Dan,

As we discussed in our 1:1 today attached are the two strategy docs for Audience Network. The idea here is to focus on a 2-part conversation – 1) why are we doing Audience Network and then 2) in support of #1 what our strategy should be to secure supply.

For part 1, the document labeled Advertiser Value describes the focus of Audience Network on Advertiser Value with a deep dive on how we measure and improve value. The document covers the negative incrementally to Facebook and the steps we are taking this year to continue to better understand and improve advertiser value. Read this first.

In part 2, the document labeled Scale, the team frames up how much scale we need to be successful, where we are today, our current strategy and options (including Google) to gain more supply.

These two documents together frame up the core strategic questions facing our business.

We can take this discussion a couple of ways. 1) I am scheduling time with you and the group next week. We can discuss questions on the strategy, the scale options or Google specifically. 2) We can cover any questions over email as well.

Looking forward to this discussion.

B

Audience Network Strategy: Scale

15 MINS READ

Core contributors: Louise Watson, Swarna Kakodkar, David Jakubowski, John Wren, Francesca Pignataro, Henry Erskine Crum

This document is the second of a two part series on Audience Network strategy. In order for AN to be successful we need to be deliver **Advertiser Value AND Scale**. This doc addresses Scale and the first doc addresses Advertiser Value.

Introduction

Goal of documents

ALIGNMENT

- Align on how much scale AN needs to be successful
- ALT-wide understanding of our supply-acquisition options
- Align on which strategy to pursue

KEY DECISION

- Do we move forward with our ad tech partnership strategy and partner with Google?

What's in this document?

As mentioned in the last doc, one of the three reasons for doing AN is to provide liquidity and be an outlet for demand during unexpected negative trends in supply or supply growth. This document outlines:

1. The scale that AN needs to reach to be an effective outlet, when we're supply constrained
2. How much supply AN generates today
3. What our existing supply-acquistion strategy is
4. Our strategic options for supply-acquistion

What is meaningful scale?

The question has been raised of 'how big does AN need to be in order to meaningfully impact supply liquidity of the Facebook ecosystem?' The reality is that the impact is proportionate to how supply constrained Fb Inc is **AND** to the amount and quality of supply it can add. There isn't a magical number. However, there are some principles that we can use to help us understand the trade offs of decisions on scaling supply.

Definition: Incrementality of supply = % revenue increase from 1% increase in additional supply. e.g. 20% supply incrementality implies that if there were 1% more impressions there would be only 0.2% more revenue.

WHERE IS THE INCREMENTALITY OF SUPPLY TODAY?

At the moment the value of incremental supply on Fb Inc is estimated between 20% (*AS-BQRT* data) and 45-50% (*finance model* estimations for 1 year incrementality). The gap between 20% and 45-50% is the estimated impact of second order effects of advertisers reacting to increased cost from CPM changes over 1 year. At this current level of supply incrementality and demand incrementality, additional demand (advertisers budget) is more valuable than additional supply.

WHAT DOES THE FUTURE (POTENTIALLY) LOOK LIKE?

It is expected that the incrementality of supply will grow as demand growth (~40% YoY growth in ad spend) outstrips supply growth (~15-20% YoY growth in impressions). Ideally we would be able to analytically measure this relationship but it's difficult to measure demand growth and there isn't a strong understanding of the relationship between supply incrementality and demand / supply growth. However, the best estimate that we have indicates that over the next 5 years supply incrementality is expected to grow from 45-50% to 70%. At the current margin of 32%, AN will only become net revenue neutral once that 70% incrementality point is reached.

Incrementality of supply	Margin	Net revenue impact	
20%	32%	-48%	⇐ ASBQRT results
30%	32%	-38%	
40%	32%	-28%	Where we are today
50%	32%	-18%	⇐ Finance team model
60%	32%	-8%	
70%	32%	2%	
80%	32%	12%	

SCENARIO 1: CURRENT STATE WHERE FB INC INCREMENTALITY OF SUPPLY < 70%

1. Scaling high-quality supply will **increase Advertiser Value**.
2. Scaling high-quality supply makes the **net revenue impact of AN to Fb Inc more negative.**

Tl;Dr the more scale the better for Advertiser Value, but it will cost us more in Fb Inc net revenue.
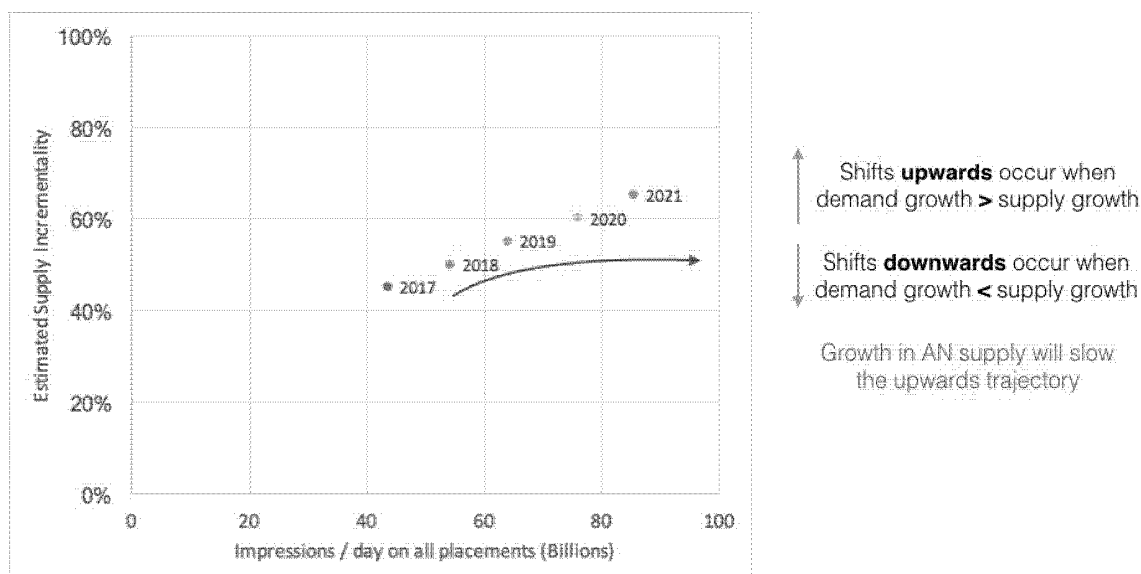
SCENARIO 2: POTENTIAL FUTURE STATE WHERE FB INC INCREMENTALITY OF SUPPLY >70%

1. Scaling high-quality supply will **increase Advertiser Value.**
2. Scaling high-quality supply makes the **incremental revenue impact of AN to Fb Inc positive.**

Tl;DR the more supply the better for Advertiser Value and net revenue impact. Simply put, in this state the more supply the better - we would really need it!

If we believe that supply will become more constrained in the future then AN will become meaningful **once scenario #2 is reached or if AN can reduce supply incrementality**. In order to shift supply incrementality AN would need to be a meaningful size compared to the rest of FB placements to try and close the gap between the ~40% YoY ad growth spend and ~15-20% YoY growth in impressions.

*Assuming the forecast holds, AN starts to become meaningful in the **realm of >10% of all placement imps** in 2020 or >7.5B imp/day*

Shifts **upwards** occur when demand growth **>** supply growth

Shifts **downwards** occur when demand growth **<** supply growth

Growth in AN supply will slow the upwards trajectory

How much scale do we provide today?

AN is currently at **2.6 B imps/day**, and forecast to grow faster than other placement types. As an anecdotal benchmark, this is the same size as Twitter ads marketplace (data estimated during clean room exercise with Twitter team).

How can AN get to >7.5B imps/day?

Supply-acquisition is highly dependent on the ad tech that a publisher uses. All publishers use ad tech (ad server/mediation platform/supply-side platform) to facilitate transactions be-tween demand sources (like AN) and their available ad impressions. Publishers either build their own ad tech (Twitter, Rovio, Snap) or use 3rd party vendors like Google DFP, Google AdMob and MoPub. By revenue, we estimate that 88% of our addressable market flows through 3rd party vendors and 12% flows through home grown solutions (see this doc for more detail).

There is always ad tech between us and the impression we want to buy, which we have no control over

At a high-level, we have 3 strategic options to acquire supply:

1 **Current strategy:** Work directly with publishers, ***don't partner*** *with ad tech*

2 **Recommended strategy**: Work directly with publishers, *partner* with ad tech

3 **Untenable strategy**: Work directly with publishers, *build* ad tech

1. Work directly with publishers, *don't partner* with ad tech

This is our de facto strategy. Our primary mechanism for buying inventory is as a tag in a publishers waterfall (88% of mkt). For those that build their own ad tech, we are increasingly working with publishers using our real-time bidding endpoint (12% of mkt). If we continue along this course, our LRP forecasts that AN will grow at a faster rate than the aggregate of non AN placements (2020: 27% vs 16%) and that we'll reach 5.8B imps/day by 2020, representing 8% share of Fb Inc placements:

	Imp Growth (% y/y)						All Non AN placements
	Page home	Page home feed	Mobile feed	Instagram	Other page types	AN	
2017	10%	10%	10%	100%			
2018	10%	10%	10%	100%	77%	37%	24%
2019	6%	6%	6%	50%	46%	26%	17%
2020	6%	6%	6%	50%	29%	28%	18%

	% of impressions						AN Impressions
	Page home	Page home feed	Mobile feed	Instagram	Other page types	AN	
2017	6%	5%	66%	9%	8%	6%	2.6B
2018	6%	5%	58%	14%	11%	7%	3.8B
2019	5%	4%	52%	18%	13%	7%	4.8B
2020	5%	4%	46%	23%	15%	8%	5.8B

However, **we believe that the probability of achieving this LRP is low if we continue along this path**, because:

1 **The dynamics of accessing inventory via waterfall technology:**

We are beginning to see a cap in access to publisher supply on a per publisher basis of ~14%. This means that if a publisher has 100 impressions, on average we only have the opportunity to win 14 of them. Ultimately, this access cap will have a corresponding revenue cap and we believe the trend limits our 2020 AN revenue to $3-4B

2 **The ad tech industry is in the middle of a shift from waterfall to unified bidding that will amplify 1:**

All of the market-leading 3P ad tech vendors have either already launched or will launch unified bidding platforms in 2018. These platforms allow 3P demand (like AN) to real-time bid on 100% of impressions. In addition Google's DFP/AdMob product, Exchange Bidding Dynamic Allocation (EBDA), will provide the clearing price from the waterfall to their bidders. Being left to compete on avg CPMs in the waterfall, while 3P demand sources move to unified bidding using real-time pricing strategies, will further reduce our ability to win impressions.

If we want to increase the probability of achieving our LRP forecast with this strategy, and more importantly enable AN to achieve its LT value of >7.5B imps/day, we would likely need to do the following:

- Lock up publisher supply through guaranteed revenue deals. This would need to

be a significant **ongoing investment for as long as we wanted access to the sup-ply.** (*personally, I view this as a short-term play that is unsustainable*).

- Invest in a much larger services organization and play the waterfall game to the best of our ability. This would require significant investments in expanding technical account management, solutions engineering and analysts.

*Aside from Advertiser Value,***we view this as the most material long-term risk to AN accomplishing its strategic goal of providing Facebook Inc with meaningful supply liquidity.**

2. Work directly with publishers, *partner* with ad tech

This is our recommended strategy and would require partnering with 3P ad tech vendors to become a bidding partner. Partnering directly with vendors would be the the culmination of the work that the AN bidding team has been doing over the last 12 months through initiatives like our header bidding program and Industry Code of Conduct (fair and transparent supply access). We are already in negotiations with Google, MoPub, Fyber, etc and will be reviewing Google commercial terms later in this doc, which will form the template of all other partnerships.

Partnering would provide us with a seat at the table to shape how the unified bidding shift happens. If we pursue this strategy, we forecast that we'll reach **11.7B imps/**day by 2020, representing 14% share of Fb Inc placements:

	% of impressions						AN Impressions
	Page home	Page home feed	Mobile feed	Instagram	Other page types	AN	
2017	6%	5%	66%	9%	8%	6%	2.6B
2018	6%	5%	58%	14%	11%	7%	3.6B
2019	5%	4%	50%	18%	13%	10%	6.7B
2020	4%	3%	43%	21%	14%	14%	11.7B

However, **partnering with ad tech vendors via bidding will require sharing a small % of AN revenue.** We are thinking of this as a tax for not having to build and service our own ad tech - the benefit is getting the same level of access as the ad tech companies own demand source. In a Google world, this means we will get the same treatment as GDN gets in the DFP/AdMob ecosystem.

One additional **important point**, is that this strategy would move the vast majority of AN impressions to real-time bidding rather than avg CPM tag. In this world, we have the optionality to dynamically change margin depending on the level of supply incrementality for ad objectives, campaign types and GEOs. This would enable AN to become a far more sophisticated supply liquidity engine and react dynamically to the ebbs and flows of demand/supply at the Fb Inc level. Due to the complexity, we have not analyzed these additional benefits in our advertiser value and supply analyses and forecasts.

3. Work directly with publishers, _build ad tech_

We view this as an untenable strategy for Facebook at this moment in time. We should look to the LiveRail post-mortem for analysis as to the difficulty of this strategy, but at a high-level the key points from that experience are:

1. Huge engineering investment to build competitive feature set to DFP for head of market publishers
2. 5-10 year roadmap to drive meaningful adoption
3. Ad tech is a services business and would require a significant service org investment
4. Facebook culture is diametrically opposite to this strategy

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The recommendation: partner with ad tech

We recommend partnering with ad tech, with Google being the most important partner. Google already dominates the market. In 2017 by addressable revenue (excluding direct) we estimate that DFP/AdMob accounted for 39% of app, 72% of web and 40% of video.

Although publishers want an alternative, the likelihood of a credible replacement emerging is extremely low. Google are the only company making credible long term investments in technology and services. For example EBDA, Firebase Analytics, Tensor Flow AI integration, Google 360 integration, Crash Analytics, etc. We estimate that by 2020 DFP/AdMob will account for 68% of app, 80% of web and 50% of video **regardless of whether we do a deal.**

Where are we with Google:

The AN bidding and partnership team have been working with Google for the last 6 months negotiating commercial terms and conducting technical due diligence. We have:

1. Commercial heads of agreement (outlined below) that falls within the initial negotiating parameters that AN leadership set out. These terms have been signed off at CEO level on Google's side.
2. A mutually agreed 18 month product roadmap to integrate AN bidder into EBDA, DFP and AdMob.
3. Kicked off the legal process.

Core deal terms that we have negotiated

Commercial heads of terms here: Commercial heads of agreement

	A	B
1	**Name**	**Description**
2	Fee	Facebook will pay Google 10% of any dollar spent, up to $500m; 5% above $500m. Therefore we would pay Google $75m at $1 billion of spend. Deal moves to flat 5% for any quarter FB spends 1.5B
3	Term	3 year initial term with an automatic 2 year auto renew. Either party can terminate the agreement upon 180 days notice, during which time both parties are contractually obligated to deliver upon the agreed terms.
4	Minimum Spend	$20M commitment through end of first phase. Assuming we continue on, the annual commitment is the average of the previous 6 months of monthly spend x 12, capped at $500M.
5	First Price Auction	Google will run an auction, net of fees, whereby the highest price wins. If buyer 1 submits a bid of $5 and buyer 2 submits a bid of $6, buyer 2 wins and will have to remit $6.
6	Transparent auction logic	As the auctioneering technology, Google will not run an auction that provides GDN and AdX special privileges.
7	Fee transparency	Facebook may disclose the 10% fee structure
8	Direct Remittance	Facebook will pay publishers directly. In the event of discrepency exceeding 3%, System of Record will default to Google's final number. Note: We have a process wherby we will know Google's count so we can make sure our systems do not have material discrepencies.
9	Specific publishers	FB chooses the publishers and signs its own agreement with its own rights with said publisher.
10	Signals Collection, Measurment & Rendering	All measurement and rendering will be done with Facebook code (SDK in app). Google will work with Facebook's custom identity mechanism (policy safe) by integrating Google SDK with Fb SDK.
11	Creative Control	Google will not impose any creative controls upon Facebook. Nor will Google run a malware scan for each new creative format that Facebook delivers.
12	Data	Google cannot use any data, such as bid value data, for commercial or any other type of gain.

Revenue with Google

It's estimated that the deal will have significant impact on the scale of AN by 2020 (+85% gross revenue by 2020). The two primary growth drivers are increased access to inventory for existing publishers and increasing market penetration from DFP/AdMob market share. In particular the deal will enable access to the desktop web market, currently 72% Google DFP mediated.

Best estimate:

Gross Revenue	2017	2018	2019	2020
Deal				
App	1,316	1,754	2,797	4,626
Web	63	107	565	1,254
Instream	150	231	356	499
Total	1,529	2,092	3,719	6,379
No Deal				
App	1,316	1,716	2,231	2,826
Web	63	86	119	167
Instream	150	229	330	454
Total	1,529	2,032	2,681	3,446

Impressions	2017	2018	2019	2020
Deal				
App	2,508	3,344	5,333	8,820
Web	141	236	1,252	2,777
Instream	32	49	76	107
Total	2,680	3,629	6,661	11,703
No Deal				
App	2,508	3,272	4,253	5,387
Web	141	190	265	369
Instream	32	49	70	97
Total	2,680	3,511	4,588	5,853

Revenue in gross millions USD per annum. Impressions is average / day anticipated each year, in millions.

ASSUMPTIONS:

Scenario analysis on win rate, quality of supply and access to inventory gave 8-13 Billion imp / day and 4-7 billion USD per annum in 2020 (primary scenario 11.7B imp / day and $6.4 billion USD). Assumptions of base scenario:

1. Market size outlined above with 20% haircut for poor quality inventory.

2. Full scale of deal achieved - AN market penetration accelerates via the deal. Initial testing phase of deal will occur in 2018 and scaling of product will occur over 2019 and 2020.

3. 5-20% increase in revenue per publisher in first year from switching over from waterfall standard integration to bidding. Win rate increases with optimisation of margins, CPMs and integrations (+40% revenue lift in second year).

Cost of Google deal

Negotiated terms - *Facebook will pay Google 10% of any dollar spent, up to $500m; 5% above $500m. Therefore we would pay Google $75m at $1 billion of spend. Deal moves to flat 5% for any quarter FB spends 1.5B.*

If the deal is scaled successfully the majority of AN revenue would be run through Google mediation by 2020, and the average payment to Google would be 5.5%. It is anticipated that the AN margin would drop to 22% (32 - 10) initially to compensate and then return to 25% over time (or higher where possible).

Net Revenue	2017	2018	2019	2020
Deal				
App	421	552	828	1,392
Web	20	32	156	372
Instream	45	69	99	142
Total	487	654	1,083	1,907
No Deal				
App	421	549	714	904
Web	20	28	38	53
Instream	45	70	101	141
Total	487	646	853	1,099

Fees Paid	2017	2018	2019	2020
Deal				
App	0	10	94	194
Web	0	2	35	64
Instream	0	1	8	13
Total	0	13	137	271

in millions USD per annum

High-level roadmap for this partnership

We have been working with product teams across Google AdX, DFP, AdMob and Spam to get a detailed plan of what we would need to do to make this partnership a reality. We have a lot more detail on each aspect:

DFP & ADMOB INTERFACES

- Publisher needs to be able to set up and manage the AN bidder as a yield partner
- Publisher needs to be able to expose all inventory to the AN bidder (regardless of whether they want to do the same with AdX or not)
- Publisher needs to be able to easily see AN bidder performance

MONETIZATION MANAGER

- Ensure publishers know how to manage bidding via MoMa
- Publishers can configure mWeb placements e.g. fullwidth within MoMa
- Publishers understand any payout discrepancy between MoMa and DFP or the discrepancy is a nonissue

PAYOUT

- Ensure that we pay Google the right amount
- Ensure we pay the Publisher what Google says
- Ensure the discrepancy between Google and Facebook is minimized

CORE BIDDING INTEGRATION

- Robust oRTB integration
- Mapping of AN ents (apps, ad spaces, placements) to DFP and AdMob ents

APP BIDDING

- Pipes work, and match rate in line with current mApp product
- Integration between DFP/AdMob SDK to enable Fb identity solution

WEB BIDDING

- Pipes work, and match rate in line with code on page

LATENCY, CPU, CPM (WIN RATE)

- Ensure that we bid accurately, within Google latency bounds (150ms)
- Ensure that we have healthy win rates to make this deal worth it
- Ensure we mitigate volatility in win rate caused by decisions around CPU or other delivery factors

SCALABILITY

- Ensure all our models are parallelized

TOOLING & DEBUGGING

- Ensure we have the right tools to manage our publishers

FRAUD AND QUALITY

- Solution to reconcile two fraud systems and charge/not charge the correct advertisers
- Solution for Google's malware and classification scanning

Next steps:

- Discuss the deal
- Take to m-team, if we align on partner strategy

Audience Network Strategy Pre-Read: Advertiser Value

15 MINS READ

Core contributors: Louise Watson, Thomas Gizbert, Alexander Barickman, Dominic Fletcher, Chinmay Karande, Jon Eide, Chris Miller, Ian Ross, Henry Erskine Crum

This document is the first of a two part pre-read on Audience Network strategy. In order for AN to be successful we need to deliver **Advertiser Value <u>AND</u> Scale**. This doc addresses Advertiser Value and the <u>second Scale</u>.

Introduction

Goal of documents

ALIGNMENT

- Align on why Fb is doing AN
- ALT-wide understanding of where AN is today
- Align on what AN needs to do to be successful

Why are we doing Audience Network?

- **Incremental advertiser value**

  Our marketplace is underpinned by maximizing advertiser value, unlike any other ads market. Our ads mission is to make meaningful connections between businesses and people and, consequently we're happy taking long term decisions that place advertiser value above revenue. By adding additional high-quality supply for advertisers that opt-into AN, we provide incremental advertiser value and help advertisers make more meaningful connections.

- **Supply liquidity for the future (insurance policy)**

  Due to (1) Rapid growth of supply over last 3-5 years and (2) Super-high levels of auto-bidding (in turn due to historical deficiencies in bidding & reporting that are being identified and fixed, but will remain for a while) - our market is currently very 'short-term budget-constrained'. We are starting to get heavily supply-constrained, so #1 is starting to go away. But #2 will still remain for a while.

AN will provide liquidity and be an outlet for demand during unexpected negative trends in supply or supply growth. In a future where our market is significantly more supply-constrained and bid-constrained, even short term BQRTs should show Audience Network to be net-positive for FB ads.

- **Incremental demand growth**

  By 2019 we forecast that advertisers will spend $52B reaching people on publishers (ex-cluding Facebook, Google and other competitors). This is our addressable market, with a contingency for fraud taken into account. Today, Google Display Network is the largest demand source in this ecosystem. With the power of Facebook's demand, measure-ment and targeting AN has the potential to become the platform of choice for adver-tisers spending in this ecosystem - in particular in app (gaming, social, entertainment) which is the fastest growing supply source.
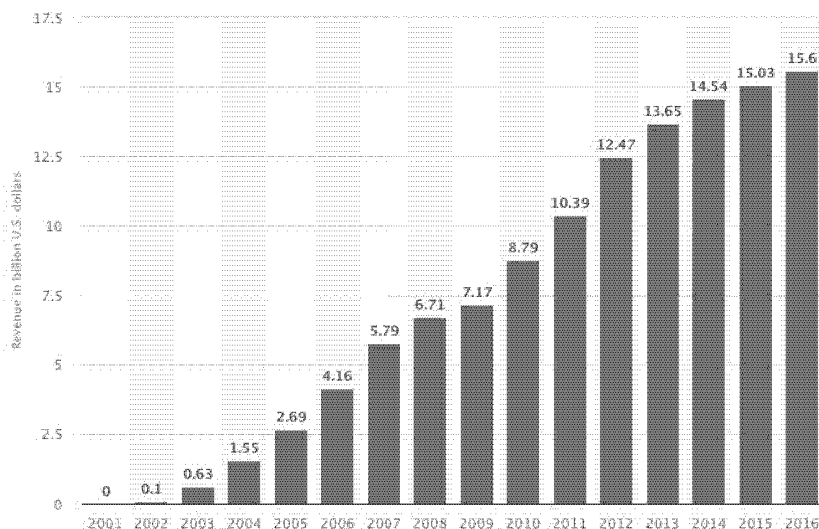
Google Display Network revenue (Google equivalent of AN). Likely reason for slow down over the last 3 years is due to header bidding, although hard to tell.

What does 2018 success look like for Audience Network?

AN has made the transition to a trusted source of high-quality supply liquidity: we're the safest and most effective way for advertisers to reach people in the $52B publisher ecosys-tem. Supply is growing at a faster rate than Fb and Insta through our focus on gaming and partnerships with Google, MoPub and Twitter. Advertiser trust is growing as we deliver incre-mental advertiser value and lower customer acquisition costs.

Without (1) scale AND (2) advertiser value, Audience Network will not fulfill its strategic

goals.

H1 GOALS:

- $850m revenue (+8% HoH, +23% YoY)
- $275m gaming (+62% HoH, +209% YoY)
- Pre-value calibrated is >0.7 for Link Click
- Post-value calibrated is >0.95 and <1.05 (equal to or better than advertiser value news-feed provides)
- Transparency for advertisers

What's in this document?

1. Where the AN business is today
2. How much advertiser value AN generates
3. Introduction to new metrics that we'll be using to measure advertiser value
4. What the opportunity cost of AN is, from a short-term and medium-term perspective
5. Our plan for increasing advertiser value and managing opportunity cost

Audience Network business today

AN is currently generating ~$5.7m/day **gross revenue** at a 31% average margin (caveat: 32% fixed margin for app, we treat margin differently in instream video, rewarded video, and bidding). The business breaks down into 3 revenue streams, which we treat as separate products:

MOBILE APP ~$4.9M/DAY

- Quality work has significantly impacted revenue growth over the last 12 months (to be expected).

AN App Gross Revenue, 2017
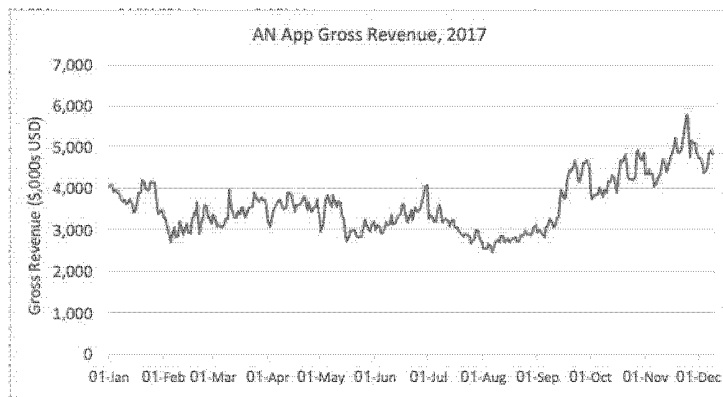
- Focus has been on diversifying away from utility by focusing on gaming. Also quality work has disproportionately affected utility (to be expected).

Share of Revenue by Category	Nov-16	Nov-17
utilities	66%	35%
games	11%	24%
entertainment	4%	8%
photo/video	5%	6%
communication	3%	5%
other	13%	22%

- **Managed** represents 89% of app revenue $4.4m/day. This is an open network, meaning we have open sign up. We have checks in place when a publisher signs up, further checks when a publisher starts generating >$100/day (financial information checks), and further checks when a publisher reaches >$1,000/day (at which point they become a managed publisher with an account manager).

INSTREAM VIDEO ~$0.6M/DAY

- This is a carefully curated closed network of managed publishers only. Top publishers include Viacom, Daily Motion, Vice, A&E, CNN, ABC, Spotify

MOBILE WEB ~$0.2M/DAY

- This is now a carefully curated closed network of managed publishers, having undergone a purge in early 2017.
- Top publishers include NYT, WAPO, Forbes, Diply, Little Things, Weather Channel, Hearst.

OVERALL NETWORK

- AN has a similar distribution of impressions globally compared to mobile feed. AN does not provide proportionately more supply in the US, but does so in APAC. Note: AN hasn't historically worked with publishers in Latin America.

Share of impressions by region	Mobile Feed	AN
Africa	6%	5%
Asia Pacific	31%	36%
Canada	1%	2%
Central & Eastern Europe	7%	8%
Latin America	23%	16%
Middle East	4%	4%
Rest of World	0%	0%
United States	16%	16%
Western Europe	13%	14%

- AN is primarily link click, offsite conversions and mobile app install. There is a small proportion of video view objectives.

Objective	Share of impressions
Link clicks	40%
App installs	36%
Website conversions	19%
Video Views	2%
Other	3%

Data based on 28 days to 9 December [https://fburl.com/m4a5r08z]

How much Advertiser Value does AN deliver?

Major props to Thomas Gizbert *for the below section.*

We measure the value of AN from the perspective of the advertiser, using short-term AS-BQRTs. This gives us a snapshot of the first-order effect on incremental conversion events when ad campaigns are opted into AN. We have two types of conversion events that we use to measure advertiser value:

1 **Optimized conversion events** tells us the value from the advertisers point of view - we're measuring based on what advertisers say they want (not always rational).

2 **Deep funnel conversion events** tells us the value from our own point of view - we're measuring based on the events that we believe are closer to demonstrating true advertiser value.

The following results are based on a ASBQRT run 23 to 29 October where for 20% of campaigns budget is split into a test group (where AN delivery is turned off) and control.

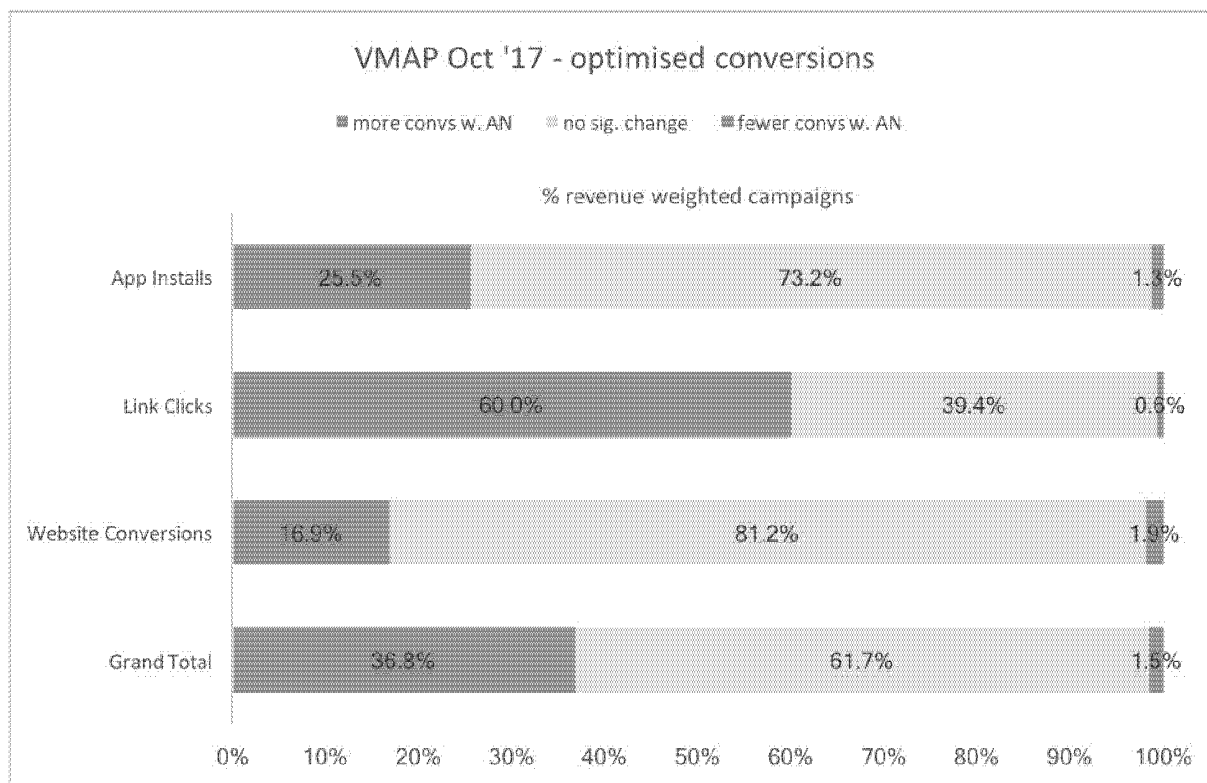## (1) Optimized conversion events - the advertisers' view of value

Opting into AN as an available placement markedly increases the number of optimised conversions achieved by campaigns. In this test:

- **App install campaigns** with delivery on Audience Network saw a **17% uplift in installs** when AN was available compared to when it was turned off.

- **Offsite conversion campaigns** saw a **33% uplift in optimised conversions**

- **Link-click campaigns** saw a **57% uplift in clicks** (https://fburl.com/2t56fcv6).

Indeed, we can see that a much larger revenue-weighted proportion of campaigns achieved significantly more optimised conversions when AN was available than achieved significantly fewer. 25.5% of app install campaigns (revenue weighted) saw significantly more installs, compared with 1.3% which saw significantly fewer conversions. 60.0% of link click campaigns (revenue weighted) saw significantly more clicks when AN was available, compared with 0.6% which saw significantly fewer. And 16.9% of offsite conversion campaigns (revenue weighted) saw significantly more conversions, compared with 1.9% which saw significantly fewer.

OUR POV ON THIS:

- This tells an extremely positive story, in our view overly positive (see below).

- In particular, we believe that link clicks don't provide as much value as advertisers believe they do.

  - We've already launched a number of successful initiatives to fix this (e.g. remove fast clicks) and have further plans (e.g. PQS iteration in Jan).

  - In the past, the negative advertiser feedback that we've heard, which corroborates our view, is that the CPC is far too cheap to the extent that advertisers have questioned value.

- The 'red' results are also extremely positive, being <2% across the board. As you'll see below, we believe that this is also overly positive.

VMAP Oct '17 - optimised conversions

■ more convs w. AN   ■ no sig. change   ■ fewer convs w. AN

% revenue weighted campaigns

Category	more convs w. AN	no sig. change	fewer convs w. AN
App Installs	25.5%	73.2%	1.3%
Link Clicks	60.0%	39.4%	0.6%
Website Conversions	16.9%	81.2%	1.9%
Grand Total	36.8%	61.7%	1.5%

Notes: Video views aren't included in the analysis because there isn't a reliable measure of true advertiser value. Over 10,000 campaigns are considered for each objective (19k for MAIA, 68k for link click and 11k for offsite conversions)

(2) Deep funnel conversion events - our view of value

Over the course of this half, we have developed a new deep funnel conversion event definition, which we will be using to define the value of AN moving forward. This work is outlined in more detail here and here.

*This is hugely important work: with this definition, **we now feel we have a robust way of measuring advertiser value on AN***
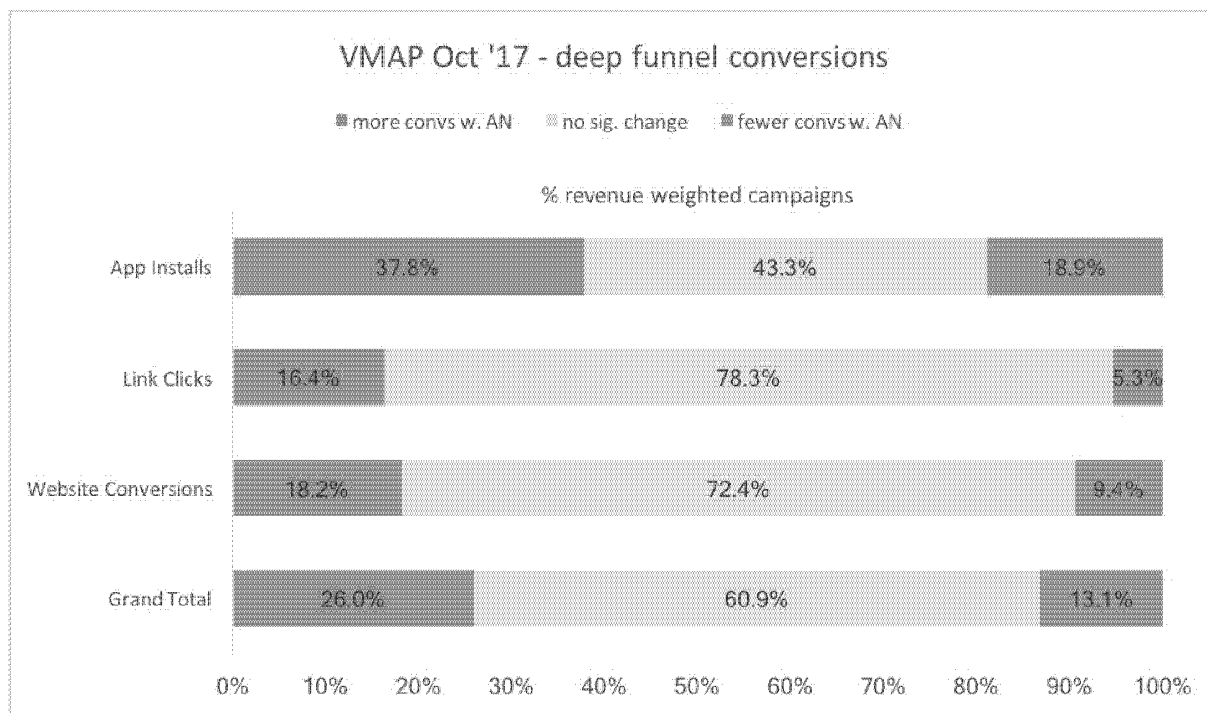
As with optimized conversions, our deep funnel definition also shows that opting into AN as an available placement markedly increases the number of deep funnel conversions achieved by campaigns. In this test:

- **App install campaigns** saw a **7.1% uplift in in-app events**

- **Offsite conversion campaigns** saw a **5.8% uplift in deep funnel conversions**

- **Link-click campaigns** saw a **1.6% uplift in deep funnel conversions** (https://fburl.com/362vjmhl).

According to this definition 26% of eligible campaigns have a significant increase in conversion events from being opted into audience network (result is revenue weighted). 60% of campaigns have a neutral result and 13% have a negative result.

OUR POV ON THESE RESULTS:

- The 'green' results for app installs extremely positive and something that we should be extremely proud of.
- However the 'red' results on MAI are also particularly high and show that we still have areas in our network that we need to fix for this objective (e.g. incentivized installs) that we are aware of and have a plan to fix
  - **Caveat:** we were dealing with a SEV on MAI from an area of the network defrauding us during this BQRT. We already expect this to be significantly less in the the January test.
- What does a good VMAP look like?
  - The fewer campaigns which fall into the 'red' grouping, the better. A:A tests show that we should expect 2.5% of revenue-weighted campaigns to be 'red' purely by chance variation, so any number less than this means that we're doing extremely well.
  - Apart from this, there is some debate about the proportion of VMAP that has to be 'green' to be good. The amount of green that can be achieved is dependent on the scale of the network, and the cost of deep funnel conversions on AN compared to feed. All in all, the more 'green' the better, although we can expect a mix of 'green' and 'grey'.

VMAP Oct '17 - deep funnel conversions

more convs w. AN   no sig. change   fewer convs w. AN

% revenue weighted campaigns

	more convs w. AN	no sig. change	fewer convs w. AN
App Installs	37.8%	43.3%	18.9%
Link Clicks	16.4%	78.3%	5.3%
Website Conversions	18.2%	72.4%	9.4%
Grand Total	26.0%	60.9%	13.1%

Note: Eligible campaigns are those that have > 1% of spend on audience network and >10 conversions and in either the AN-enabled or AN-disabled group over the week in which the experiment is running. Because the inclusion of a campaign is dependent on the number of conversions received, the deep funnel analysis includes fewer campaigns than the shallower-funnel optimised conversion analysis (6.2k for MAIA, 480 for link click and 5.8k for website conversions)

Neutral is always the biggest area, what's in it?

33% of Facebook revenue is opted into audience network and audience network is 3% of Facebook total revenue. It's unlikely that the placement is of a scale that it can deliver significant impact on a large proportion of campaigns opted in. This means that a large number of the campaigns just don't get that different results - they deliver mainly on feed when opted into AN anyway.

*The critical point here, is that in the future **our biggest lever to increasing green is by scaling high-quality supply at a faster rate than Fb and Instagram are growing.***

Negative results

A campaign has a reduction in deep funnel conversion events when opted into audience network if a click or app install on audience network less frequently results in a deep funnel conversion or an in app purchase. We have an 18 month plan to reduce this gap, a summary is here <u>What has happened so far...</u>

What is the opportunity cost of AN?

Major props to Louise Watson *for the below section.*

AN is a different business model to Fb/IG because we share revenue with the publisher. Whilst we take 100% of revenue on Fb/IG, we operate at a 31% margin on AN. This means there is an opportunity cost to Fb Inc in serving ads on AN and sharing 69% revenue with a publisher, when we could have taken 100% if the same budget was delivered on Fb/IG.

This opportunity cost is measured as "**net revenue impact**" to Fb Inc, and is dependent on

- The elasticity of advertisers' budgets to changes in cost per event
- The time frame over which advertisers adjust to changes in cost per event

We can measure the **maximum opportunity cost** of AN using an ASBQRT, which tells us the net revenue impact of AN from immediate first order effects over a very short window of time.

ASBQRT analysis of net revenue impact: 23 - 29 October

Over this period the avg daily gross revenue on FB Inc was ~140m/day, of which AN made up 3.6% at 5.1m/day.

*The net revenue impact to Fb Inc over this period was **negative 2.5m/day** or **47% of AN gross revenue**.*

This is because:

1. Of the $5.1m/day on AN, only $1m/day was truly incremental gross revenue (no supply on Fb/IG for these imps);

2. Of the $5.1m/day, $3.5m/day was paid to publishers (68.6%) and FB took $1.6m/day (31.4%);

3. If AN didn't exist the ASBQRT shows that **$4.1m/day would have still been spent on other placements**, so the net revenue impact is 1.6 - 4.1 = **- 2.5m/day (-47%)**

What does this look like a click deeper?

It's worth noting that the opportunity cost for budget constrained campaigns (*definition is ">90% of budget is utilised"*) is much higher than audience or bid constrained campaigns.

- Of the budget constrained campaigns, the BQRT shows that 100% of advertiser budgets could have been spent on other placements than AN.
  - By their very definition, budget constrained campaigns are spending their budget. From a first order effects perspective, removing AN for 40% of their budget will likely always show 0% gross revenue impact as budget can be delivered on other placements, just at a higher cost per event (which will get more expensive as we get more constrained on FB).
  - This ASBQRT was tested on 20% of campaigns, so it doesn't include the full scale of the impact that if all AN for was removed for all advertisers. We anticipate that there would be secondary effect on the availability and pricing on feed

campaign constraint	AN revenue	Gross Revenue Impact	% Gross Revenue Impact	Net Revenue Impact	% Net Revenue Impact
Budget	3,720,981	8,200	0%	(2,527,014)	-68%
Audience	801,845	577,295	72%	23,368	3%
Bid	592,590	466,812	79%	54,090	9%

In addition, link click campaigns are more costly than other objectives. This coupled with low advertiser value for link click ads indicates that there should specific product focus on this objective.

| objective	AN revenue	Gross Revenue impact	% Gross Revenue Impact	Net Revenue Impact	% Net Revenue Impact
App installs	1,863,661	777,692	42%	(548,029)	-29%
Link clicks	1,624,105	61,606	4%	(1,057,973)	-65%
Website conversions	900,132	147,457	16%	(469,903)	-52%
Video views	545,670	36,060	7%	(286,785)	-53%

This is more apparent when looking specifically at **bid constrained campaigns.** Mobile app install is nearly at the ideal level 100% gross revenue positive (95%) while even bid con-strained campaigns for link click are 35% gross revenue positive.

objective	AN revenue	Gross Revenue impact	% Gross Revenue Impact	Net Revenue Impact	% Net Incr. Revenue
App installs	380,514	358,734	94%	89,123	23%
Website conversions	98,581	74,286	75%	6,693	7%
Link clicks	70,568	20,300	29%	(28,159)	-40%
Video views	38,058	14,776	39%	(9,170)	-24%

For a much deeper analysis on the net revenue impact of AN, please read this quip: Incremental value of AN

Longer term view than ASBQRT

The ASBQRT analysis is insightful for telling us (1) the **maximum opportunity cost** of AN and (2) **net revenue impact in different areas of our network** to inform product strategy. How-ever, it definitely doesn't tell the whole story, because it doesn't show us how advertisers would adjust budgets over time, given prices (second order effects). In particular, we know that advertisers that do opt-into AN tend to spend a significant proportion of their budgets on AN, with 16% spending 100% of their budget:
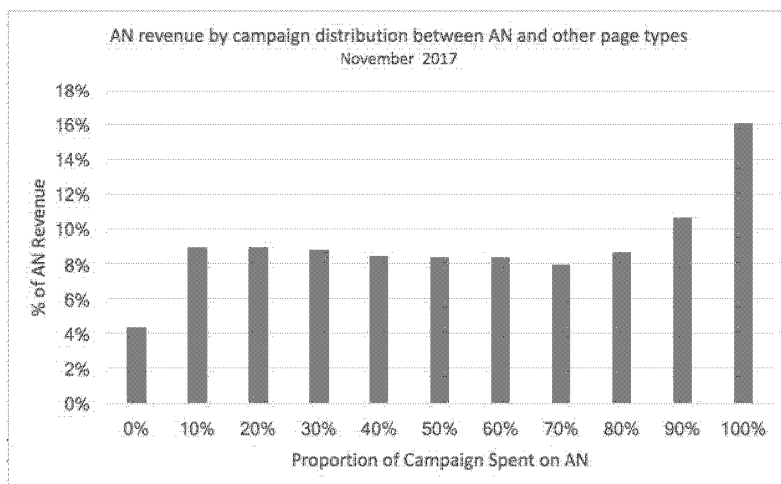
Over a longer time (~1 year) horizon where advertisers have the ability to adjust budgets, from higher CPMs, it is anticipated that the cost of AN today is closer to -20% net revenue

impact to Fb Inc. This is based on modeled influences of ads revenue growth, so is less exact than a/b test results. https://fburl.com/6kfav54m by Chris.

Second order effects we need to believe in to do AN:

- If we entirely remove AN from Fb Inc, we should expect a number of advertisers to either reduce their budget or stop spending on Fb (especially those that spend the majority of their budgets on AN).
  - We should expect this to become more acute as Fb becomes more supply constrained.
- As we increase the Advertiser Value of AN, in particular by pricing link click campaigns better, we should expect the ratio of link click : MAI : offsite conversion to change in favor of reducing net revenue impact.
  - With this, we should expect truly incremental gross revenue to grow along with the number of incremental deep funnel conversion events.

We don't have the infra today to measure second order effects and likely never will. We need to believe in the direction of our hypothesized second order effects.

Increasing advertiser value and managing opportunity cost

## What should ALT expect from us in H1 2018?

ADVERTISER VALUE

1. VMAP using our new deep funnel definition is the way that we will measure our value. Expect regular analysis using this.

2. AN will reduce 'red'. We view an acceptable level as anything <2.5% for each ad objective, when allowing for random variation.

3. AN will increase 'green' campaigns for deep funnel conversions to the same benchmark as optimised conversions (from 26% to 36%). From this point any additional growth in incrementality will come from increased scale or improving value beyond the benchmark of feed

In 2018, it will be far easier to reduce red to the acceptable level than significantly increase green.

OPPORTUNITY COST

1 Continued research in this area with future BQRTs
2 Present a framework on how we think about this moving forward, along with product strategy

The Ian Ross AN 2x2

Incremental Revenue Impact to Fb Inc

2018 work
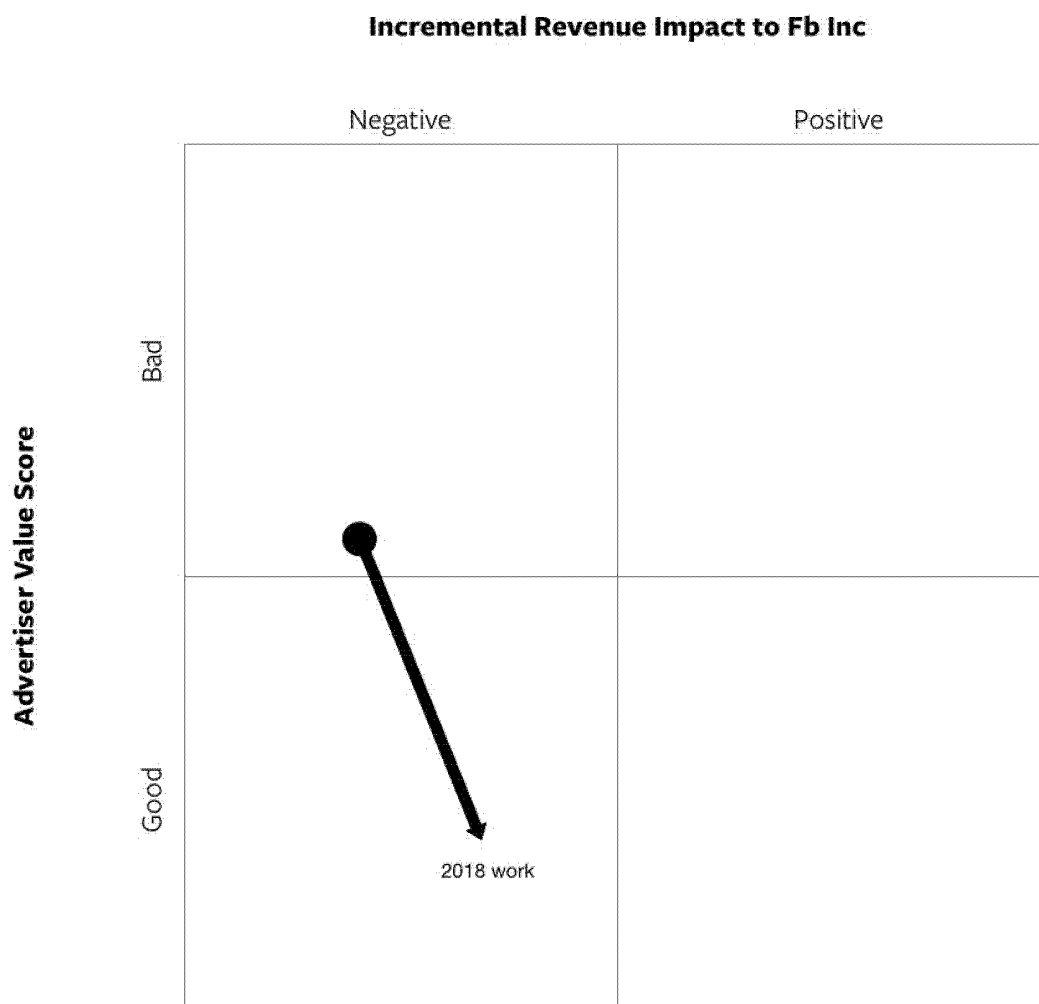
What's the plan to achieve in H1 2018?

Below is a list of the key projects and expected impact on Advertiser Value and Net Revenue Impact.

	A	B	C	D
1	**Type**	**Description**	**Expected change to Advertiser Value (measured by VMAP)**	**Expected change to Net Revenue Impact**
2	Incentives framework	This project will add a new incentives framework on top of our delivery system for valuing impressions. The framework proposed using margin as a lever to reward publishers with high-quality supply (measure pre-value calibration) and punish low-quality supply. Further details: AN Supply-Side Goals and Incentives	This change is likely to have significant impact on the scale (decrease) of our network and the advertiser value score (increase). In the long term providing such an incentive should significantly increase Advertiser Value (as measured by VMAP). However, in the short-term as we remove supply we will also reduce Advertiser Value through reduction in scale.	Net Revenue Impact should go down because we are disincentivizing low-quality supply that, does likely not lead to truly incremental gross revenue.
3	Advertiser Value Score	We are rolling out the new advertiser value score at a publisher-level. This will enable us to identify and work with publishers to increase their Advertiser Value Score. Details are here: https://fb.facebook.com/notes/thomas-gizbert/advertiser-value-score-on-audience-network/297263654111627/	This is likely to increase Advertiser Value through improving the conversion rate of deep funnel events.	There is no obvious first order impact from this on net revenue.
4	PQS iteration	Now that we have a robust measurement of advertiser value, we can better optimise against it. In particular, link click revenue is currently overvalued and we will be correcting this by iterating on PQS in January.	We expect this to have a very positive impact on VMAP, although like with the incentives framework there is a risk that we lose a significant part of our scale (cheap low-quality supply) which may offset some of the gains.	Net Revenue Impact should go down marginally, as we further reduce the proportion of link click impressions on the network (the most costly objective).
5	Advertiser controls	Providing advertisers with pre and post campaign transparency of the campaigns they run.	No immediate impact on Advertiser Value	No immediate impact on Net Revenue Impact
6	Gaming/HOM-app focus	In 2018 we will be having a ruthless focus on expanding supply of the gaming vertical (currenty provides most Advertiser Value and lead Net Revenue Impact), as well as onboarding the biggest apps like Twitter.	With the nature of the supply, we expect this to increase Advertiser Value.	The gaming and the mobile app install market had the lowest net revenue impact. By focussing on growing this segment we should reduce the Net Revenue Impact.

We've already been making great progress in this area

*Major props to* Alexander Barickman *for the below section.*

As all of you will know, we are in the middle of an intense transformation of the AN business, centered on our work on quality, combined with our push for growth in new verticals (out-side of utility). We have been focusing on improving Advertiser Value since our scam app ads discovery in March 2017.

Overall, we estimate that **AN would be +140% in (bad) gross revenue of where it is today** *without the work this team have been doing.*

HERE ARE SOME HIGHLIGHTS OF THAT WORK:

- We **removed obvious accidental clicks** from AN, which improved link click advertiser value by 26%:

Advertiser Value Score
Accidental Clicks Backtest

Holdout: 0.596
Removing Accidental Clicks: 0.694
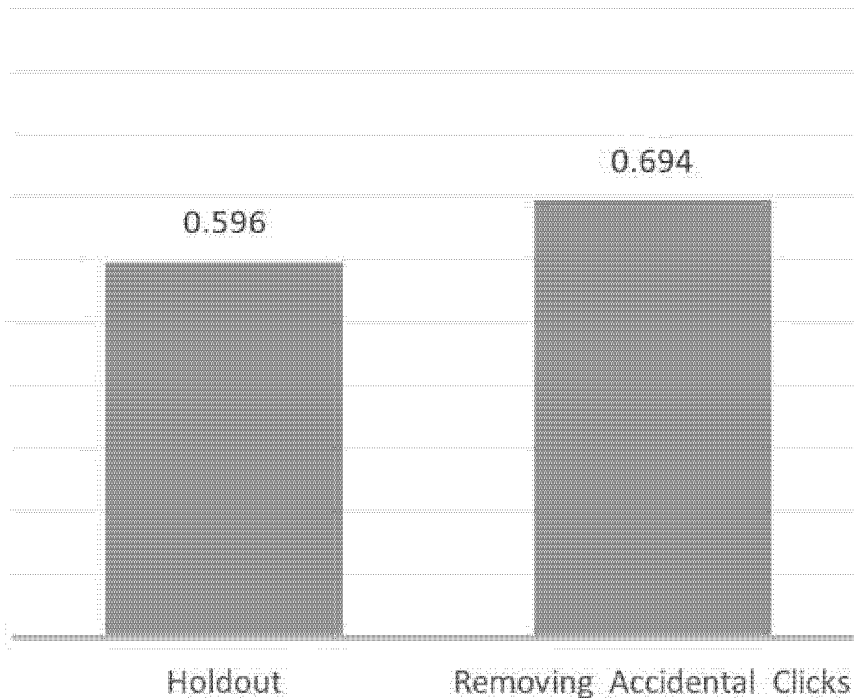
- We **enforced against placements that had extreme CTRs**, improving advertiser value by 15%.

- We **enforced against placements with extreme MAIA install rates**, improving advertiser value by 10%.

- We **ran the quality playbook (SDK updates, new data structure) against specific worrying publishers**, which lead to a 20% improvement in advertiser value during the rehabilitation period.

For a more thorough analysis of exactly where we are wrt to Quality, along with our framework and approach, please read this doc: AN Quality vTeam Progress

Next steps

- Get feedback on doc

- Talk about how we scale AN.