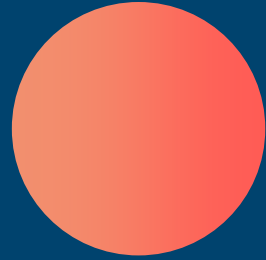


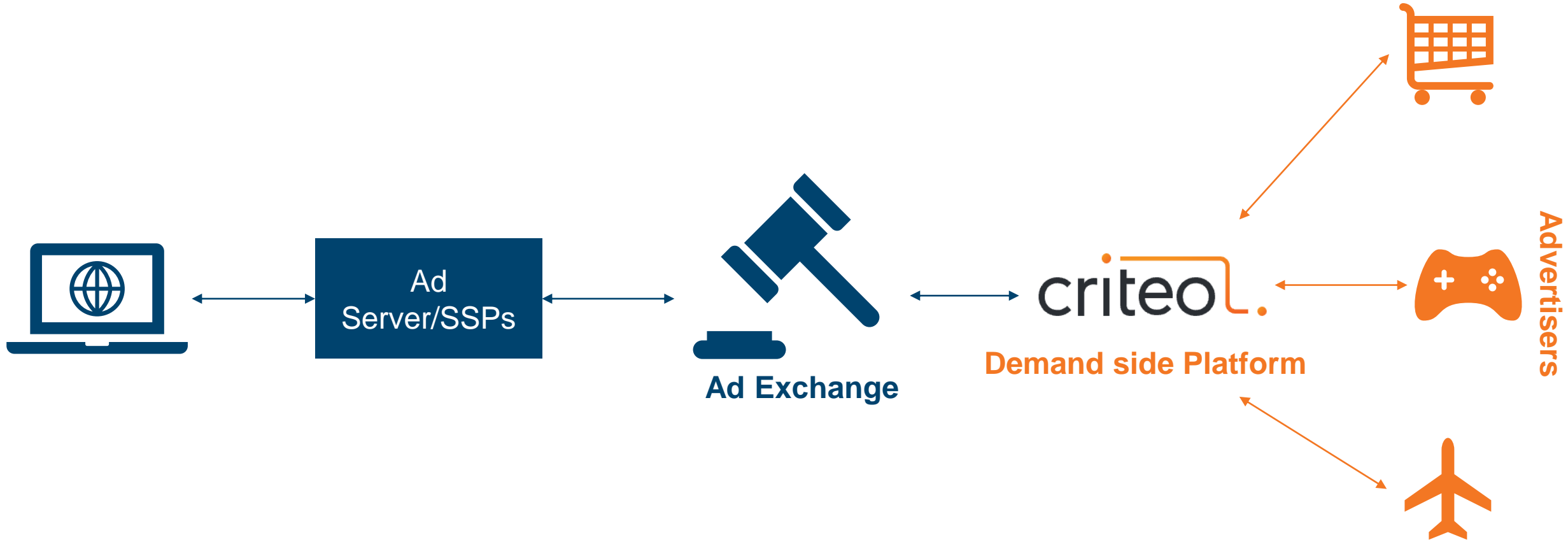


On the causality of advertising

Vincenzo D'Elia, v.delia@criteo.com

AdKDD'19







20,000

Advertisers
(incl. 1000+ Brands)

95+

Countries



Awareness

Consideration

Conversion

Marketing Goals

Generate interest in your products or services

Get people to consider your products or services

Encourage interested people to purchase

Ad Objectives

Brand Awareness

Video Views

Traffic: Web, App

App Installs

Conversion: Web, App

Store Conversions

Optimization

Reach

Views

Visits

Installs

Purchase
(Conversions)

Demand side: Advertisers

- Integration
- Set a bid (CPC, CPA) and/or a budget
- Set an objective (views, clicks, conversions, ...)



Supply side: Ad exchanges

- Criteo Integrates with SSPs
- We participate in real time on a CPM basis

Demand side: Advertisers

- “Second price” property: higher CPA → higher payment → higher volume



Supply side: Ad exchanges

- Second price auctions (with/without reserve prices, dynamic floors, etc.)
- First price auctions
- Header bidding (multiple sub-auctions resolved by a single “meta-auction”)
- ...

- $\text{bid} \propto \text{CPA} * P(A|\text{Display, User, Context info})$

- We show and track ads

THE HIP STORE

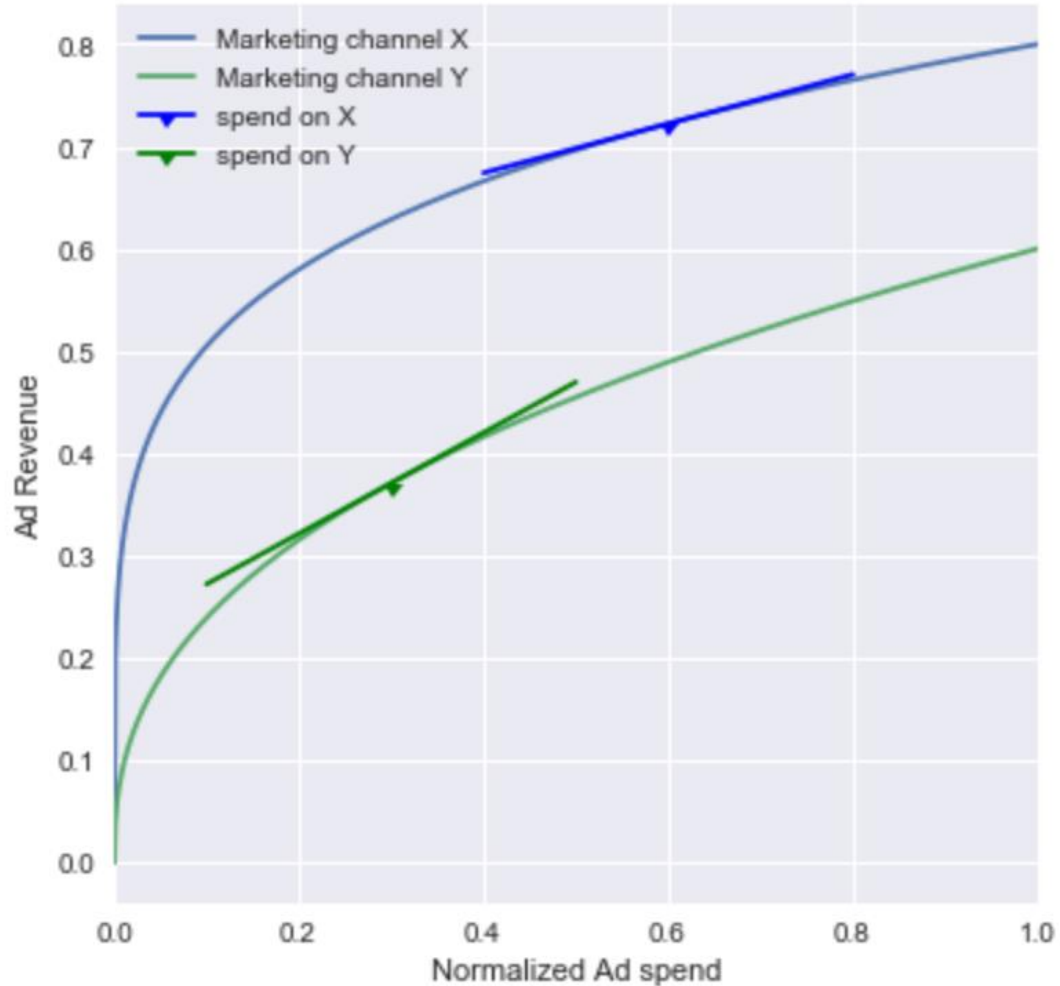
adidas Originals Punstock SPZL	Patta Inji Crewneck Sweatshirt	Universal Works Harris Tweed Bakers Chore Jacket
£120	£52	£295
buy now	buy now	buy now

immobiliare.it

Venezia - Appartamento - 70m²

€ 480 / mese

Budget management



Budget allocation

Align marginal ROIs

How many Actions?

What is the revenue of the Ad campaign?

What should we predict?

Advertiser's dashboard

users

visits

conversions

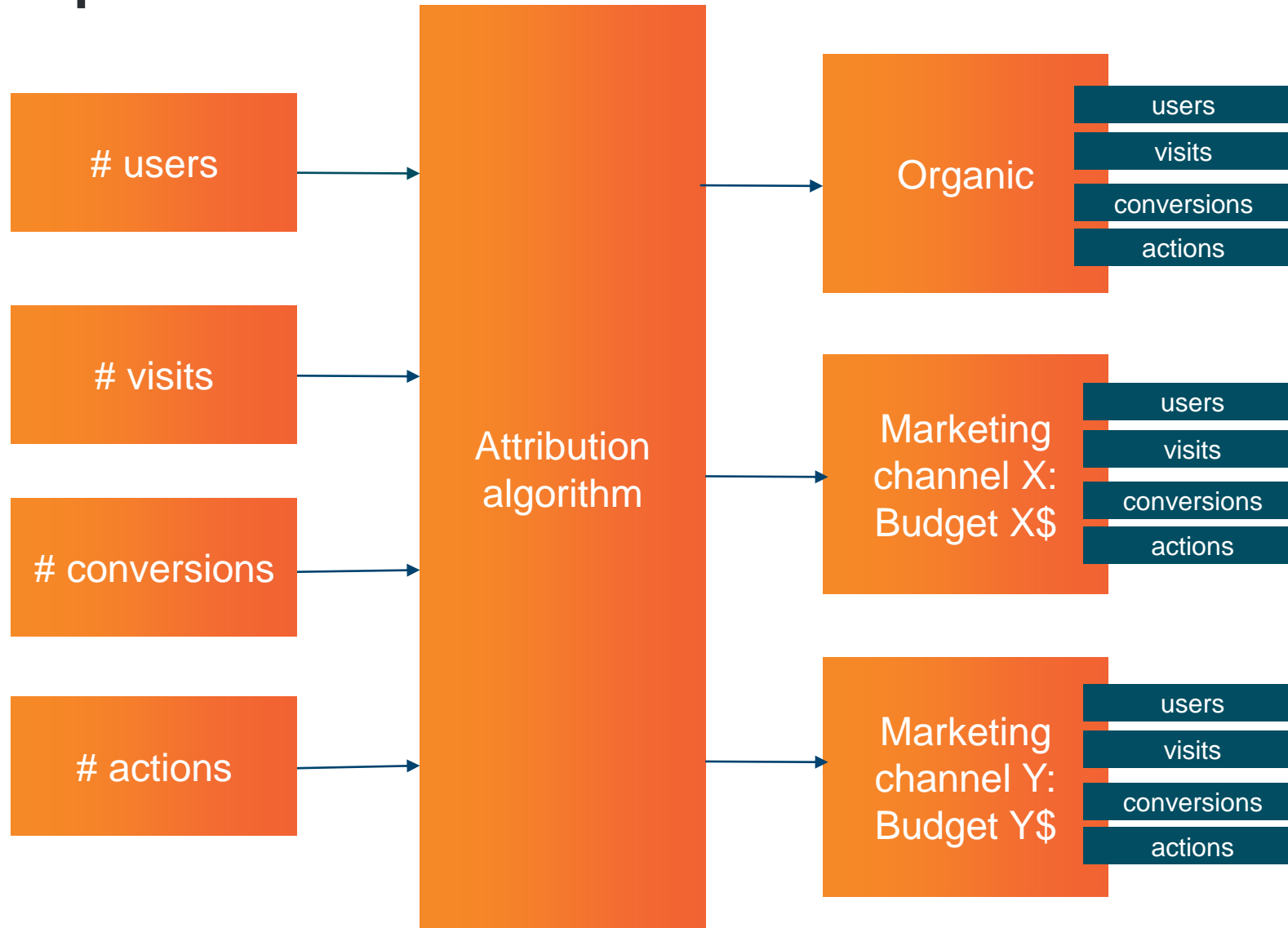
actions

Organic

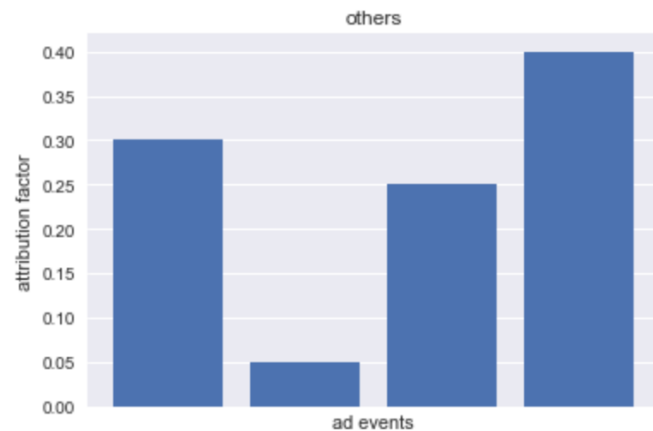
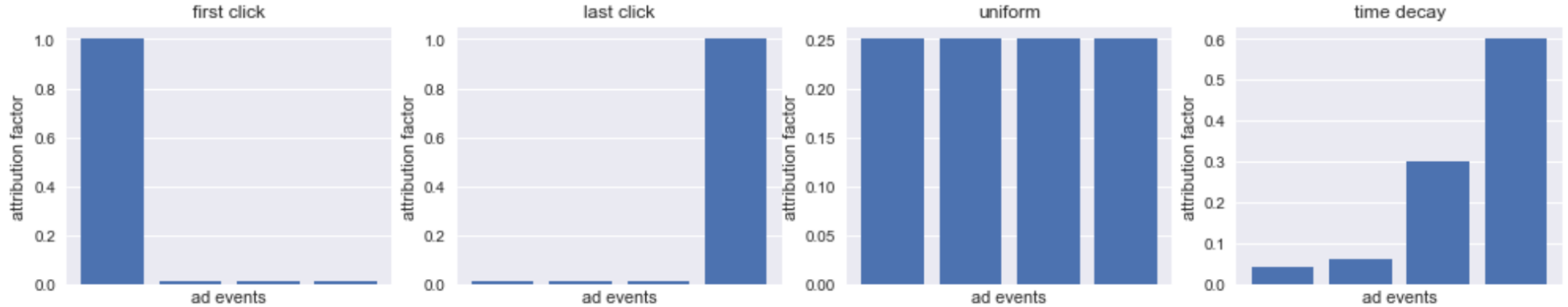
Marketing
channel X:
Budget X\$

Marketing
channel Y:
Budget Y\$

The attribution problem



Advertisers' attribution models – rule based



Other rules, based on

- Position (i.e. first and last clicks get 40% each, the rest is uniform)
- Matching to other events (e.g. add to cart)

Advertisers' attribution models – algorithmic

- Incremental value effect
 - Probability of conversion as a function of ad exposure
 - Use the model to compute incremental value of each ad.

- Game theory
 - Shapley values (assign credit to individual channels who cooperate to generate a conversion)
 - Multiple payment schemes proposed



What are the models for an attribution-aware bidder?

Advertiser's dashboard

users

visits

conversions

actions

Organic

Marketing
channel X:
Budget X\$

Marketing
channel Y:
Budget Y\$

Use a control population!

users

visits

conversions

actions

Organic

Marketing channel X:
Budget X\$

Marketing channel Y:
Budget Y\$



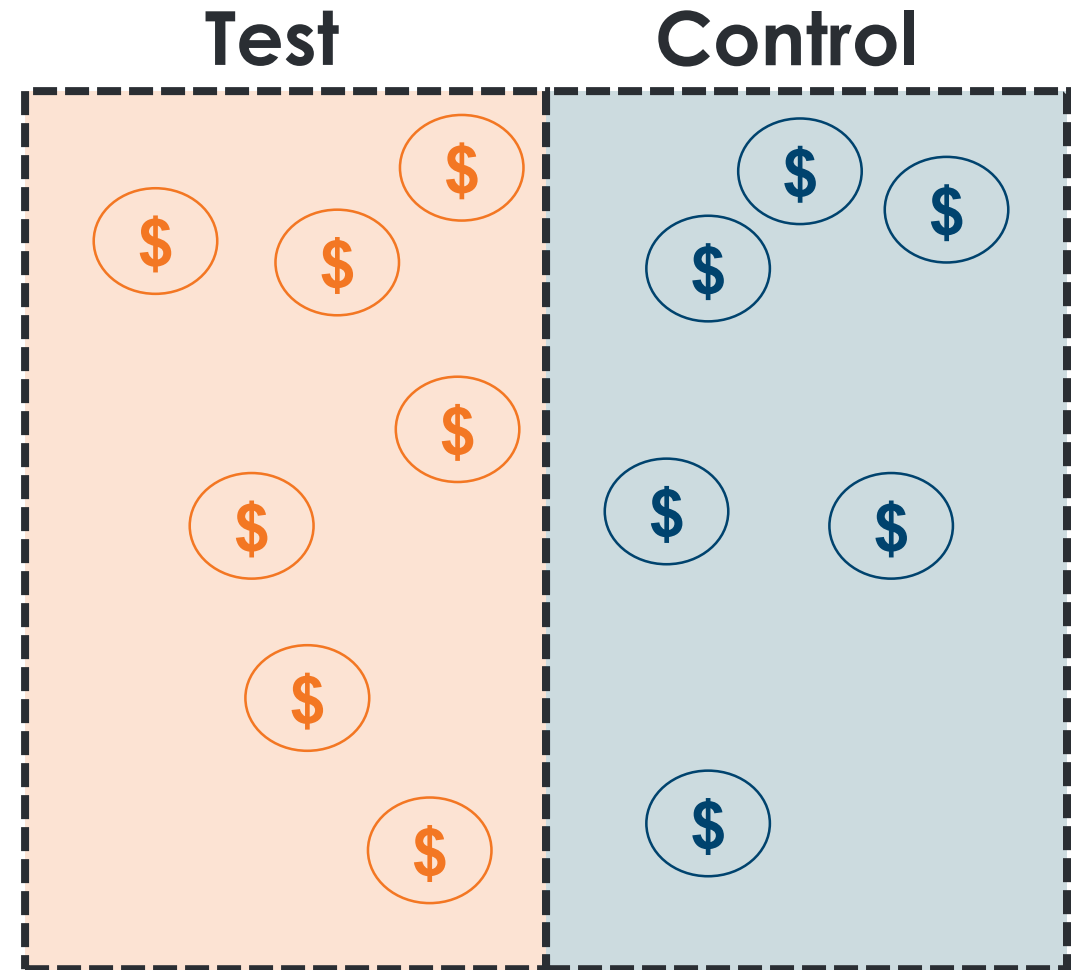
**Control 20%
ignore first days**



**Control 20%
ignore first days**

Incrementality testing for a DSP

- It is client-wise
- Test users get the normal treatment
- For a Control user, every time we would show an ad for the client under iABT
 - We log all information
 - We participate with another client



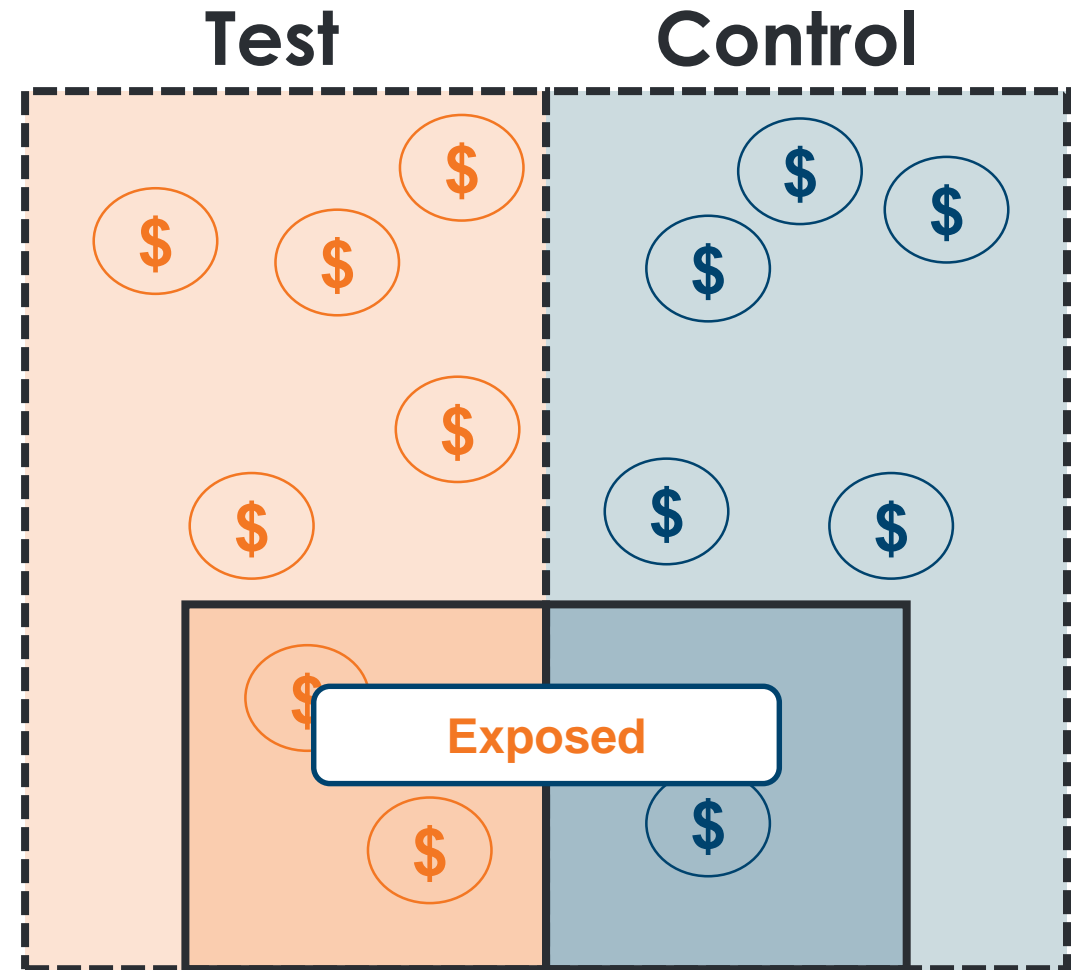
Uplift measurement - exposed

Exposed Users who had seen an ad vs users who would have seen an ad (for a specific client)

It is a counterfactual measurement.

$$\text{Uplift} = \frac{\text{Sales}_{\text{Test}} - \text{Sales}_{\text{Control}}}{\text{Sales}_{\text{Control}}}$$

Computed on exposed population (!?!)

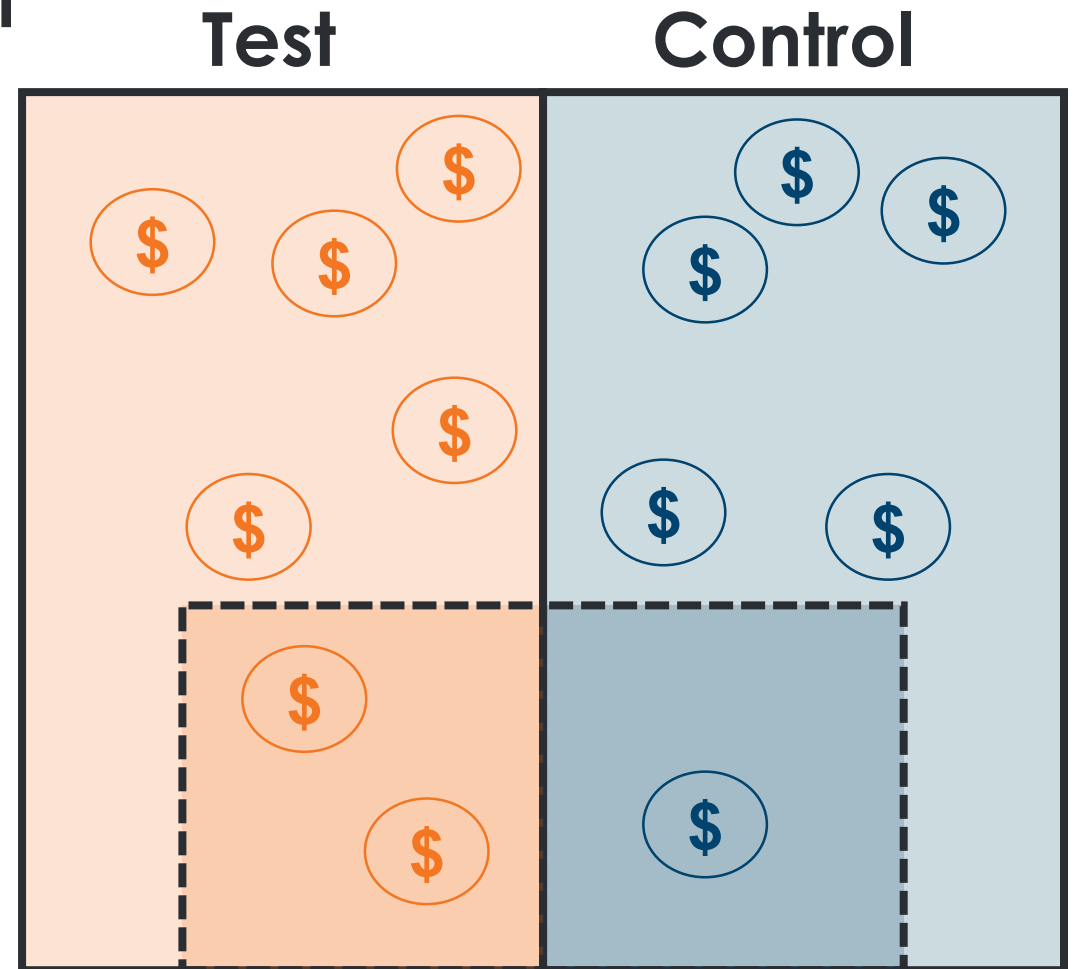


Uplift measurement – Intent to treat

Intent to treat We consider all users which could have been treated (e.g. all retargetable users)

$$\text{Uplift} = \frac{\text{Sales}_{\text{Test}} - \text{Sales}_{\text{Control}}}{\text{Sales}_{\text{Control}}}$$

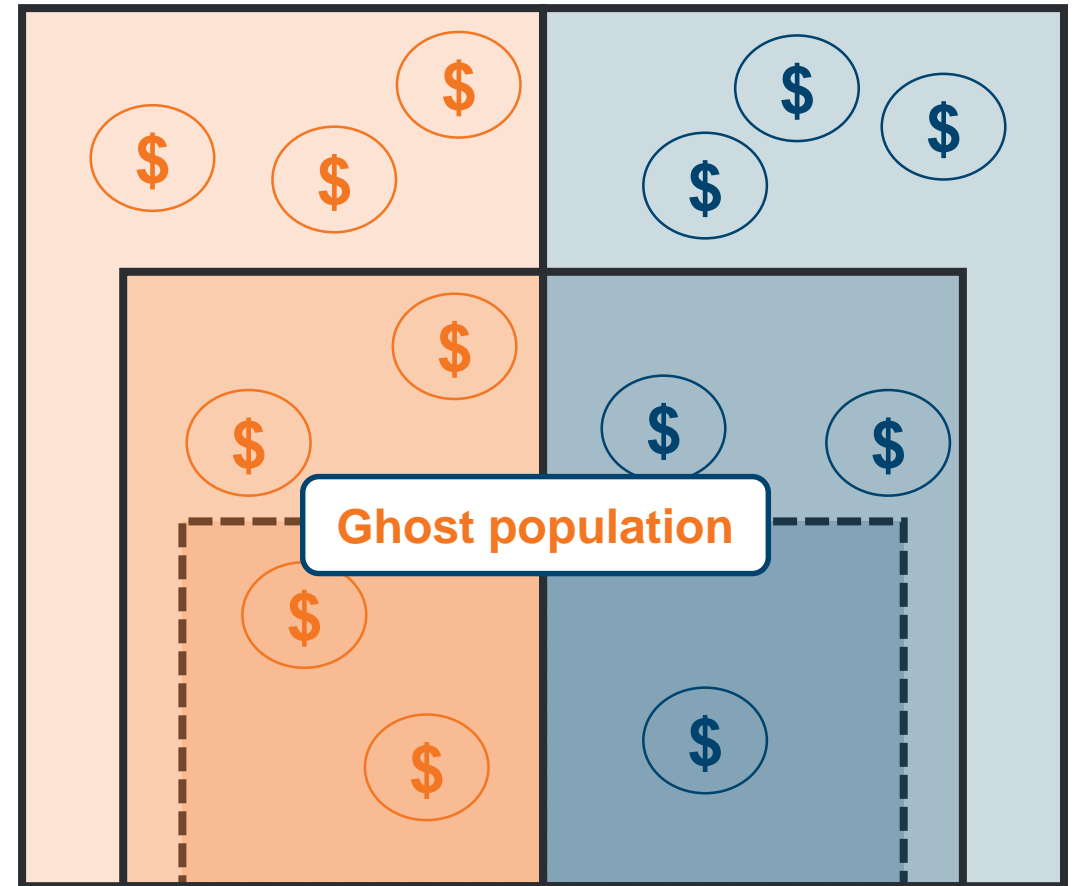
Computed on retargetable users



Uplift measurement – Ghost population

Test

Control



Ghost population subset of users that we see on ad exchanges, for which we participate (or would participate) for that client

$$\text{Uplift} = \frac{\text{Sales}_{\text{Test}} - \text{Sales}_{\text{Control}}}{\text{Sales}_{\text{Control}}}$$

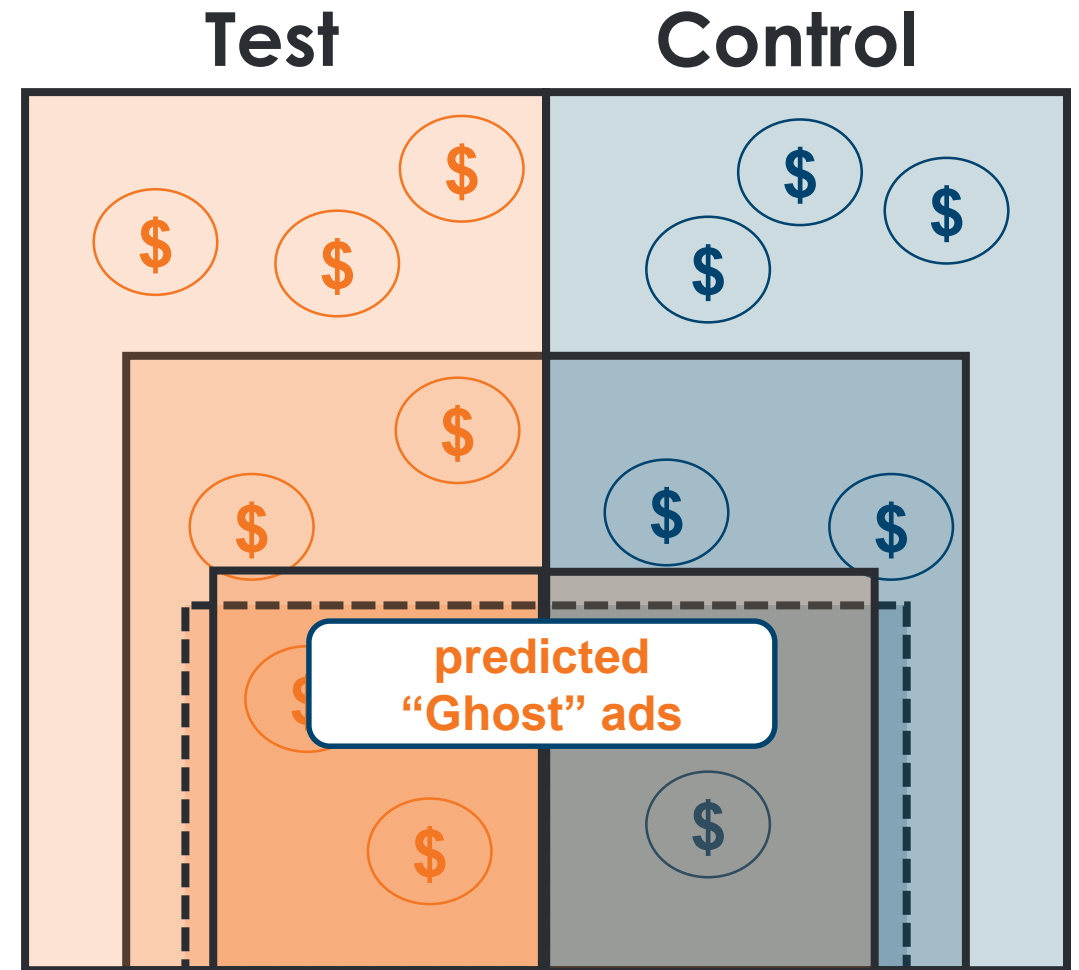
Computed on ghost population

Approximating control-exposed

Predicted “Ghost” Ads: use simulated auctions on the ad exchange.

Use it both on test and control to predict exposed users.

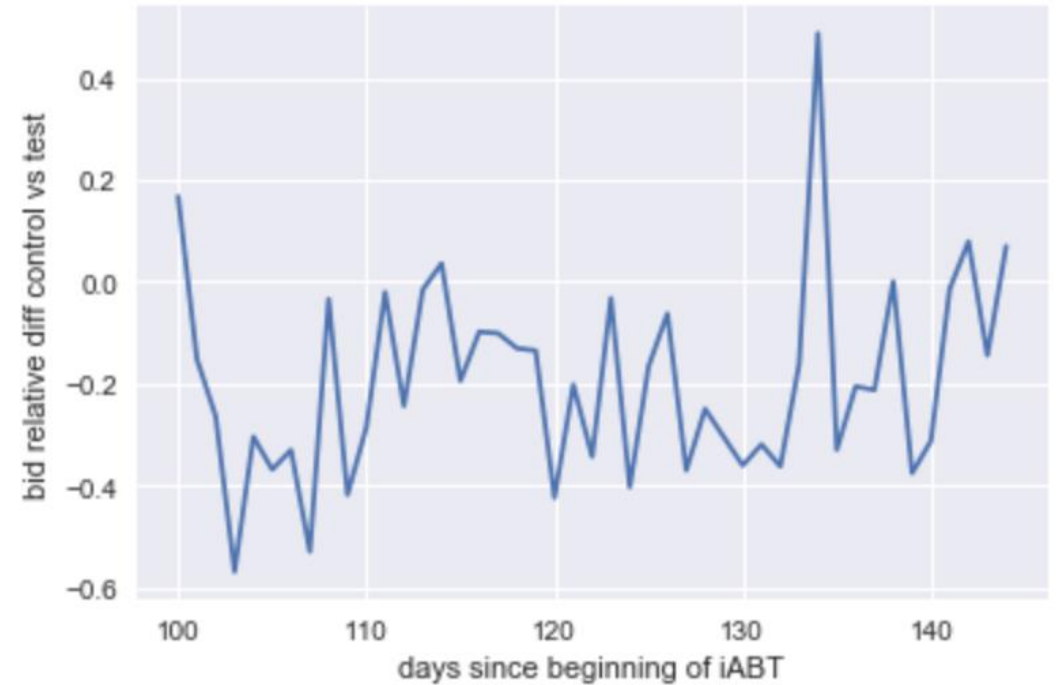
“Ghost” exposed: assume sales in Ghost not exposed are the same in Test and Control.



Beware of filters!

The bidder changes the status of users

The probability that we participate for a client in iABT is not the same between test and control





**Work with
clients**

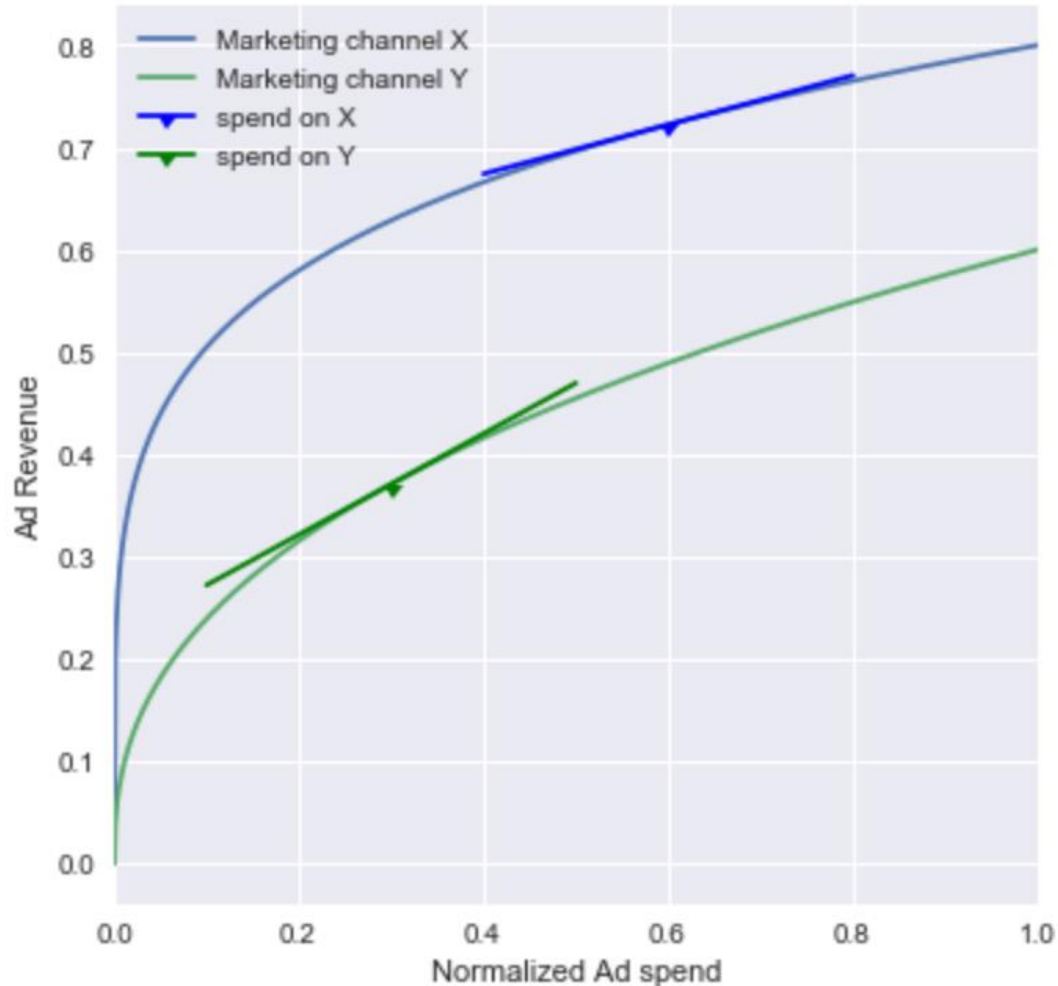
Transparency

- Share raw data
- All experiences and measurement must be reproducible by both


Interpretability

- Who are the incremental buyers?
- Where do I generate a new sale?
- How effective is web inventory wrt app inventory?

Budget management - bis



- iABT are expensive
- iROI very noisy
 - Measure average iROI is ok
 - Measuring marginal iROI much more challenging
- Measurement is challenging for small advertisers



**How does an incremental attribution system
look like?**

References

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Thank you

criteoL.