Invalid Traffic & Viewability: What is the cost of an unseen ad?
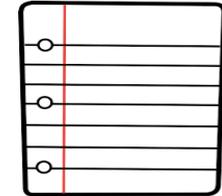
May 2016

Paul Barford
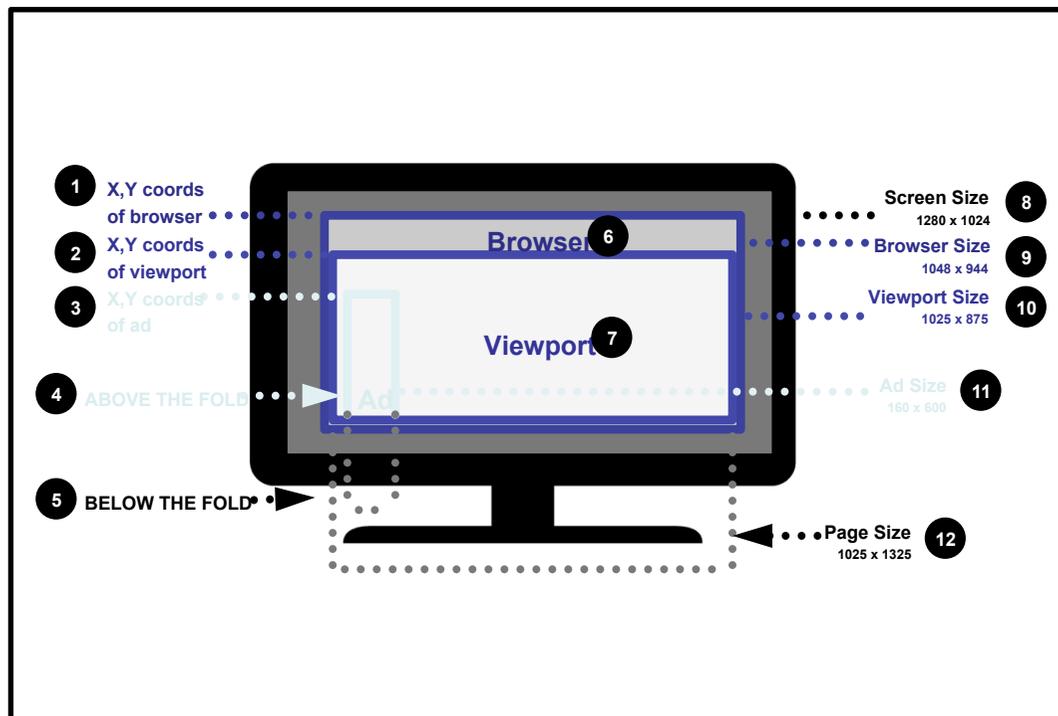**Chief Scientist**

comScore

Overview

- **Objectives**
- **Viewability**
  - **What & how**
- **Invalid traffic (IVT)**
  - **What are attackers doing?**
- **Ad blockers**
- **Counter measures**
  - **Detection, filtration and mitigation**
- **Recent measurements**
  - **Views, IVT, ad blockers**

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Measuring viewability

- Ad viewability: ads that appear within viewable space in a browser on a user's screen
  - MRC standards
- Considerations
  - Screen size
  - Location of the browser
  - Location of the ad relative to the page
  - User actions including tab, scroll, minimize

A hybrid approach

- **Both static and dynamic characteristics must be considered to produce accurate viewability measurements**

- ***Geometry*: consider X,Y coordinates of ad to determine it's exact location in the viewport**

- ***Timing*: use clues associated with content to determine if creative is in-view**

- **Hybrid method enables broad coverage (97%) plus adaptability to browsing dynamics**

The threat landscape

- **What motivates ad fraud?**
  - **"Because that's where the money is." W. Sutton**
- **Fraudster's advantages**
  - **Anonymity, vulnerabilities, complexity, scale**
  - **Humans in the loop**
- **Key requirement – a way to put $$ in the bank**
  - **Ad exchanges and DSPs are obvious opportunities**

Who is harmed?

Brands · Agencies · Trading Desks · DSPs · Exchanges · SSPs · Networks · Publishers
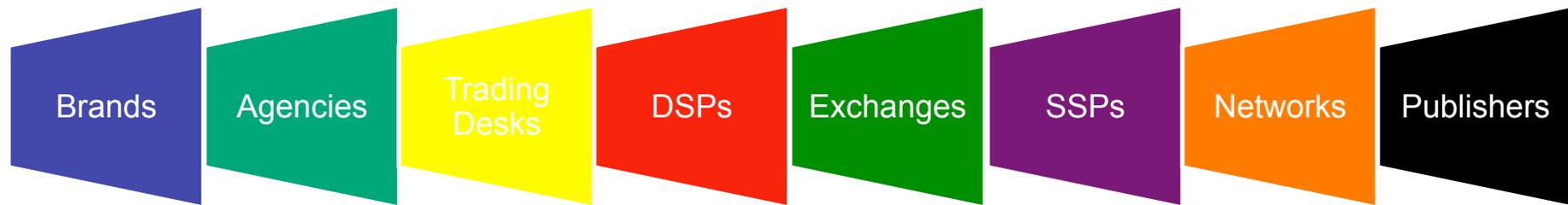
Everyone

Attack vectors

Invalid traffic includes both clicks and impressions that Google suspects to not be the result of genuine user interest

- **Invalid traffic falls into four general categories**
  - **Traffic generators – human & automated**
  - **Unwanted ads – plugins & injectors**
  - **Unseen ads – including popunders & PPV**
  - **Misrepresented placements – placement laundering**

- **Grey areas abound!**

Traffic generation

- **Valid traffic generation offerings**
  - **Adwords, Outbrain, BingAds, Facebook ads, etc.**
- **Type "purchase web traffic" in Google**
  - **MANY traffic generation offerings**
- **Simple threats: script-based page retrieval**
  - **Ubiquitous - $12/10K impressions**
  - **Not very human-like**
- **More complex threats: botnets***
  - **Objective – look more "human"**
  - **As much as $100/10K impressions**

Plugins and injectors
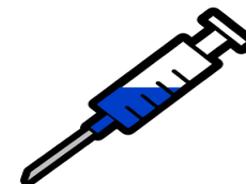
- **Software that generates ads that are not part of publisher placements**
  - **Most do not try to hide**
- **Plugins enhance native browser functionality**
  - **PageRage, BuzzDock, Sambreel, etc.**
- **Injectors impose ads other than or in addition to those intended**
  - **Trick users by promising extended functionality**
  - **Google: say 5% of their users have an ad injector**
  - **Superfish, JollyWallet, etc.**

comScore Inc. Proprietary

What about bots?
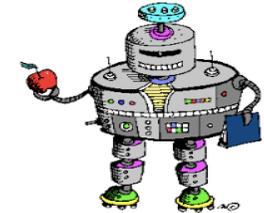
- **Bots have been around for a long time**
  - **Originally developed in 90's to manage host**
  - **Compromised hosts under the control of remote entity**
- **Bots are characterized by key capabilities**
  - **Impressions and injection**
- **Example: Athena botnet**
  - **Various ad viewing capabilities**
- **But, why bother with a botnet?**
  - **Clouds are better…**

K. Springborn "Inside a Botnet: Athena and Ad Fraud", comScore blog, 2014.

Unseen ads and PPV nets

- **Ads that appear in invisible frames**
  - Simple additions to web pages that can be "viewable"
  - Many not be 0-size, but still invisible
  - Often appear as pupup's/popunders

- **PPV network: groups of sites that run tags from a single TG service**
  - Some TG services offer a JS tag that when included on a site pays attractive CPM
  - "…will not block any of your site content…"
  - Tag will "display" camouflaged 3rd party websites

K. Springborn and P. Barford, "Impression Fraud in On-line Advertising via Pay-Per-View Networks", In the USENIX Security Symposium, 2013

Placement laundering

Placement laundering is the act of sending false information to an ad provider about an ad placement

- How do we know who is requesting an ad or where it's placed?
  - We typically rely on trust and Javascript
- "Domain laundering" coined by comScore's Jeff Kline in '14
  - Recent press release with Google on vulnerability in Safeframe
- <u>Key issue</u>: Low quality ad: $0.01 CPM, High quality ad: $10 CPM

J. Kline and P. Barford, "Placement Laundering and the Complexities of Attribution in Online Advertising", Under submission, 2015.

Ad blockers on the rise
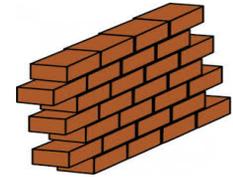
- **Ad blockers (browser extensions) have received significant attention over the past year**
  - **Blockers have been available for over a decade**
  - **"…ad blocking is robbery, plain and simple" R. Rothenberg, AdAge**
- **Blockers are here to stay, what can we do?**
  - **Measure and assess their prevalence and impact**
  - **Develop technical counter-measures**
  - **Take control of the narrative on responsible advertising**

Addressing the threats

- **Basic issues are similar to IT security**
  - **Need to understand (evolving) threats**
  - **Detection vs. mitigation**
  - **Tools and processes for decision support and remediation**
- **Core components for addressing ad fraud**
  - **Diverse measurement capability**
  - **Filters to identify/mitigate threats**
  - **Tools for visualization and forensics**

Start with telemetry

- **Objective: breadth and depth**
  - Any specific measurement method has limits!
- **Challenges: scale, diversity and dynamics**
- **Census/Ad tags: for a wide variety of threats**
  - Careful attention to errors/failures
- **Panel: for plugins, injectors, traffic generators and publisher side threats**
- **Crawler: for publisher side threats**
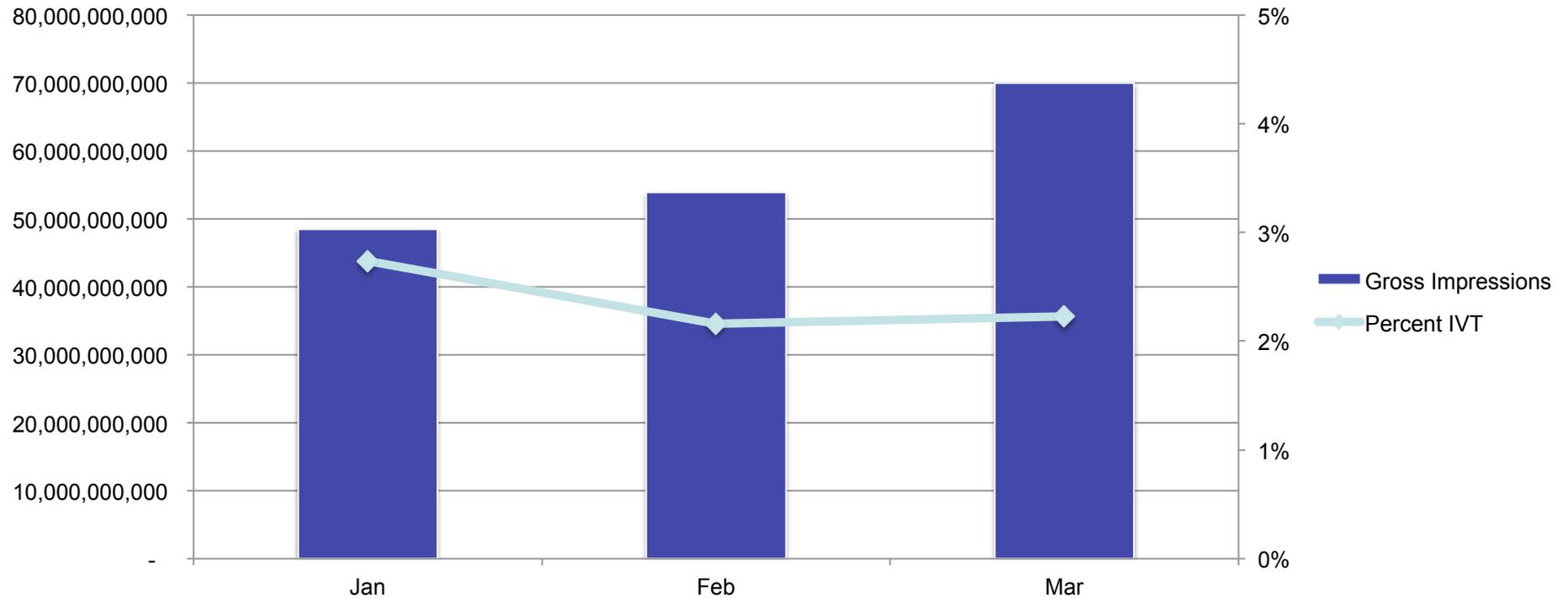- **Honeypots: for traffic generation threats**

From telemetry to filters

- **Objective: accurate, efficient threat identification**
- **Approach: mine diverse telemetry for signals**
  - **Hypothesis-based, iterative process**
- **Write code (*i.e.,* filter) that isolates signals in telemetry associated with fraud**
  - **General vs. sophisticated**
  - **Detection vs. active mitigation**
- **comScore has over 25 different IVT filters**

M. Molloy, S. Alfeld and P. Barford, "Contamination Estimation via Convex Relaxations", In Proceedings of IEEE International Symposium on Information Theory, 2015
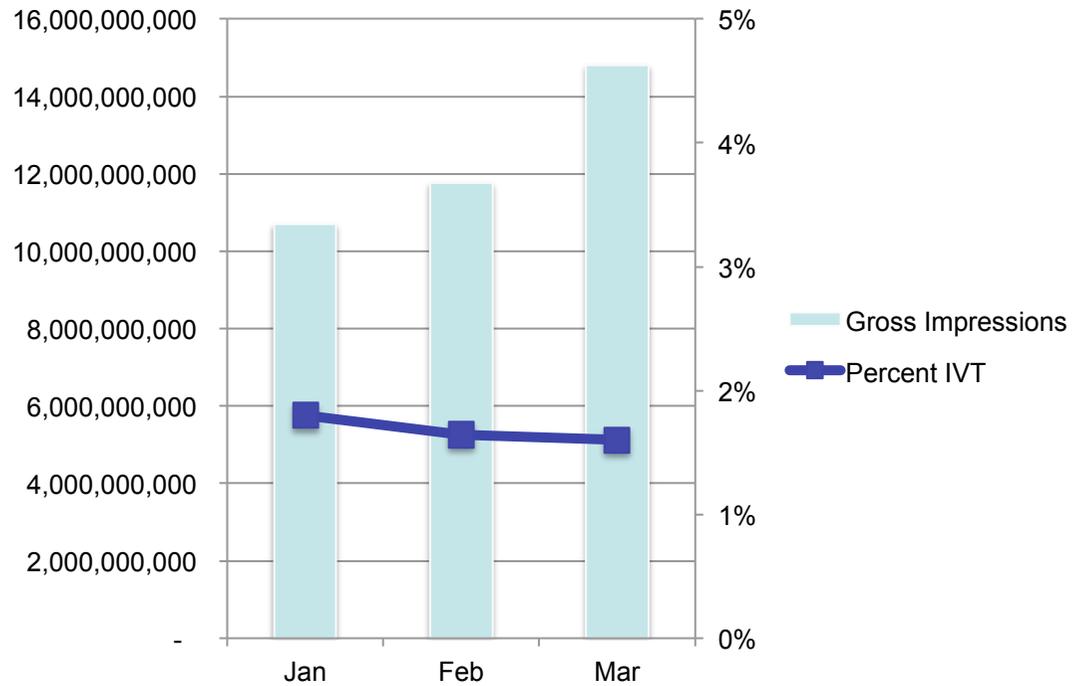
Raw Q1 '16: impressions/IVT
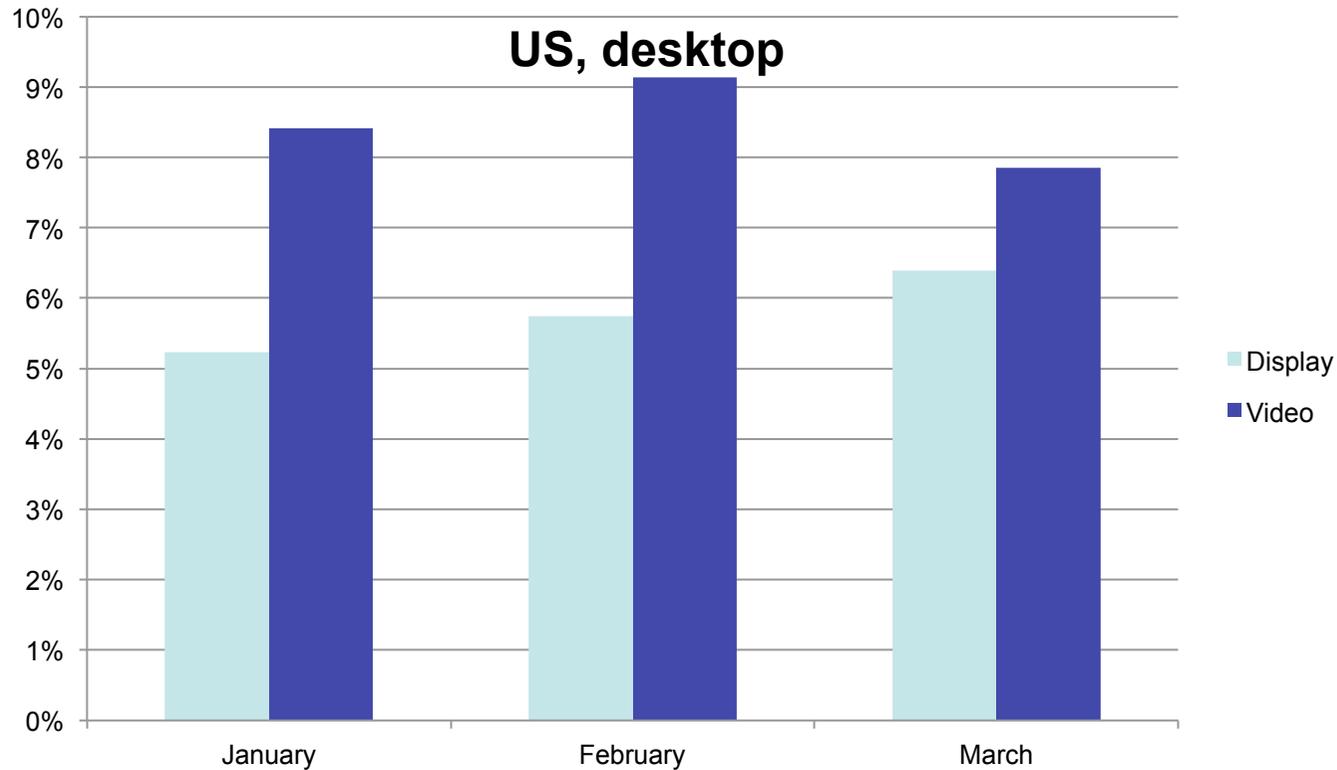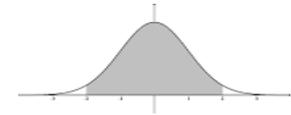
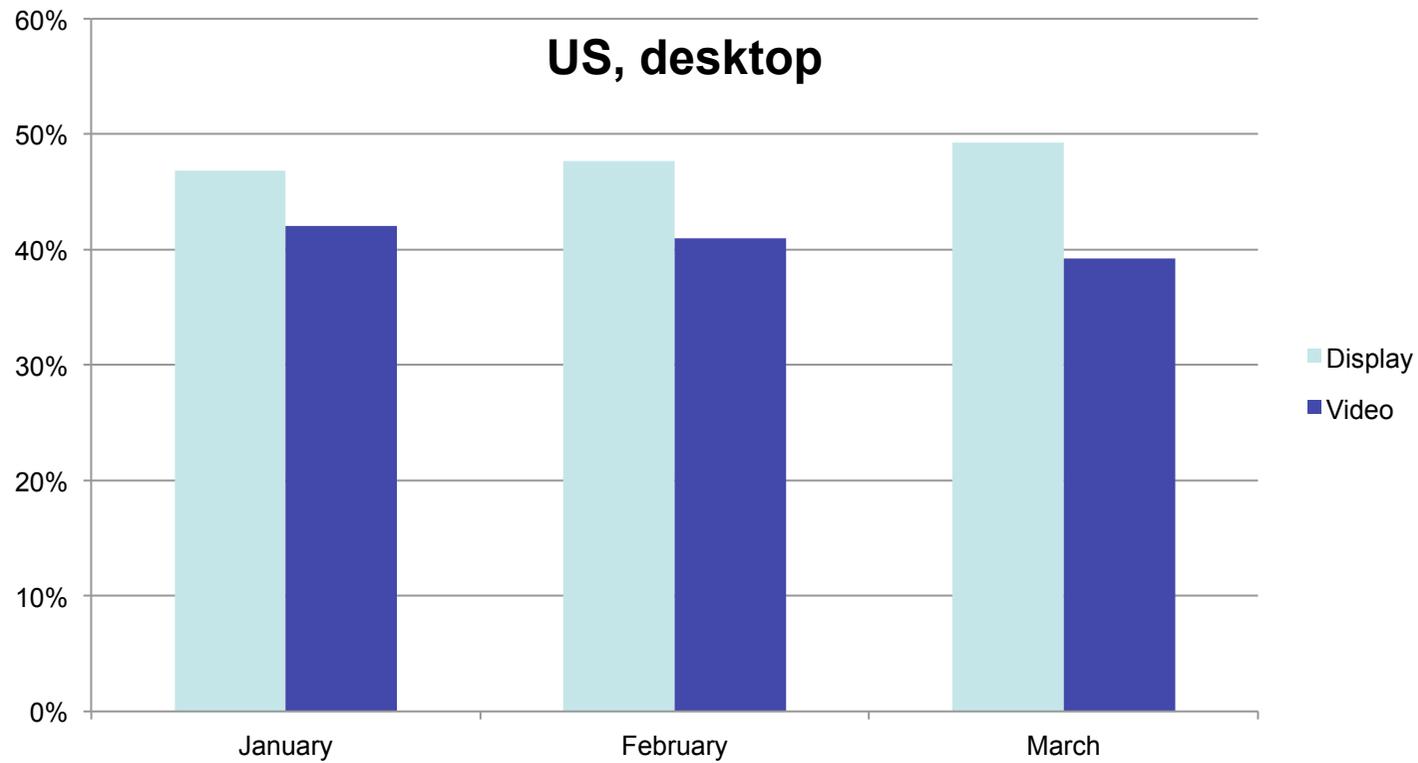# Raw Q1 '16: regional imprsn/IVT

North America

Europe

Gross Impressions
Percent IVT
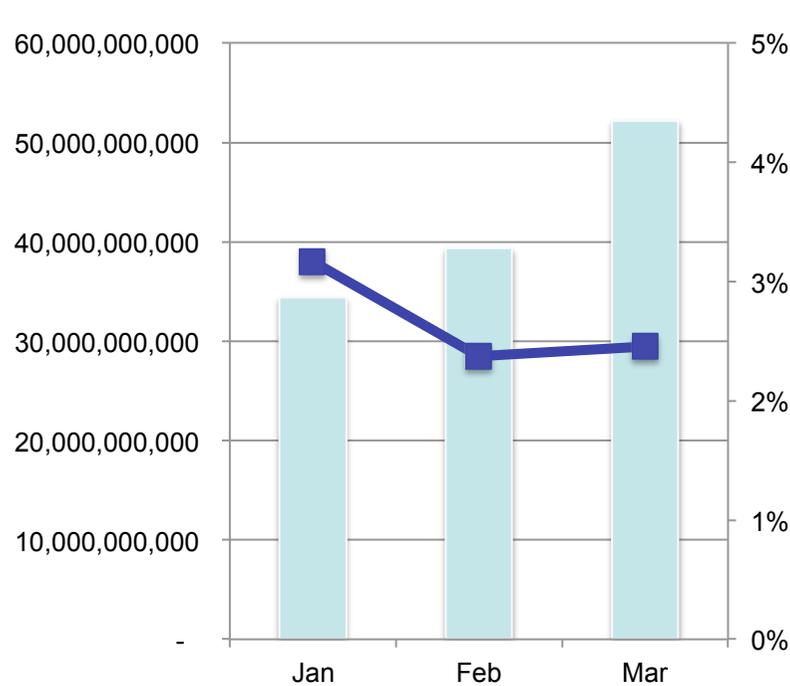
Norms Q1 '16: IVT

Norms Q1 '16: in-view

US, desktop

Chart showing in-view percentages for Display and Video across January, February, and March.

Month	Display	Video
January	~47%	~42%
February	~48%	~41%
March	~49%	~39%

Legend:
- Display
- Video
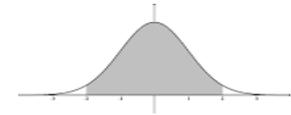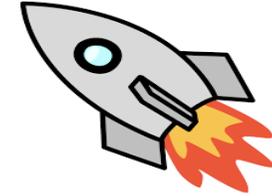
Norms Q1 '16: direct/indirect
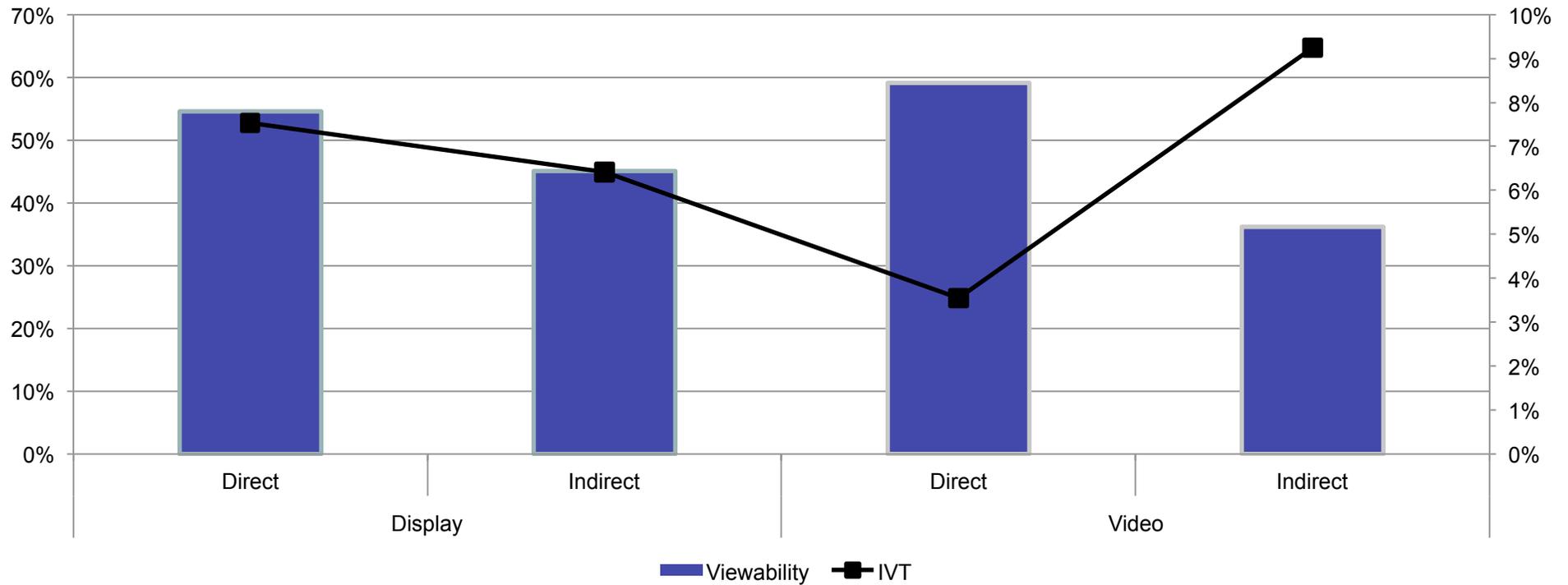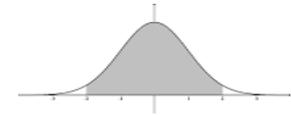
Conclusion

- **Summary**
  - **Your ads may not be seen**
    - **Viewability has a fixed objective**
    - **IVT detection and mitigation is a moving target**
    - **Ad blockers are having an impact**
  - **Diverse telemetry + data science can address threats**
- **Q: What is the cost? A: Depends on where you advertise**
- **Future**
  - **Broad deployment of active mitigation**
  - **Anti-ad blocking**
  - **Cross media**

Thank you