Ghost Ads

Improving the Economics of Measuring Online Ad Effectiveness

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*Based on joint work with Randall Lewis & Elmar Nubbemeyer

garjoh.com
garjoh_canuck

A long time ago in a galaxy far,
far away....

sign in my account ▼ stores customer service

FREE SHIPPING with $99 purchase. FREE RETURNS U.S. only. exclusions

the magic of macy's

star wars

my bag (3)

HOME BED & BATH WOMEN MEN JUNIORS KIDS ACTIVE BEAUTY SHOES HANDBAGS JEWELRY WATCHES BRANDS

THE GIFT GUIDE lists deals & promotions gift cards wedding registry

Star Wars

Star Wars Heros

Star Wars Villains

filter by

Pick Up In-Store ›

Special Offers ›

Age Group ⌄

- Adult (198)
- Child (249)
- Teen (130)
- Toddler (49)

Gender ⌄

- Boys (201)
- Female (48)
- Girls (29)
- Male (150)
- Unisex (4)

Category ⌄



featured categories



kids



guys



juniors



accessories

459 items in Star Wars

4 columns 3 columns



10 shopper(s) love this

Briefly Stated Star Wars Darth Vader One-Piece Pajama Suit

Be the first to write a review.

Special Savings

Reg. $70.00
Was $52.99
Sale $49.99

Sale ends 11/22/15 Savings not based on actual sales

EXTRA 25% OFF $75 Enjoy 25% off $75 select men's! Code: PRIV details

Color: **Darth Vadar**

Size:

S M L XL

Qty: 1

ADD TO BAG

E-GIFT IT

What's e-gifting

ADD TO LIST

Share email

customers also shopped



Briefly State Star Wars Stor...

Reg. $70.00
Sale $49.99

EXTRA 25% off $75



Briefly Stated Teenage Mutan...

Reg. $70.00
Sale $49.99

EXTRA 25% off

macy's buy online pick up in-store $49.99 shop

CONDORS HIT THE ROAD WITHOUT THEIR BEST PLAYERS

Scott Zerr
November 04 2015 08:00AM



macy's buy online pick up in-store $49.99 shop now

macy's buy online pick up in-store $49.99 shop now

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Ghost Ads: Improving the Economics of Measuring Ad Effectiveness

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October 13, 2015

Simon Business School Working Paper No. FR 15-21

Abstract:
To measure the effects of advertising, marketers must know how consumers would behave had they not seen the ads. We develop a methodology we call 'Ghost Ads,' which facilitates this comparison by identifying the control-group counterparts of the exposed consumers in a randomized experiment. We show that, relative to Public Service Announcement (PSA) and Intent-to-Treat A/B tests, 'Ghost Ads' can reduce the cost of experimentation, improve measurement precision, and work with modern ad platforms that optimize ad delivery in real-time. We also describe a variant 'Predicted Ghost Ads' methodology that is compatible with online display advertising platforms; our implementation records more than 100 million predicted ghost ads per day. We demonstrate the methodology with an online retailer's display retargeting campaign, for which a PSA test would be severely biased. We show novel evidence that retargeting works as the ads lifted website visits by 17% and purchases by 11%. Compared to Intention-to-treat or PSA experiments, advertisers can measure ad lift just as precisely while spending at least an order of magnitude less.

Number of Pages in PDF File: 40

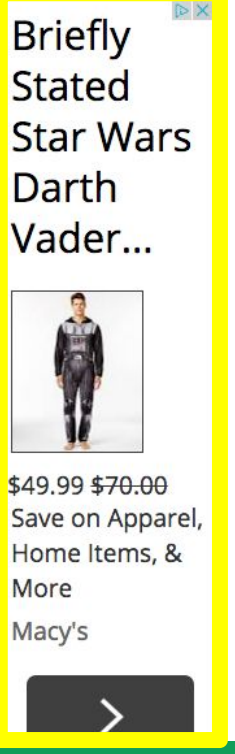
Keywords: advertising effectiveness, field experiments, digital advertising

JEL Classification: M37, C93

Date posted: June 19, 2015 ; **Last revised:** October 14, 2015

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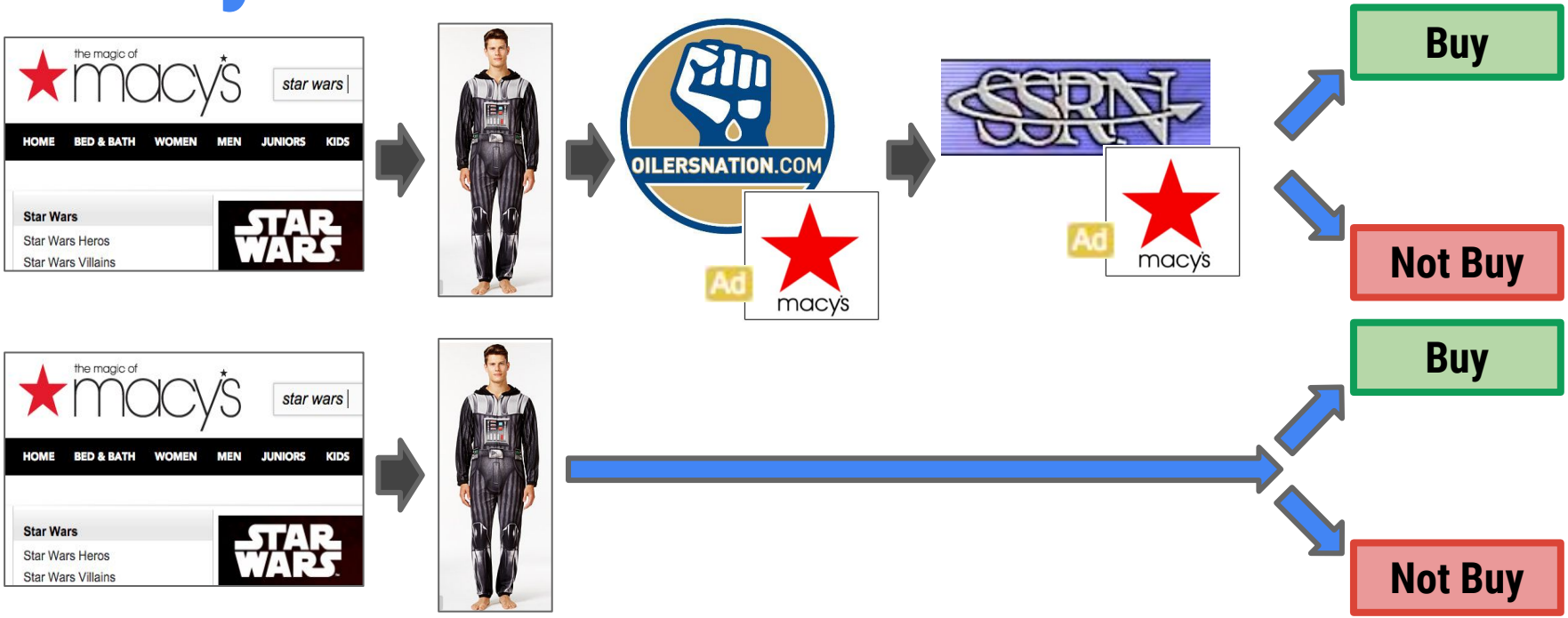
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Recap: The consumer journey with retargeting



Macy's ROI problem: What if Macy's *had not advertised*?

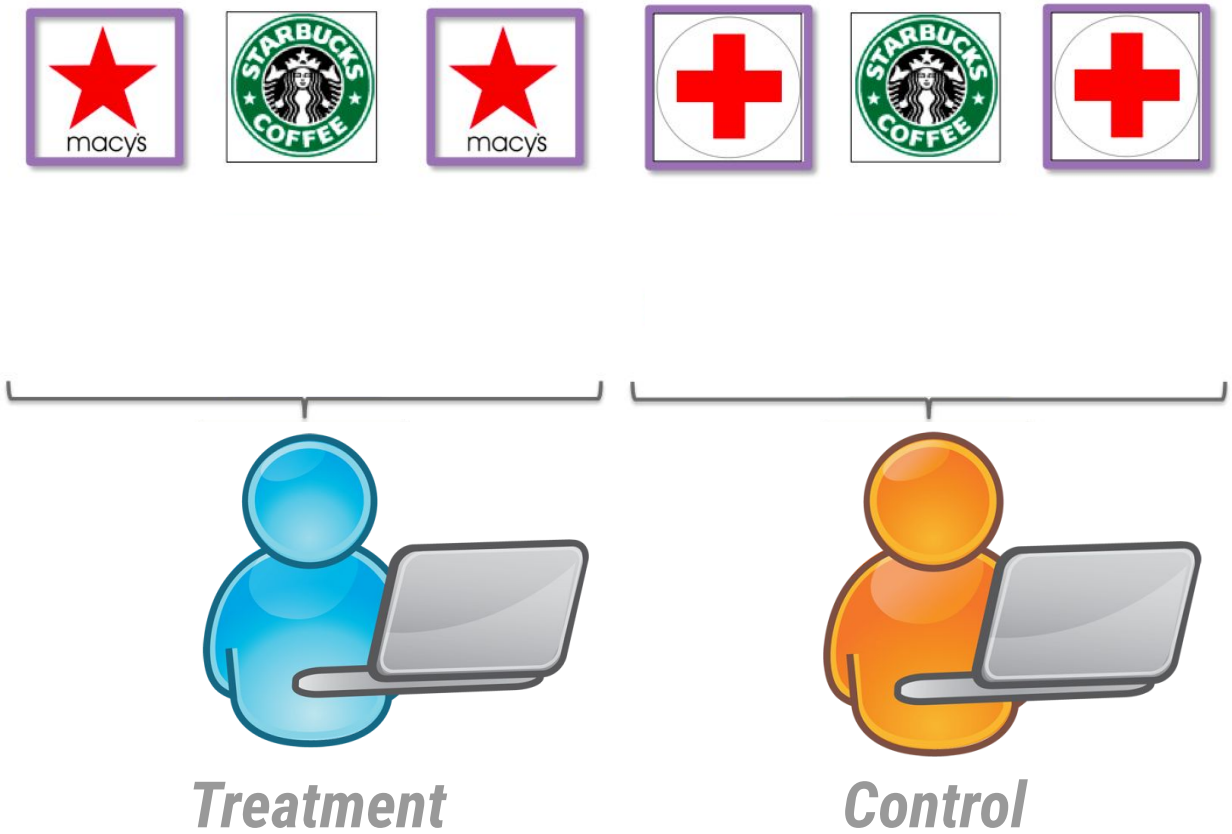


Solution: Run an experiment, but what ad do you show instead?

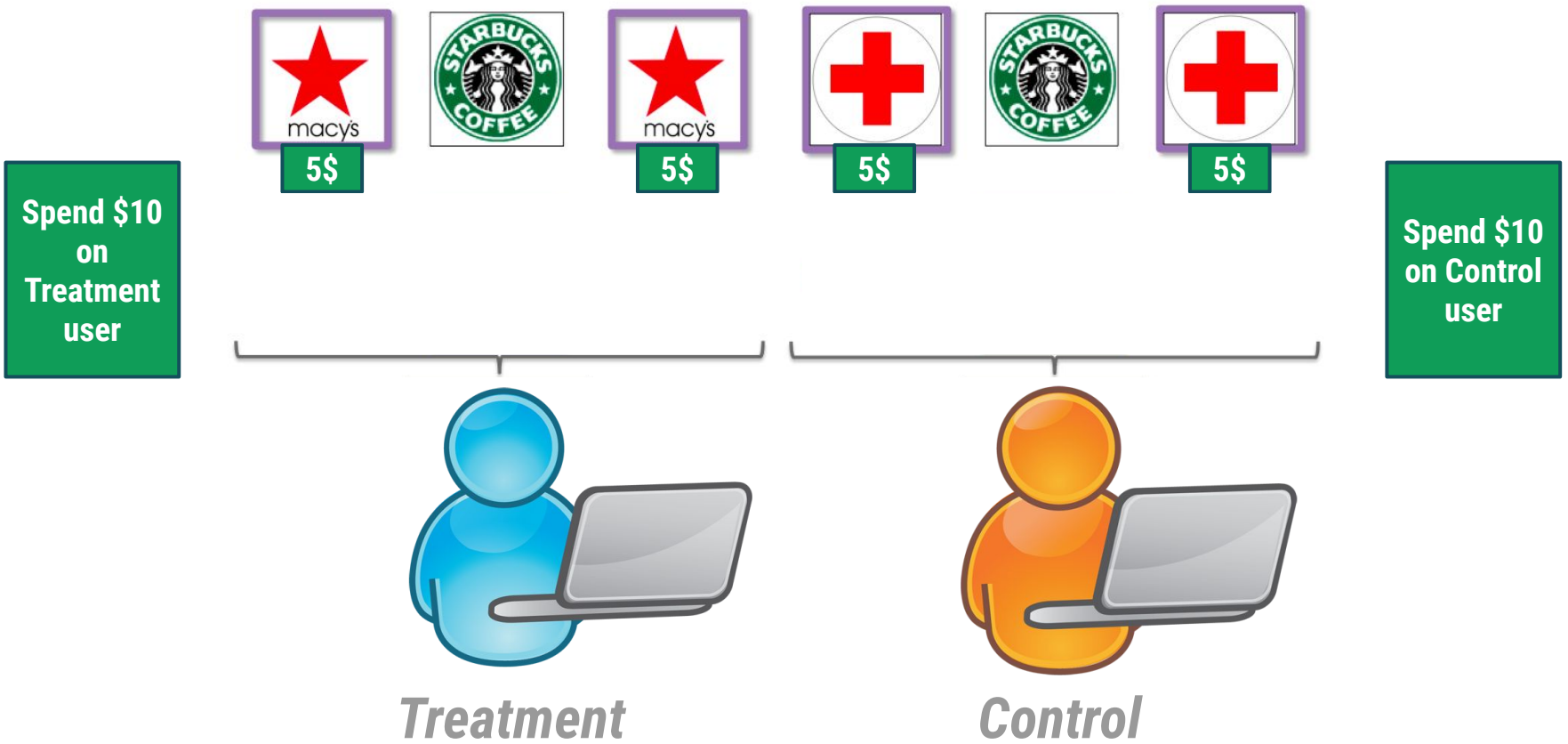


What are ghost ads?

PSA Experiment



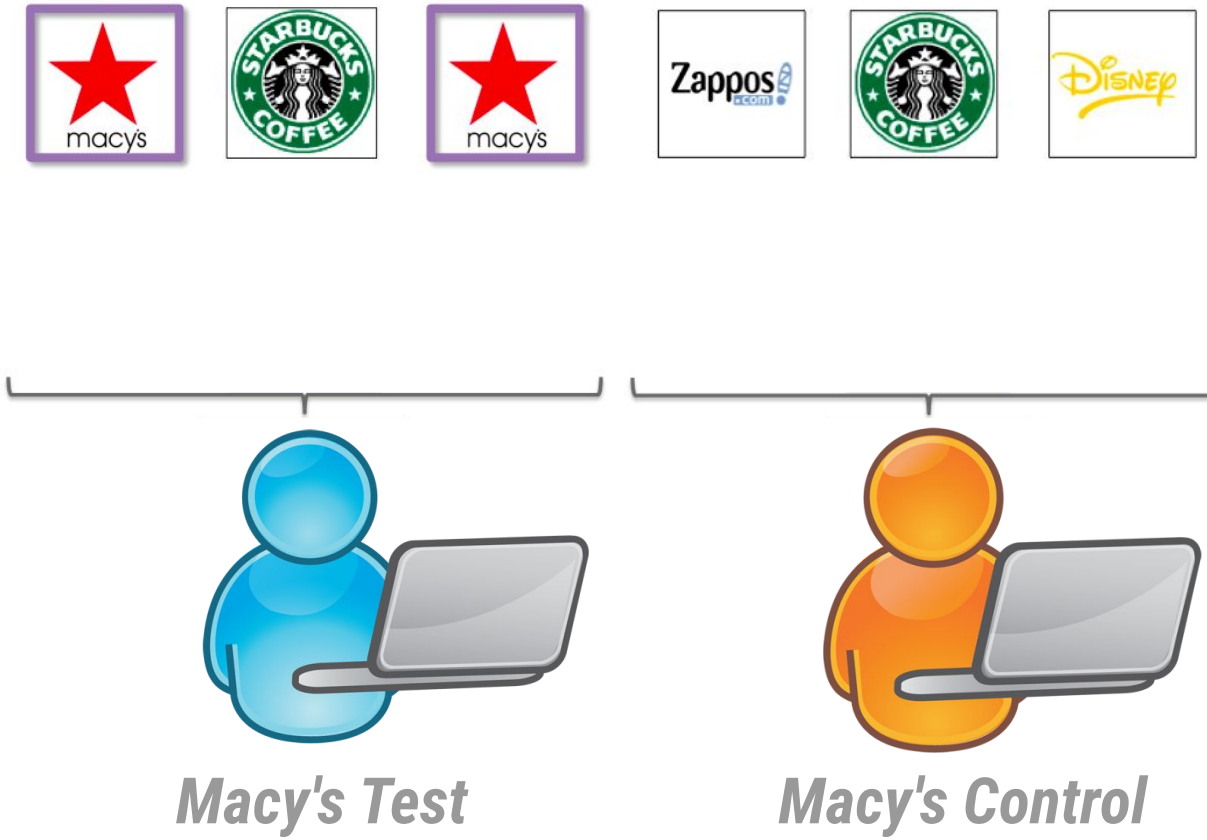
PSA Problem #1: Cost of PSAs



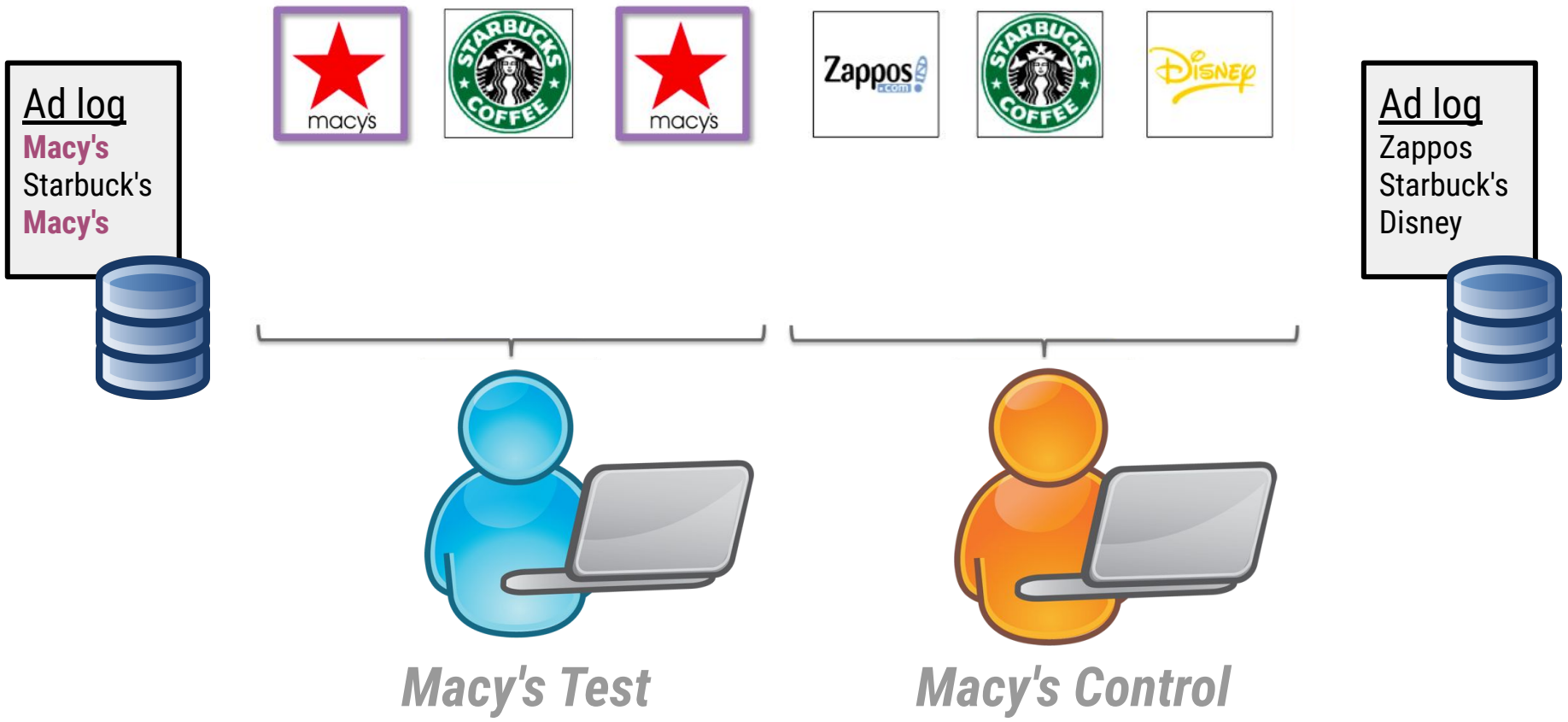
"I **want** to spend
half my budget on PSAs
every time I run a campaign"

-Said **no** advertiser, **ever**

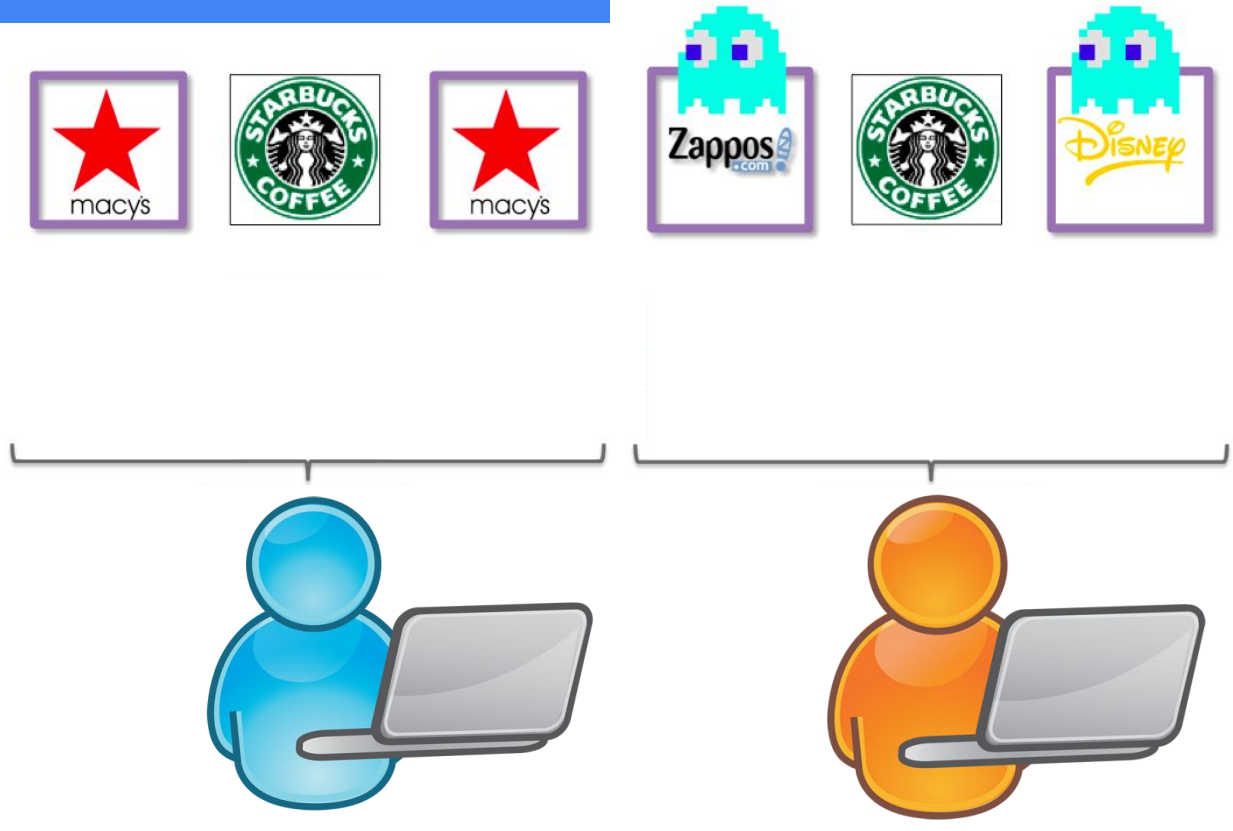
What about using 'next best' ad?

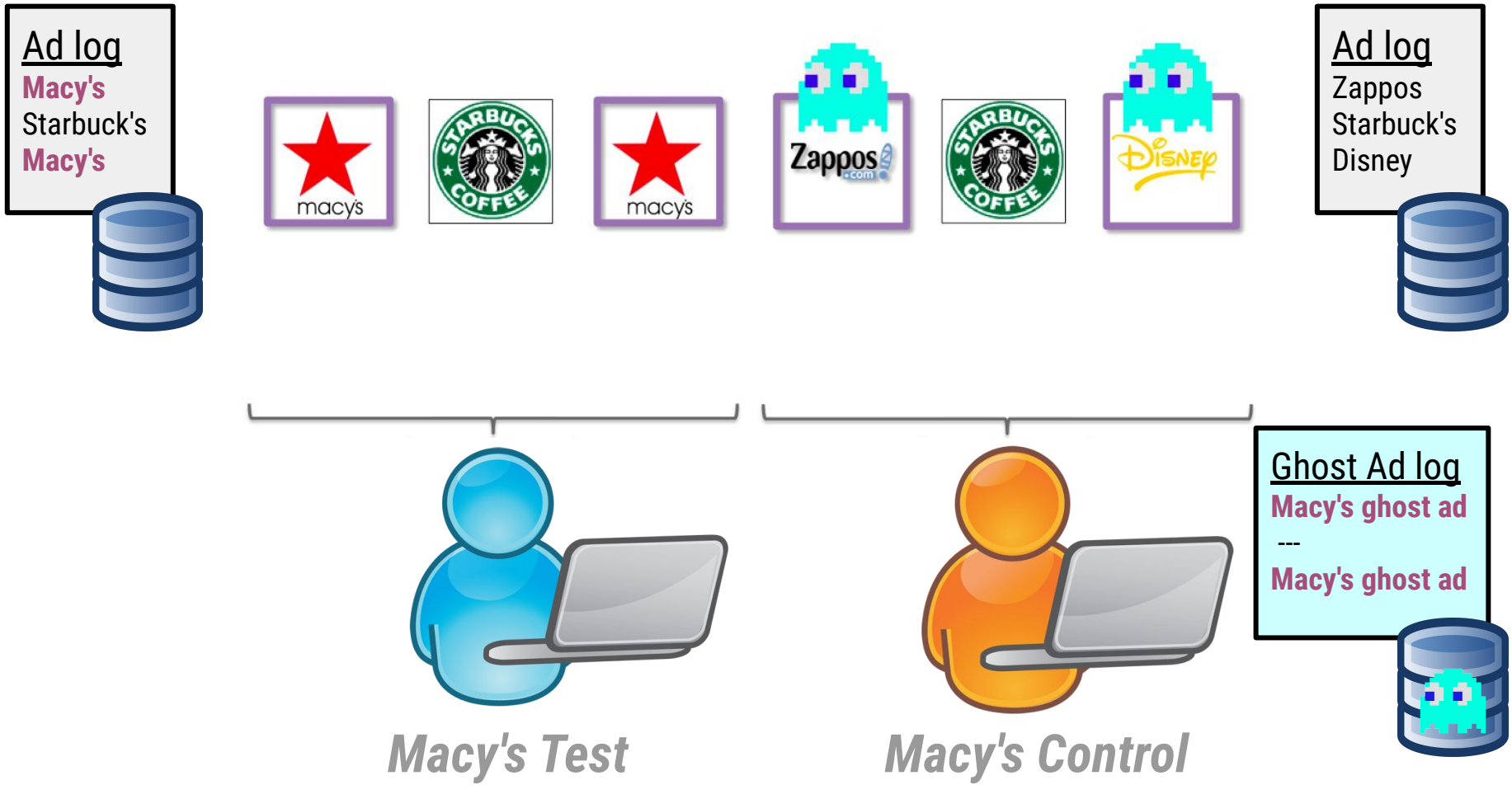


Counterfactual Macy's ads unobserved

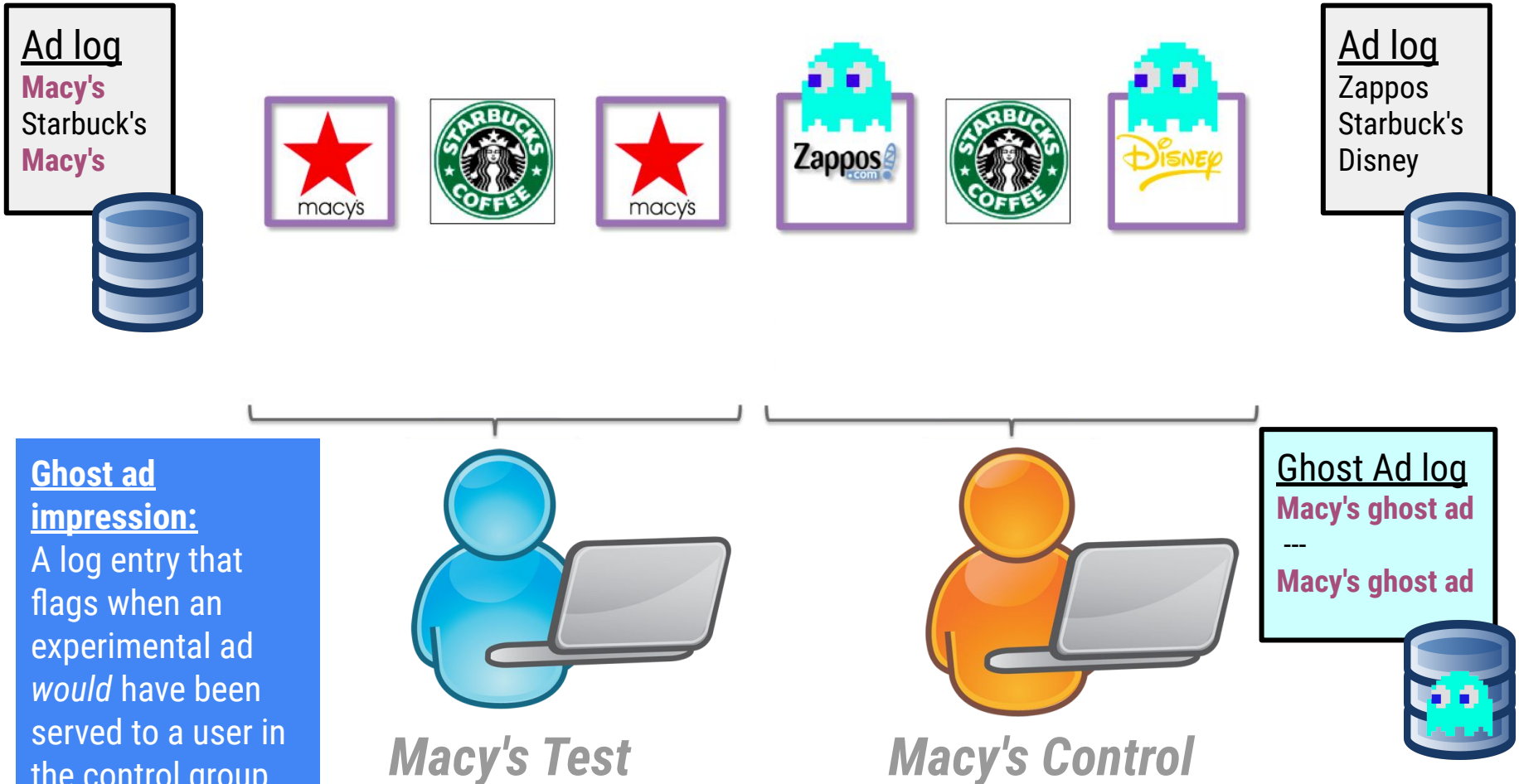


Ghost ads


macy's
STARBUCKS COFFEE
macy's
Zappos .com
STARBUCKS COFFEE
Disney
Macy's Test
Macy's Control


Ad log
Macy's
Starbuck's
Macy's
Ad log
Zappos
Starbuck's
Disney
Ghost Ad log
Macy's ghost ad

Macy's ghost ad
Macy's Test
Macy's Control


Ad log
Macy's
Starbuck's
Macy's
Ad log
Zappos
Starbuck's
Disney
Ghost ad impression:
A log entry that flags when an experimental ad would have been served to a user in the control group
Macy's Test
Macy's Control
Ghost Ad log
Macy's ghost ad

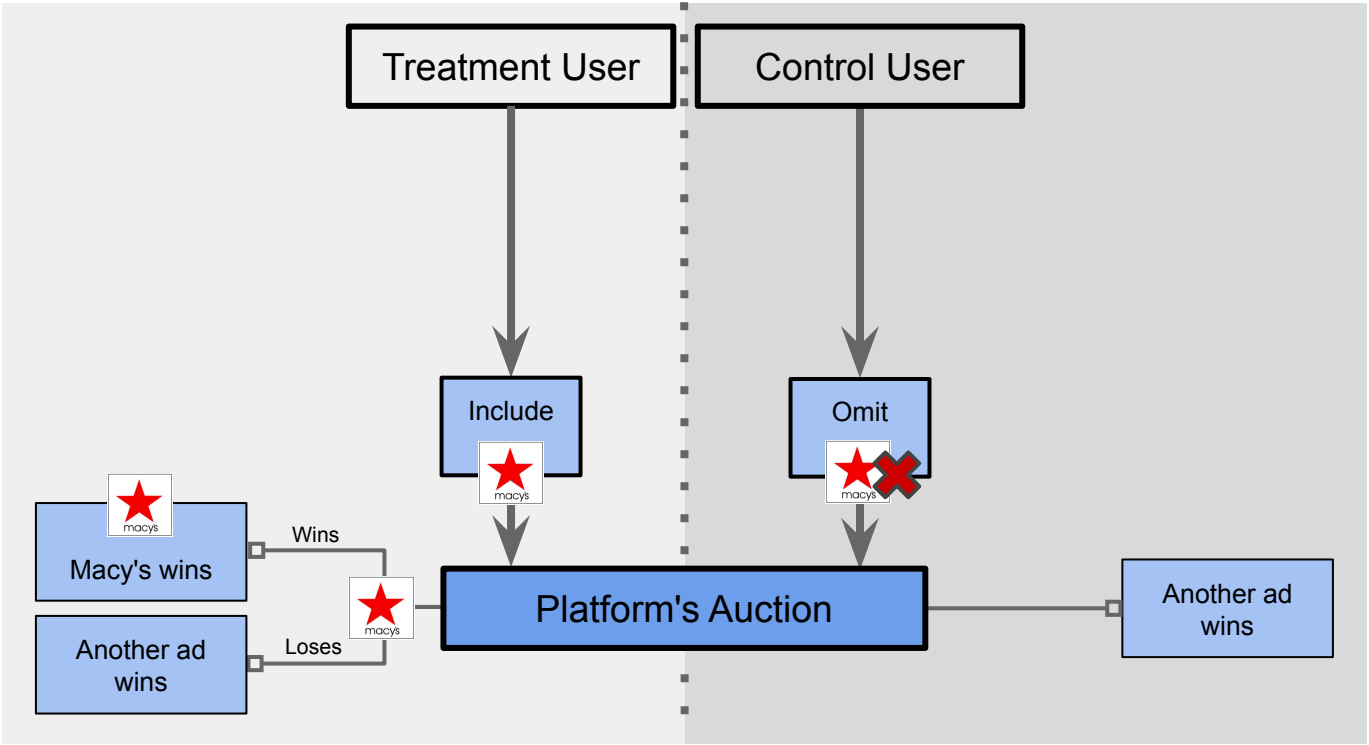
Macy's ghost ad

Ghost Ad Benefits

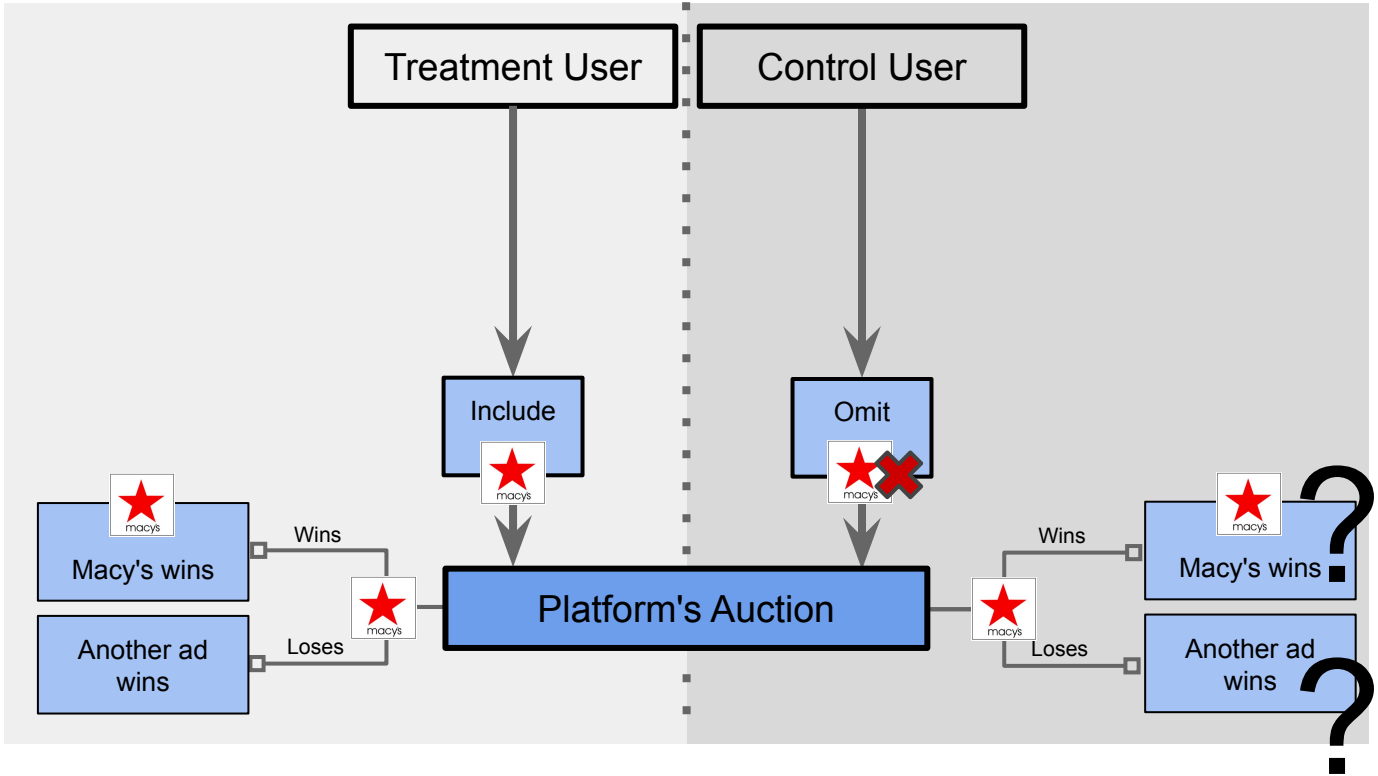
	Ghost Ads	PSAs
Low cost	✔	✘
Correct Strategic Ad Baseline	✔	✘

How do ghost ads work?

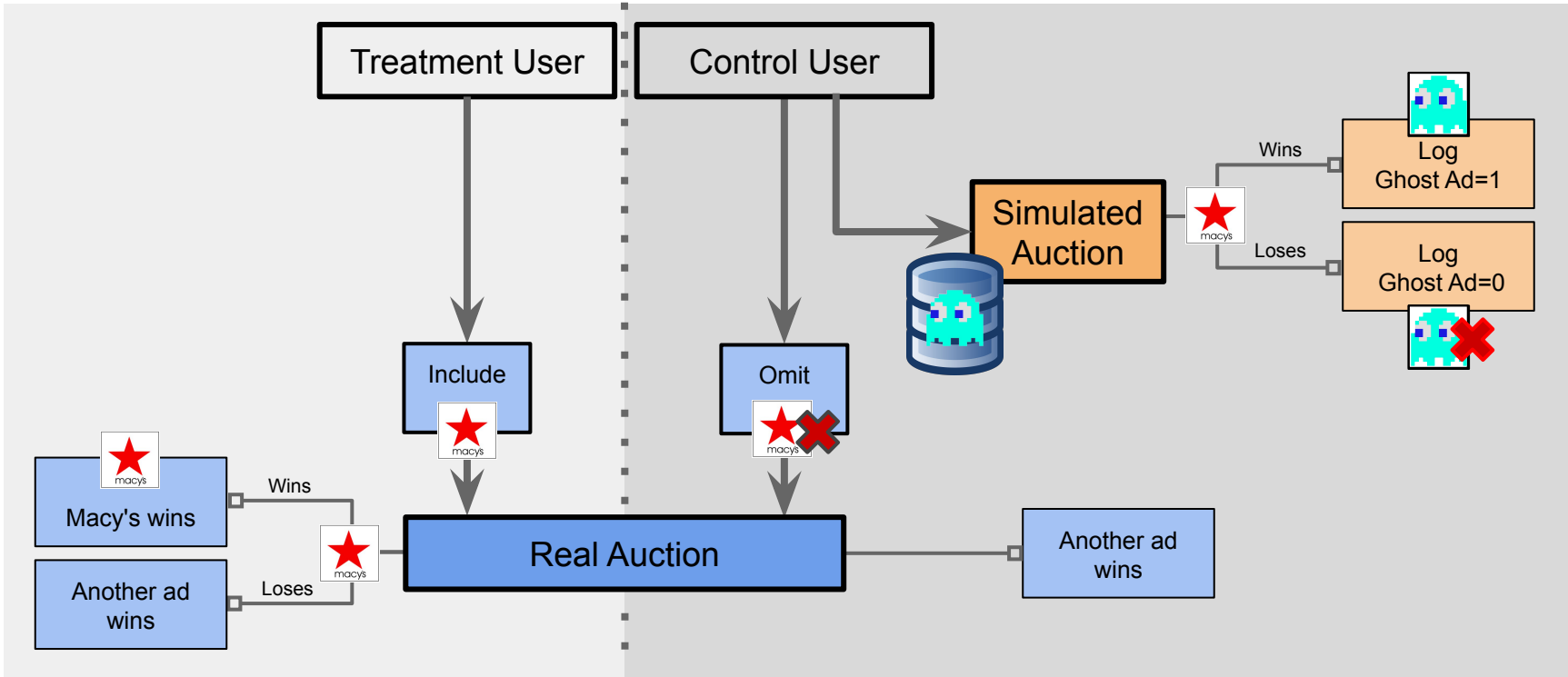
Ghost ads mimic delivery of Macy's ad (Part 1/3)



Ghost ads mimic delivery of Macy's ad (Part 2/3)

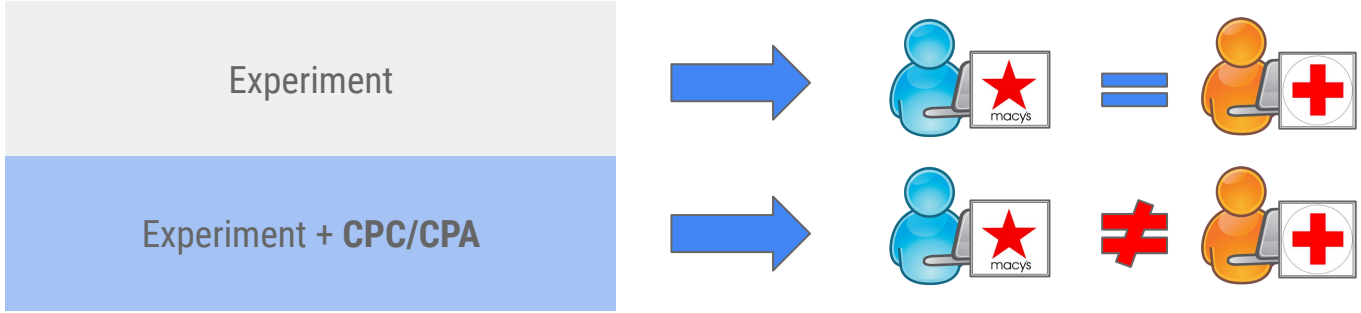


Ghost ads mimic delivery of Macy's ad (Part 3/3)



CPC & CPA campaigns break PSA A/B experiments

- Cost-per-Click (CPC) and Cost-per-Action (CPA)
  - Great tools to automate and optimize campaigns
  - ⅔ dollars spent in online display advertising use in-campaign optimization (IAB 2014)
- Problem: Ad platform will deliver advertiser & PSA campaigns to different people
  - Why? Ad platform matches ad (e.g. Macy's, Red Cross) to people it thinks will like the ad
  - CPC/CPA creates 'apples' and 'oranges' comparison



Ghost Ad Benefits

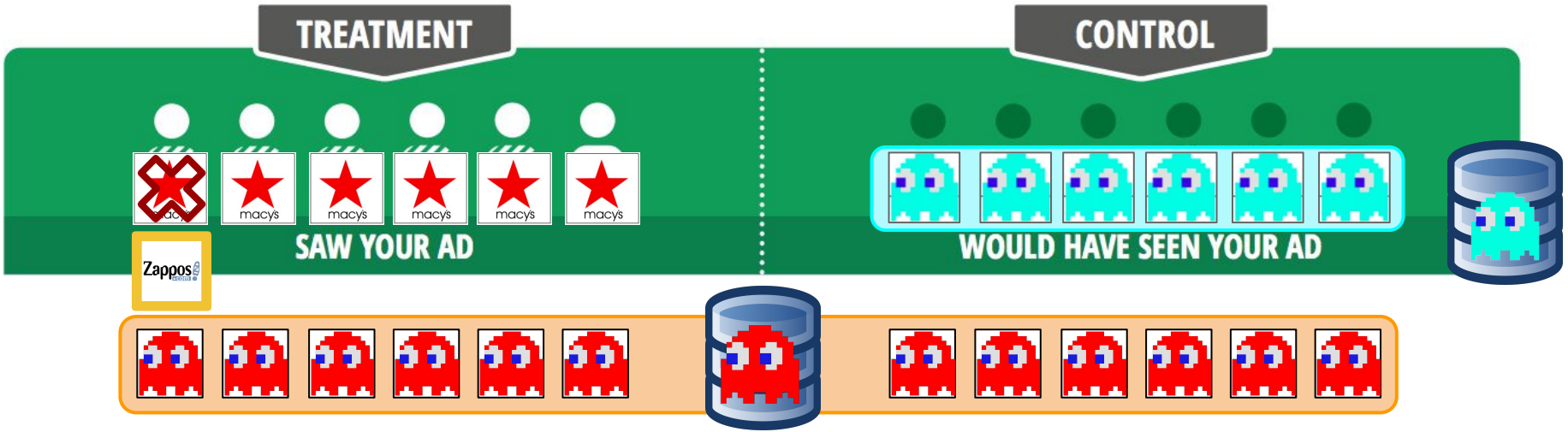
	Ghost Ads	PSAs
Low cost	✔	✘
Correct Strategic Ad Baseline	✔	✘
Validity	✔	✘

What are predicted ghost ads?

Online display ad platforms don't fully control ads users see

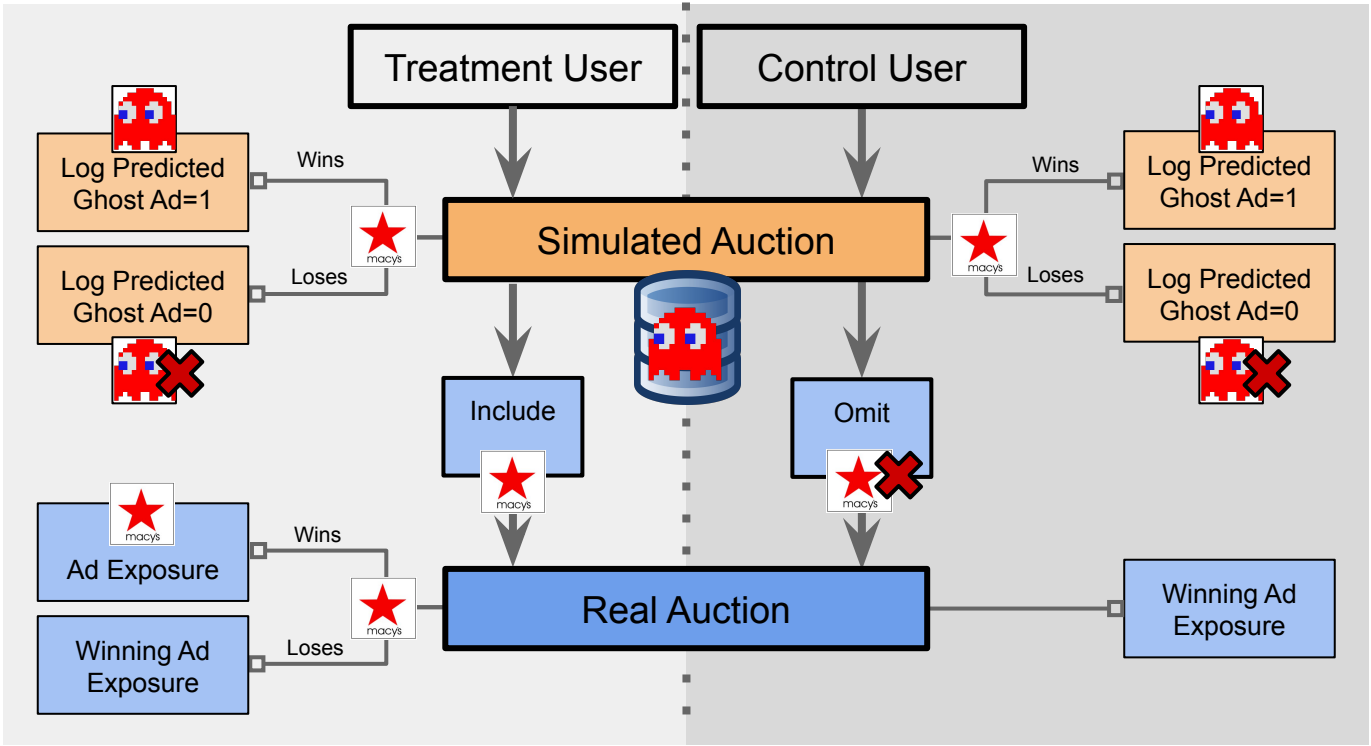
- Online display ad platforms only recommend ads to be shown
- Recommended ads may not be shown because
  - Publisher exclusion
  - Publisher hidden reserve price
  - Technological incompatibility
  - Ad-serving latency

Complication: Online display ad platforms break ghost ads



Solution: Log ads that are **predicted** to be shown

Predicted Ghost Ads ensure symmetry



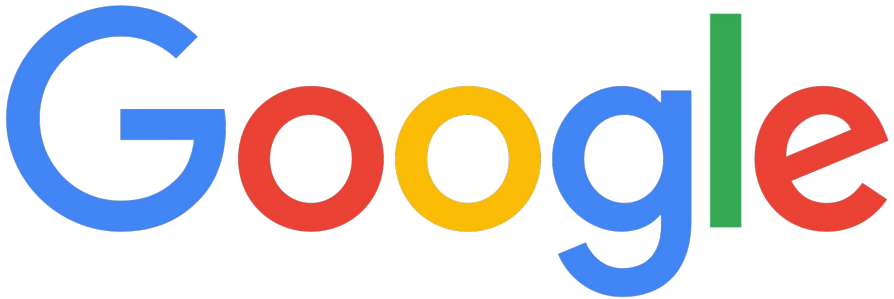
Predicted Ghost Ad Benefits

	Predicted Ghost Ads	PSAs
Low cost	✔	✘
Correct Strategic Ad Baseline	✔	✘
Validity	✔	✘
Operational robustness	✔	✘

Ghost ads at scale

Conversion Lift

Brand Lift



Conversion Lift

secret escapes

DEFSHOP

tableau

FUJIFILM

travelstart

chromecast

Brand Lift

Mondelēz International

Santander

L'ORÉAL

DANONE Actimel

DURACELL

sunrun

Wendy's

TED BAKER LONDON

the warehouse — where everyone gets a bargain

P&O CRUISES

SAMSUNG

ORKIN

FISHERMAN'S FRIEND

PORSCHE

NISSAN

OPEL

Ford

FIAT

Legal & General



ING

- **1K+ campaigns daily**
- **$millions** in ad spend
- **billions** user observations



Handful of ad platforms & advertisers using methodologies









Sources: Peris 2018; AdRoll 2018; Lewis & Wong 2018

Back to retargeting…
2 case studies

Demonstrating retargeting effectiveness

"Sportsing" *Sporting and outdoor goods retailer*

- Retargeting campaign **increased**
  - **Website visits by 17.2%** (t=13.64)
  - **Sales by 10.5%** (t=3.51)
- **1st academic evidence** of retargeting effectiveness
- Measurement precision for **10X less cost** than existing methods (Intent-to-Treat or PSA)



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DEFSHOP *streetwear and hip-hop clothing retailer*

- More evidence of **retargeting** effectiveness
- Campaign drove an **incremental lift** of
  - **12% in purchases**
  - **23% in site visits**
  - **38%** more brand **search queries**

Demonstrating retargeting effectiveness

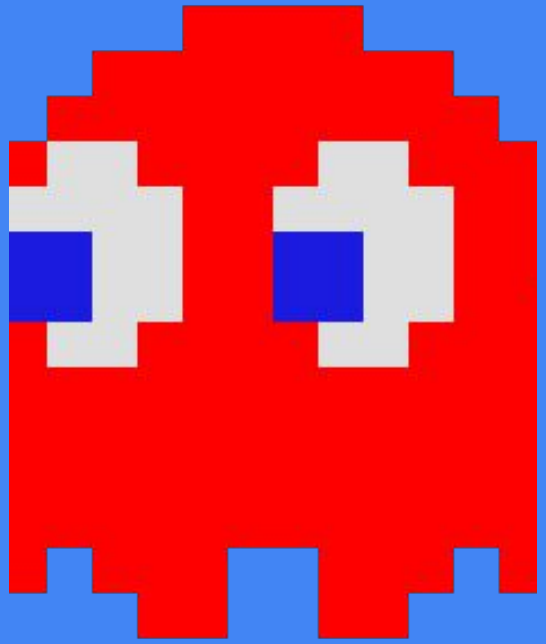
"Sportsing" *Sporting and outdoor goods retailer*

DEFSHOP *streetwear and hip-hop clothing retailer*

TAKEAWAY

Naive attribution (view-through + click-through)
overstates causal lift by 10X
90% of sales would have happened without the campaign

Questions?





CPM CPC CPA CPIA