# iab CANADA'S LITTLE BOOK OF DATA AND ANALYTICS

Presented by

contobox™

# Introductions

**iab.canada**

contobox™
DATA DRIVEN. TECHNOLOGY DELIVERED.

It is clear that the growth in digital media investment is directly linked to its unique relationship to data. The industry knows that effective digital media execution demands rigorous analysis of data at all stages of planning and buying. The industry is currently rising to the demand for specialized talent, improved technology and above all, consistency in defining currency and value.

In 2016, IAB Canada's Data and Analytics Committee set out to provide an output that would bring useful clarity to the industry on the state of measurement and currency as an important first step towards realizing absolute best practices in the online media industry.

In keeping with IAB Canada's commitment to provide valuable tools for education, we are proud to present our members with this first installment of "Little Books". This Little Book is designed to provide you with clear definitions on current terms being used widely in the arena of Data and Analytics. It is written in a fun, comic book style narrative to bring the subject to life but also includes technical explanations for the more serious types.

We hope you enjoy this resource as much as the IAB Canada Data and Analytics Committee enjoyed pulling it together.

**Sonia Carreno, President**
**Interactive Advertising Bureau of Canada**

As technology accelerates, it's important that we are all aligned on how data is evolving our industry.

Contobox helps drive the actionable insights our clients need to reduce waste, and effectively engage with their audiences.

As we collectively improve our understanding of the convergence of media, technology and data, we can help solve the challenges facing our industry today.

This will result in more advanced attribution models, improved use of programmatic with data, and most importantly more relevancy for users. What we will find is that a better customer experience leads to increase ROI for brands.
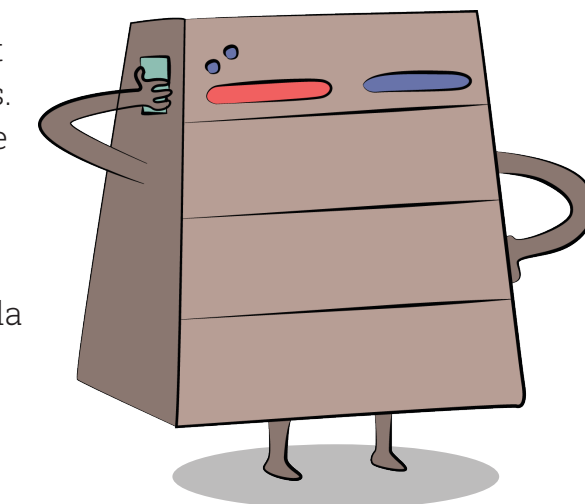
We are excited to partner with IAB Canada on this book. We hope you have as much fun reading it, as we did making it. 😉

**Petar Bozinovski, President**
**Contobox/Crucial Interactive**

# Contributors

A special thanks to the following members of the IAB Canada Data & Analytics Committee

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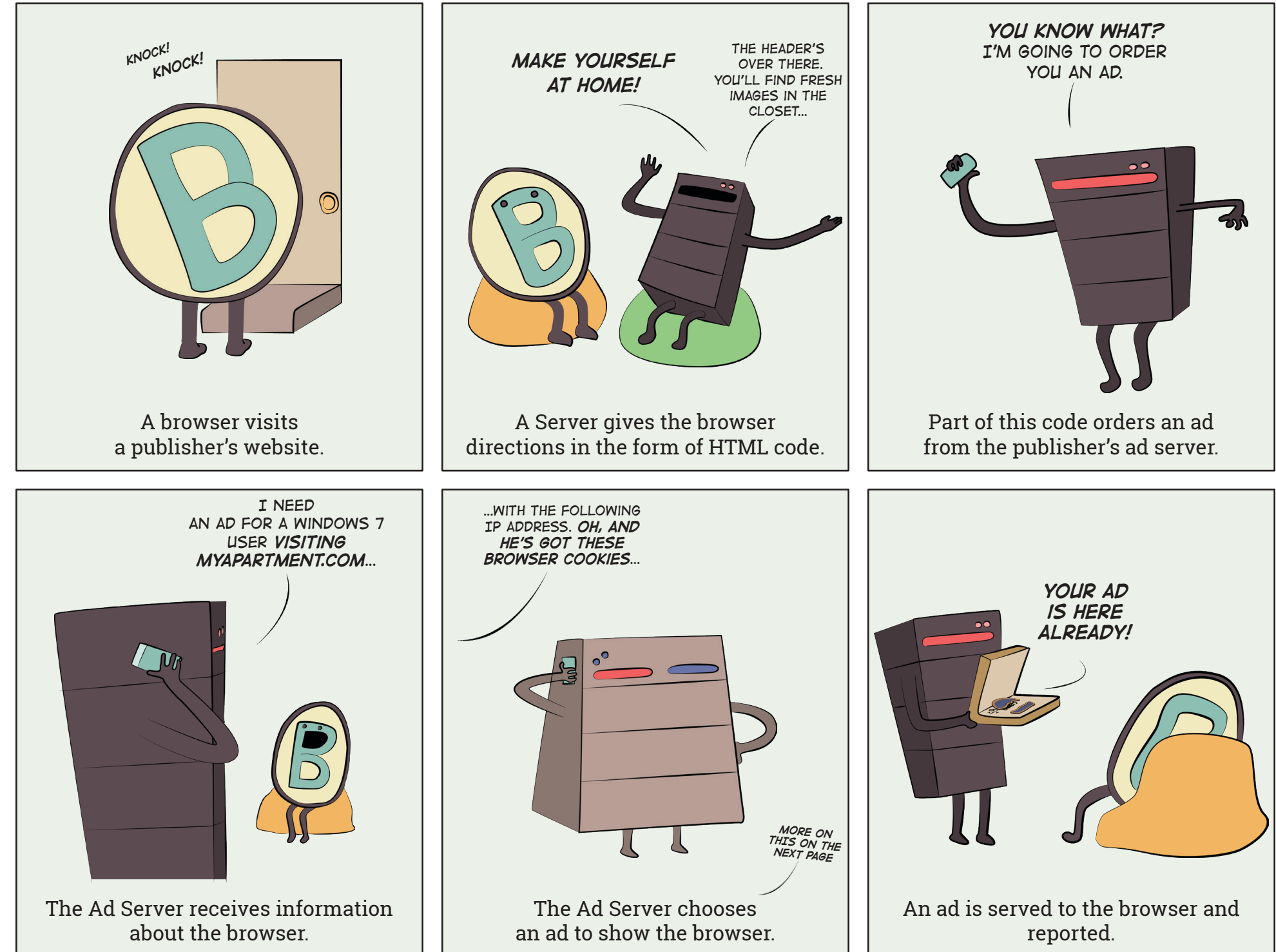
# How an Ad is Served

When a browser navigates to a publisher website, the publisher's web server sends it HTML code. This code tells the browser where to get the content for the website and how to format it. Part of the HTML code returned to the browser is an ad tag.

When the ad tag loads, it begins a conversation with the ad server and the browser. The browser gives the server basic info like its cookie ID, browser/OS, IP address and URL it is making the call from. The ad server uses this information to select an ad (more on this on the next page) and tells the browser where to find the ad. The ad is served and reported. All this takes around 200ms.

## It's kind of like staying at a friend's place...



A browser visits a publisher's website.

A Server gives the browser directions in the form of HTML code.

Part of this code orders an ad from the publisher's ad server.

The Ad Server receives information about the browser.

The Ad Server chooses an ad to show the browser.

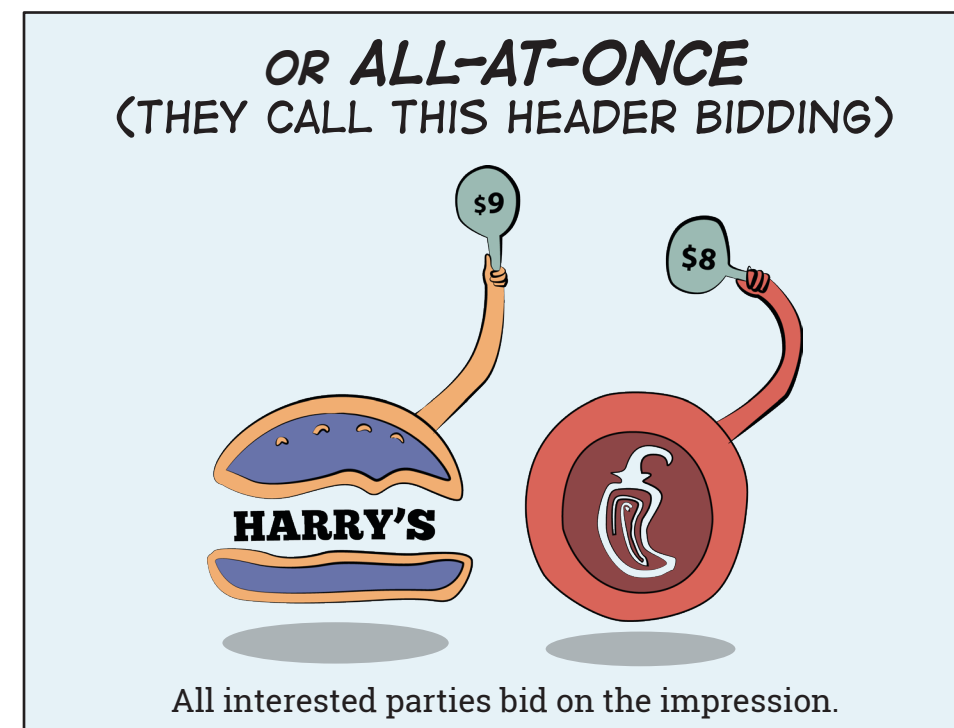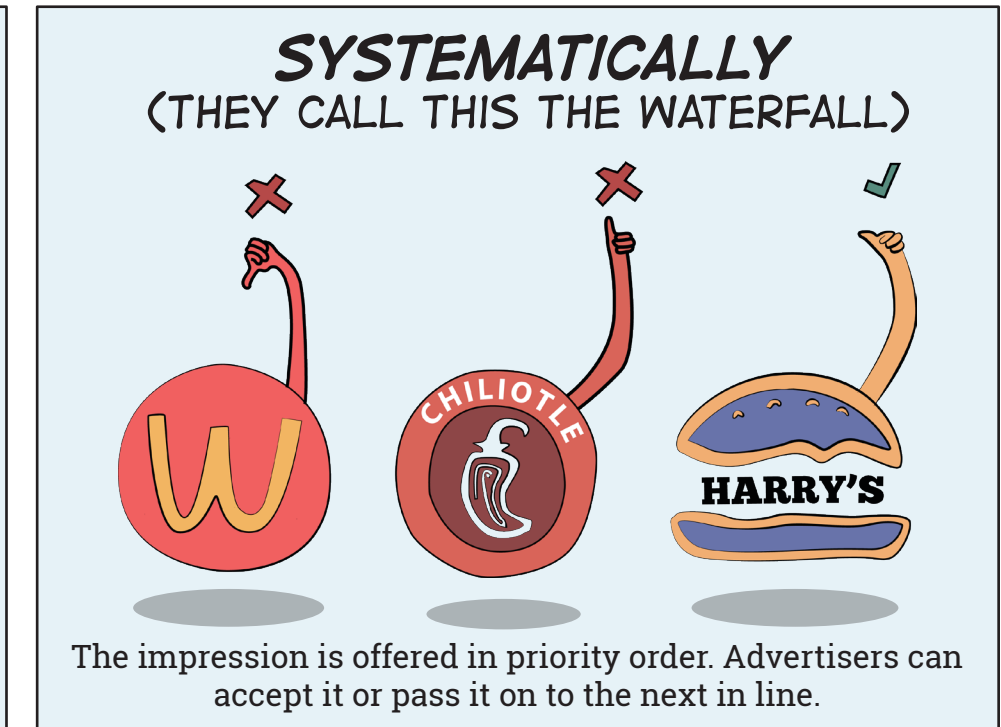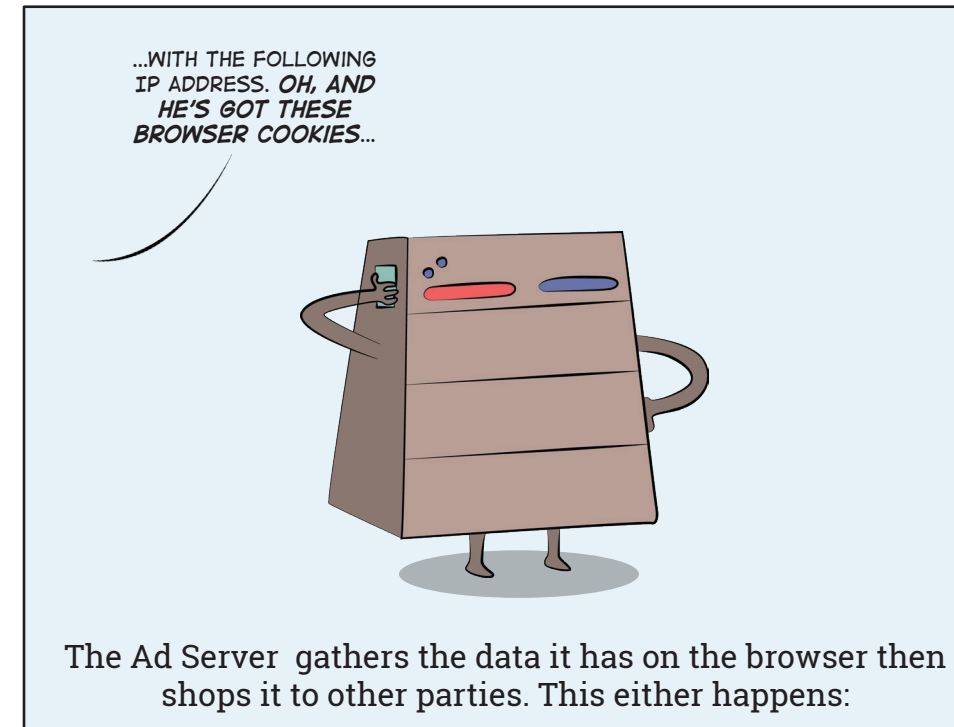An ad is served to the browser and reported.

## How an Ad is Selected

The Server gathers the data it has on the browser (see the previous page) and the impression is then shopped to other parties either systematically (they call this the Waterfall) or all at once (they call this Header Bidding). These other parties receive the data from the impression and check it against their own parameters and data to determine if they want to purchase the impression.

They then either accept the impression, decline it or bid on it depending on their agreement with the website. The Server chooses the highest priority party that accepts (Waterfall) or the highest bidding party (Header Bidding) to serve an ad to the impression.

Note: Bidding may also occur in The Waterfall at different stages.

...WITH THE FOLLOWING IP ADDRESS. *OH, AND HE'S GOT THESE BROWSER COOKIES...*

The Ad Server gathers the data it has on the browser then shops it to other parties. This either happens:



**SYSTEMATICALLY**
(THEY CALL THIS THE WATERFALL)

The impression is offered in priority order. Advertisers can accept it or pass it on to the next in line.



**OR ALL-AT-ONCE**
(THEY CALL THIS HEADER BIDDING)

All interested parties bid on the impression.



**WINNER!!!**

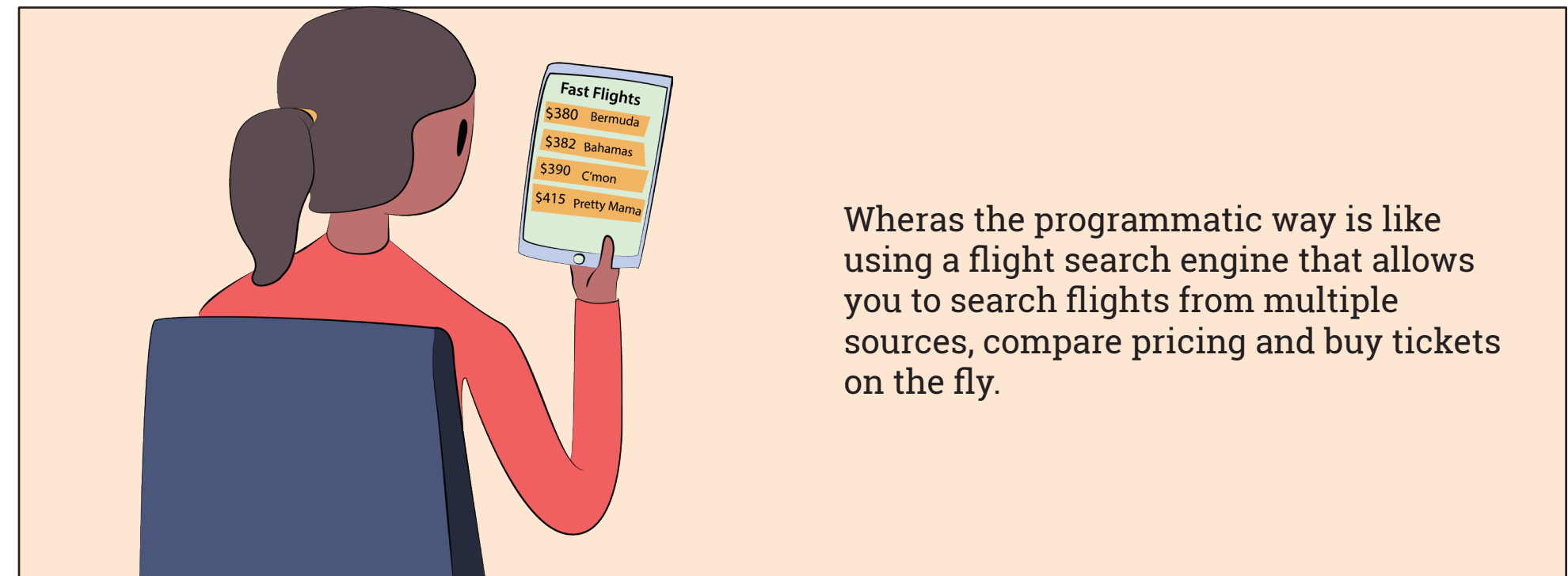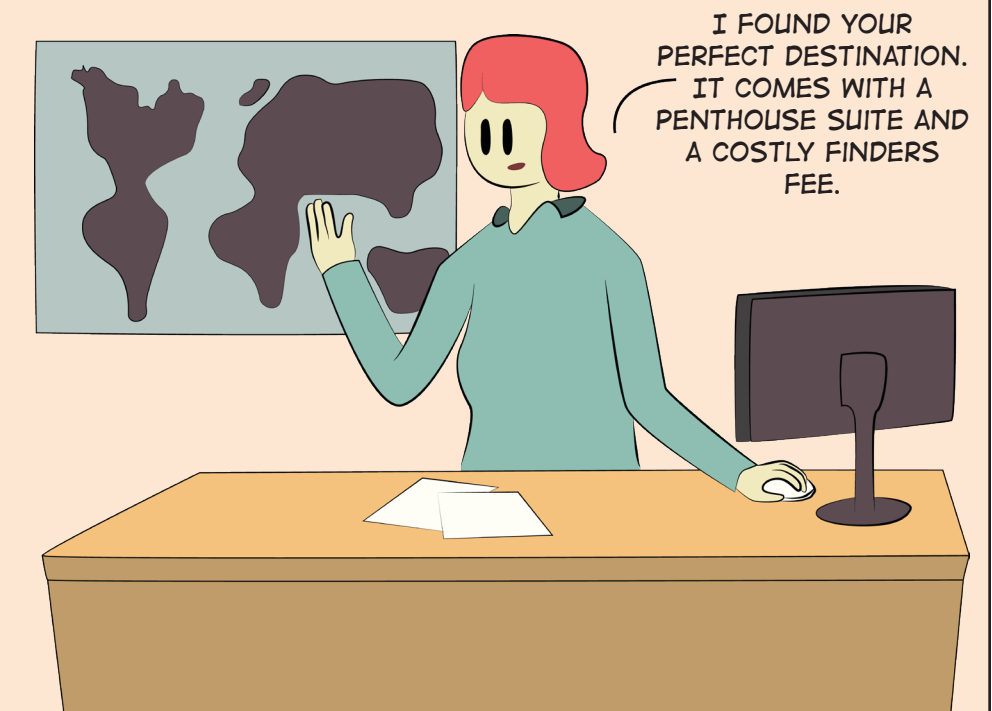A winner is selected and an ad is served.

## Programmatic

**Programmatic** put simply means 'automated'. Programmatic buying is any ad buy that gets processed through machines; Programmatic differs from the traditional process that involves RFPs, human negotiations and manual IO's, because it uses software and technology to purchase digital ads.

It is not to be confused with real-time-bidding (RTB), which is just one type of programmatic ad buying. Some of the main advantages of Programmatic include: data driven targeting (to target the right consumer, at the right time, within the right environment), greater control, and reduced waste.

### It's kind of like booking a flight online...



I FOUND YOUR PERFECT DESTINATION. IT COMES WITH A PENTHOUSE SUITE AND A COSTLY FINDERS FEE.

Traditionally, you would go to (or call) your local travel agency or individual airlines to find and book flights.



Fast Flights
$380  Bermuda
$382  Bahamas
$390  C'mon
$415  Pretty Mama

Wheras the programmatic way is like using a flight search engine that allows you to search flights from multiple sources, compare pricing and buy tickets on the fly.
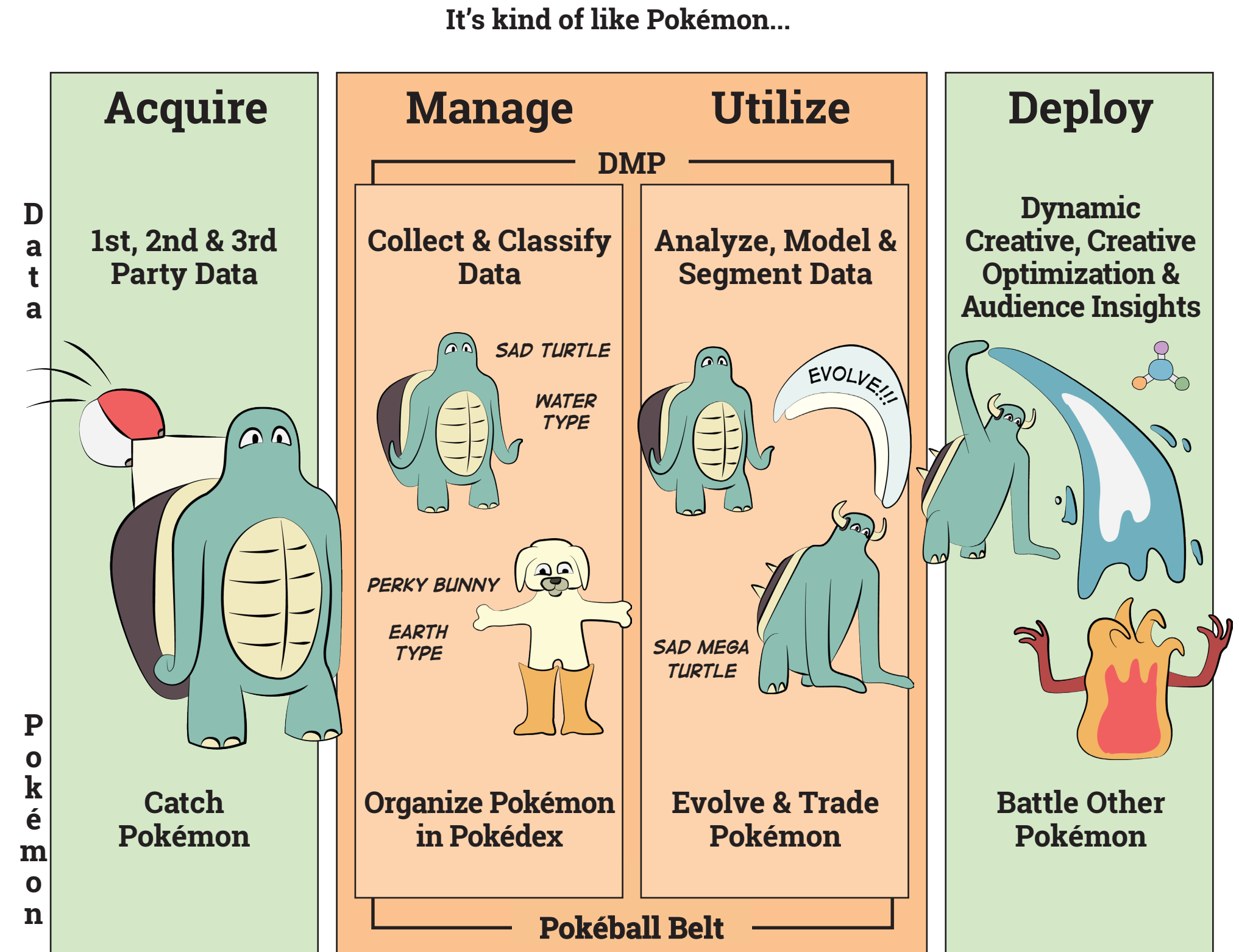
# Data Management Platform (DMP)

A **Data Management Platform** (**DMP**) is a SaaS (Software as a Service) based product that helps marketers host and manage their own "first party" data about their known customers for use in marketing campaigns.

It can provide analytics and insights including:

- How many users fall in each bucket?
- How often can I find those users online in each marketing channel?
- Which of these audiences performs the best when activated through advertising or email?

Or deploy activations into email systems or DSPs.

It's kind of like Pokémon...



**Acquire**

1st, 2nd & 3rd Party Data

Catch Pokémon

**Manage**

DMP

Collect & Classify Data

SAD TURTLE

WATER TYPE

PERKY BUNNY

EARTH TYPE

Organize Pokémon in Pokédex

**Utilize**

Analyze, Model & Segment Data

EVOLVE!!!

SAD MEGA TURTLE

Evolve & Trade Pokémon

**Deploy**

Dynamic Creative, Creative Optimization & Audience Insights

Battle Other Pokémon

Data

Pokémon

Pokéball Belt

## Demand Side Platform (DSP)

A **Demand Side Platform** (**DSP**) is a technology platform where buyers (Advertisers or Agencies) can plan, target, execute, optimize, and analyze digital media buying programs across 100% of the media plan. Through a DSP, the buyer can set targeting criteria, pricing, frequency, and other criteria governing the purchase of digital ad units.

Advanced DSPs provide additional capabilities to the buyer, including: integration of various online and offline data sources, the ability to provision direct media buys (as opposed to just RTB), advanced optimization and decision-making capabilities, and creative tools.
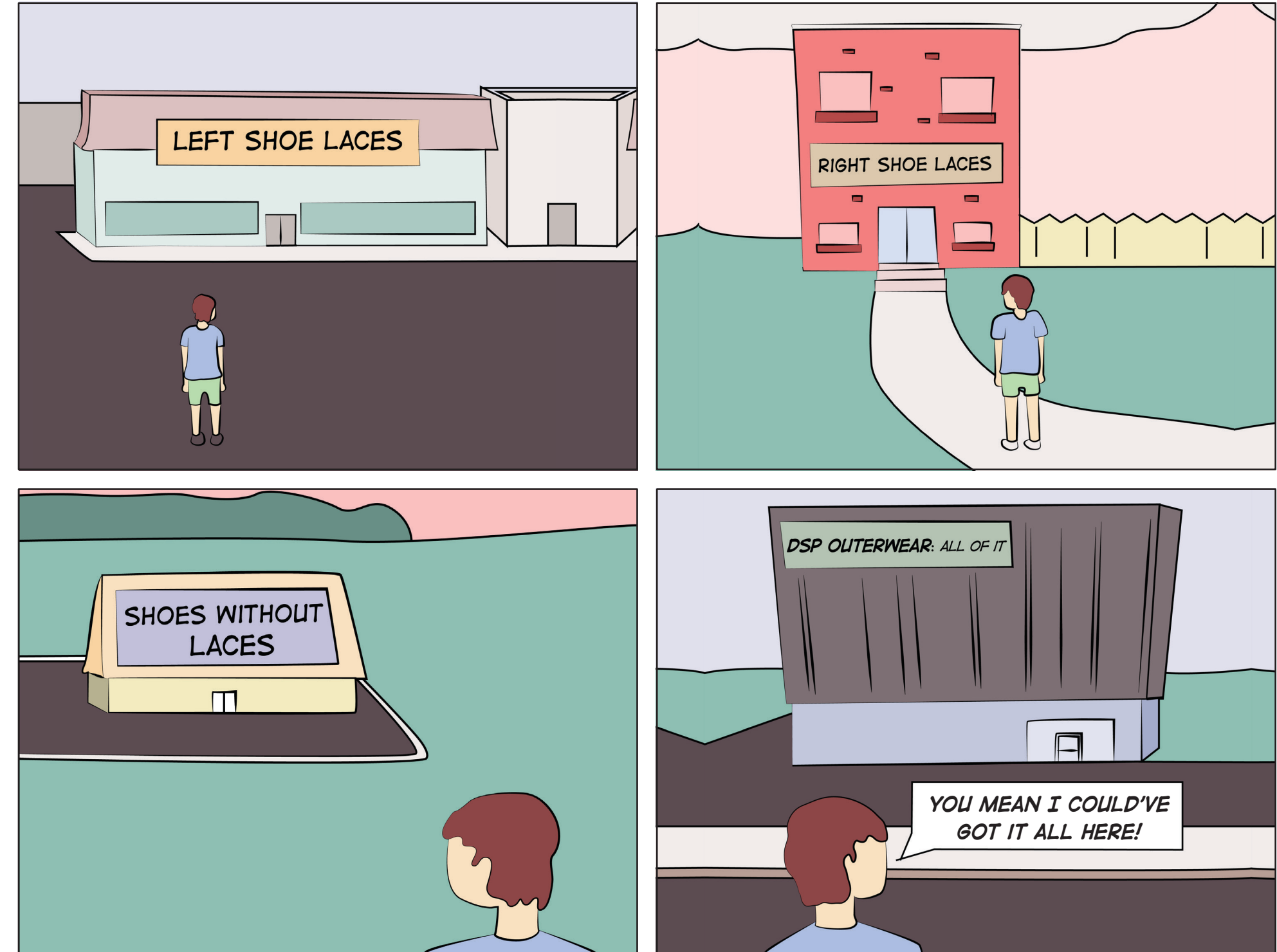
# Attribution Modeling

**Attribution modeling** is the process of identifying the sequence of touchpoints ("events") along the user journey from exposure to conversion that contributed to a desired action (i.e. a sale), and then assigning a value to each of these events.

Attribution models include: first interaction, last interaction, linear, time decay, and custom models.



It's kind of like picking the right outfit...
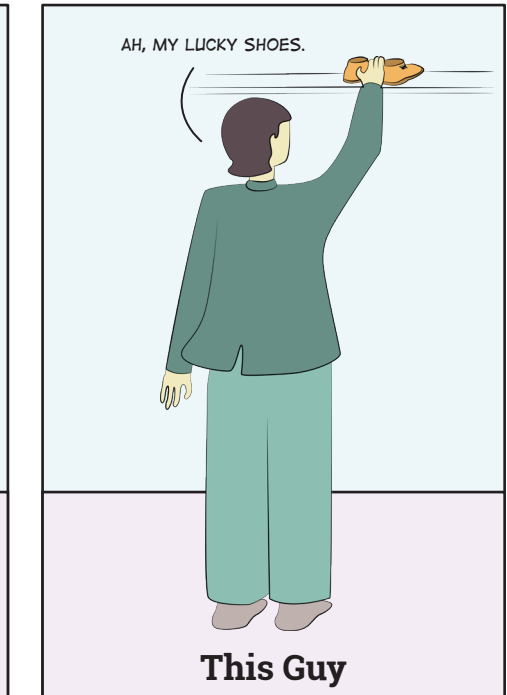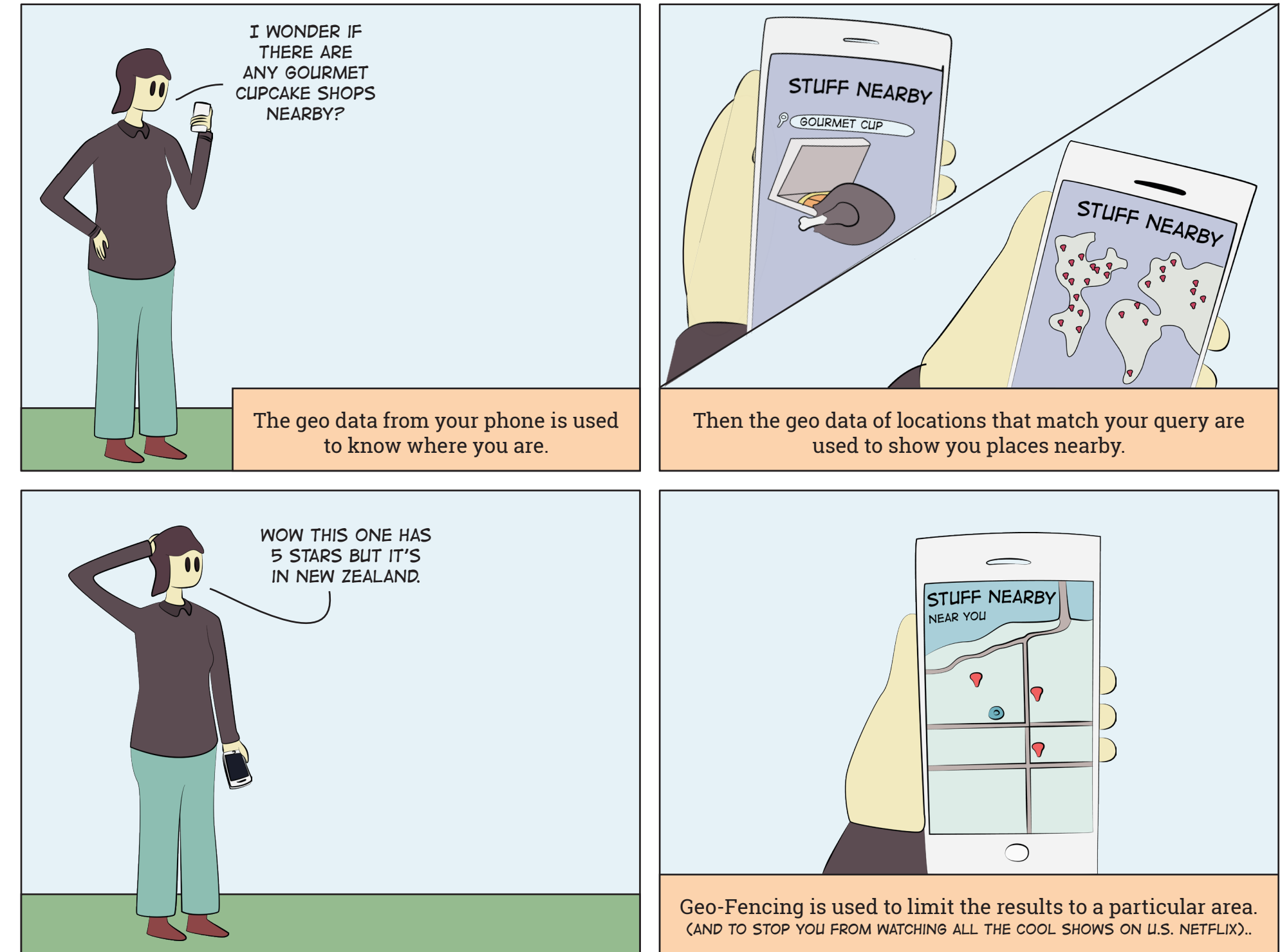
But who gets the credit...
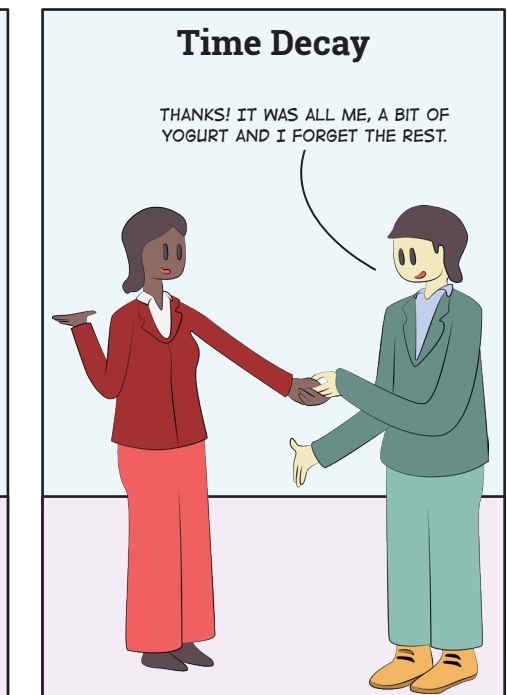
# Geo-Data VS. Geo-Fencing

**Geo-Data** is geographical information that is stored in a digital format and is used by a Geographic Information System (GIS) to locate a person, place or object. Marketers use this to ensure that an organization's digital online presence is accurate and complete.

Geo data also refers to the ability to analyze details about objects or individuals that fall within a defined area.

**Geo-Fencing** is a feature in software programs that uses either Global Positioning Satellites (GPS) or Radio Frequency Identification (RFID) to define a geographical boundary around something. In other words, drawing a big old circle on a map around a specific location you want to target and ignoring anything that falls outside of it.

**It works like this...**



I WONDER IF THERE ARE ANY GOURMET CUPCAKE SHOPS NEARBY?

The geo data from your phone is used to know where you are.

STUFF NEARBY
GOURMET CUP

STUFF NEARBY

Then the geo data of locations that match your query are used to show you places nearby.

WOW THIS ONE HAS 5 STARS BUT IT'S IN NEW ZEALAND.

STUFF NEARBY
NEAR YOU

Geo-Fencing is used to limit the results to a particular area. (AND TO STOP YOU FROM WATCHING ALL THE COOL SHOWS ON U.S. NETFLIX)..

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## Contobox: Dynamic Creative & StoryTell

Dynamic Creative and StoryTell by Contobox are technologies that use data to create more relevant ads. **Dynamic Creative** creates ads for each user based on demographic, contextual, real-time and behavioural data. Each user gets a different ad based on who they are, where they are, and what they do instead of the same ad no matter who they are.
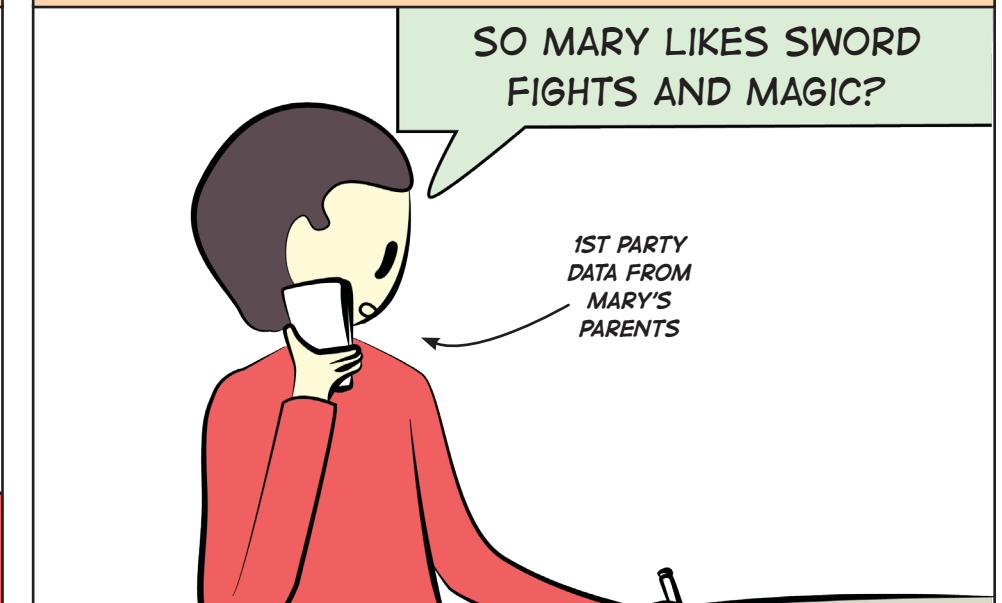
**StoryTell** creates a series of ads that follow users down the purchase funnel. Once a user has interacted with your brand this data is used to give them a new relevant ad based on their actions - like the next chapter in a book. It's the perfect tool to deliver a sequential brand story or to customize offers based on user preferences.
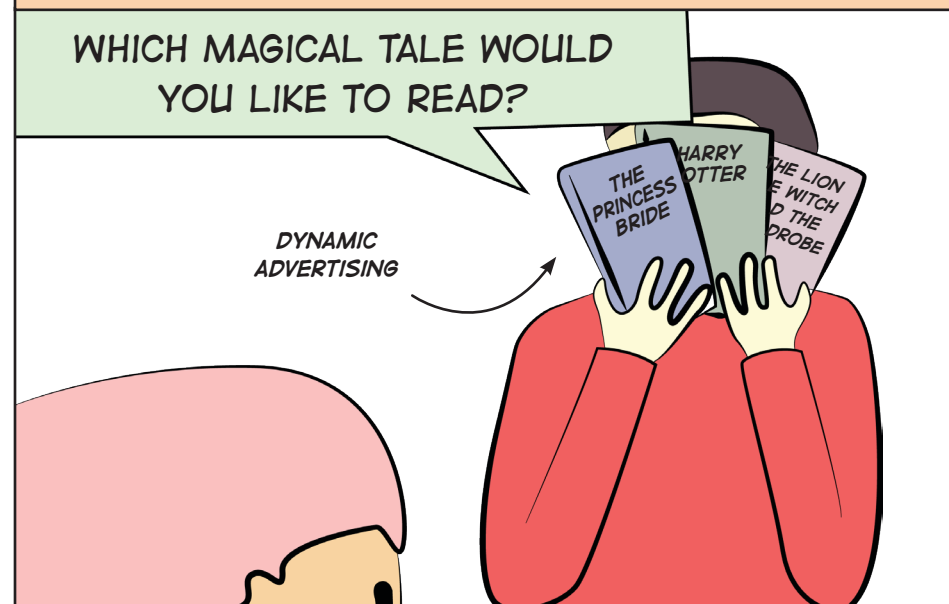
### It's kind of like babysitting...
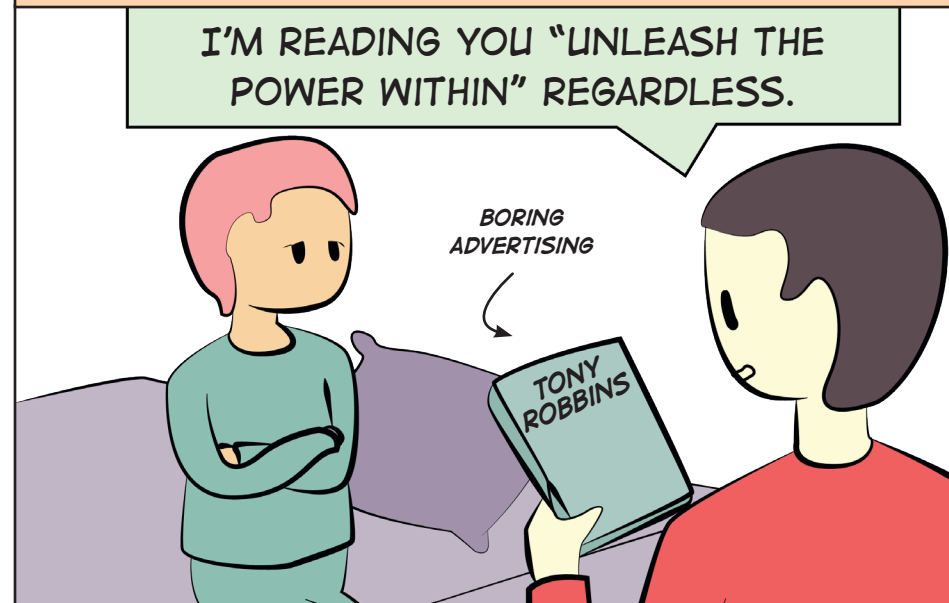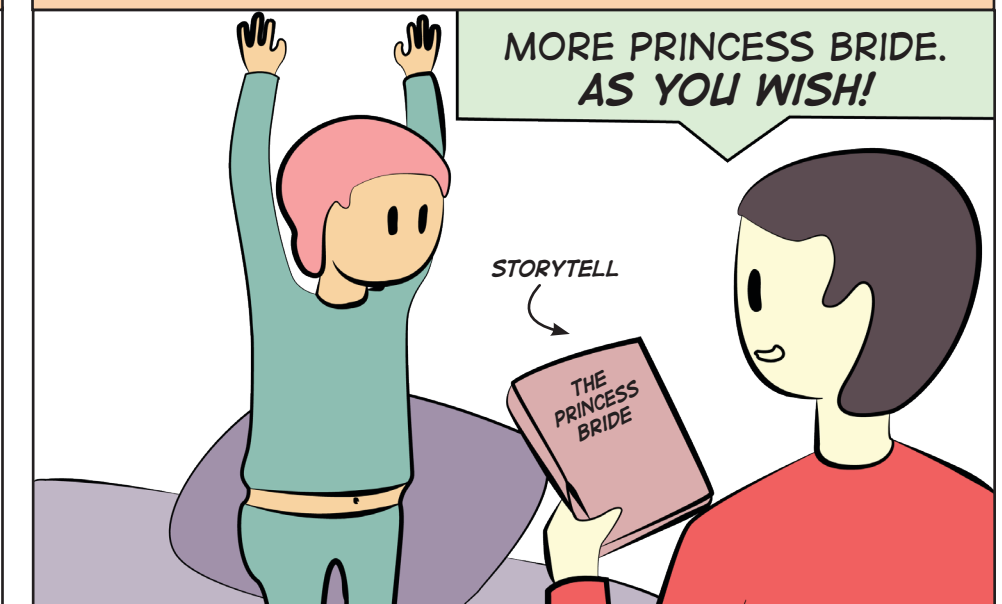
## Key Performance Indicator (KPI)

Often confused with business objectives, a **Key Performance Indicator (KPI)** is a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs to evaluate their success at reaching targets.

### KPIs

• Are SMART = Specific, Measurable, Actionable, Realistic, Time-Related
• Are quantifiable/measurable & actionable
• Measure factors that are critical to the success of the organization
• Are tied to business goals & targets
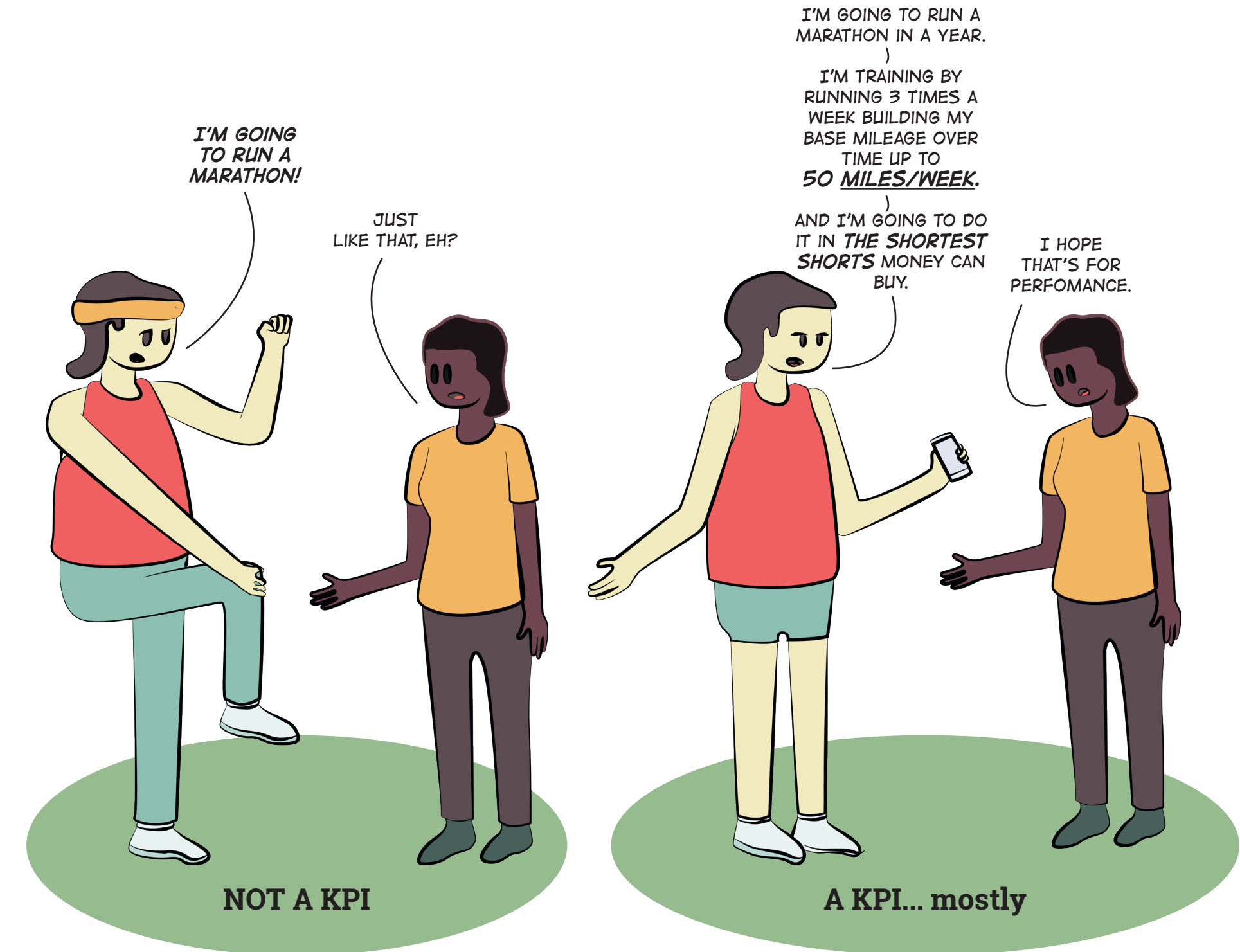• Are applied consistently throughout the company
• Are aligned or associated with an objective or business strategy
• Are measured against a goal

**It's kind of like training for a marathon...**



I'M GOING TO RUN A MARATHON!

JUST LIKE THAT, EH?

I'M GOING TO RUN A MARATHON IN A YEAR.

I'M TRAINING BY RUNNING 3 TIMES A WEEK BUILDING MY BASE MILEAGE OVER TIME UP TO *50 MILES/WEEK.*

AND I'M GOING TO DO IT IN *THE SHORTEST SHORTS* MONEY CAN BUY.

I HOPE THAT'S FOR PERFOMANCE.

**NOT A KPI**

**A KPI... mostly**

## "Clean" Impressions

All impressions are not the same. Recording a page request is only the beginning. As one digital media leader states, "If an ad can't be seen, it's worthless…". Measures that can be taken to ensure the quality of an impression:

1. Use an ad verification solution to help ensure an impression is viewed by humans.
2. Employ brand safety practices & technologies so that an ad appears in the brand appropriate environments.
3. Compare your media's viewability metrics against industry or company benchmarks.
4. Understand industry viewability trends, viewability definitions, and the limitations of current measurement technology.
5. Be aware of/educated of ad fraud tactics.

### It's kind of like Halloween candy...



Most houses give out candy on Halloween.

But not all candy is quality candy.

TWO FULL CHOCOLATE BARS AND A POP. *JUST LIKE LAST YEAR!*

That's why it's better to know what houses offer the goods.

ROCK

TOOTSIE ROLL

CANDY CORN

BOT TRAFFIC

Like candy on Halloween, the quality of impressions is important. If an ad is not in a brand safe environment or viewed by a human, that ad is pretty much worthless.
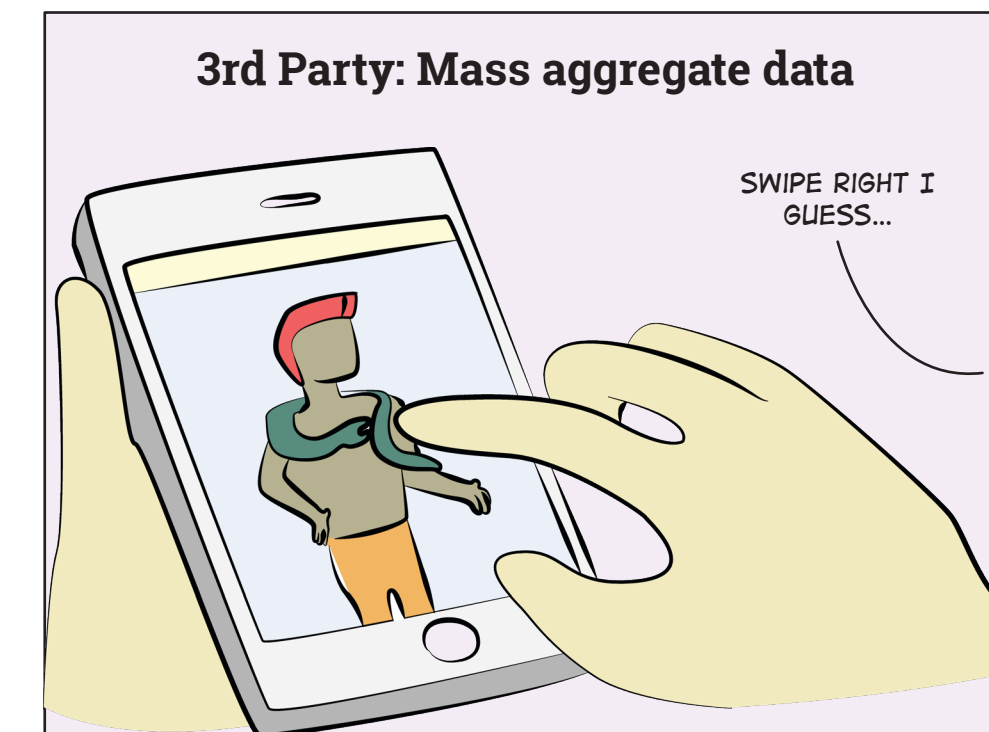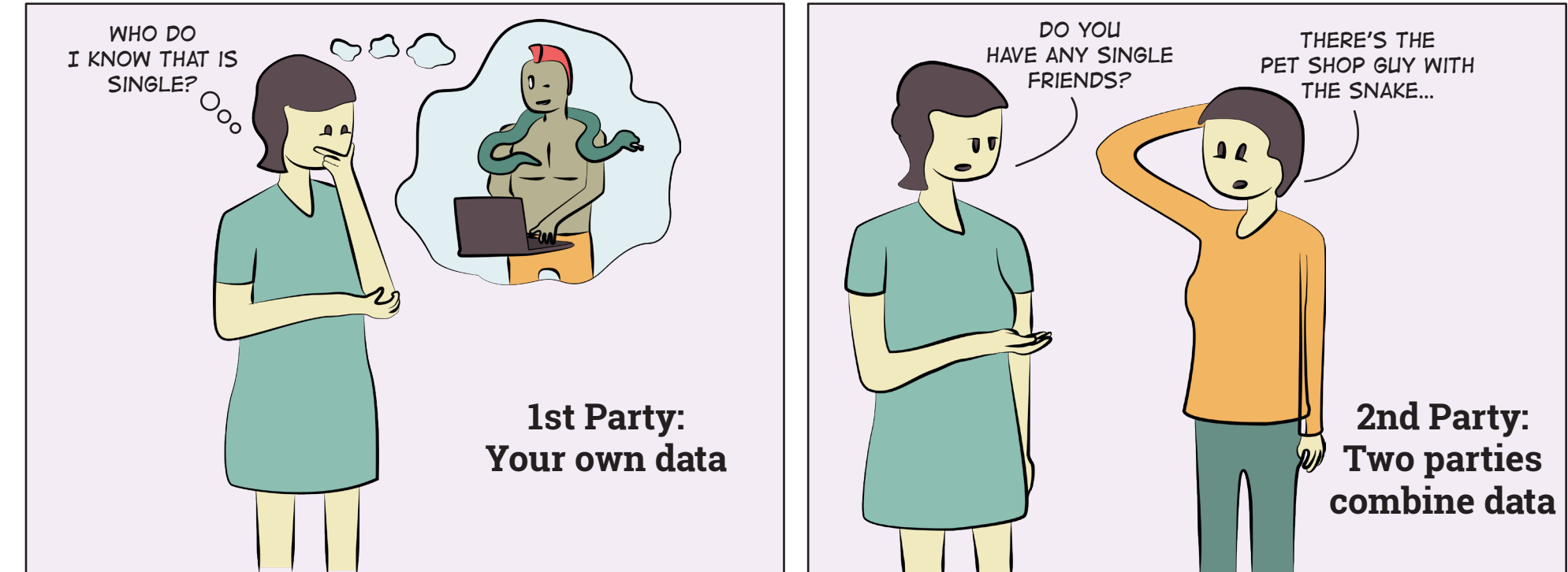
## 1st, 2nd & 3rd Party Data

**1st Party Data** is collected by you – internally. It provides insight into your own audience/consumer.

**2nd Party Data** is fairly new to the scene. It occurs when two parties combine their 1st party data to strategically enhance and/or grow audiences.

**3rd Party Data** is nonpartisan data that provides insights into audience segments and/or competitors. It is aggregated by nature.

It's kind of like finding a date...



WHO DO I KNOW THAT IS SINGLE? Ooo

**1st Party: Your own data**



DO YOU HAVE ANY SINGLE FRIENDS?

THERE'S THE PET SHOP GUY WITH THE SNAKE...

**2nd Party: Two parties combine data**



**3rd Party: Mass aggregate data**
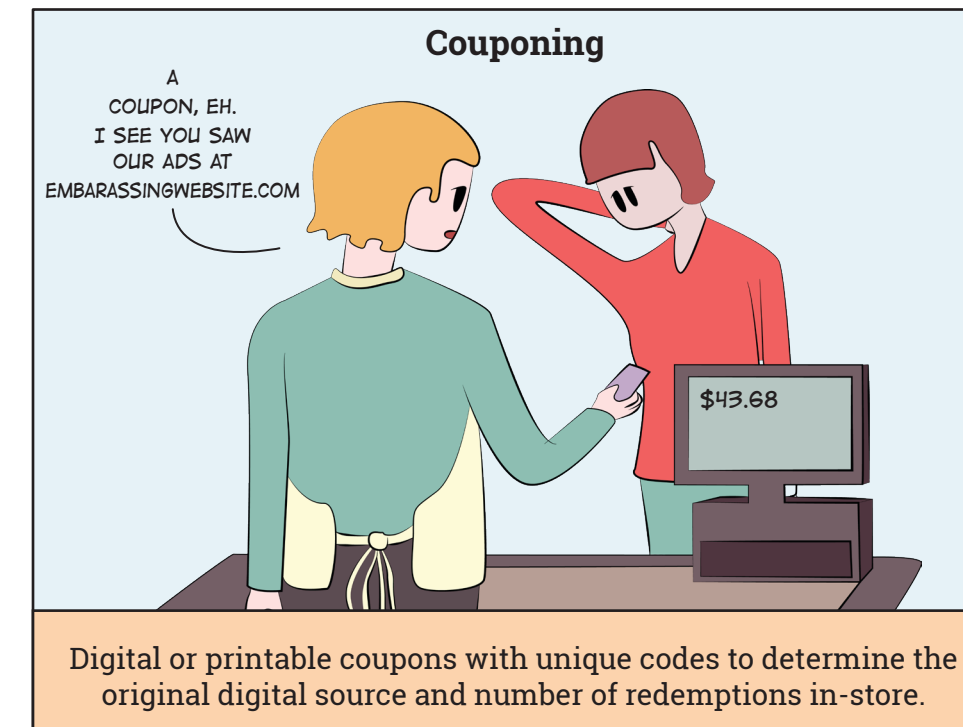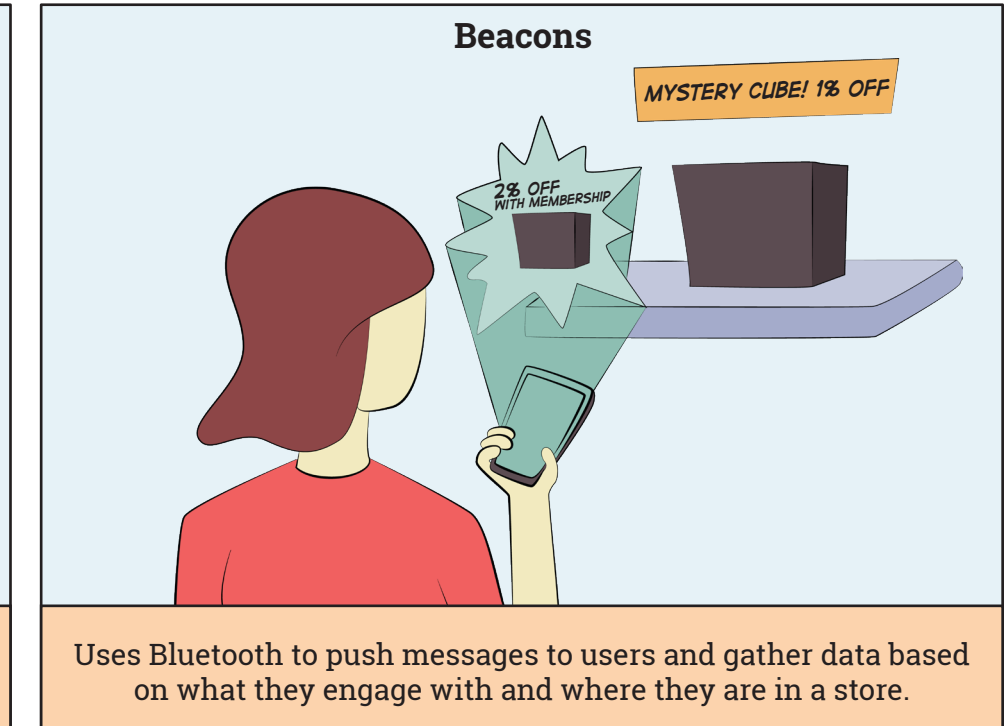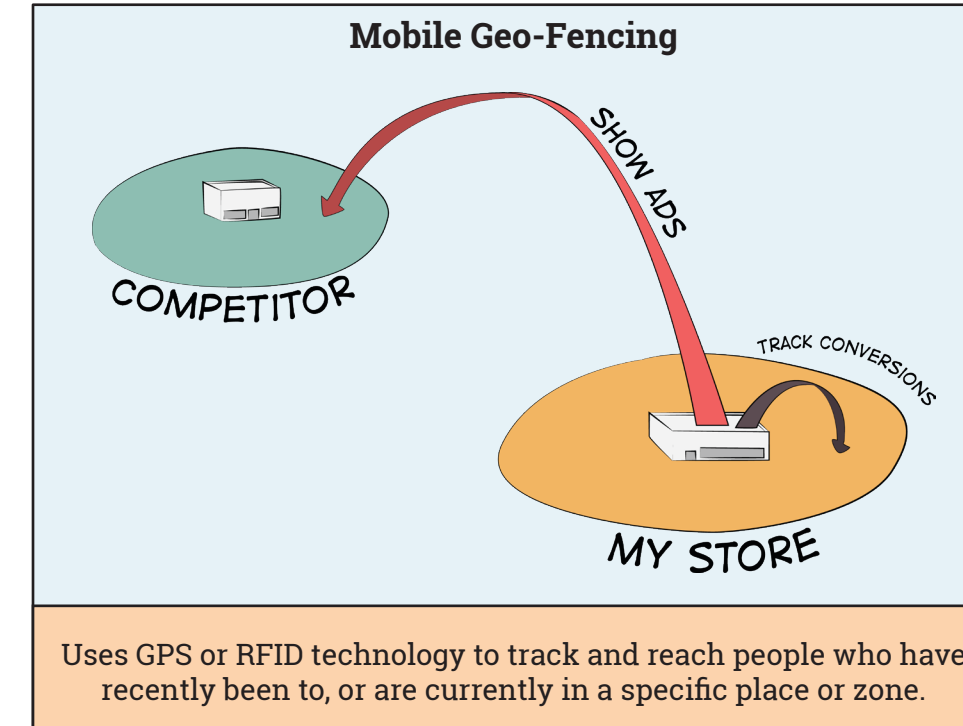
SWIPE RIGHT I GUESS...

## Online to Offline Conversions

Online and offline conversion tracking connects the dots between being exposed to a campaign and taking action. In a nutshell, a user needs to be "stamped" (through a unique identifier) in the online and offline world so activity in both places can be mapped to the same person.

Though there still isn't a silver bullet, we've come a long way from QR codes. With the rise of new data and technology we're now able to better find, target, and track users between online and in-store.

**Mobile Geo-Fencing**

COMPETITOR
SHOW ADS
MY STORE
TRACK CONVERSIONS

Uses GPS or RFID technology to track and reach people who have recently been to, or are currently in a specific place or zone.

**Beacons**

MYSTERY CUBE! 1% OFF
2% OFF WITH MEMBERSHIP

Uses Bluetooth to push messages to users and gather data based on what they engage with and where they are in a store.

**Couponing**

A COUPON, EH. I SEE YOU SAW OUR ADS AT EMBARASSINGWEBSITE.COM
$43.68

Digital or printable coupons with unique codes to determine the original digital source and number of redemptions in-store.

**Check-in Offers and Loyalty Programs**

HEY LOYAL CUSTOMER!
PURCHASE THIS PRODUCT ONLINE AND COLLECT IT IN STORE TOMORROW FOR A DISCOUNT! WOAH!

Offers promoted online that are redeemable in-store.

## ROI VS. ROAS

**Return on Investment** (ROI) is the overall profit from a strategy or initiative. When talking about an ad campaign this includes the production costs and the media costs. As a KPI, it lets senior level execs see how advertising contributes to a business overall.

**Return on Ad Spend** (ROAS) is the profit from a tactical ad campaign. ROAS does not include production costs and focuses on the media spend. This KPI lets campaign managers see which layers of a campaign are performing and optimize towards higher ROAS.

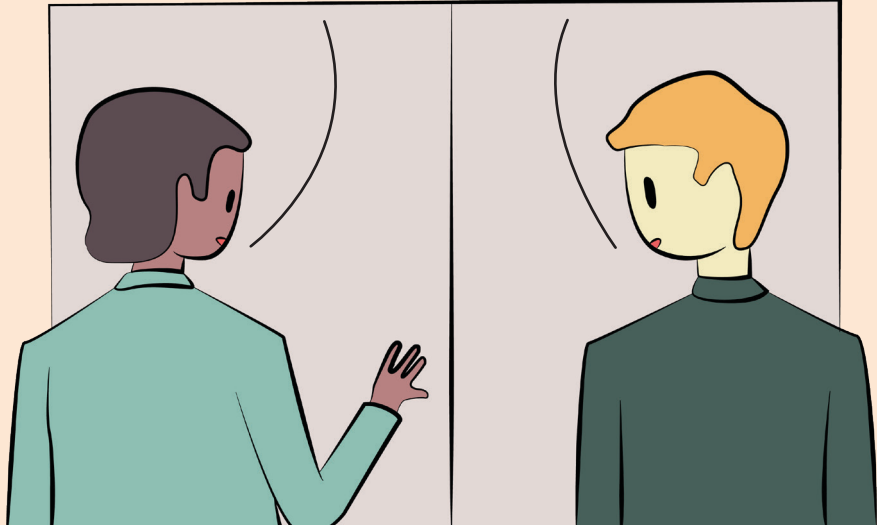### Follow along in the examples below...



**ROI**
= profits-costs x 100 / costs

**Profits**
10-Pack Hot Dogs: $450K
Single-Serve Hot Dogs: $550K
**TOTAL PROFIT: $1M**

**Costs**
Media Buy: $6K
Film Shoot: $14K
CGI Hotdog: $1.98M
**TOTAL COSTS: $2M**

**ROI** = $1M-$2M x 100 / $2M
**ROI = -50%**

THE CAMPAIGN CAN BE PROFITABLE IF WE LIMIT HOW MUCH WE SPEND ON THAT *CGI TALKING HOT DOG.*

*CGI?*

**ROAS**
= gross revenue from ad campaign
cost of ad campaign

**Websites**
Revenue from hotdogfam.com: $600
Cost of ads on hotdogfam.com: $100
**hotdogfam.com ROAS: $6.00**

Revenue from relishtoday.com: $800
Cost of ads on relishtoday.com: $200
**relishtoday.com ROAS: $4.00**

Revenue from nobeef.ca: $1,000
Cost of ads on nobeef.ca: $100
**nobeef.ca ROAS: $10.00**

NOBEEF.CA IS OUTPERFORMING THE OTHERS BY A BIG MARGIN. *ISN'T IT A VEGETARIAN SITE?*

HOT DOGS ARE VEGAN, UNLESS ONE OF THE OLD SHOES THEY USE HAPPENS TO BE LEATHER.

NOBEEF.CA  1
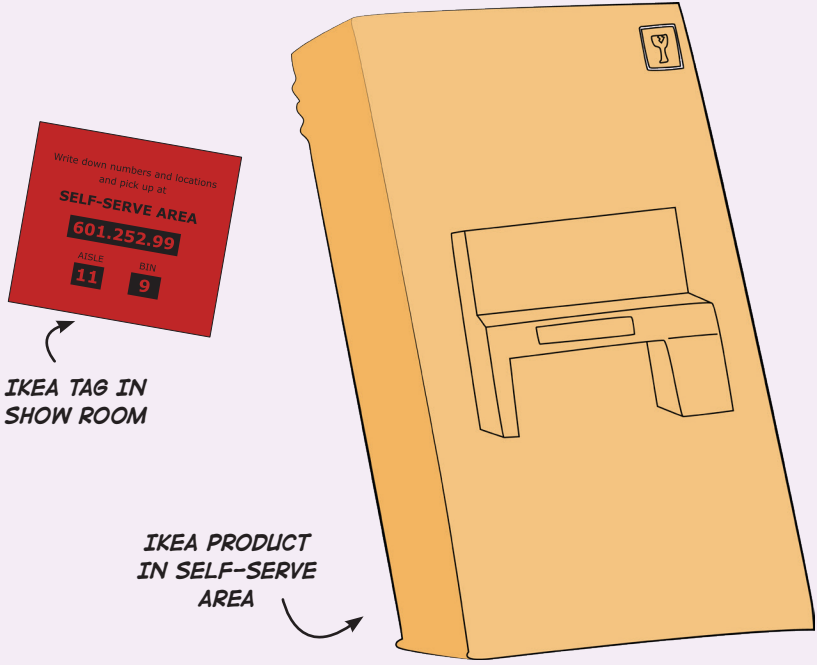HOTDOGFAM.COM  2
RELISHTODAY.COM  3

## Deterministic & Probabilistic Data

**Deterministic data** is definitive data created with 1 to 1 matching of two or more data sets based on unique identifiers. In the digital world these data sets are built by taking cookies or mobile IDs and matching them with commonly used identifiers such as names or email addresses. Deterministic data is very accurate but hard to scale.

**Probabilistic data** relies on identifying patterns in an audience group to create a reasonable approximation of answers. Data scientists use deterministic data to build larger groups of targeted audiences with a high probability to be accurately profiled. They do this by observing relational patterns from multiple datasets and segmenting these into larger look-a-like groupings. Probabilistic data is less accurate but provides larger scale and reach.



### It's kind of like IKEA...

**IKEA TAG IN SHOW ROOM**

**IKEA PRODUCT IN SELF-SERVE AREA**

### Deterministic

*DATA*

*DESK SHOW ROOM TAG:*
AISLE 11
BIN 9

*SELF-SERVE AREA:*
DESK IS LOCATED IN
AISLE 11 BIN 9

We can **determine** where the desk will be located in the Self-Serve area from the showroom tag... unless some troll moved it.

### Probabilistic

*DATA*

*JACOB:*
IMPATIENT
GETS FRUSTAED EASILY

*DESK:*
HARD TO ASSEMBLE
USUALLY REQUIRES 2 PEOPLE

It is highly **probable** that Jacob will not be able to put the desk together on his own.

*UNASSEMBLED DESK*

*JACOB*

# Glossary

**1st Party Data:** Data collected internally. This data is owned and operated by whomever owns it (ex: brand marketer, content publisher or agency), and can consist of, but is not limited to: audience, customers, attitudes, preferences or behaviours.

**2nd Party Data:** Fairly new to the scene, 2nd party data occurs when a strategic partnership takes place between two entities to benefit (and sometimes share) 1st party data. Think of 2nd party data as a way to directly enhance your 1st party data, giving you the ability to reach a larger audience, or different (even new) segments. This share can happen through: a Data Management Platform (DMP), Master Cookies or Independently.

**3rd Party Data:** Data collected by a nonpartisan party. 3rd party data has the ability to enhance 1st party data by providing insights into segments of consumers and competitors; useful for benchmarking purposes.

**Ad Exchange:** Ad exchanges allow Advertisers to bid on inventory that Publishers make available in real-time.

**API - Application Program Interface:** An API is a program that allows the user to amalgamate data points offered through different data sources (often different software applications) into one place. By connecting these disparate data sources together and housing them in one spot, data points become more coherent.

**Attribution Modeling:** Attribution modeling is the process of identifying the sequence of touchpoints ("events") along the user journey - from exposure to conversion, in order to know what caused a desired action (i.e. a sale). Each event is then assigned a value. Examples found in attribution models may include: first interaction, last interaction, linear, time decay, and custom models.

**Big Data:** Data that, by its complexity of sheer volume or velocity (volume per unit time), cannot be conveniently processed using the old generation of tools either due to IO or CPU bottlenecks. Note that data volume and CPU load depend critically on how the data is represented; there are always trade-offs.

How big is 'big' is an ever-present problem, and moving target, but can be identified as:
1. Does not fit in memory (some GB) and so requires out-of-core processing
2. Does not fit on a disc (some TB) and so requires disc arrays or distributed storage
3. Too big to be stored anywhere (>~PB) and can only be processed with streaming
4. Easily parallelized  CPU-heavy calculations (e.g., ETL transform/filter) can be spread to many CPUs/machines/data centres
5. Complex algorithms (e.g., machine learning) requires a dedicated cluster and message-passing/scheduling techniques

**Binary Decisioning:** Reducing a problem down to a set of yes and no questions. Often represented as a flow or tree diagram.

**Clean Impressions:** The IAB defines impressions as the measurement of responses from a Web server to a page request from the user's browser, which are filtered from robotic activity and error codes and is recorded at a point as close as possible to the opportunity to see the ad by the user. However, this definition of an ad impression may not guarantee that a marketer's ad is seen by a person.  As one digital media leader states, "The twin issues of viewability and fraud are the ugly sisters of online advertising. If an ad can't be seen, it's worthless…"  Specifically, when a marketer is buying digital media, they should ask what measures are taken to ensure the quality of an impression (AKA a 'clean' impression).

Such industry pronouncements are simple and powerful axioms that should drive how quality media is evaluated. But in practice, it is not nearly that simple from an implementation perspective. Tracking and confirming that an impression is clean is in fact, an emerging discipline, requiring third party technologies that are still developing. As such, it is necessary that a marketer take steps to understand:
1. The complex array of vendors:  3rd Party Ad Server solutions, Media solutions, 3rd Party Verification solutions.
2. Technical limitations of the technologies: Measuring non-standard ads, Vendors' technologies and methodologies yield variances, 'unfriendly' iFrames in Display & Mobile web, Mobile app require SDKs from 3rd Party Verification vendors to be implemented. There are also limitations with video (i.e. sound detection and tracking limitations in Connected TV environments).  These are some examples of technical limitations of viewability.

3. Brand Safety:  Practices & technology that ensure an ad does not appear in a context that will harm the brand.
4. Viewability Definitions:  Measured impressions versus In-view impressions.
5. Viewability Benchmarks:  MRC versus GroupM standards.
6. Fraud typically in the form of: Phony traffic brokers, ghost sites, masking URLS in bid stream, and hiding ads.
7. Trends associated with Ad Viewability that vary across Display, Video, and now Mobile channels.  Mobile measurement presents challenges to current verification technologies.
8. Costs.

There are many factors behind identifying a 'clean' impression, of which all stakeholders in the digital media ecosystem need to be vigilant of. When it comes to viewability and fraud, all must be involved in the solutions and adopt/insist on transparent media sourcing practices.

**Cookies:** Within the digital context, cookies are a piece of code (think: small file) passed from a web server to a user initiated browser. Their purpose is to allow a website to remember a user and their preferences upon their return to the site.

**Cross Platform Analytics:** Cross platform analytics refers to the ability to understand the behaviour of an individual across a variety of different devices such as: desktop, mobile, tablet, Over The Top (OTT) and any other connected device.

**Data Analytics:** Data analysis finds models that describe the data and parameters of which can have real-world meaning

to predict outcomes for combinations of inputs. For example, analytics can show that two variables - education level and income, are correlated. By using this measured relation, we can predict an individual's income, based on inferences made from the data sample (possibly given other information and relationships too).

Data => information (=> model) => conclusions (inferences, insights) => decisions

**Data Science:** This is a continuously evolving term, but can be applied to: ETL (parsing, ingestion, cleaning), data warehousing, modeling and analytics (particularly for big data), visualisation and business intelligence. Data science tends to be associated with new and emerging technologies under big data, machine learning and more intricate statistical analyses.

**Data Streaming:** Occurs when you are processing data in "real time", as it comes down the pipe from the real world, either by writing an extract of the useful parts for a later standard (i.e. "batch" processing), or modifying model parameters on the fly, such that the model always represents the current best-guess of the state of the system.

**Data Visualization:** Producing graphical representations of models and data which best illustrate relationships between variables. May be static or interactive, multi-dimensional and colourful, but showcases data in a more visual way, making it easier to interpret.

**Demand-Side Platform (DSP):** A software platform that executes a programmatic buy; advertisers have the ability to purchase ad inventory through an exchange.

**Deterministic Data:** Refers to the analysis of data that is known to be true. Examples include: name, address, phone number, credit card number etc. In other words, your digital fingerprint. Deterministic data is extremely difficult to fake, and therefore presumed to be accurate.

**Earned Media**: Refers to a brand's presence on channels that was gained through editorial influence, versus direct advertising (paid for media advertising). The key role that earned media has for a brand is to help expand reach and credibility of the brand's message, without incurring a direct cost to do so. Earned media is sometimes an intended outcome of marketing efforts but happens naturally - without force. Some examples include, but are not limited to: word-of-mouth through social mentions, shares, reposts within social media, reviews, and influencer outreach.

**Geo-Data:** Information about a geographical location held in digital format. Examples include: longitude and latitude of a brick and mortar location.  Geo data refers to a bunch of numbers that are used by a computer to pinpoint the location of something.

**Geo-Fencing:** A feature in software programs that uses Global Positioning Satellites (GPS) or Radio Frequency Identification (RFID), to define a geographical boundary around something. Geo fencing draws a circle around a specific location you want to target, and ignores anything that falls outside of said circle.

**Intelligent Decision Automation (IDA):** IDA combines both artificial intelligence and automation for aggregating, extracting and analyzing complex, unstructured data (i.e.: human speech or unstructured text), in order to come to a conclusion on the information collected.

**KPI's:** KPI's are SMART = Specific, Measurable, Actionable, Realistic and Time-Related. They measure an action and align with a specific objective or business strategy. Generally speaking, KPI's are factors that are critical to measure in order to help answer your business questions to determine whether or not you are still on course to meet a predetermined requirement. In understanding the outcomes of several different KPI's, an organization can determine what their future course of action will be in order to be successful. Some attributes to consider when understanding KPI's might be: a trend, actual/landed vs. goal/target, percentage change, and variance, to name a few.
Business KPI's - are often overlooked but are 'nice to knows' that are not always measurable. They tend to be values of information that track business activities of a specific area (i.e. sales metrics, marketing metrics etc.)

**Look-alike Modeling:** Look-alike modeling is a way to build incremental reach by building a larger audience from a subset of a smaller audience that is an important segment to your business. This model is commonly applied to the programmatic space.

**Owned Media:** Is media, content, assets, and community platforms that are partially or wholly owned and controlled by the brand. The key role that owned media has for brands is that it acts like more of a platform to house robust brand content and create long-term relationships and engagement with customers. Some examples include, but are not limited to: pre-existing website properties, mobile and video channels, social properties or links, and email databases.

**Paid Media:** Occurs when advertising channels are bought to deliver a brand's message and / or drive traffic to owned and controlled properties. The key role that paid media has for a brand is to create awareness, drive traffic and jumpstart owned, earned and shared efforts. Some examples include, but are not limited to: pay per click, display advertising, retargeting, paid influencer outreach, and social media

**Personally Identifiable Information (PII):** Personally Identifiable Information pertains to data that is unique and specific to you as an individual, and is deterministic in nature.

**Personal Analytics:** Analytics derived from your owned and operated devices which track, collect, and report data specific to you. An example of such devices would be wearables (i.e. FitBit, Garmin).

**Predictive Modeling:** Using data analytics for descriptions and implied predictions. This requires extrapolation outside of the original parameter space (e.g., given past data, predict for the future), and a corresponding understanding of the uncertainties inherent in the model.

# Glossary

**Probabilistic Decisioning:** Given models with sufficient understanding of uncertainties (~"error"), a prediction becomes not just a single value, but a range of possible values and typically used as a confidence interval. When wishing to base a decision on such a prediction, one needs to know the likelihood of being above or below a threshold. In short, the probable outcomes, i.e. the ROI, needs to be weighed against the predicted probability of circumstances that align unfavourable, so that they outline the "risk".

**Probabilistic Data:** Is data that is either unknown or has such an array of knowns that it prevents it from being objective. Probabilistic Data requires subjective statistical analysis in order to interpret. In other words, information that is not self-evident and requires some degree of thought in order to understand.

**Programmatic:** Programmatic put simply means 'automated'. Programmatic buying is any ad buy that gets processed through machines; programmatic differs from the traditional process that involves RFPs, human negotiations and manual IO's, because it uses software and technology to purchase digital ads. It is not to be confused with real-time-bidding (RTB), which is just one type of programmatic ad buying. Some of the main advantages of Programmatic include; data driven targeting (to target the right consumer, at the right time, within the right environment), greater control, and reduced waste.

**Real-Time Analytics:** Refers to the ability to access data as soon as it becomes available, opening up the opportunity to respond to changes in user behaviours quickly. Generally speaking, this means obtaining data within a minute following an action; there is no lag in time from when an action happens to when you are able to collect data on said action. These actions may include, but are not limited to: page views, website navigation, shopping cart usage, website conversion etc.

**Real-Time Bidding (RTB):** Works similar to a stock exchange in that advertisers (or their DSP) can bid on an ad impression, based on a CPM and/or segment of interest, all in real-time. If the bid wins, the ad is instantly displayed on the site.

**Static (Persistent) Data:** Data that does not change (as opposed to dynamic data, or the extreme: streaming data). Relationships can be calculated exactly once as the data may rarely change, if at all. Dynamic data can become static one it is obsolete, i.e., the latest version of a document is dynamic, but the archive of previous versions is static.

**Streaming Analytics:** Analyzing data in real-time, generally for the purpose of making immediate decisions, such as in-flight or medical decisions. Data comes from multiple machines, sensors, and other equipment and is sometimes subject to latency issues.

**Supply-Side Platform (SSP):** A software platform that allows publishers of digital content to help sell their ad inventory.

**Visual Business Analytics:** Software that makes complex data sets visually digestible.

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