ML can analyze complex data quickly to arrive at a very reliable judgment (fraudulent file or not? Correct price or not? Should this part be replaced or not?).
- **Autonomy**: ML allows vehicles and robots to make quick series of diagnostics, which can produce a complex behavior (steering a vehicule, grasping an object, talking ...).

## Influencers to follow

Andrew Ng, Yann LeCun, François Chollet, Zeynep Tufekci, Azeem Azhar, Cathy O'Neil.

## Companies to assist you

Machine learning is at the heart of AI, so they are the same companies: DataGenius, mfglabs, Datalyo, Sicara, Quantmetry, nabla.com + any major consulting firm.

## Organizations leveraging machine learning

Machine learning is widely adopted by all industries, service providers and business functions:

- Bank & insurance: fraud detection, product recommendations, scoring calculation
- Industry: warehouse and logistics chain management, production management

- HR: sourcing of candidates
- Marketing: market analysis, targeted advertising campaigns
- Finance, audit and accounting: automation and control of information flows.

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# Text mining

## What is it?

"Text mining" is simply the search for useful information in written documents. It is also called Natural Language Processing (NLP) or Natural Language Understanding (NLU). It is a set of software pieces that can identify words or phrases, count them, determine in which language a text is written, identify the feelings expressed in a text, etc.

## What business impact?

- Marketing: the analysis of text makes it possible to characterize very specifically the author of the text. It is therefore widely used for segmentation and profiling.
- Conversational interfaces: chatbots use text mining and data science to perform their function.
- Business applications: in legal professions in particular, the work of documentation can be accelerated by the search of text.

## Influencers to follow

Lynn Cherny, Stuart Shulman, Ted Underwood. Seth Grimes.

## Companies to assist you

Synomia, Inbenta, 55, mfg labs, Stat4Decision, Doyoudreamup + academic research labs.

## 4 organizations leveraging text mining

**Multiposting**, start-up acquired by SAP in 2015, analyzes resumes to identify and extract skills and other relevant information.

**Aiden.ai** uses text mining, among other techniques, to do intelligent data mining in customer relationship management software, and deduce recommendations.

**Softlaw** offers a smart reading soluton for legal documents, to save time on contract writing.

**MATCHA**, a chatbot which acts as a virtual wine shop: it recommends wines based on the questions you ask - and learns from your preferences.

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# Graph mining

## What is it?

Network analysis, or "graph mining", involves extracting information from a network. An example of a network is your relationships on Facebook or LinkedIn, but it also covers communication networks, or financial transactions, and so on. Relevant information is, for example: "who is central in the network? What are the subgroups in the network? How does the network evolve over time?"

## What business impact?

- Fraud detection: network analysis is useful for detecting groups of people who conduct transactions in common, and identify patterns of suspicious activities.
- Identification of "influencers": in a social network, the most connected people can be the most influential.
- Market study / business intelligence: network analysis makes it possible to qualify a crowd in sub-segments.

## Influencers to follow

Lada Adamic, Mathieu Jacomy, Sébastien Heymann, Marc Smith (NodeXL), Vincent Traag, Jure Leskovec.

## Companies to assist you

Linkurious, Linkfluence, Cambridge Intelligence, Tom Sawyer Software.

## 3 organizations leveraging graph mining

**CybelAngel** uses network analysis, among other data science techniques, to conduct its cybersecurity activities.

**Bluenod** analyzes Twitter networks to identify influencers on specific topics.

**Walmart**, Amazon and many others use network analytics to detect which products are frequently co-purchased to create new recommendations.

To go further : https://emlyon.github.io/mk99

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# Blockchain

## What is it?

The blockchain is a technology with similarities to a database: it allows to store and access data on a computer support. Unlike a database, the data stored on a blockchain is unalterable: it can not be deleted or modified. Another difference: the blockchain is not controlled by a particular actor: everyone has a copy. This ensures transparency and inalterability, and eliminates the need for a trusted third party.

## What business impact?

- Disintermediation. A blockchain guarantees the inalterability of registered transactions. For this reason, it can replace trusted third parties responsible for the notarization of acts: notaries, certification offices, chartered organizations, public regulators and official agencies. The guarantee provided by these organizations would now be provided by a blockchain.
- Re-intermediation. New players invent several blockchain variants ("distributed ledgers"), implement and manage them, and create related services (certification, audit, marketplaces, etc.)

## Influencers to follow

Nadia Filali, Sajida Zouarhi, Luca Comparini, Xavier Lavayssiere, @leshackeuses

## Companies to guide you

StratumnHQ, TheLedger.be, ChainAccelerator

## 3 use cases

**Quantmetry** uses the blockchain to ensure the transfer of assets (here, datasets) between stakeholders, without the need for trusted third parties.

**bitcoin** - This currency uses the blockchain to determine how new currency units are created, and to manage financial transactions. Bitcoin was created as the first use case of the blockchain in 2009.

**BCDiploma**: start-up developing a solution for the certification and authentification of diploma, across schools.

## Traps to avoid

Always ask yourself these questions before embarking on a blockchain project:

- Does the project involve the need to do without a trusted third party?

- Would a "classic" database suffice?

# Platforms

## What is it?

A platform is a half-organization, half-market structure that coordinates and stimulates transactions between producers and consumers of goods and services. The platform is set up by one or more organizations that take advantage of the value created.

**Platforms look like organizations** in that they are most often companies or public bodies that create them. But unlike organizations, resources, activities and value are developed by producers and consumers situated outside the organization.

**Platforms look like markets** to the extent that value is created by independent agents who carry out "atomic" transactions (trade, services or sales on a piecework basis). But unlike markets, these transactions are organized and strictly controlled by an organization - which in a way plays the role of a "private market place".

## "Dataification", key factor of success for platforms

The key factor of success for a platform is not the market fit between an in-house product and external buyers, but its ability to:

- **orchestrate a useful, fluid and efficient coordination** between many and varied third parties. This requires intensive data collection on the platform's players and their behavior (see *big data* and *IoT* memo cards), automation and scalability of information exchanges (see *web API s* and *cloud* memo cards), excellence of the interfacing devices and channels (see memo cards on *web APIs* and *data visualization*), and fine management / governance of the rights and duties associated with the data (see *GDPR* and *blockchain* memo cards).

- **put learning mechanisms in place** that increase the value that platform users gain over time. This is made possible by data analysis (see memo cards on *IA*, *machine learning*, *graph mining*, *text mining*).

## To go further

Andrew Mcafee and Erik Brynjolfsson, *Machine, platform, crowd*, W. W. Norton, 2017.
David S. Evans and Richard Schmalensee, *Matchmakers*, Harvard Business Review Press, 2016.

## To guide your company

Platform Design Toolkit:
https://platformdesigntoolkit.com/

## Organizations that developed platforms

**Dawex** is developing a market platform for data, connecting data sellers and data buyers. The added value that Dawex brings to the players is the total control of the transaction, on a sensitive asset.

« Distribution » platforms: **Spotify, Netflix, Amazon, booking.com, Uber Eats …** coordinate suppliers with customers, drawing their competitive advantage from flawless logitics, interfaces, and data-driven processes

« Matching » platforms: **Facebook, Airbnb, Uber, Blablacar, LeBonCoin …** provide a data-driven digital infrastructure enabling users to buy, exchange or communicate.

Pour aller plus loin : https://emlyon.github.io/mk99

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