



White Paper

Written by
Patrick Colangelo

1. Synopsis	4
1.1 Abstract	5
1.2 Synopsis	6
2. The Problem	8
2.1 Video Shortage Problems Inducing Fraud	9
2.2 Why We Hate Ads	10
3. The Solution	13
3.1 Data Layer	15
3.1.1 Data Layer	15
3.2 Consensus Layer	16
3.2.1 Consensus Layer	17
3.3 Application Layer	17
3.3.1 The Application Layer Further Broken Down	18
3.4 How It All Works	19
4. Fracture Issues Of A Broken System	21
4.1 No User Interface Standard	22
4.2 Slow Page Loads	22
4.3 Irrelevant Ads	23
4.4 Banner Ad Stigmatization	24
4.5 Lost Users Via Purchase Funnels	25
4.6 Monopolies Threatening The Free Market	26
4.7 Poorly Paired Ad Content With Inventory	26
5. The Product	28
5.1 The One-Tap Purchase Modal	29
5.2 Detecting Bot Fraud	30
5.3 A Perpetually Free Product	32
5.4 Tactical Mobile Indexing	32
5.5 Crowdsourcing a Video Map of the Web	33
5.6 The Embed Layer's Social Future	34
6. Technical Execution	35
6.1 The Only Blockchain Play For Ads	36
6.2 How Vidy Will Tackle Scalability	37
7. Why Users Will Hold Down	39
7.1 To Earn Money	40
7.2 To Purchase With One Tap	40
7.3 To Watch An Interesting Vidy	40
7.4 To See A Good Ad	41
8. Win-Win-Win For The Industry	42
8.1 Win For The User	43
9. Vidy Revenues	47
9.1 Revenue 1: Ad Placement Payouts	48
9.1.1 Calculations	48
9.1.2 Payouts	48
9.2 Revenue 2: One-Tap Purchase (OTP) Payouts	49
9.2.1 Calculations	50
9.2.2 Payouts	50
9.3 Coin Conversion Fees	51
9.4 The Non-Profit Pool (NPP)	51
9.5 User Payout Via Arithmetic Progression	52
10. Vidy's User Payout Structure Explained	53
10.1 The Effects of Monetary Incentives on Effort and Performance	54
10.2 Piece Rate Payouts for VidyCoin	57



11. The Need For VidyCoin	59
11.1 Store Of Value	60
11.2 Medium Of Exchange	60
11.3 Membership Key	61
11.4 Stakeholder Tiers	61
11.4.1 Free Tier	62
11.4.2 Titanium Tier	62
11.4.3 Gold Tier	63
11.4.4 Platinum Tier	63
12. Vidy's Technology	65
12.1 The Vidy Technology	66
12.2 Vidy's Segmentation Neural Network (CNN)	66
12.3 Prevention Of Inappropriate Content	67
12.4 Disrupting The Search Status Quo	68
13. Terms Of Issue For VidyCoin	69
13.1 Issuance & How to Purchase	70
13.2 Fundraising Caps	71
13.3 Issuance Provisions	71
13.4 Burning	72
13.5 Airdrop	72
13.6 Bounty Program	72
13.7 Crowdsale Contract	72
13.8 Use Of Proceeds	73
13.9 Buying VIDY On Exchanges Post ICO	74
13.10 Token Specifications	75
14. Vidy's NLP Protocol	76
14.1 What is NLP	77
14.2 Vidy's Algorithm Broken Down	78
14.3 The Protocol's Lowest Level - Word Embedding	81
14.4 Feeding The Protocol	86
14.5 Takeaway	87
15. Where Vidy Stands	88
15.1 Gameplan and Milestones	89
15.2 Comparing Vidy To Other Blockchain Ad Companies	91
15.3 Partner Traction	92
16. The Vidy Team	93
16.1 Team	94
16.2 Advisors	99
16.3 Chinese Celebrity Partnerships	103
17. Conclusion	104
18. Definitions, Disclaimers & Sources	107
18.1 Definitions	108
18.2 Disclaimers	110
18.3 Sources	111
19. Solving Market Distortion with Economic Theory	115
19.1 Adverse Selection Theory	117
19.2 Transparent Information Increases Trade	118



1

Synopsis

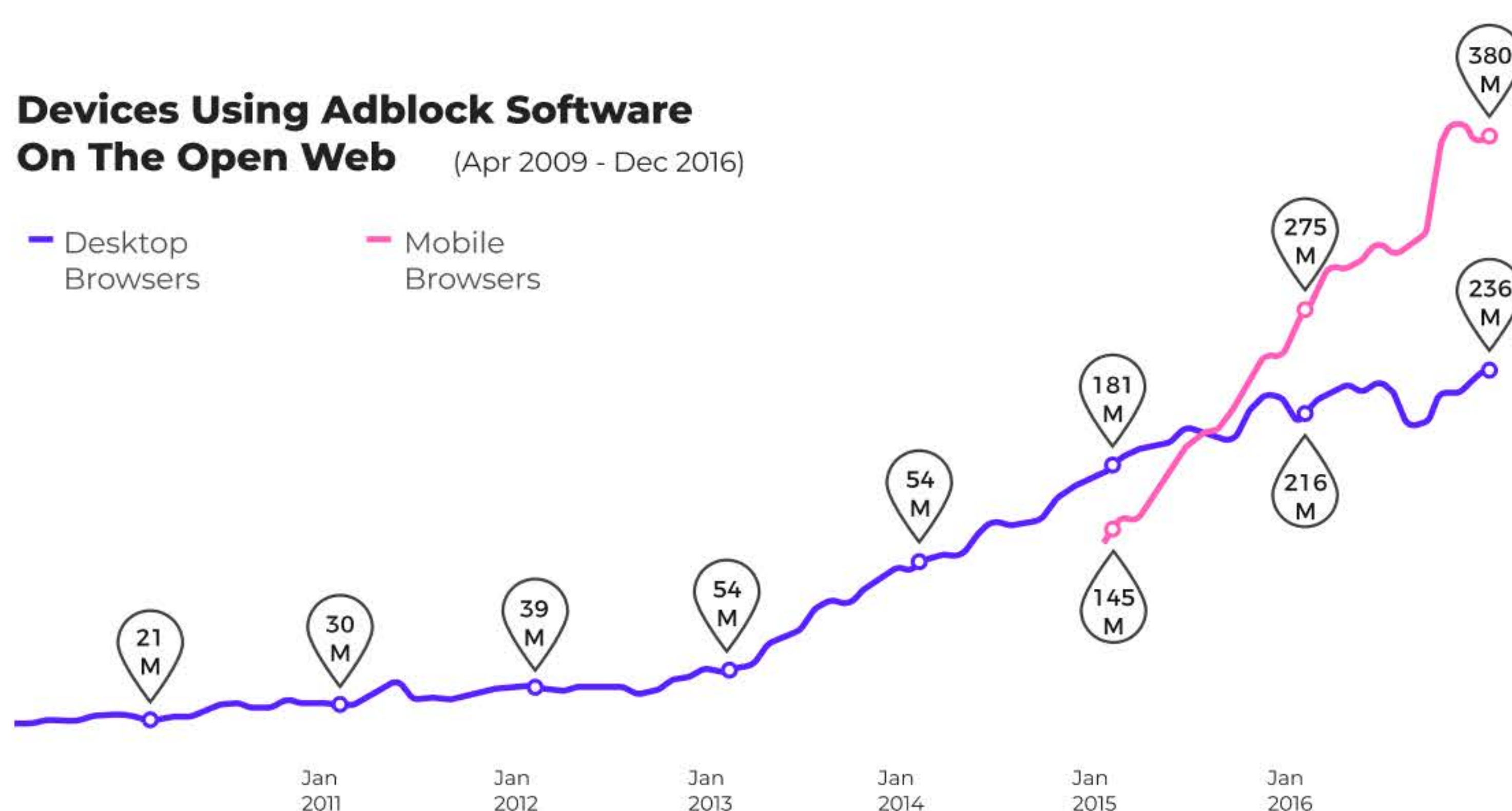
Backed by a veteran engineering team, a rockstar crypto advisory board, and fresh with over 20 partnerships with the biggest advertising brands in the world, Vidy is ready for a global rollout to millions of users worth of partner publisher platforms with its decentralized video ad embed layer that is already in beta.

1.1 Abstract

Today, 600 million people run ad blockers on their phones and desktops because they're tired of being abused by the advertisement industry.¹ Unbeknownst to most, unwanted mobile advertising accounts for more than \$23 per month in data charges on the average user's data plan, and approximately 21% less daily battery life.²

This relationship is not consensual; users have no say and no perceived right to avoid ads or choose which ads they want to see in today's climate.³ Their only choice is to opt out of the ecosystem completely, and it is advertisers and publishers who suffer the most from this ad blocking backlash, because this means that there are 600 million sets of eyeballs - and therefore 600 million potential customers - who they lose out on.⁴

Vidy pledges to bring these 600 million lost users back into the advertisement ecosystem. Our tri-layer solution built on the blockchain will be the win-win-win that this broken industry needs to fairly reward all participants, augment video ad relevance, and cut out the troublesome middlemen that have erected an opaque, fraudulent, and abusive status quo.



Source: PageFair⁵

Vidy™ is the first decentralized video ad distributor that embeds video ads behind the text of web pages via an NLP consensus-layer.

¹ The State of the Blocked Report released in 2017 shows that more than 600 Million people run ad blockers, while 11% of the global internet population is blocking ads on the web

<https://pagefair.com/blog/2017/adblockreport/>

² A group of researchers from UC Berkeley and Microsoft Research in a study concluded that 23% of an apps total energy use was tied to mobile ad fetching and display.

<https://www.fastcompany.com/3013584/study-mobile-advertising-kills-battery-life>



1.2 Synopsis

The world needs a decentralized video ad platform that can ensure a strong, steady, equitable profit channel for publishers and advertisers, and at the same time consolidate the industry's fragmented work flow of middlemen, exchanges, networks, and distributors muddying up what should be a simple handshake between an advertiser and publisher.

Vidy's patent-pending content delivery model is one that will forever change how the internet works. It is the **new hyperlink**, taking inspiration from the hyperlink's years of global adoption and usefulness, but improving upon its stark limitations with the goal of delivering users and publishers unparalleled convenience, utility, and simplicity with just one hold.

Vidy constructs a ledger system that measures how long a user watches an ad thanks to hold tracking technology on its embed application layer. Vidy then rewards publishers and users accordingly for holding on ads with VidyCoins, taken as a fraction of the VidyCoin payout made from advertiser to publisher for that video ad impression.

In this way Vidy properly incentivizes and compensates users and publishers alike, and delivers video ads judiciously through the world's first NLP-powered consensus layer, while securitizing precious user data through smart contracts.

Vidy's mission is to **empower people to find the best things in video fast**, without the need to be party to a profit-obsessed online world that treats our internet lives like tradable data warehouses, offering us no compensation in the process. Everyone knows that the internet is run on advertisement revenue,⁶ and that the highest revenues come from user-relevant ads.^{7 8 9 10} To our detriment however, there has never been a way to escape the need to fuel these targeted ads with invasive user data tracking that is traded, sold, made public, and exploited.¹¹

But in 2017 the Vidy team found a way around this decades-long problem, and we've been racing ever since to make our solution a reality. We believe we can allow the online ad ecosystem to have its cake and eat it too by aligning incentives for all parties. With our answer, people won't need to unwillingly forfeit their privacy anymore, can rightfully be rewarded for powering the ad industry with their attention, and ad publishers will make more money than they do now on video ads by unlocking a whole new frontier for video ad inventory.

Vidy's solution is an invisible layer, resting atop any web page, that embeds videos inside the text on that page. This layer allows publishers to embed any video advertisement into the actual words that their users are reading, without the ad needing to be ever-present on screen taking up precious real-estate or indenting paragraphs. Essentially, Vidy is opening up the internet to a new hidden dimension of UI for video ads to be placed through NLP embedding behind relevant text.

This allows ad revenue to be driven for the first time by the direct relevance of the text on a web page, in conjunction with a user's filtered affinities on top of NLP placement. Vidy's embed layer will provide an order of magnitude more inventory for publishers than that of our broken banner ad status quo, and will liberate online users from an advertiser's vapid need to broker



invasive user-data thanks to Vidy's smart contract data storing. Therefore it is the first win-win the ad industry has ever seen.

As a distributed search engine that performs its queries **inside** video, Vidy harnesses the power of blockchain to finally bring relevancy, transparency, security, and decentralization to advertisements served up through its distributed video search.^{12 13} Thanks to the Vidy team's core strengths in NLP, blockchain development, AI, distributed systems architecture, and web engineering, Vidy has conceived a tri-layer solution, to be discussed later on, to execute on this vision.

Vidy is uniquely poised to deliver on this undertaking, not just because it has already built the technology behind this invention, but because it has already forged global partnerships with the biggest names in media, including an exclusive partnership with Baidu in China, and deals with dozens of other multi-million user companies. All told, Vidy has access to millions users throughout China and the greater world thanks to its partnerships.

Vidy has also inked deals and intent-to-use statements from some of the biggest brands in the world to debut as the first advertisers on its patent-pending embeddable layer. These advertising partners include multi-billion dollar retailers, fortune 50 enterprises, and over a dozen multi-national brands. This means Vidy will be revenue-positive from day one of launch, and will deliver profits to publishers almost immediately.

³ A system analyzes a user's historic browsing activity to determine one or more topics of interest to the user and displays to the user one or more advertisements that are relevant to the user's topic(s) of interest <https://patents.google.com/patent/US20050033771A1/en>

⁴ 2017 State of the Adblock Repot <https://pagefair.com/blog/2017/adblockreport/>

⁵ The number of devices using an adblock software has been increasing. <http://uk.businessinsider.com/pagefair-2017-ad-blocking-report-2017-1?IR=T>

⁶ Advertising generates the vast majority of revenue in the search and social media portions of the Internet industry. <https://www.investopedia.com/ask/answers/041015/how-important-advertising-revenue-internet-sector.asp>

⁷ Ad blocker users aren't entirely against advertising. <https://digiday.com/media/motivations-ad-block-users/>

⁸ Why people block ads <https://research.hubspot.com/why-people-block-ads-and-what-it-means-for-marketers-and-advertisers>

⁹ Simple answer to marketers is to make ads less irritating. <https://www.smh.com.au/business/companies/marketers-simple-answer-to-adblockers-make-ads-less-irritating-20171120-gzonpn.html>

¹⁰ Proponents claim ad blockers improve user experience. Ad blockers remove unwanted intrusive ads that interrupt the online viewing experience <https://nativeadvertisinginstitute.com/blog/ad-blocking-impact-online-advertising-ecosystem/>

¹¹ <https://vidy.com>

¹² Transparency and data security are two advantages of a blockchain-based network which centralized platforms like Google AdSense and Amazon Advertising cannot provide. It is the immutability of blockchain technology and its cryptographically encrypted network that enables every piece of data to be accessed as public information. <https://themerple.com/blockchain-based-decentralized-advertising-marketplace-thrive-takes-on-big-players/>

¹³ The underlying blockchain ... takes into account a set of increasingly complex algorithms that are used to combat fraud by bots and farms. These transactions are not rewarded for their fraudulent meta-mining activity <https://www.forbes.com/sites/steveolenski/2017/12/19/digital-advertising-is-ripe-for-blockchain-disruption/#313a4ee327e4>



2

The Problem



2.1 Video Inventory Shortage Problems Inducing Fraud

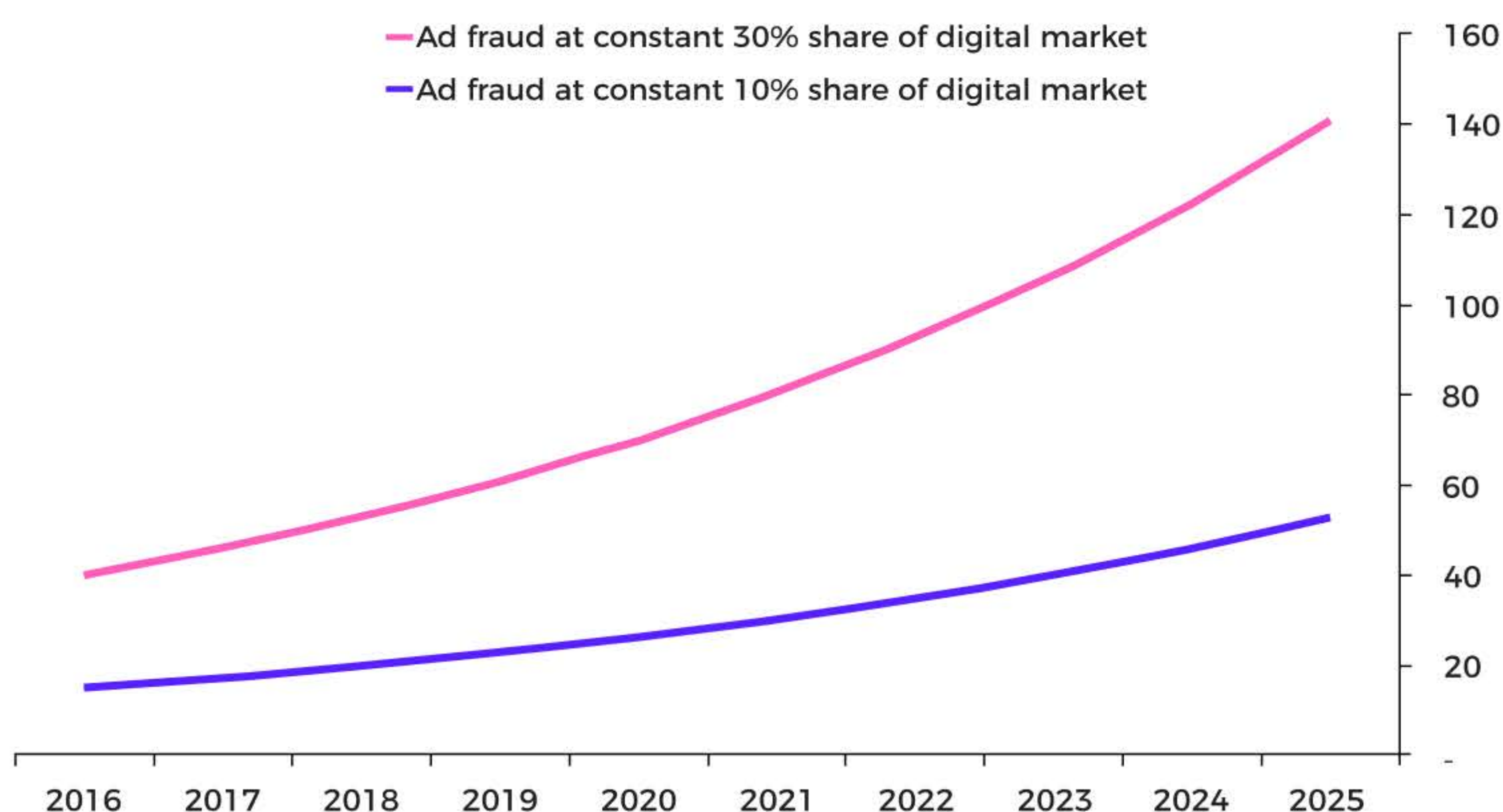
Over 30% of advertisers and 50% of ad exchanges complain today about a deep shortage in inventory on the web for video advertisements.¹⁴ Inventory means digital real estate where publishers can place an advertiser's video ad on screen for users to see. Advertisers desperately want more of this inventory (more real estate) to show their video ads, but publishers simply can't keep up with the increasing demand. This is in part because publishers are already confined to tight spaces on small screens overrun by the clutter of banner components.

This shortage in space for video ads, paired with a steadily growing demand for publishers to find ways to accommodate, has become the catalyst of a gross imbalance in ad fraud.¹⁵ Video ads account for less than 45% of all ads on the web, yet they are the cause of more than 64% of all advertisement fraud.¹⁶

It is believed that advertisers lose over \$16.4 billion a year in ad fraud, specifically in instances where they pay for impressions that simply don't exist,¹⁷ or they pay full price for impressions that have been manipulated by bots and other tactics.¹⁸ Google believes that only 44 per cent of views are human, and over the next 10 years, the global cost of ad fraud is projected to rise to \$50 billion, according to the World Federation of Advertisers.¹⁹

Global Cost of Ad Fraud

Projection (Billions, USD)



Source: World Federation of Advertisers, 2016

¹⁴ AdAge reports that around 40% to 50% of publishers' ad inventory is unsold, even though publishers recognize that there is an opportunity to create a new incremental revenue stream without cannibalizing their existing relationships.

<http://adage.com/article/special-report-ad-network-exchange-guide/ad-exchanges-a-premium-level-future/126186/>

¹⁵ The amount of global advertising revenue wasted on fraudulent traffic, or clicks automatically generated by bots, could reach \$16.4 billion in 2017

<http://www.businessinsider.com/ad-fraud-estimates-doubled-2017-3/?IR=T>

¹⁶ Forrester Data Report: Ad Fraud and Viewability Forecast, 2016 to 2021 finds that while video accounts for 45 %of total ad spend, it is tied to 64% of all ad fraud

<https://www.forrester.com/report/Forrester+Data+Report+Ad+Fraud+And+Viewability+Forecast+2016+To+2021+US/-/E-RES137685>



This fraud is exacted by middlemen in the video ad industry on two main levels. The first is via the misrepresentation of pre-roll ads whereby a distributor will mislead an advertiser about where, when, and how their video ad appears on content pre-roll.²⁰ And the second is via the intentional altering of video tags in order to assign irrelevant videos to low performing inventory through artificial tag appearance.

The Chief Brand Officer at Procter & Gamble, Marc Pritchard, sums it up well, “Better advertising and media transparency are closely related. Why? Because better advertising requires time and money, yet we’re all wasting way too much time and money on a media supply chain with poor standards adoption, too many players grading their own homework, too many hidden touches, and too many holes to allow criminals to rip us off. We have a media supply chain that is murky at best and fraudulent at worst. We need to clean it up, and invest the time and money we save into better advertising to drive growth.”²¹

Simply put, the current ad ecosystem where central parties have sole control over the complicated and opaque brokerage of ever-changing bids, asks, and spreads is just not working for anyone.²²

2.2 Why We Hate Ads

When you consider what an advertisement tries to accomplish, it really should be a positive and value-adding aspect of online life. Advertisements are supposed to make it convenient for you to purchase and access the products and services that you are most likely to care about. So why have advertisements become so broken, and so hated, and so stigmatized? The simplest answer is that we as users have become altogether annoyed, desensitized, and abused by ads for far too long.

Ads are annoying:

Advertisements are annoying because there is zero global standardization for how an advertisement is required to be displayed to a user across all platforms. The result of this fragmentation is a hodgepodge of ad styles that pop up at the worst times, a dangerous normalcy around banner ads that convey fake premises to lure clicks, disruptive visuals

¹⁷ The Compendium of Ad Fraud Report by World Federation of Advertisers notes that ad fraud is likely to represent in excess of \$50 billion by the year 2025, and that it is easy to produce scenarios where ad fraud revenues equate to \$150 billion per annum in the same time frame. https://www.wfanet.org/app/uploads/2017/04/WFA_Compendium_Of_Ad_Fraud_Knowledge.pdf

¹⁸ “The amount of bot fraud in our midst is unrivaled in any other industry and is sadly leading to a crisis of confidence on the buy side.” – Solve Media CEO, Ari Jacoby in Advertising Age. <https://www.inmarketingwetrust.com.sg/paying-ad-fraud-bots/>

¹⁹ The report also notes that By 2025 the total global investment on digital media is projected to be within a range of \$400 billion to \$500 billion. If just 10% of the upper limit within this range is exposed to ad fraud, this will be second only to cocaine and opiate markets as a form of organised crime https://www.wfanet.org/app/uploads/2017/04/WFA_Compendium_Of_Ad_Fraud_Knowledge.pdf

²⁰ “But despite the promise of digital ads being more effective because they can target a market so precisely, the downsides include a target reach that is totally fake or wrongly identified”. <http://www.straitstimes.com/tech/real-promise-marred-by-bots-trickery-and-fake-ads>

²¹ Procter & Gamble, as one of the world's highest-spending advertisers, urged the media buying and selling industry to become transparent in the face of “crappy advertising accompanied by even crappier viewing experiences.” <https://www.cnn.com/2017/01/31/procter-gamble-chief-marketer-slams-crappy-media-supply-chain.html>



architected purely to disrupt mobile user experiences, and countless other tactics employed to manipulate user sessions at the behest of target advertising profit. Ads are so annoying that most companies, despite the need for cash to sustain themselves, today are forced to go ad-free and therefore revenue-free in order to not bleed users who come to their product and leave immediately due to seeing invasive ads that cannibalize the experience. The moment that a company reaches the inflection point when they can begin showing ads without suffering massive user loss is what we call at Vidy reaching the “annoyance tolerance level”. Sadly most companies never reach this point.

Vidy’s **invisible embed layer** will solve this.

Ads are abusive:

Advertisements are abusive because they are powered by a collection of data points on yourself, gleaned from your history, your actions, your words, your social graph, and every definable aspect of your online life without any compensation to you for it. Companies trade this information, sell it, share it, publicize it, and exploit it to help puppeteer your micro-actions on the web.²³ Scary? Just as we are afforded the same right to privacy in the physical world, our digital lives should be no different, especially given that we are progressively spending more time online than offline. Yet our rights in the physical world versus the digital world are grossly inversive. Incidentally, targeted ads also abuse us in other unknowing ways. For one, they take a significant toll on our battery life since tracking methods are run in the background of our devices as they operate. Moreover, they put a piece of our monthly data allowances on hijack, since data is collected at every turn and our devices regularly communicate with the cloud for storage and processing.²⁴

Vidy’s **smart-contract data containers** will solve this.

Ads are ineffective:

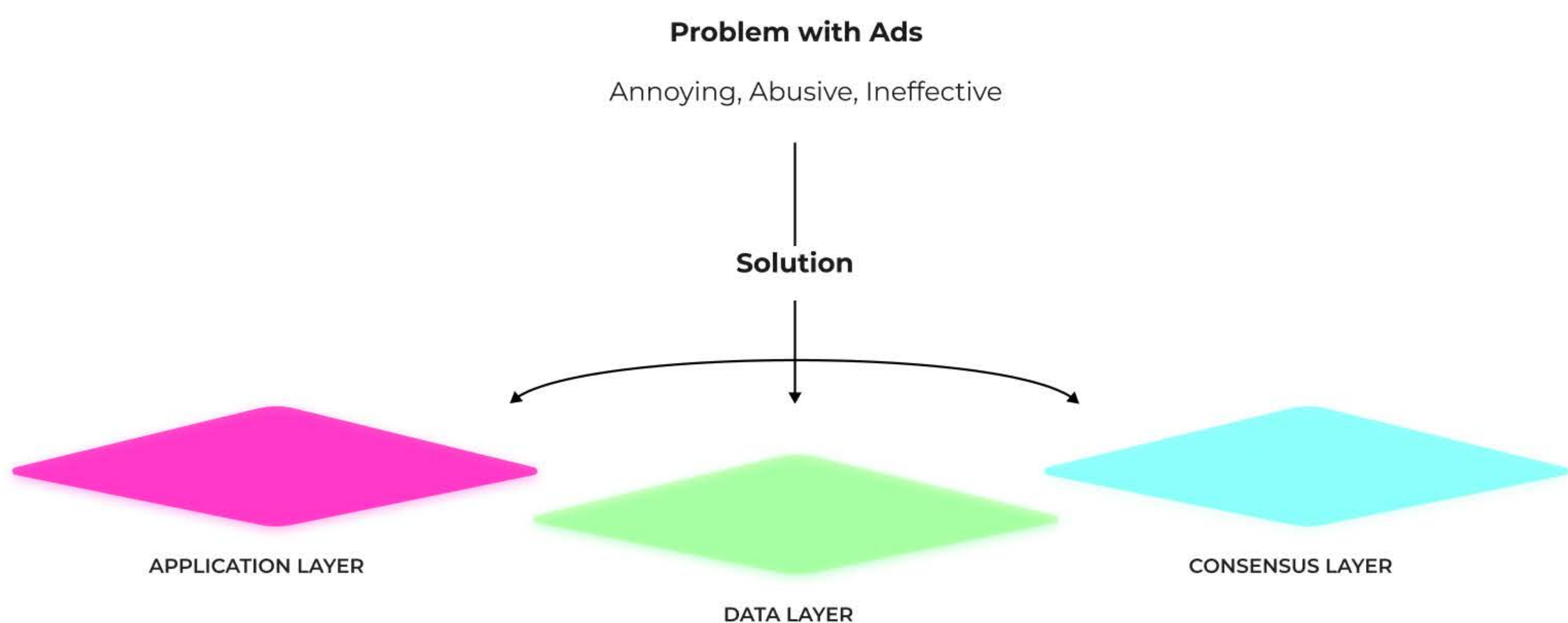
Advertisements are ineffective because as humans, we build up a ‘muscle memory’ around UI components when we see and experience them repeatedly. A simple example of this is that we don’t have to think about where to tap on a screen when we want to exit a view; the back button is almost always in the top left on a navigation bar on a mobile view and we instinctively tap there to leave. Likewise when it comes to ads, we have become grossly desensitized to banner ads and interstitial ads given that they are so regularly, so irrelevantly, and so disruptively displayed everywhere. The result is that most ad UI components have grown to be ignored, to the point of a growing adverse stigmatization from brands who employ



them, and the stats speak for themselves. Banner ads are seldom tapped to the tune of 0.05% out of 1000 impressions, and full-screen interstitials, despite hijacking your whole screen, are only tapped 5% of times out of 1000 impressions.²⁵ This means that unless you want to entirely derail your product's current user experience with a full-screen interstitial ad takeover, as a publisher you are looking at click/tap-through success rates lower than a tenth of one percent with your existing advertising inventory options.

Vidy's **NLP consensus-layer** will solve this.

Indeed the industry has problems abound for all parties involved. As users, we get harmed the most, and are powerless to any recourse except the nuclear option of disconnecting from the ad world completely with an ad blocker. Despite this broken climate that we are up against however, with a little innovation, enhanced by the powers of blockchain, we are confident we can fix it.



²² Article from CNBC on Ad Fraud, “Brands inadvertently bought advertising space on these fake sites via ad exchanges, promotions that were seen by computers not humans, meaning that advertisers wasted money and publishers missed out on ad dollars”
<https://www.cnbc.com/2017/11/22/ad-fraud-hyphbot-generates-fake-web-traffic-scams-advertisers.html>

²³ Transparency and data security are two advantages of a blockchain-based network which centralized platforms like Google AdSense and Amazon Advertising cannot provide. It is the immutability of blockchain technology and its cryptographically encrypted network that enables every piece of data to be accessed as public information.
<https://themerple.com/blockchain-based-decentralized-advertising-marketplace-thrive-takes-on-big-players/>

²⁴ The underlying blockchain ... takes into account a set of increasingly complex algorithms that are used to combat fraud by bots and farms. These transactions are not rewarded for their fraudulent meta-mining activity

<https://www.forbes.com/sites/steveolenski/2017/12/19/digital-advertising-is-ripe-for-blockchain-disruption/#313a4ee327e4>

²⁵ Across all ad formats and placements ad CTR is just 0.05%

<https://www.smartinsights.com/internet-advertising/internet-advertising-analytics/display-advertising-clickthrough-rates/>



3

The Solution



3. The Solution

Vidy is creating **the first, decentralized, truly distributed**,²⁶ video-ad platform for fair and consensual advertisement consumption.

Vidy is **the first** platform to execute on this because of its patent-pending distribution model to deliver video ads through NLP embeds. Vidy's solution is an invisible layer that rests atop any web page, allowing advertisers to embed their video ads behind the relevant text that they are linked to.

Vidy is **decentralized** because it harnesses the power of blockchain to bring transparency, security, equity, and privacy to ad distribution for all parties. It accomplishes this with its open-source protocol for NLP-powered video advertisement distribution, driven by miners on its consensus layer.

Vidy is **truly distributed** because it is not a central app, or browser, or core property requiring users to sign-up to use it, or worse yet switch over from their current products to use it. Instead Vidy's embed layer was built as an SDK to live on any web page **that already exists**, running silently as it containerizes user data securely via its smart contracts for private demographic targeting.

Vidy is built upon the Ethereum blockchain because of its unparalleled track record, reliable smart contract technology, and global following.^{27 28} With each transaction listed in the Vidy ledger, advertisers and publishers will now have complete transparency for all bids, asks, holds, payouts, coin balances, and completed placements through blockchain.

On top of the Ethereum blockchain, Vidy's tri-layer platform is broken down as follows. The first part of its system is its data-layer which will track and containerize data, the second part is its consensus-layer which will distribute ads, and the third part is its application-layer which will display ads.

Vidy's three decentralized layers are detailed below:

- a. The Data Layer
- b. The Consensus Layer
- c. The Application Layer

²⁶ Transparency and data security are two advantages of a blockchain-based network which centralized platforms like Google AdSense and Amazon Advertising cannot provide. It is the immutability of blockchain technology and its cryptographically encrypted network that enables every piece of data to be accessed as public information.

<https://themerple.com/blockchain-based-decentralized-advertising-marketplace-thrive-takes-on-big-players/>

²⁷ The underlying blockchain ... takes into account a set of increasingly complex algorithms that are used to combat fraud by bots and farms. These transactions are not rewarded for their fraudulent meta-mining activity

<https://www.forbes.com/sites/steveolenski/2017/12/19/digital-advertising-is-ripe-for-blockchain-disruption/#313a4ee327e4>

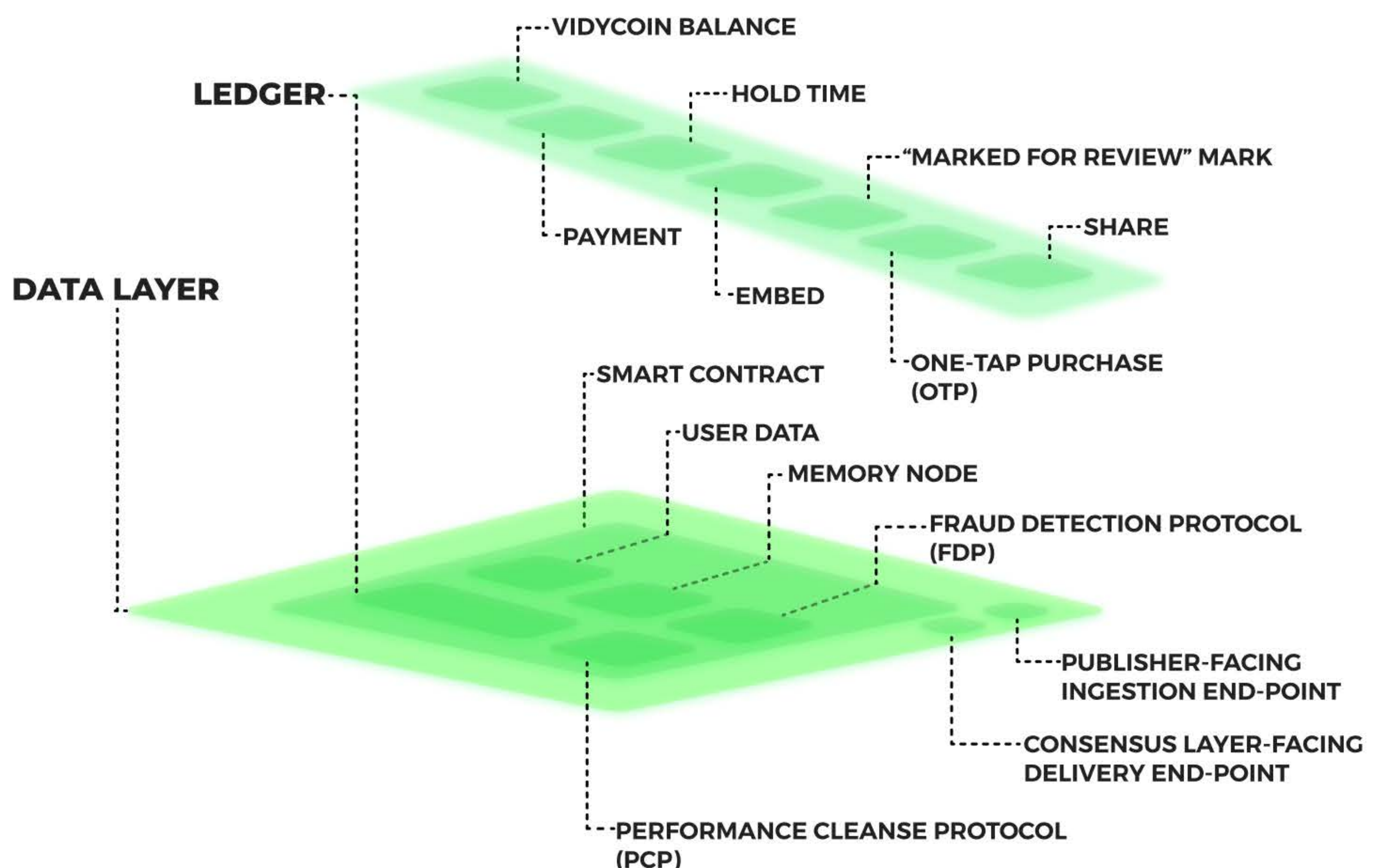
²⁸ Ethereum Foundation technical documentation for testnets, mainnets, transactions and contracts, mining, and dapps
<http://www.ethdocs.org/en/latest/>



3.1 Data Layer

The data layer is the foundation of the Vidy ad distribution platform, concurrently communicating with the application and consensus layers, and transparently maintaining all incoming data in the immutable Vidy ledger. The data layer maintains a record of all embed placements, hold times, VidyCoin payouts, VidyCoin staked balances, and all VidyCoin transactions via the application layer's one-tap purchase modal.

The data layer also warehouses a collection of user data points and containerizes them in a secure smart contract for safe handoff to the consensus layer when miners are making a realtime determination of where and when to place an ad.



3.1.1 The Data Layer Further Broken Down

- Smart contracts containerize user data for secure and private target marketing
- Memory nodes via smart contract remember user data and pre-fill in Vidy's purchase modal
- Cookies are dropped on all publisher pages via the application layer, stored in smart contract
- The handshake between publisher and consensus layer occurs via smart contract as soon as a user arrives to page, whereby the publisher hands off user data securely and consensus layer uses the decrypted data to filter relevant advertisements to display.
- The data layer maintains the ledger of all VidyCoin balances, transactions, hold times, and video ads currently embedded.



- The data from holds and skips is registered in the data layer ledger for VidyCoin payout calculation to the user and publisher, as well as for further learning via AI on the user's data profile so that future ad placement can become more precise.
- This ad performance data is fed into the consensus layer and an iterative cycle of ingestion, analysis, learning, and adjustment ensues, so the consensus layer becomes more accurate with ad relevance.
- For security, the data layer is architected with only two endpoints - a publisher-facing ingestion end-point and a consensus layer-facing delivery endpoint. No other entities can speak directly to the data layer.

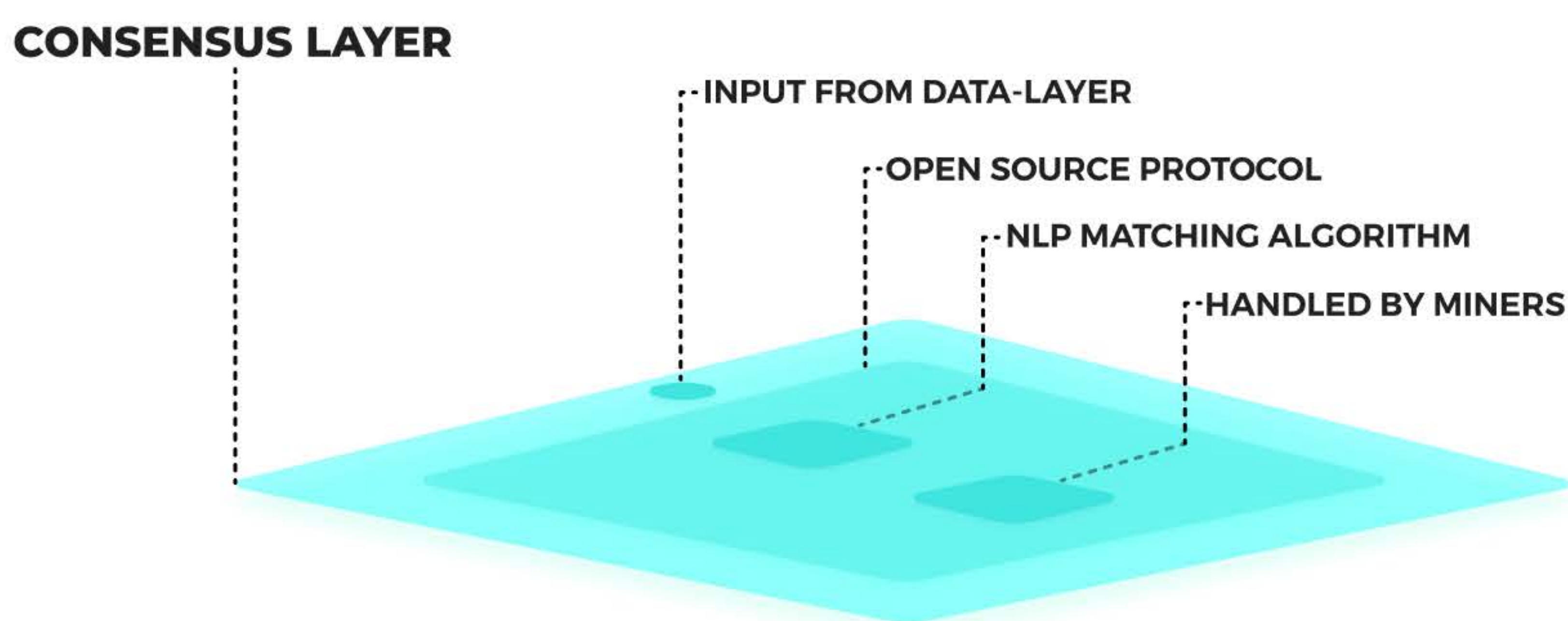
3.2 Consensus Layer

The consensus layer receives user data along with ad performance information from the data layer and processes it as inputs in the placement-scripts that it runs. This is done in conjunction with decrypting the smart contracts that are handed off for user-data target application.

A network of miners drive the consensus layer by running an open-source protocol that matches the natural language of live video ads with available video ad inventory. Placements are further customized in realtime with the decrypted user-data of a visitor so that miners can filter matching video ads down to the most relevant corresponding video ads for that particular user visit. In this way, the consensus layer is able to:

- decentralize ad placement fairly and efficiently,
- place ads based on precise NLP matching, and
- filter matches down to inventory most relevant to a user's interests.

This allows for one NLP-linked video ad to show up for user X, and a completely different NLP-linked video ad to show up for user Y, on the very same publisher page, based on each of these users' respective preferences and containerized profiles. Miners are compensated with VidyCoin each time they successfully place an ad, with payouts delivered in aggregate of a pre-determined number of ad placements.



3.2.1 The Consensus Layer Further Broken Down

- Controlled by an open-source protocol powered by Vidy's NLP distribution script
- Miners determine where an advertisement is placed by
 - a. decrypting the smart contract for a transaction,
 - b. using the decrypted demographic information to filter ad choices down to matching ones,
 - c. employing Vidy's open-source NLP script in conjunction with Vidy's bid-sort algorithm to place ads into publisher pages.
- The basis of ad placement by the consensus layer is
 - a. a relevance match between the advertiser's keywords and the natural language found on the publisher web page,
 - b. a user demographic profile match to all filtered available ads,
 - c. a final calculation to determine placement based on the past performance of ads compared against the past performance of the publisher inventory.
- Miners handling the consensus layer are paid VidyCoin at consistent intervals as an incentive for adding blocks to the ledger.

3.3 Application Layer

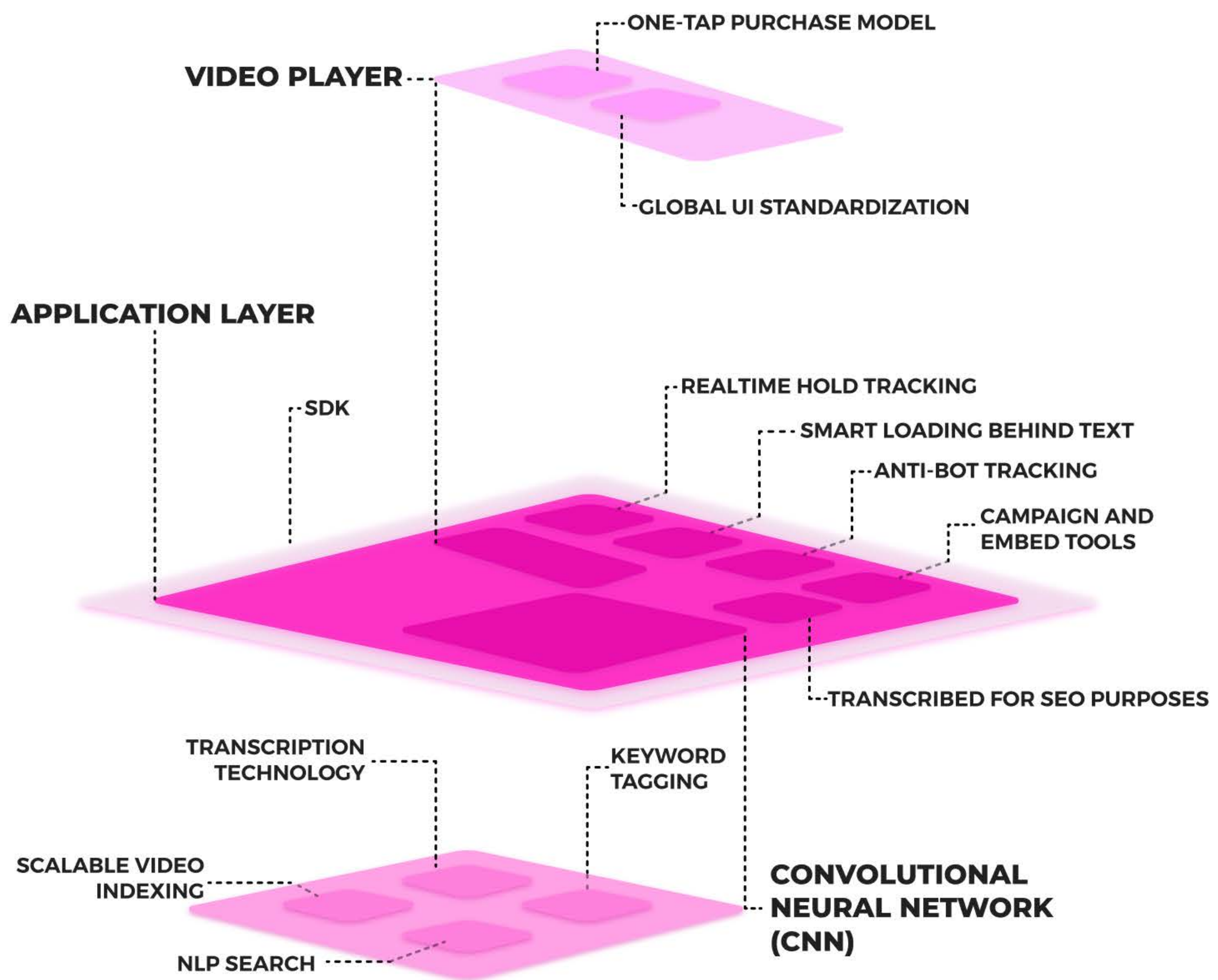
The application layer is the consumer-facing distributor of video ads across the web, encapsulated in an SDK that can be installed with just a tap by any publisher. This SDK requires all participating publishers to adhere to a global UI standardization via

- a. the UX tied to activating an embedded video ad, and
- b. the video player which tracks client-side activity on the front-end.

The application layer registers and reports all event activity back to the data layer so that the consensus layer can make iterative improvements on NLP placements. Additionally, the application layer provides users with a host of gesture controls to better experience a playing embedded vidy. Users can swipe up to purchase, swipe down to save and share, and can provide feedback and scores on all content that they interface with on the embed layer. In this way, the application layer becomes a distributed ecosystem of its own.

On this layer, platform owners can instantly embed a tiny video into the text of their site, letting their users hold down on that linked text to reveal supporting video for literally any line that is printed online. Advertisements that are relevant to the content that you're consuming can now live within the very page that you're on, and the power is in your hands to decide when you want to hold down to see the video that fortifies that text statement, or when you want to simply continue reading, thereby skipping it. This keeps users on the same page longer, thereby increasing session time for the publisher and ultimately, profit.





3.3.1 The Application Layer Further Broken Down

- Overlay SDK embedding vidys and video ads behind their relevant text for activation by hold
- Realtime hold tracking and VidyCoin payout calculations to publisher and holding user
- Patent-pending one-tap purchase modal, appearing after 3 seconds of hold time
- Checkouts with VidyCoin credit completed on one-tap
- Complete global standardization of UI for all publishers and advertisers
- Smart loading behind text to facilitate immediate page loads. This strategy alone makes Vidy the only viable blockchain-powered ad distribution solution on the market today, since current blockchain consensus models take 10-30 seconds for ads to appear, and a delay that dramatic for ads to appear is simply not a viable option for publishers.
- Anti-bot tracking via machine learning to catch bots engaging in malicious tactics
- Complimentary tooling for advertisers/publishers to track campaigns and manage embeds
- All embedded video ads transcribed for SEO purposes for publishers
- Powered by convolutional neural networks (CNN), transcription technology, keyword tagging, Vidy's multi-million item video database, NLP search, and scalable video indexing.



3.4 How It All Works

Advertiser X signs up to Vidy, connects their crypto wallet and shows the amount of VidyCoin that they have staked, subsequently unlocking either the Titanium, Gold, or Platinum advertising tier. The advertiser then gets access to a dashboard where they can manage their campaigns and upload their video advertisements. All uploaded video advertisements are transcribed to determine the words said in them, and subsequently run through a convolutional neural network to segment out speakers in preparation of being embedded into corresponding text.

The advertiser then lists up to 10 keywords that embody their video advertisement, and designates the campaign dates, preferred target demographic (if available), and how much ad spend to allocate to its campaign. All ad spend is automatically credited from their VidyCoin wallet balance at the end of each day. If they are a Platinum tier advertiser, they can also designate which publishers that they prefer to advertise with, and which they prefer to avoid. When the campaign is ready, the advertiser hits the “Go Live” button and from there the consensus layer has access to advertiser X’s new video ads for adjudication on placement in available publisher inventory.

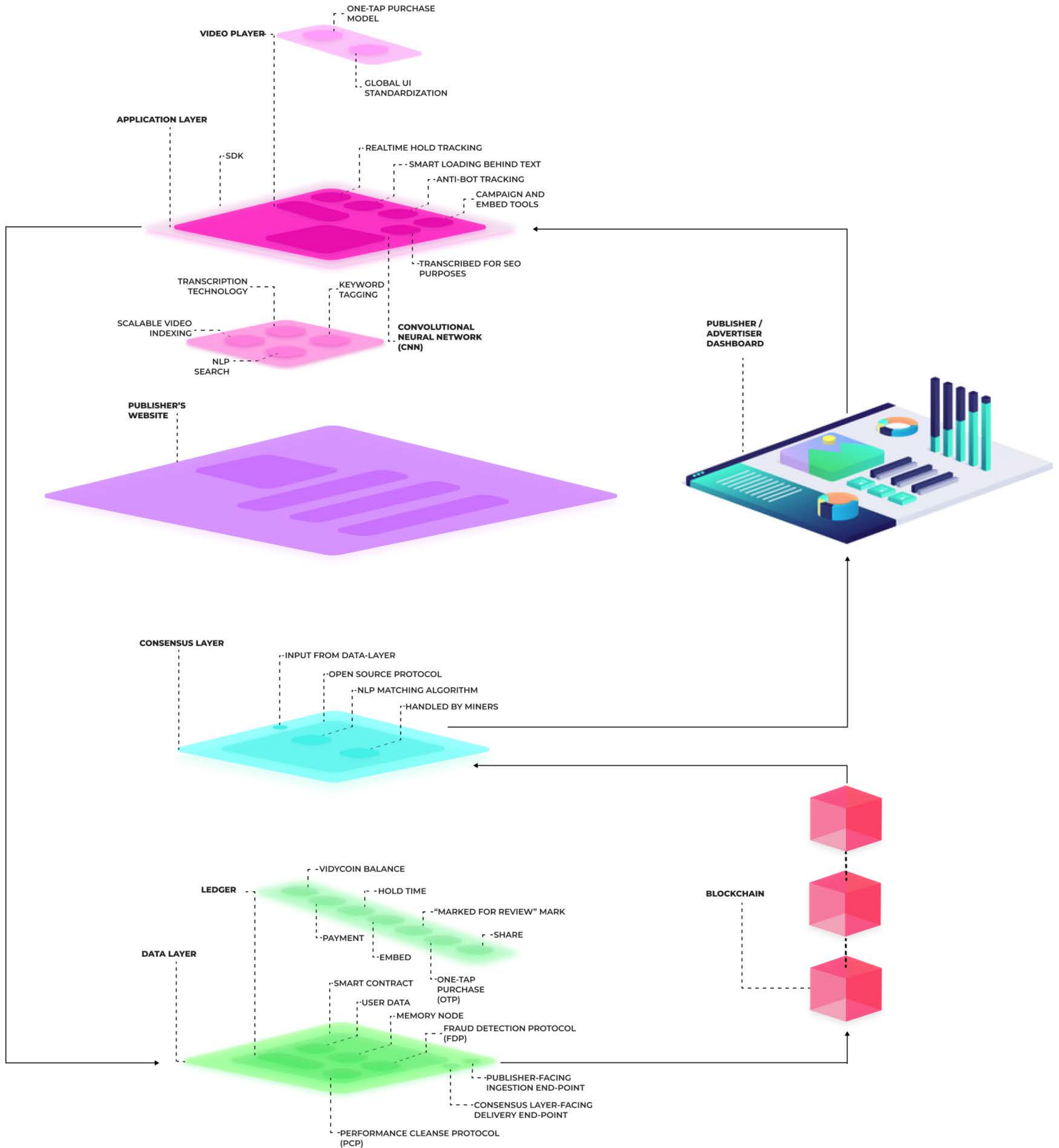
On the dashboard the advertiser can adjust live campaigns, view statistics on each campaign and individual video ad’s performance, and see analytics on users and publishers to evaluate how they are performing and iterate copy and creative accordingly.

Publisher Y signs up to Vidy, connects their wallet and selects ‘Allow’ to share all pages on their site with the Vidy indexer. The Vidy indexer powers the consensus layer’s matching script by scanning for natural language on each publisher page against the keywords and transcriptions of possible ads. Publisher Y is then prompted to enter keywords of ads that are most relevant to their platform as a whole, as well as specific keywords relevant to each individual page they publish with Vidy’s application layer integrated. These keywords become another input for the consensus layer to evaluate when matching relevant ads to the natural language of a publisher page. The publisher receives a similar dashboard to that of the advertiser where they can see all pages indexed, all currently embedded vidys, and add and remove vidys at any time. The dashboard will show performance statistics of each embed and allow any page to have ads turned on or off. When user Z visits Publisher Y’s page, Publisher Y shares user Z’s demographic information via a secure smart contract with Vidy’s consensus layer. This handoff occurs as soon as the user reaches the site, so that the consensus layer has time to use the decrypted user data to filter ads for placement behind the text before the user or the publisher experiences a delay in experience. Miners driving the consensus layer then place the most relevant ads behind the linked text that they will be activated on within that publisher’s page.

As user Z holds down on the video ad, the application layer records hold time and reports it to the data layer’s ledger for calculation of VidyCoin payout to both the publisher and the user. The advertiser’s VidyCoin balance is subsequently credited at the end of the day based on hold time performance. The data layer also stores and processes data on which ads were held and which were skipped to then pass along to Vidy’s AI engine for further user profile precision learning.



Should user Z make a one-tap purchase with VidyCoin after holding down, VidyCoin is credited from their connected wallet, and the application layer passes user Z's encrypted information via to the advertiser for shipment and record. The user's wallet address is obfuscated and never reaches the advertiser.



4

Fracture Issues Of A Broken System



4. Fracture Issues Of A Broken System

Simply put, the current advertising ecosystem where central parties have sole control over the complicated and opaque brokerage of ever-changing bids, asks, and spreads is just not working for anyone.

The primary consequence of a centralized industry ridden with video ad supply shortages and rampant fraud is the host of negative externalities that ripple wherewith. These fractures all have different victims, but their commonality rests in their analogous origin - untrustworthy private centralism. Under each present-day problem listed below is a paragraph detailing how Vidy solves that issue through blockchain:

4.1 No User Interface Standards

Advertisers, publishers, and users alike all complain about the messiness of ads.²⁸ When there is no UI standardization to adhere to, parties across the ad spectrum take advantage of the policy dearth and go rogue in their pursuit of better metrics. It is a real challenge for users to get acclimated to an advertising landscape when a different type and style of ad is thrown at them with no consistency. In a minefield of different aspect ratios, impression timings, and action outcomes, it is no wonder why users today feel a universal reticence to tap, a reticence to use, and a reticence to trust.

How Vidy solves

With Vidy's embed layer, a global UI standard emerges for ads for the first time. On both mobile and desktop, now advertisers have a one-size fits all model to create and upload their creatives, and publishers don't need to worry about a plethora of inventory sizes and specifications that they must bend their own web page to accommodate for. Users have just one way of viewing NLP embedded video ads and know exactly what to expect every time they see a Vidylink on the text of a page they are reading.

4.2 Slow Page Loads

Good publishers are always obsessing over slow page loads, since the stats show that most users are lost within the first few seconds of arriving to a new site.²⁹ Banner ads with multiple designated placement areas on screen are big offenders of this delay since they often carry large asset files and long respective load times. Essentially, an ad network must process a request for an immediately visible advertisement quickly enough to match the page load speed

²⁸ In Why People Block Ads (and what it means for Advertisers and Marketers) by Hubspot Research, "The most frustrating experience for online browsers involve full page pop-up adverts that require the user to find an "X" to remove. More generally, 91% of respondents agree ads are more intrusive today compared to two to three years ago, and 87% agree there are more ads in general. 79% also feel that they're being tracked as a result of retargeted ads"

<https://research.hubspot.com/why-people-block-ads-and-what-it-means-for-marketers-and-advertisers>



of the publisher site itself, which is often just textual content and which therefore usually loads in immediately. When you add more than just one image to this request, for a page loading multiple banner ad placements on screen for instance, it can be a great challenge for an ad network to match the necessary page load speeds that publishers demand. The result is that a user sees nothing on screen for seconds on end, and in the digital world, waiting seconds is far too long.

How Vidy solves

Vidy's invention has no requirement to immediately load visible banner ads into open spaces on an integrated publisher page. Instead, all of Vidy's video ads are pre-loaded behind the text of the page as Vidylinks, and therefore beyond the field of view of the visitor. This allows Vidy to employ measures such as smart caching strategies, and anticipatory queue downloading as a user scrolls on the page. Slow page loads are one less thing publishers need to worry about for their digital experience with Vidy.

4.3 Irrelevant Ads

Over 45% of internet users who have left the ad ecosystem by installing an ad blocker, explicitly cite that they installed that blocker because the video ads that they were seeing were not relevant enough for them.³⁰ This means that in this digital age, serving up irrelevant content is as damaging as serving sub-par content. The name of the game for advertisers who want to see the best conversions on their campaigns, and for publishers who want to reap the most profits on their advertising inventory, is to make ads as relevant as possible for their respective audiences. As such, ad networks and exchanges track, harvest, trade, and sell as much user data as possible in order to facilitate greater placement relevance. But as the ad blocker stats clearly demonstrate, the ad market is still greatly lacking the necessary relevance to keep people participating. Ad networks' answer to this is saying, "Don't worry, we just need more user data. We need more aggressive user tracking, we need further freedoms afforded to us for selling this data, and we need continued cross-party sharing of private user profiling through our insecure data management platforms." Vidy's answer to this is saying, "it's time for a different approach."³¹

²⁹ A report by Google, The need for mobile speed: How Latency Impacts Publisher revenue, notes that 53% of mobile website visitors abandon sites that take longer than three seconds to load.

<https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/>

³⁰ Research done by Hubspot by asking users why they installed ad blockers noted as follow: 64% said ads were annoying and intrusive, 54% said ads were disruptive, 39% said ads create security concerns while 36% said their major concern was that ads affect load time and bandwidth usage

<https://research.hubspot.com/why-people-block-ads-and-what-it-means-for-marketers-and-advertisers>

³¹ A report by The Observer notes that "Companies like Google and Facebook use cookies to track users across multiple websites over an undisclosed amount of time. When a person clicks on one site and then moves on to another, the cookie embedded in the first site keeps track of that user's searches, thereby building up a repository of information over time"

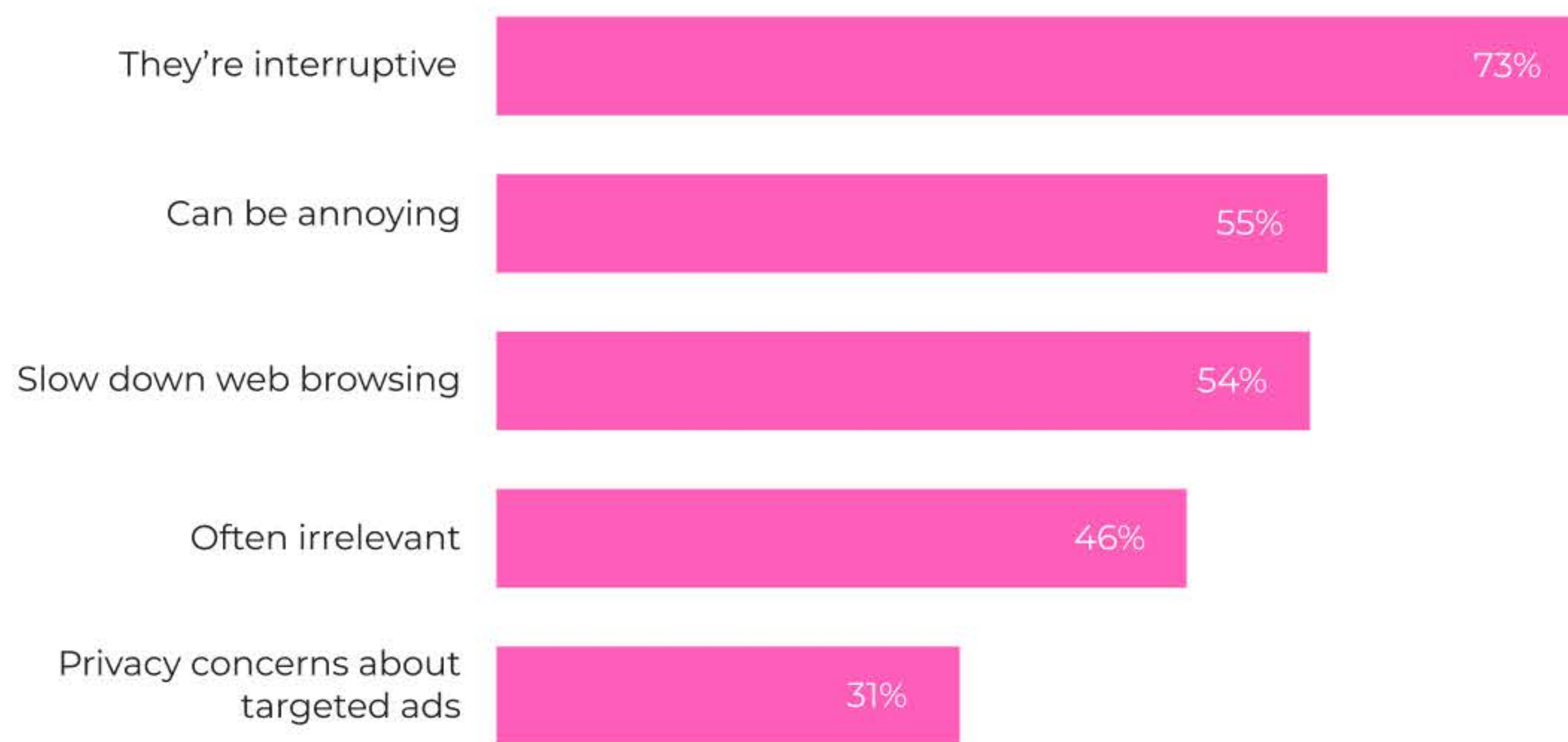
<http://observer.com/2016/07/the-truth-about-data-mining-how-online-trackers-gather-your-info-and-what-they-see/>

³² Why Ads are getting ignored

<https://neilpatel.com/blog/your-ads-are-getting-ignored-5-smart-strategies-to-overcome-banner-blindness/>



Why People Block Online Ads



Source: NeilPatel³², Why Ads Are Getting Ignored

How Vidy solves

Vidy employs a purist approach to the distribution of video ads, letting natural language protocols determine all contextual matches that it makes. The consensus layer then integrates a decrypted smart contract of each visiting user's profile data to determine which videos from the NLP-designated set of matches are the most relevant for that user on that page. By containerizing all user data in smart contracts, Vidy safeguards and validates user information and ensures that user profiles can never leak to a third party, and can never be sold via the platform's data layer. With a system of checks and balances like this, communication between an advertiser and publisher is secure and precise not because some company in the middle tells us so, but because we know it to be so through trust-less decentralization.

4.4 Banner Ad Stigmatization

After years of being click-baited, the internet community has collectively wised up and now primarily abstains from succumbing to the tricks of banner ads. Banner ads today are tapped about 0.02% of the time out of 1000 impressions.³³ After all, you don't know what you'll see or where you'll go when you tap a banner ad. Some ads end your session immediately and open up apps, some redirect you to other sites with long page-load waiting times, some try to phish or install packages on their landing site, some deliver disruptive pop ups on each click. As James Green of AdAge says, "For a long time, advertising has been annoying. The first generation of ad-tech firms only made things worse by overflowing the web with too many ads, not-so-great targeting, and overall disruptive experiences. People don't want creepy ads following them around, especially for a product they've already bought or that they don't care about. Now people are blocking ads, and publishers are feeling the pain. So, we shouldn't be so shocked to hear that they are eschewing ad-tech firms since we are partially to blame for the fact that people dislike advertising."³⁴ Advertisers suffer with this stigma, originating from the earliest days of the internet when malevolent advertisers actually did regularly bait, phish, steal, and inject viruses. But decades later this display format has largely been left unchanged, and click-through performance metrics have steadily declined.



How Vidy solves

With **Vidylinks**, users get to choose what they want to hold down and watch, and what they want to skip as they consume the content on a page. By empowering people to choose, yet incentivizing them financially to hold down on what they are interested in, Vidy can capture the hearts of users who otherwise do not trust advertisers anymore. Users can now rest assured that there is a decentralized buffer operating between the advertiser and publisher via the embed layer, thereby ensuring that their hold will always deliver a video in the same format, UX, and appearance that they expect. When you trust something, you have a greater proclivity to use it more.

4.5 Lost Users Via Purchase Funnels

Advertisers spend billions of dollars a year optimizing their purchase funnel to maximize the chances that a visit becomes a purchase in the same session. Advertisers lose web visitors at every step of a purchase funnel flow, just like a new app loses users at every stage of a sign-up flow.³⁵ With each additional step, every extra button and actionable image, every further requirement and box to fill in, the chances of that user successfully completing the purchase declines. When you land on a website after tapping an ad and waiting for the new page to load, even if that website is highly optimized and you are presented with a purchase page immediately, there are so many online distractions and external pulls that can derail your purchase that it is likely you often do not proceed with it.

This is a big reason why on average less than 2.2% of online visits to a retailer site from an advertisement end in a successful purchase.³⁶ This is a battle that an advertiser needs to keep on fighting with or without a Vidy integration, since they will always get direct traffic to their site that they need to optimize their funnel for. But for inbound traffic via ad clicks, this is something that Vidy can help with to augment successful sales **pre-site visit**.

How Vidy solves

Vidy completely circumvents this entire purchase funnel that happens on the advertiser website, and instead brings the purchase right to the forefront of the embed layer where the user is watching the video ad. By flipping the purchase flow on its head, Vidy is able to greatly simplify the checkout process. The one-tap purchase modal appears after a user holds down on a video ad for at least 3 seconds, at which time the application layer determines this to signal a user's intent to learn more and potentially execute an end action. End actions that can be displayed by advertisers include the option to purchase or the option to reserve in one-tap, with VidyCoin or other payment methods. From there, any necessary information for shipping and data registry is securely handed off to the advertiser from the data-layer that has write access to the advertiser's control dashboard, and the transaction is entered into the ledger. The one-tap purchase modal is available only to advertisers who are in the Platinum Advertising Tier, for which there will be a worldwide cap for the number of brands that can have access to this feature on the embed layer.



4.6 Monopolies Threatening The Free Market

Monopolies and oligopolies are the direct antagonists to a free and capitalistic society where all businesses have equal opportunities to grow. Anti-trust laws exist in America and in most countries to safeguard the free market and ensure that competition thrives for this very reason. But since the dawn of the internet and spanning the last 20 years, a troubling paradigm has emerged - every valuable piece of information tied to our digital lives is now owned and stored by just a few private companies. With this information, these companies wield unprecedented power over us, and are themselves confronted with an almost nonexistent threat of competition. When competition dissipates in industries as integral to our lives as big data, social, and advertising, life becomes perilous for the mass consumers whose lives depend on those services. One of the most important points of blockchain is to take the power out of the hands of a few and place it back into the hands of the many where it belongs. Yet today, 73% of all ads come from just two players, Google and Facebook. And last year a whopping 99% of all ad growth came from just two players, Google and Facebook.³⁷ This is clearly not a level playing field, and market ownership at these levels is good for no one.

How Vidy solves

Vidy is by its very DNA a decentralized platform where market placement decisions always rest in the hands of the many. Vidy's consensus layer is driven by miners with direct financial incentive to place ads judiciously through Vidy's NLP open source protocol. This cuts into the current climate's grip on the market, since centralized distributors like Google and Facebook will now have direct pricing competition against a decentralized network where all parties are financially aligned. Vidy's blockchain ecosystem eliminates all risk that a single monopoly can change internal policy, and thereby change our lives, to their fiscal benefit and to our collective detriment.

4.7 Poorly Paired Ad Content With Inventory

Youtube and Facebook's biggest problem in the ad space today comes from an industry-wide complaint from advertisers about their video ads being placed near inappropriate ad inventory on their platforms. The last thing that Coca Cola wants is its advertising dollars going to the assignment of its digital ads on publisher content related to terrorism for example. To answer this call to action, Youtube has pledged thousands of workers throughout Asia to solve this with manual cleaning and prevention. Facebook likewise has pledged a significant annual budget allocation toward the mitigation of politically charged and socially taboo content pairing with video advertisements.³⁸ But obviously these measures are not scalable, sustainable, or all-encompassing enough to solve the issue.

³² Why Ads are getting ignored

<https://neilpatel.com/blog/your-ads-are-getting-ignored-5-smart-strategies-to-overcome-banner-blindness/>

³³ Across all ad formats and placements ad CTR is just 0.05%

<https://www.smartinsights.com/internet-advertising/internet-advertising-analytics/display-advertising-clickthrough-rates/>

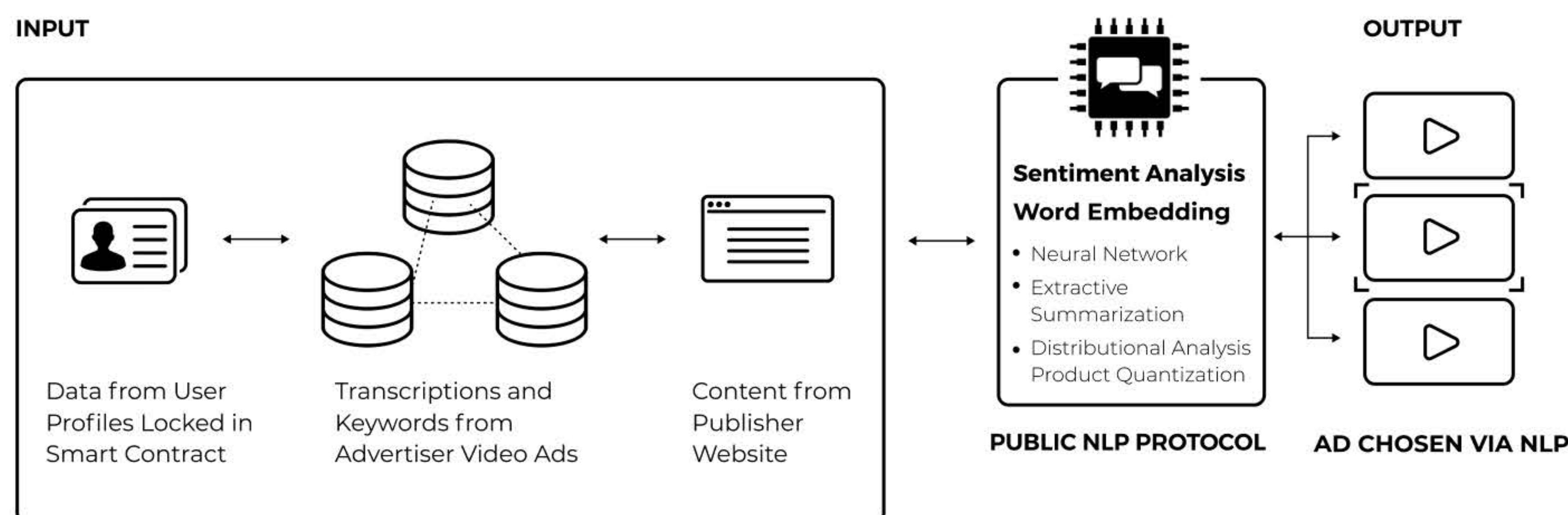


How Vidy solves

Vidy indexes, analyzes, matches, and distributes based on a wide array of natural language data points across the ad buying spectrum to determine the proper placement of an ad in a completely scalable and automated fashion. With this natural-language tethered approach, there is no need to hire an army of content curators, quality assurance professionals, or video flaggers to determine what content is appropriate for pairing. Vidy considers the following information when making a placement decision:

- the transcription of the uploaded video ad
- the video ad keywords manually entered by the advertiser
- the community-vetted advertiser umbrella keywords to determine context congruence
- the inventory page keywords manually entered by the publisher
- the whole publisher page to determine the veracity and relevance of the publisher's keywords against the greater content of the writing on the page itself

Through these measures, Vidy ensures that there is a public protocol around assigning video ads to available inventory based purely on the natural language relevance of that fit, thereby ensuring that its video ads are either in contextually relevant and appropriate places, or they are not placed at all.



³⁴ A study by Nielsen explored why people choose not to click on a mobile ad, users cited apathy as the number one reason.
<https://www.clickz.com/why-dont-people-click-on-mobile-advertisements/30003/>

³⁵ Why Ads are getting ignored
<https://neilpatel.com/blog/your-ads-are-getting-ignored-5-smart-strategies-to-overcome-banner-blindness/>

³⁶ A report by PricewaterhouseCoopers finds that Even in categories where consumers predominantly buy online (e.g., consumer electronics, books), some consumers still research online and buy in-store—25% for consumer electronics and 13% for book
<https://www.pwc.com/gx/en/retail-consumer/retail-consumer-publications/global-multi-channel-consumer-survey/assets/pdf/total-retail-2015.pdf>

³⁷ Advertising, Facebook and Google Build a Duopoly
<https://www.ft.com/content/6c6b74a4-3920-11e6-9a05-82a9b15a8ee7>

³⁸ Facebook takes a stricter stance on political advertising
<https://www.recode.net/2017/10/27/16555926/facebook-political-advertising-ads-2016-russia>



5

The Product



5.1 The One-Tap Purchase Modal (OTP)

Vidy is moving the most important action a user can take - the purchase - to the forefront of the web experience through its single-page embed layer. With just one tap, a user can now purchase a product, reserve a table, or have an item delivered, after holding down on an embedded video ad.

Advertisers and brands spend billions of dollars a year trying to optimize for the highest conversions on their purchase funnels once a user arrives to their site from an ad. As an advertiser, the battle to get people to tap your advertisement is just the very beginning for your metrics mandate. You always want a successful action to close out the loop. Rather than risk losing users from distracting product lists, confusing button UI, tiring customization flows, troublesome payment pages, and a host of other fail-points that derail checkouts after arriving on a site, you can now execute your purchase or reservation right from the publisher page. Vidy then encrypts the transaction, enters it into the ledger, and sends only the user information needed to make the shipment or registry happen on your end - all accessible through your control dashboard.

How it works is simple, if you are a Platinum VidyCoin stakeholder, you will see the option to run a Platinum ad campaign from your dashboard. On all Platinum ads, there is a purchase button that appears on the embed layer next to the video as a user holds down. The purchase button only appears after 3 seconds of hold time so that a) primary focus is given to the start of the video ad, and b) the application layer can test if a user demonstrates enough interest to learn more and potentially execute an end action. Upon the purchase button animating in, the user can then pay instantly with VidyCoin, along with other checkout options like WePay, AliPay, PayPal, and credit card. All VidyCoins that have been earned by holding down on embedded vidys can be accessed by the user at this time and used to pay for the purchase with one tap.

The price of the purchase is shown as both a VidyCoin calculation and local fiat currency amount, taken as a realtime market price conversion against VidyCoin. If the purchase is made with VidyCoin, the VidyCoin is instantly deducted from the purchasing user's account and the advertiser receives payment in seconds.

Vidy's one-tap purchase modal was also built to equip the flow with up to 2 variable buttons to designate purchase specifics, when an advertiser needs them for checkout. For example, a Nike shoes ad could have a user select their size right from the embed layer and then hit Pay. Likewise, a Hilton resorts ad could have a user select their room type and date of stay before hitting Reserve.

Users who are not yet in the Vidy ecosystem will see vidylinks across the web and will be able to fully interact with them and hold them. But if they want to start redeeming VidyCoins that they earn from holding, or if they try to make a one-tap purchase, they will be prompted to sign-up. Once authenticated, VidyCoin earnings are automatically credited to their Vidy account. After a user's first successful purchase, Vidy locks their shipping data into a smart



contract and pre-fills shipping details the next time that authenticated user executes a one-tap purchase.

Vidy conducted a quick and dirty study examining the purchase pages of over 60 major online retailers, and found that less than 7% of all sites, on a randomly chosen product item from the home page, displayed more than 2 configurable variable requirements before allowing it to be added to cart. With the majority of online product customizations being that straightforward, this told us that the entire purchase flow could be expedited, simplified, and entirely housed on the same layer that a user learns about that product from.

The one-tap purchase feature is only accessible for Platinum VidyCoin stakeholders, for which advertisers need to own and stake 1 million VidyCoins to gain access to. With a total available pool of 10 billion VidyCoins to be issued, this means that there can only be a max of 10,000 companies worldwide at any single time who can have access to the feature. There are over 115 million companies worldwide, all of whom need to advertise to grow their business, but <0.01% of them can offer one-tap purchases through the Vidy platform.

Vidy is restricting access to its one-tap purchase modal for two reasons. The first is that Vidy's biggest focus for the future is in bringing tremendous value to the utility of its coin for the good of the platform and for early believers in its long term potential. Vidy wants to engender an ecosystem that becomes more and more useful and efficient to participating agents as more companies learn about Vidy and adopt Vidy. The second reason to restrict access to this feature is because Vidy wants to build and grow a roster of the strongest and most value-adding brands worldwide who adopt Vidy's embed layer to give their users truly remarkable experiences. Whether you are an ambitious start-up or a multi-national retailer, if you believe in Vidy and stake it early, you will have access to this defining feature. Having the free market determine who can revolutionize how people buy things online and who cannot by a first come first served basis seems like the fairest policy for VIDY coinholders, publishers, and interested advertisers alike.

5.2 Detecting Bot Fraud

Vidy's application layer runs proprietary bot tracking algorithms in the background that analyze the movements and actions of millions of users to determine usage patterns and map out typical user behavior routes. Using deep learning, Vidy's neural networks learn how a human, and conversely how a bot, interacts with its video ads through Vidy's signature hold gesture and through other micro-movements on screen. It then automatically deducts hold times via the data layer's open-source fraud detection script when it flags a discrepancy between a human user and a bot user.

Vidy evaluates over two dozen data points from simple feedback like hold times, hold positioning, video spacing, scrolling, ancillary movement, hold surface area, screen location area, gesture consistency, user profile background, and prolonged session activity; right through to more advanced user profiling analysis like macro actions, extended gesture behavior across whole pages, and sustained usage patterns across time.

All of this information is locked in smart contracts so it remains secure, and inaccessible to any

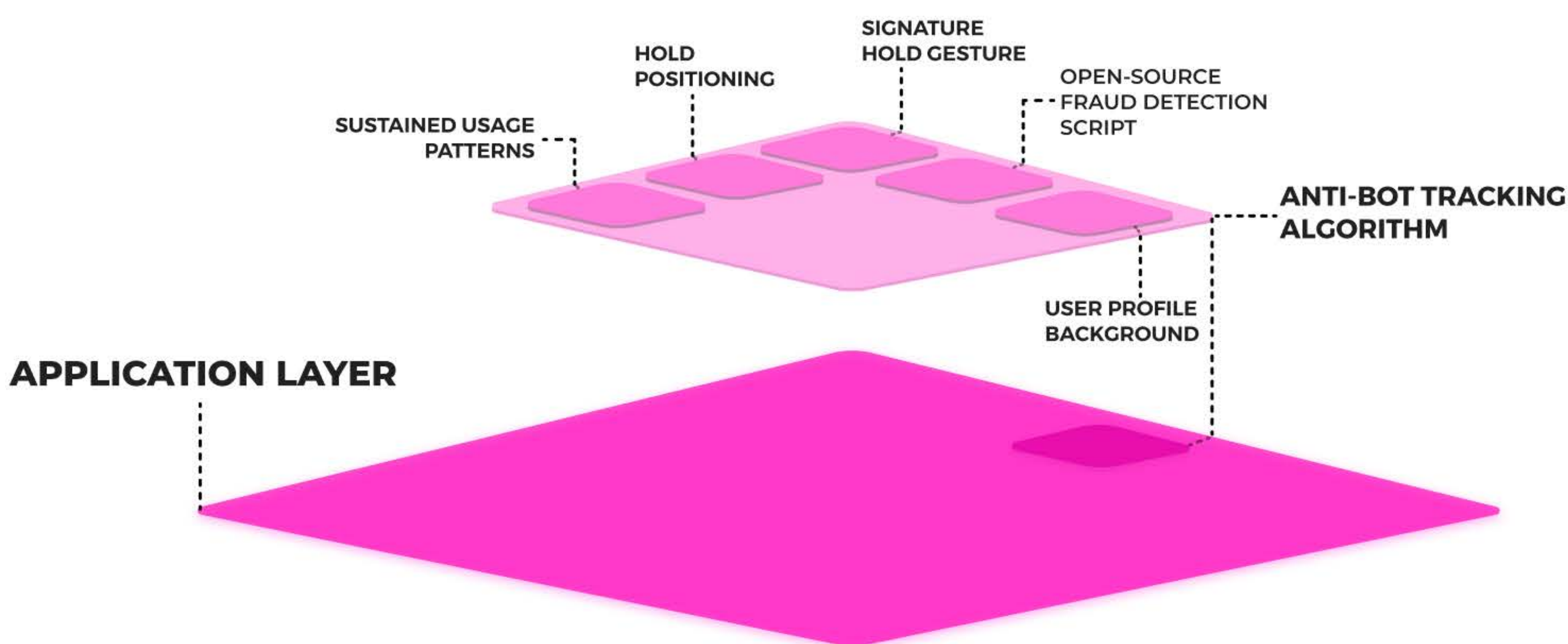


third-party entity or person. Only the Vidy data layer, which makes a realtime determination of whether the data returning from the application layer is a real hold or fake hold, maintains it and executes on it.

When Vidy believes a hold entry currently queued up to be added to the ledger by the data layer has been manipulated by bots, a VidyCoin payout is still released to the publisher, but a “marked for review” entry is added into the ledger so that the publisher can see the notice through their control dashboard, monitor the frequency of these alerts, and respond to them to dispute them. Once a publisher account passes the acceptable threshold of “marked for review” counts, which is a ratio set respective to all other publishers on the platform, the publisher is removed from the system. Upon publisher removal, all current embed campaigns on the publisher’s site are terminated, and the publisher is prompted to transfer their accumulated VidyCoin to another wallet. VidyCoin payouts that have already been distributed out to a publisher, even for hold entries believed to be bot enhanced, are never recouped. Instead the publisher is banned from the platform.

Puentes of Rebel AI aptly pushes back on the feasibility of conducting fraud checks in realtime (pre-payout) given blockchain’s speed bottlenecks, “Compared to the millisecond response times required to return an ad, the blockchain is just too slow to be a tool for real-time fraud prevention and validation.”³⁹ This is why Vidy uses a delayed reconciliation strategy to continually refine its pool of participating publishers to be A-players with repeated iteration after payout.

In this way, Vidy facilitates a transparent ecosystem of decentralized monitoring, and can catch tactical bots trying to steal from advertisers, while effectively mitigating their potential fiscal damage by removing all long-term impact from the ledger. As more users interact with the embed layer, Vidy’s AI keeps learning and getting stronger at identifying bot activity. The data layer’s open source fraud-detection script that is used to detect malicious activity is regularly updated based on Vidy’s AI versioning improvements.



³⁹ <https://rebelai.com/rebel-ai-talks-blockchain/>



5.3 A Perpetually Free Product

Tucking Vidy's ad distribution platform aside for a moment, it is important to underscore that Vidy offers a flagship non-revenue driving product alongside its ad system to round out the full breadth of use cases for the 'embeddable vidy'. This section spotlights Vidy's core product offering, and details exactly how it affects publishers who don't want to advertise.

At its foundation, Vidy has built a platform that lets publishers embed any video they want behind the text of their page, not just video ads. These videos span all topics, all sources, all formats, and all contexts. On a topical level, they range from news, speeches, trailers, and interviews, right through to entertainment, event recaps, sports highlights, and educational lessons.

Any publisher with a website or mobile app can opt into the Vidy ecosystem for free, and use Vidy's embed layer without the need to connect ads. Publishers have access to the full gamut of product features, including Vidy's NLP search, SDK embed layer, Vidylinks consumer-facing UI, the Vidy uploader which lets publishers make their own vidys in seconds, and of course Vidy's database of millions of highlight clips that grows daily thanks to its community and curators. In offering this complete package to publishers with no contract, lock-in, or demand to advertise, Vidy introduces the market to its core offering and lets publishers get acclimated to the control dashboard and to the power of Vidy's embed feature-set with no strings attached. Then when a publisher who uses Vidy's embed layer wants to augment their revenue stream with video advertising, they can just tap "Turn Ads On" in the dashboard and immediately have NLP-powered video ads embedded in their site pages.

There is no advertisement SDK in the world that offers this type of free value to publishers, whether they choose to advertise or not. Vidy wants to change the online landscape with valuable video embeds first and foremost, and believes that strong ad revenues will follow suit if users are happy first, and if their online experiences are regularly embellished with great embedded video content from top publishers.

5.4 Tactical Mobile Indexing

With user session times and user attention progressively moving further toward mobile from web, the advertising industry's respective revenue split between mobile and web is progressively following suit.

This means that it is imperative for a video ad distribution platform with aspirations of being the ubiquitous favorite through blanket convenience for publishers, to be able to run and live on mobile apps just the same as it can on web pages. In order to do this however, the platform would need to be able to scrape and index mobile app pages, and that is no easy feat with existing processes and mobile development infrastructure. Unlike web pages which can be crawled and indexed offline for contextual advertising, the content that is shown on mobile apps is often generated dynamically or lives in the binary file itself, and therefore cannot be regularly accessed and scraped.



Vidy's solution is to crawl partner publisher apps at runtime, extracting keywords and feeding them to the consensus layer for realtime placement of relevant video ads. Vidy stays cognizant of the overhead involved with a runtime scrape method and employs cost saving provisions so that economical and functional efficiency is ensured.

On iOS there are 4 locations for adding and editing text, and therefore 4 methods that the SDK focuses on, beyond of course text on buttons. There is the input view, the web view, the text view, and the label. With the Vidy iOS SDK, mobile app publishers can make all 4 areas readable to the Vidy platform for automatic vidy embedding. Android has a similar breakdown of text display areas with respective OS-specific terms for each.

The Vidy mobile team is currently building a native iOS and native Android SDK counterpart to that of its Web SDK to be run on mobile apps. The mobile SDKs will go live at runtime, analyzing all of the available pages of text throughout all partner app views, and combining NLP matches with the visiting mobile user's data to embed relevant vidys on the pages that they are viewing.

5.5 Crowdsourcing a Video Map of the Web

As a consumer-facing embodiment of the greater network, the Vidy team will be deploying a Chrome extension for all Vidy users who want to see and interact with vidys on any website, whether that site is a partner publisher or not within the Vidy ecosystem.

We know that the future of Vidy will be powered and dictated by our users, especially as the platform's features evolve to specifically serve their needs and wants. The Chrome extension is our way of giving users a conduit for them to leave their signature on all digital territory across the web, and what we hope will be a catalyst for bringing non-participating publishers into the Vidy orbit by virtue of people interfacing with publisher sites before they even come to know what Vidy is.

With the Chrome app, users will be able to both publicly and privately embed a vidy into the text of any site that they navigate to, and will receive attribution via their own user profile for public embeds that they make across the web. Users will be able to see all public embeds made for any specific portion of text, and in the future will be able to interact with other users' embeds with comments, likes, and other actions.

The Chrome app will therefore be a way to crowdsource the most fitting vidys into publisher pages before publishers do it themselves, and publishers will have access to this video map through their control dashboard so that they can take inspiration and ideas from the creativity of the Vidy community.

Vidy users who run the Chrome app daily, will receive 1.5x the amount of VidyCoin payout for each second of hold time that they accumulate. Users who don't run the chrome app will have their experience unaffected, but they will lose out on 1.5X earnings gains on all hold payouts.



5.6 The Embed Layer's Social Future

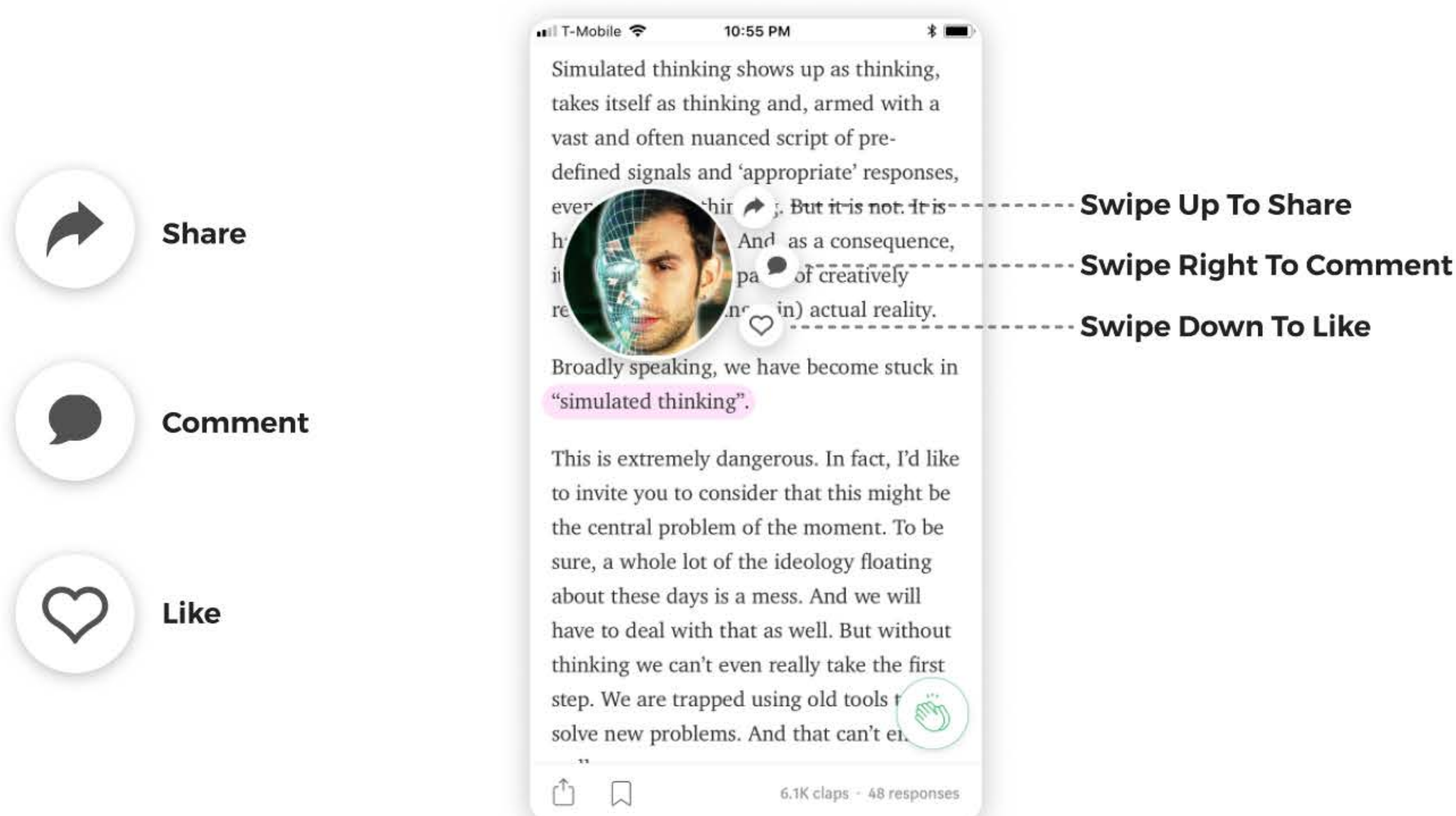
Vidy's embed layer has immense potential to be a driver for social connectivity and networking within the fabric of advertising, e-commerce, and entertainment on the web. It operates at the intersection of likeminded people sharing the same interests, visiting the same sites, and seeing the same embedded videos; and those commonalities forge unique bonds of shared experience.

By empowering users with a voice to air questions, post comments, give praise, and write reviews next to embedded vidys and purchase modals on the embed layer, a sort of crowdsourced intelligence emerges on the platform to help people make better informed choices on products and services, and feel more connected to each other as they navigate publisher pages. Users could filter comments based on private networks of friends or the general public, and could always control their privacy.

Advertisers could get a direct window into what their greater audience thinks about their video advertisement and their product, and could learn and iterate from those free insights. Publishers would get to gauge levels of macro activity and verbal sentiment around video ads that are being embedded into their content, as well as examine the topical relevance between their content and the corresponding advertiser's embeds through the feedback of their audience who interacts with it.

Facebook and Twitter both see significant traffic on conversations and comments stemming from product and service advertisements, and Vidy's embed layer could be the first distributed version of this.

Vidy has a strong lean toward social media proclivities given that it was formed initially around social use-cases, and the core product is an effective augmenter for messaging and social consumer experiences. With a social aspect to the layer, users can connect to each other, video ads can be community-vetted, and advertisers and publishers can capitalize on a realtime pulse on interaction.



6

Technical Execution



6.1 The Only Viable Blockchain Play For Ads

There are some great advertisement blockchain projects on the market today that have proposed decentralized replacements to the broken ad landscape.^{40 41} Despite having great concepts however, the reality is that blockchain has a significant technical limitation for present day production-level advertising integration - loading time. Right now it just takes far too long to process an ad request through blockchain, particularly when juxtaposed with today's near instant page load speeds and short-wired user attention brackets. Blockchain response times average up to 30 seconds for a distributed consensus layer to agree upon the placement of an advertisement in a banner space, and this makes it prohibitively slow for a blockchain to load ads on any web page currently live today. Manny Puentes, CEO of Rebel AI and a regular writer on the industry identifies with this issue all too well. He ascertains, "due to its distributed nature, where transactions are verified by miners around the world, blockchain technology simply can't analyze or process real-time advertising transactions fast enough. Current confirmation times for a transaction to be validated and added to the public ledger range between 10 and 30 seconds."⁴²

In a consensus-driven ecosystem where speed is both preceded and limited by network reliability, delays this high will unfortunately keep blockchain projects irrelevant in the ad space indefinitely. A distributed platform is only as strong as its weakest link, so even a network of miners with top level hardware and internet speeds will always be held back by the slowest link in the chain. As Puentes further points out, "the scale and speed that programmatic advertising requires means that blockchain-based platforms are still years away."⁴³ Indeed, until this limitation is overcome, any ad-based blockchain project is rendered a revolutionary dream rather than an executable reality.

Vidy is also hampered by this same blockchain speed bottleneck.⁴⁴ However, by its very design, Vidy maneuvers around it organically by pre-loading assets behind text instead of in plain view where delays are immediately apparent to a user and therefore unacceptable for a publisher. Essentially, if Vidy were to load in a banner ad via its consensus layer, users would have to wait 10-30 seconds to see it load in, and that would be unacceptable. But Vidy does not have to load in a banner ad instantly; instead it pre-loads in video ads behind the text of a page, beyond the field of view for a user when they first arrive to a page, so there is no apparent wait time to consume content. In this way, Vidy's blockchain solution can be integrated on publisher pages immediately on rollout without needing to wait for a performance solution to this industry-wide blockchain problem.

⁴⁰ <http://www.the-blockchain.com/2018/03/01/400-percent-growth-decentralized-marketing-technology-projects-report/>

⁴¹ <https://basicattentiontoken.org/announcing-a-new-blockchain-based-digital-advertising-platform/>

⁴² What Blockchain Can (And Can't) Solve For Ad Tech, Manny Puentes
<https://rebelai.com/rebel-ai-talks-blockchain/>

⁴³ <https://rebelai.com/rebel-ai-talks-blockchain/advertisingindustry>

⁴⁴ "Blockchain's biggest asset – decentralization – is also its biggest weakness in the digital advertising space. Due to its distributed nature, where transactions are verified by "miners" around the world, blockchain technology simply can't analyze or process real-time advertising transactions fast enough"
<https://adexchanger.com/data-driven-thinking/blockchain-can-cant-solve-ad-tech/>



6.2 How Vidy Will Tackle Scalability

Blockchains are notoriously hard to scale. Presently, public permission-less blockchains are restricted with regard to the number of transactions per second that they can achieve, with this number being fixed at a low point. Ethereum typically maxes out at around 10 transactions per second.⁴⁵ Some fixes have been introduced, like elevating the top-end speed of processing performed per block by a constant factor, but these are only short-term resolutions, meaning that with the current exponential increase of worldwide Ethereum's adoption, we will soon again end up back at square one. The Raiden network, based on payment channel technology, is unique in that it is able to scale along with the number of its increasing users, therefore being an optimum payment solution; This means that as the Raiden Network increases in size, so does its processing capability, with essentially no ceiling.⁴⁶ The Vidy system will utilize Ethereum mainnet and the Raiden network to establish a direct channel of VidyCoin transfer payouts among all three parties.

Key Features of the Raiden Network

The Raiden network has been successfully released to the Ethereum testnet as of September 2017 and hopes to deliver 1M transfers per second (TPS) via "state channels," thereby eliminating the current scalability issues in most blockchain applications.^{47 48} Per the Raiden website: "the basic idea is to switch from a model where all transactions hit the shared ledger on the blockchain (which is the bottleneck) to a model where users can privately exchange messages which sign the transfer of value".⁴⁹ The Raiden network offers the following benefits which are complementary to the core business logic of the Vidy ecosystem:

- The network scales linearly with the number of participants. It is expected that the network will facilitate 1 million or more transfer per second, suitable for the Vidy platform that needs to programmatically place ads in realtime and deliver corresponding VidyCoin payouts.
- Transfers are confirmed within a sub-second, ensuring reliability to traders.
- Individual transfers that do not show up in the global shared ledger, ensuring confidentiality.
- Transfer fees are orders of magnitude lower.
- Low transaction fees enable micropayment processing.

All transactions in the Raiden system are carried out by using the processing power of operations. The size of commissions depends on the same indicator and this allows transactions to be optimized for the transfer of medium and large amounts of cryptocurrency,

⁴⁵ The selling points of Ethereum's are its blockchain and enterprise clients. Ethereum can process almost three times as many transactions per second as bitcoin can. Not only are these transactions processed more quickly, but they're also cheaper.
<https://www.foxbusiness.com/markets/3-cryptocurrencies-that-could-still-double>

⁴⁶ <https://raiden.network/>

⁴⁷ Raiden Network <https://en.allcryptonews.com/raiden-network-rdn-cryptocurrency-overview-advantages-and-main-benefits/>

⁴⁸ Raiden Network Explained <https://coinjoker.com/raiden-explained/>

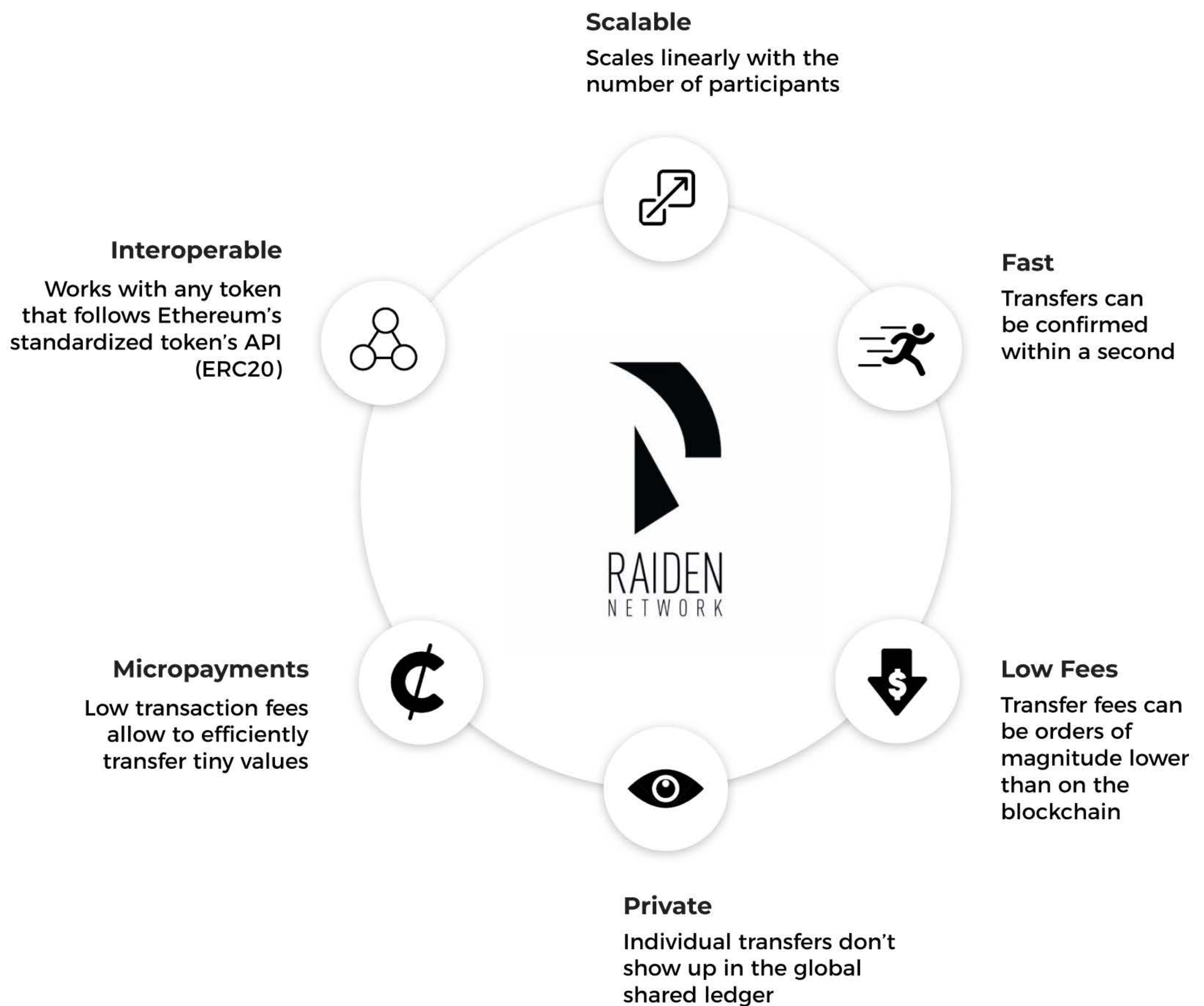
⁴⁹ <https://raiden.network/>



while excluding overpayment in the implementation of micropayments. The Raiden network also boasts the following characteristics:

- No limits for operations;
 - Instant execution of transactions;
 - A solution to the problem of scalability;
 - The Raiden Network token cannot be affected by inflation due to the basis of the ERC20 algorithm;
 - Raiden Network token holders are provided with ample opportunities for work;
- The liquidity of the system is ensured by using the full version of the Raiden client.

Raiden Network Features



7

Why Users Will Hold Down



7. Why Users Will Hold Down

Vidy wants to build the most addictive and compelling experience possible with its embed layer's hold properties. When users see a vidylink, we want them to be pulled to it, curious to see what's underneath, and always feeling great when they hold down. With the construction and user experience of the layer now in perspective from previous sections, here are the fundamental reasons why users will hold on vidys as much as possible.

- a. To earn VidyCoin
- b. To purchase with one tap
- c. To watch an interesting video
- d. To see a good ad

7.1 To Earn VidyCoin

Users will do it for the cash. Until now, as users we have received no due compensation in return for making advertisers, publishers, and the bevy of intermediaries in between them, rich. But with Vidy that is all going to change. Every time you hold, you earn. As you hold down on an embedded vidy, you are steadily earning VidyCoin, calculated on a hold time basis.

Users can now collect VidyCoin based on their respective activity and repeat engagement on the embed layer. Hold times offer a transparent metric for success, and make it brutally simple for users to be rewarded with their attention and action. The embed layer was carefully architected and designed to cultivate an elegant, sleek, and gamified experience for users to track how much VidyCoin they are earning mid-hold.

7.2 To Purchase With One Tap

Vidy's OTP is the fastest and easiest way to make a purchase or reservation on the web. Within a mere few seconds, a user can identify an interesting topic in text, hold down to see it displayed in video, and then tap to have it purchased and shipped to them. Doing this lands them right back on the same page they were on a few seconds before, as if they never even left.

This is browser agnostic, this is hardware agnostic, this is publisher agnostic, this is language agnostic, and this is territory agnostic. There has never been a distributed facilitator of e-commerce that is both so universally accessible to all purchasing internet users, and yet so easy for all three fiscally-involved parties to respectively adopt, with zero switching costs required to use.

7.3 To Watch An Interesting Vidy

When we first created Vidy, we made it not to be an ad-first platform, but to be a social platform. As such, the product was designed, incubated, and tailored to be fun, exciting, and



interesting to users of all demographics looking for a daily dose of digital entertainment. We expect that on our initial rollout, far more publishers will start with an ad-free experience as they get accustomed to the Vidy embed layer, and all that the control dashboard and its suite of features has to offer. Then as Vidy becomes a part of their trusted daily publishing routine, they will reach for the ads integration that can magnify their revenues. This anticipated course will translate into great experiences for users who are reading a publisher page, or consuming the content on a publisher app, as they will have a plethora of entertaining vidys that have been thoughtfully embedded by top notch publishers.

How many times have you wanted to watch the video associated with a quote, statement, or scene that you just read about? Think about how much time it takes to go find it and how much of a hassle it is to stop and start sessions on different browser pages and websites to get to it. Through entertainment-first embeddable vidys, integrated both via Vidy's database of millions of clips and through the on-demand Vidy uploader, you can enjoy that experience on a publisher page right from the quote itself. It is on-demand entertainment delivered on touch with a relevance to what you're reading.

On the embed layer, users can also swipe up to share a vidy that they like and want to send to a friend. Every video share respects the aspect ratio and visual treatments of the embedded video itself, so a friend could receive anything from a typical landscape video right through to a segmented out body with holo effect in a text message or on a social post. The share feature gives friends the opportunity to join in the fun, and get that same laugh you did, or learn something that you found interesting as well. Vidy hunters will start getting credit for great 'vidy finds' across the web that they share, just like Youtube video sharers and Instagram meme hunters do. In the future, Vidy may incentivize sharing with a 1.2x earning multiple on all VidyCoin payouts for users who reach a daily threshold of vidy shares.

7.4 To See A Good Ad

Good ads are great. Bad ads are terrible. When you see a good ad, you remember it and you appreciate it. That's why Vidy is built on two premises of advertisement scarcity. The first is a cap to its total pool of available coin, with the requirement that advertisers stake enough VIDY to participate in its membership tiers and access its advertising features. This allows the natural forces of demand and supply to decide permitted companies from non-permitted ones. Constraints have always driven both people and companies to great creative achievement, and we believe feature scarcity will be no different here.

The second is Vidy's built-in performance cleanse protocol, where bad ads with short hold times are regularly flagged by the data layer for advertisers to edit and replace, and are gradually phased out from the internal consensus of placements. A poorly performing ad will a) spur a notification to that advertiser, and b) start to dissipate from request pools for the consensus layer to place. All advertisers with consistently low hold counts get notified in their dashboard and are given community tips on how to improve with the future video ads that they upload to the system.



8

A Win-Win-Win For The Industry



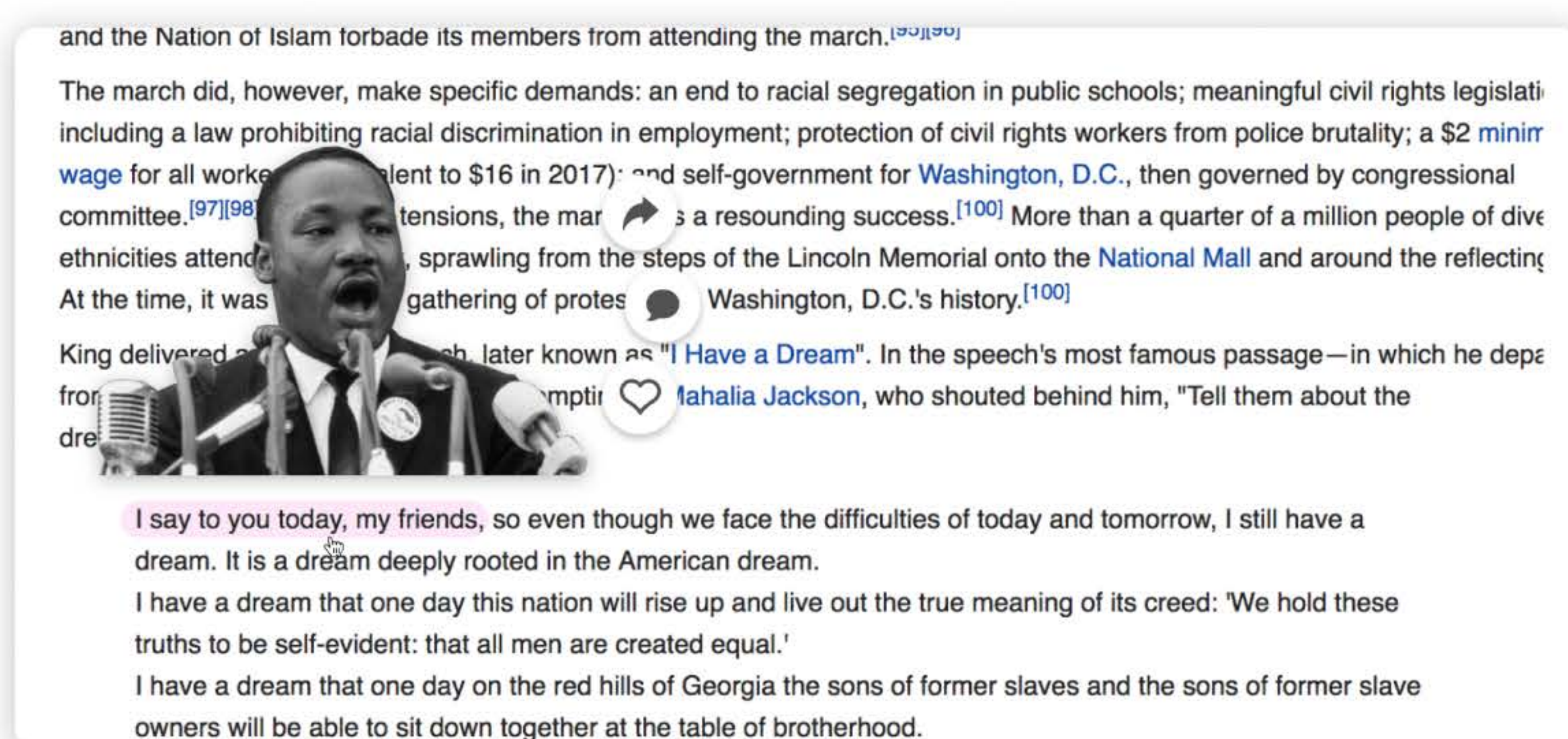
8. A Win-Win-Win For The Industry

Whether you are a user, a publisher, or an advertiser, you are looking for positive change in the current climate after being taken advantage of for years. This is why we call this fresh new paradigm of decentralized video advertising a win-win-win for all parties involved.

8.1 Win For The User

As a user you want the best possible experience while expending the smallest amount of effort to get that experience. This means that when possible, having a feature-robust application is preferred because for convenience sake, if everything is on one page or on one site there is no time cost involved in switching to another site. Facebook and WeChat are prime examples of this concept, having each enjoyed great successes with their respective session times.

Picture yourself reading a Wikipedia page about Martin Luther King Jr. and learning about his 'I Have a Dream' speech that he delivered in 1963. You're intrigued and want to see some actual footage rather than just reading about it. Until now, you would have to google the speech to find the video for it, thereby leaving Wikipedia entirely and ending your experience on that page. Your path would likely begin with a google search, and upon seeing results you would likely be directed to Youtube where you would then either further refine your search to get to the right video, or watch the video straight from the Youtube landing page. At this point however, your expected route becomes hazy. You may stay on Youtube if another video catches your eye, you may go back to Wikipedia to finish reading the page, or you may replicate this flow ad infinitum if again you want to see something that is not quick to find on the Youtube platform. This type of constant switching builds up an ever-growing **cognitive overload**, and it is one of the things internet users cite as one of the biggest pain points for their online experiences.



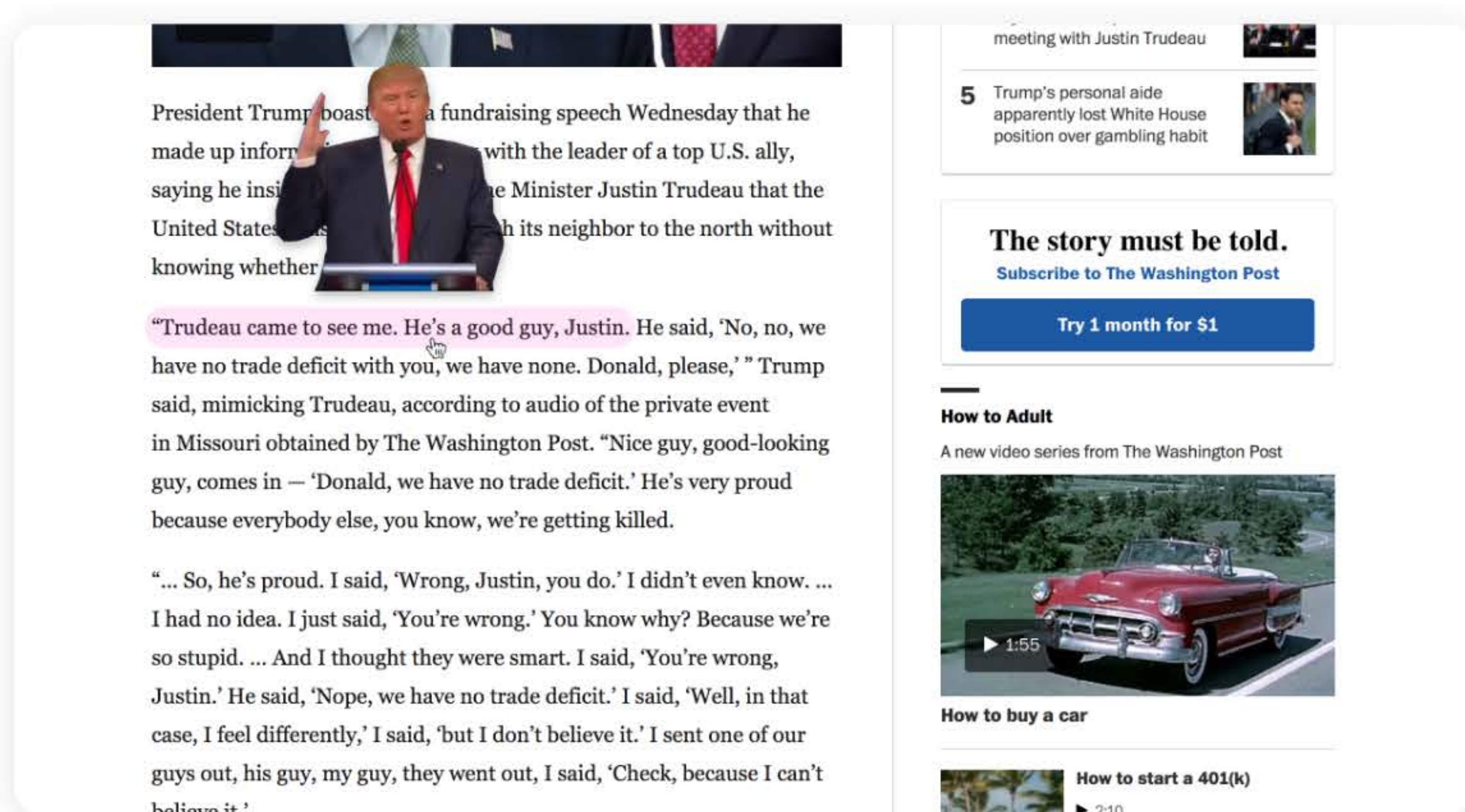
If Wikipedia had that footage embedded within the text of the speech name as it appeared in the paragraph the reader first read about it in, then Wikipedia would never have lost that user in the first place. Instead that user would now have the added dimension of video support for all of the interesting things they come across on Wikipedia, and as a result Wikipedia's session time would grow dramatically since the session is maintained contiguously.



Now picture yourself reading a Washington Post article that is covering Trump's response to the Charlottesville rally. As the Washington Post covers Trump's actions and responses, they begin to quote him and you think to yourself, how cool would it be if I could actually watch him saying that right here. You could see his delivery, hear his tone, understand the context around his statement, and on the simplest of levels merely confirm that he actually did in fact say what was quoted. It would be the end of fake news as we know it! But alas, unless the article has posted that video between paragraphs, which seems rarer than being struck by lightning these days, your only recourse is to scour the web on other websites, leaving your article to find the correct video of him. From there you'll be confronted by a 40 minute speech; how will you ever find the exact moment when he makes that statement when you're seeking it out of a 40 minute speech?

Until now, there was no solution to this conundrum, and that stemmed from a dearth in publicly accessible tools for finding things in video. While the text search industry booms at hundreds of billions in market cap today, the video search industry for finding things inside video is virtually nonexistent. Youtube's keyword search does not help you find a quote in a 40 minute video, and this is where Vidy's NLP-powered search and video highlights database comes into play. Vidy has transcribed millions of videos and analyzed, indexed, and processed them for free accessibility by the public across its mobile clients and API channels.

With a Vidy integration on the Washington Post website, while reading that quote in the article you could just hold down to reveal Trump saying that quote right there. The following shows a demo of Vidy's layer in action with a Trump quote. The video is accessed by a hold and the video is controlled via gesture movements on a superimposed layer.



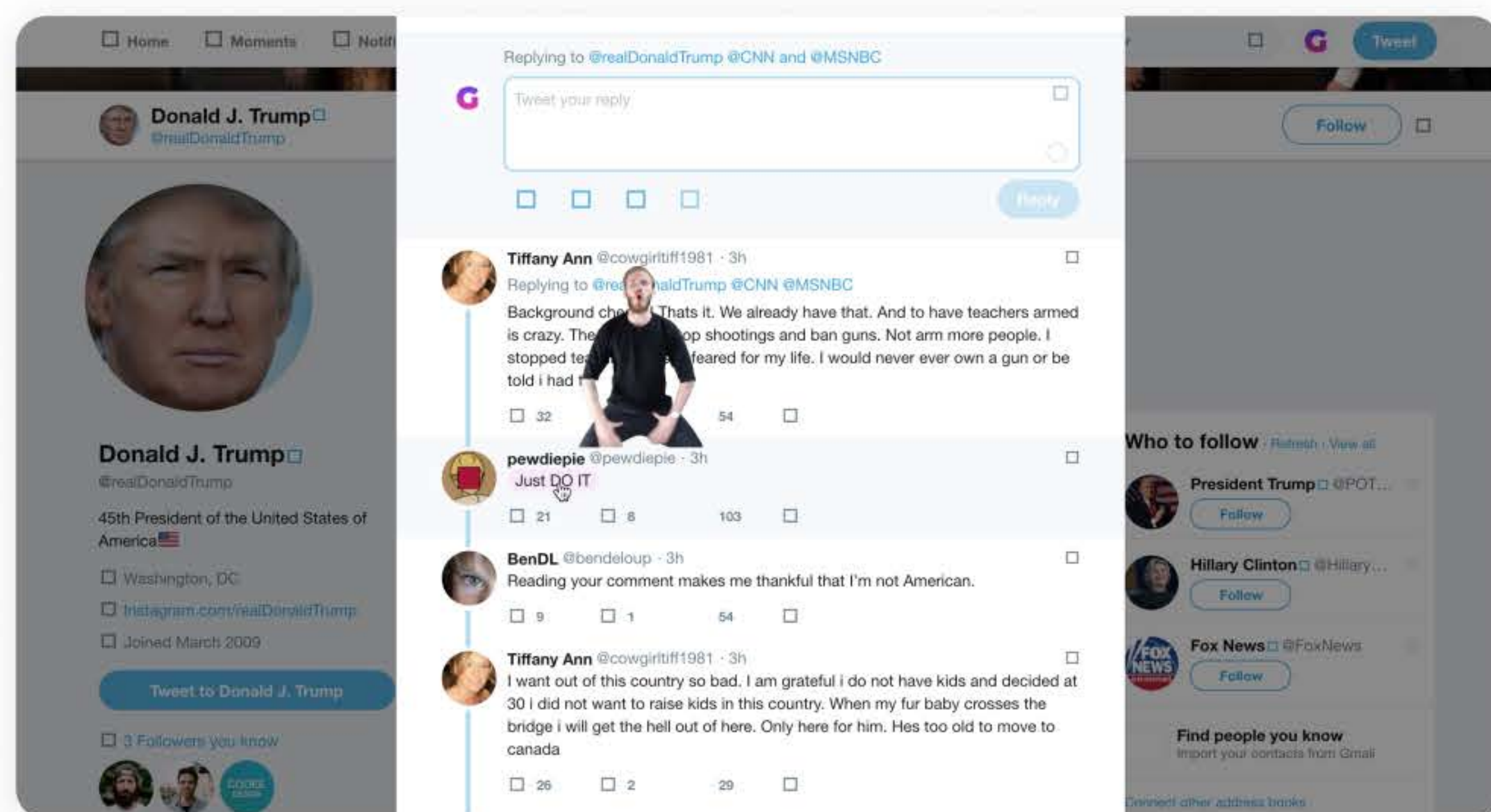
Now every quote that the Washington Post cites within its publications can have a corresponding video of that speaker actually saying it, seamlessly nested behind the text. Reporters, editors, and writers get free access to Vidy's database of millions of video highlights, updated daily, to find each relevant clip with just a search, or can submit any long form video or link and let Vidy's uploader kick out a short vidy of that highlight in seconds. This is a tool that no publication has today and every publication needs today.



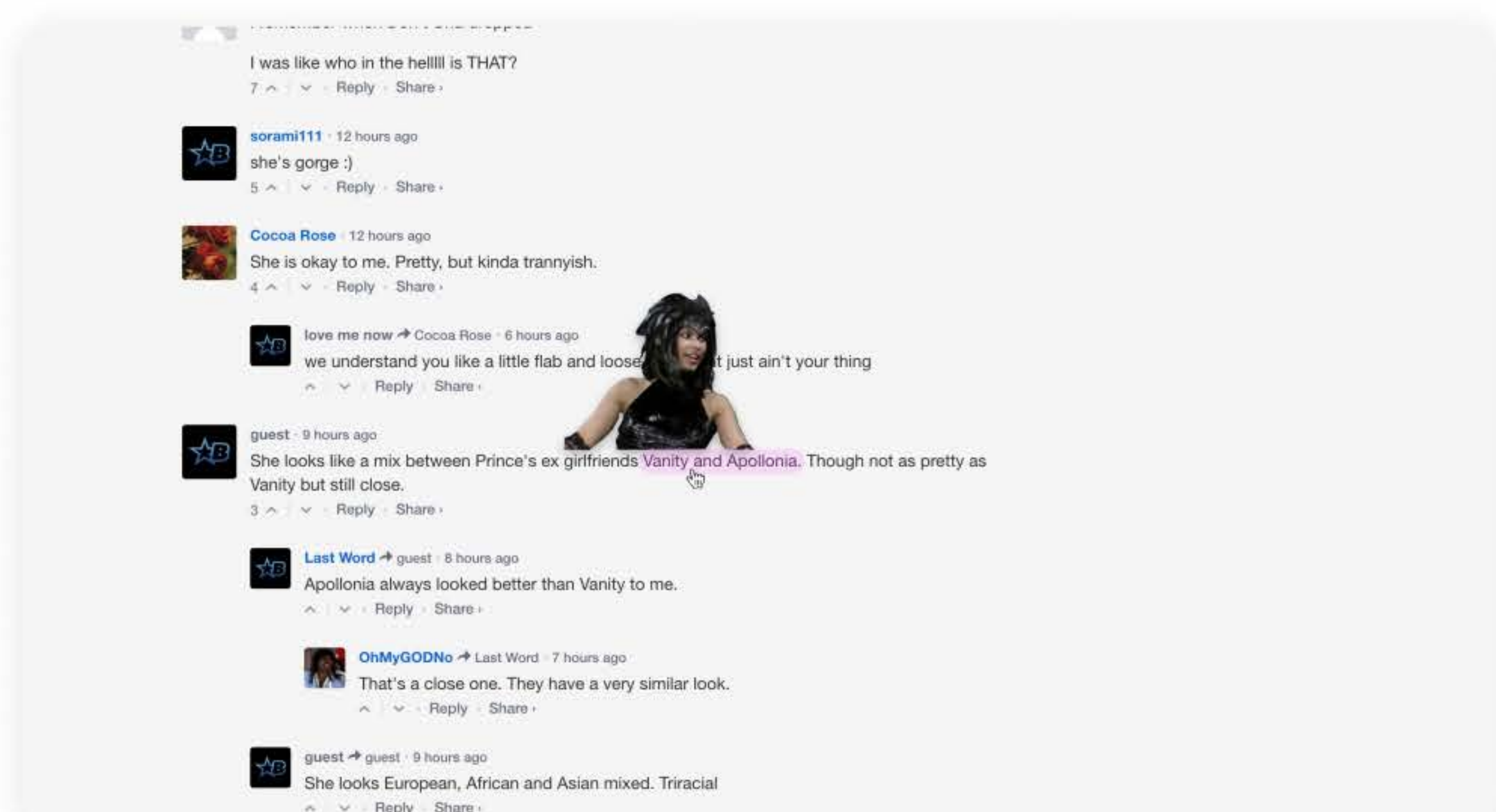
In another example, picture yourself browsing through the comments section of a platform such as Twitter, with users communicating back and forth replying to a tweet that has been made by a popular celebrity. As people weigh in, their main methods of communication in comments typically range from text and emoji to sticker and gif.

In the social media world, each text post and reply that you make embodies you digitally - your voice, your tone, your take, and your delivery. And today, this is almost always done in text form due to our existing UX constraints on the web and on small-screen mobile devices that are short on real estate. But imagine if you could deliver that reply in the comments section by speaking it in video form, and other people could hold down on your transcribed text reply to watch you emerge and say it in a vidy.

The following shows a demo of Vidy's layer in action with a response from user Pewdiepie's account to a Trump tweet, and an embedded vidy of him shouting it within his quote. The video is accessed by a hold and the video is controlled via gesture movements on a superimposed layer.



Additionally, here is a demo illustrating how vidy can be nested in the comments sections of any website, with a Disqus integration being specifically spotlighted here given their market reach with online publishers. In this demo, the commenter's own vidy is nested into their text response, accessible via a hold on the Disqus comment feed.



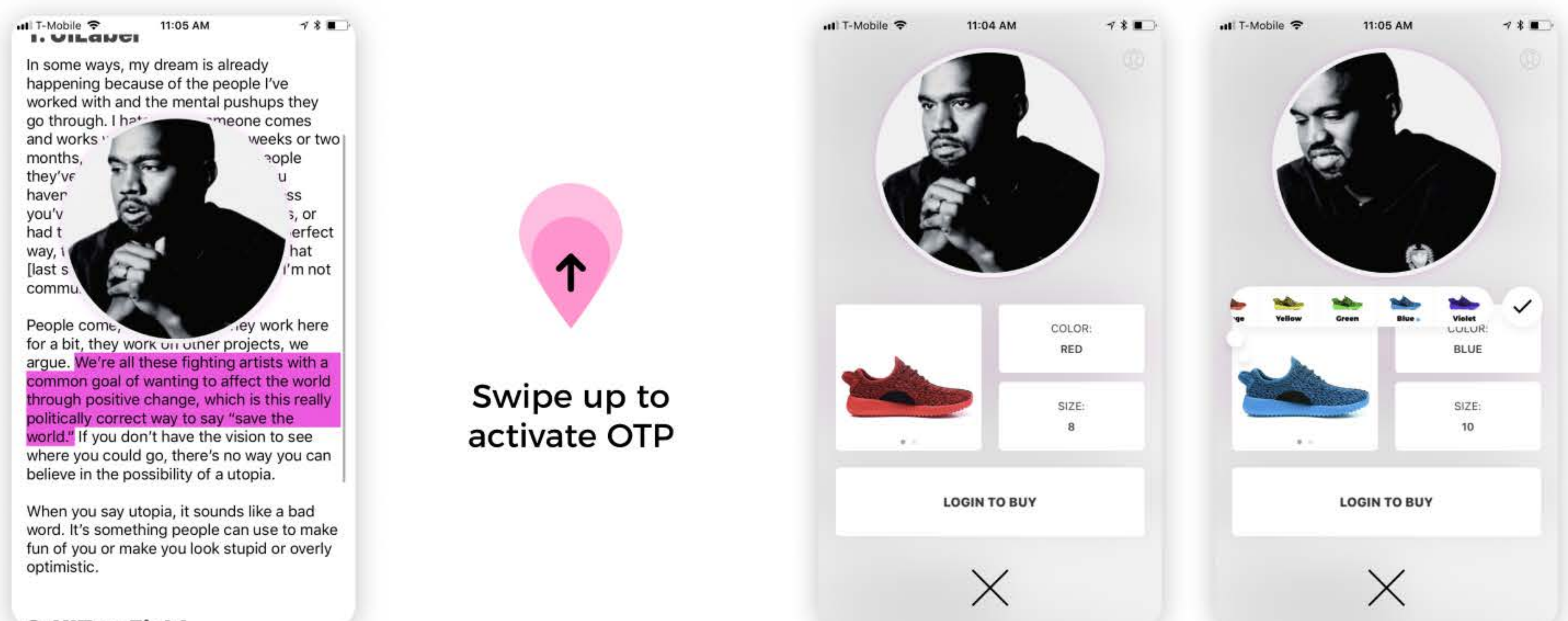
As illustrated from these examples, Vidy's technology is applicable across all domains that have text, from articles and wikis right through to social networks and comment sections. Any contained body of text can be augmented with the power of video to give the conveyance of a statement a new dimension.

In a final example, picture yourself reading a BuzzFeed listicle about Apple's new iPhone X that has just been released, alongside a comparison of other top-line smartphones that have recently launched from other brands. The article details each product's respective specs, gives commentary on the editor's opinions on each, and includes an image of each phone indenting every paragraph, so that readers can consider the pros and cons of the available options in their pursuit for the right smartphone purchase.

Buzzfeed can organically close the loop by integrating a Platinum OTP video ad, and give its users the convenience to purchase in seconds right from the page. BuzzFeed also puts itself in a strong position here to execute successful sales on behalf of these listed players, given that the entirety of the article is a series of reviews essentially to help users make a purchase. It almost feels nonsensical in today's digital milieu that BuzzFeed does all of this, and then stops short of actually facilitating the purchase on-page. But understandably, due to the complexities around lack of standardization and the fragmentation of the industry, it remains impossible for them to execute, not to mention well out of their line of business to build. So instead they write about these products, sell banner ads, and just hope to collect affiliate money through website taps.

Similarly, an article detailing the impending release of a new Tesla Model X car could have a "Reserve Now" button above the playing video ad. As a user you could watch a few seconds of the ad by holding down. You get to hear the engine rev, see the full 360 view of the car, watch it being taken for a test drive, all in an embedded vidy for a sentence talking about how great the car show was. Then with just one tap on the button above, reserve your place on Tesla's waitlist for the car. A touch point to purchase that is this intimate and convenient is unprecedented on the internet today.

In essence, with Vidy's single-page embed layer on sites that you already frequent, your existing experience remains unchanged; and now it is augmented with the new dimension of embedded video when you choose to hold and consume it. You possess the power to choose when to hold and when to skip, so your life just got that much better.



9

Vidy Revenues



9. Vidy Revenues

Vidy's primary company focus is delivering steadily increasing value to the utility of VidyCoin (VIDY) for the good of the ecosystem that relies on it to operate. VIDY is not only a utility for advertisers, publishers, and users, but it is the life blood of the decentralized system itself, and what incentivizes miners to drive it forward. The Vidy platform was built to be self-sustaining whether company revenues are generated or not, and as result, revenue propositions come second for us within the scope of platform feature design. But thanks to the mutual rewards that all parties reap from each transaction on the platform, Vidy is able to share in the benefits as well. Vidy's three revenue streams are as follows:

9.1 Revenue 1: Ad placement payouts

For each second that a user holds down on an embedded vidy, a payout calculation is made and VidyCoin is debited from the advertiser's account and distributed to the publisher and the holding user. Vidy takes a fraction of this payout as well. The following example payout calculation illustrates what a typical distribution would look like:

9.1.1 Calculations

User hold time: 3.4 seconds
Fiat value of hold: \$0.0942
VIDY current fiat value conversion: 1 VIDY = \$0.015
Hold x Fee current rate: 1sec = 1.847 VIDY
Total Advertiser fee: 6.28 VIDY

9.1.2 Payouts

Publisher payout (85%): 5.338 VIDY
User payout (3%): 0.1884 VIDY
Vidy payout (7%): 0.4396 VIDY
Miner payout (5%): 0.3141 VIDY

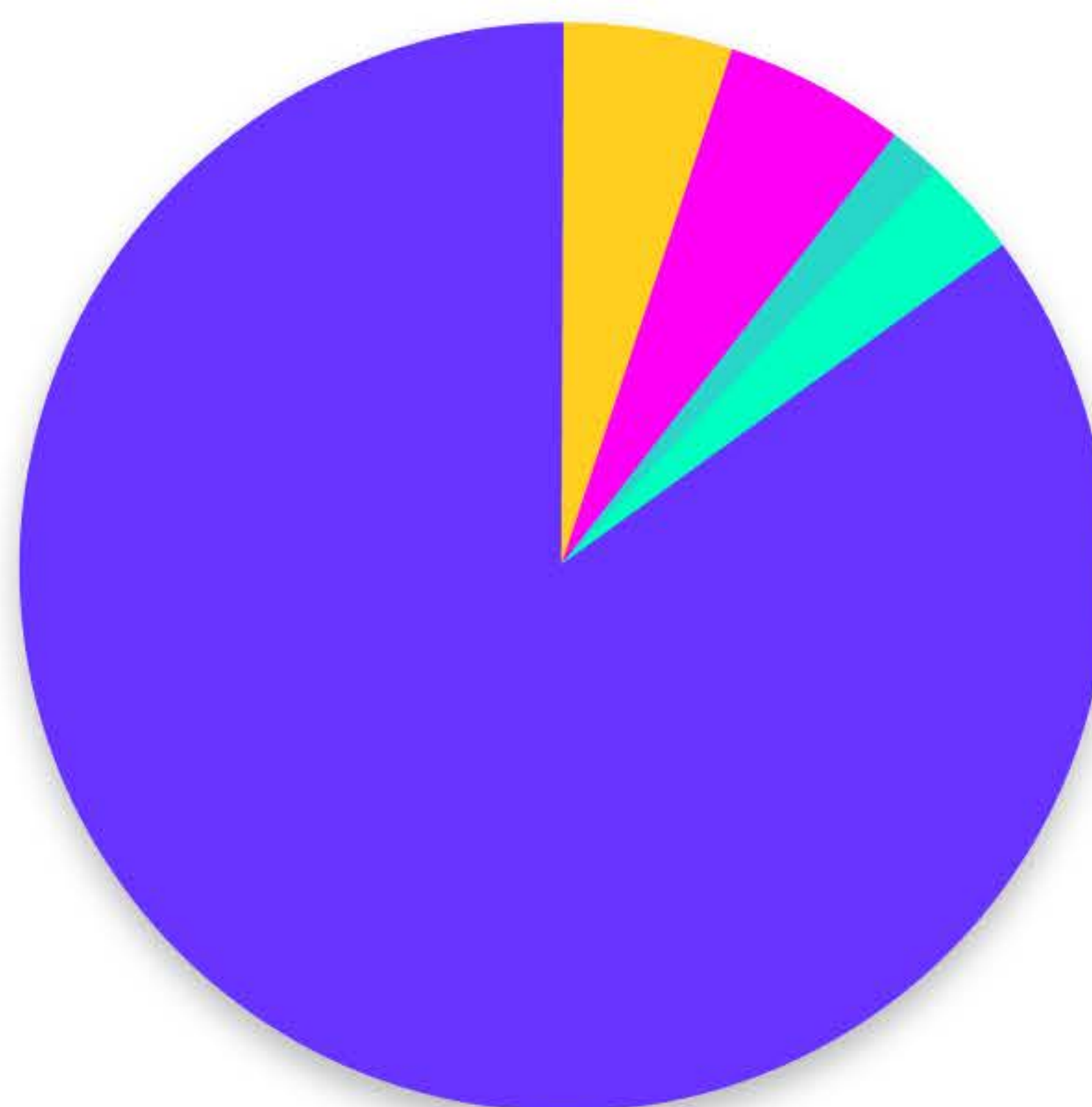
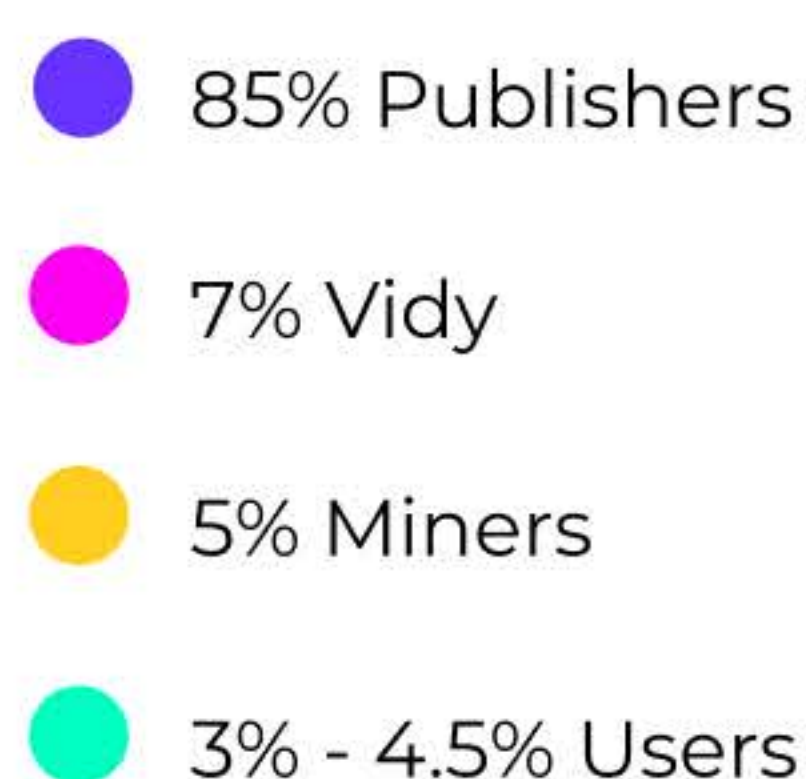
As a user holds down, the rate of VidyCoin they receive is directly proportional to how long they hold for. Early in their hold, users earn less VidyCoin per second than later in their hold as the velocity of the earnings payout to the user increases. Vidy will launch with this user payout embodiment after more user testing around the results of incentivizing longer holds for more VIDY earnings.

User payouts can be magnified by up to 1.5x if the holding user has installed and currently runs the Vidy Chrome extension on their browser. The bonus payout to user comes out of Vidy's end. A miner's payout is delivered every 3 days after passing a threshold of VidyCoin earnings and successful block adding-events.



All ad placement payout sizes and ratios are subject to change, particularly as Vidy's product progresses out of beta status and into full-fledged production v1.0 mode. Below is a pie chart illustration detailing the VidyCoin payout pie that Vidy currently operates with for ad placement payouts:

AD PLACEMENT PAYOUT ALLOCATION



Section 9.5 of this whitepaper details Vidy's Velocity Payout Progression algorithm (VPP) which is used to calculate payouts to users under an ever increasing earnings rate based on hold time. The equation below however is a much simpler method for displaying a fixed rate of earnings for payouts to users, to be tested alongside the velocity method. Here, all payouts are flat realtime conversions of fiat price with the input of hold time, and this equation uses the 3% user payout figure as listed above.

User payout

$$y_2 = 0.03tv$$

Where y_2 is user payout

t is user hold time on embedded vidy

v is vidy hold time rate per second, which is given as

$$v = \frac{\text{Fiat hold time rate per second}}{\text{Vidy Conversion rate}}$$

9.2 Revenue 2: One-Tap Purchase Payouts

Each time a user makes a one-tap purchase on the embed layer, the advertiser receives a VidyCoin payout for the purchased product from the purchasing user's token account. A fraction of this VidyCoin payout to the Advertiser again goes to the publisher, the miner, and to



Vidy. There is no NPP payout slice for OTP transactions on the platform. A publisher's payout on OTP is the equivalent of affiliate money that exists today, but can be a multiple of the typical affiliate payout amount since that video ad embed is generating a direct purchase rather than just a page land. Likewise, Vidy's payout commission for successful purchases can be much higher than its ad placement payout. A miner's payout for OTP payments stays level relative to their ad placement payouts. The following example payout calculation illustrates what a typical distribution would look like:

9.2.1 Calculations

Fiat value of purchase: \$24.99
User purchase price: 489.804 VIDY
VIDY current fiat value conversion: 1 VIDY = \$0.015
Affiliate payout ratio: 10%
Affiliate amount: 48.98 VIDY
Advertiser receives: 440.824 VIDY

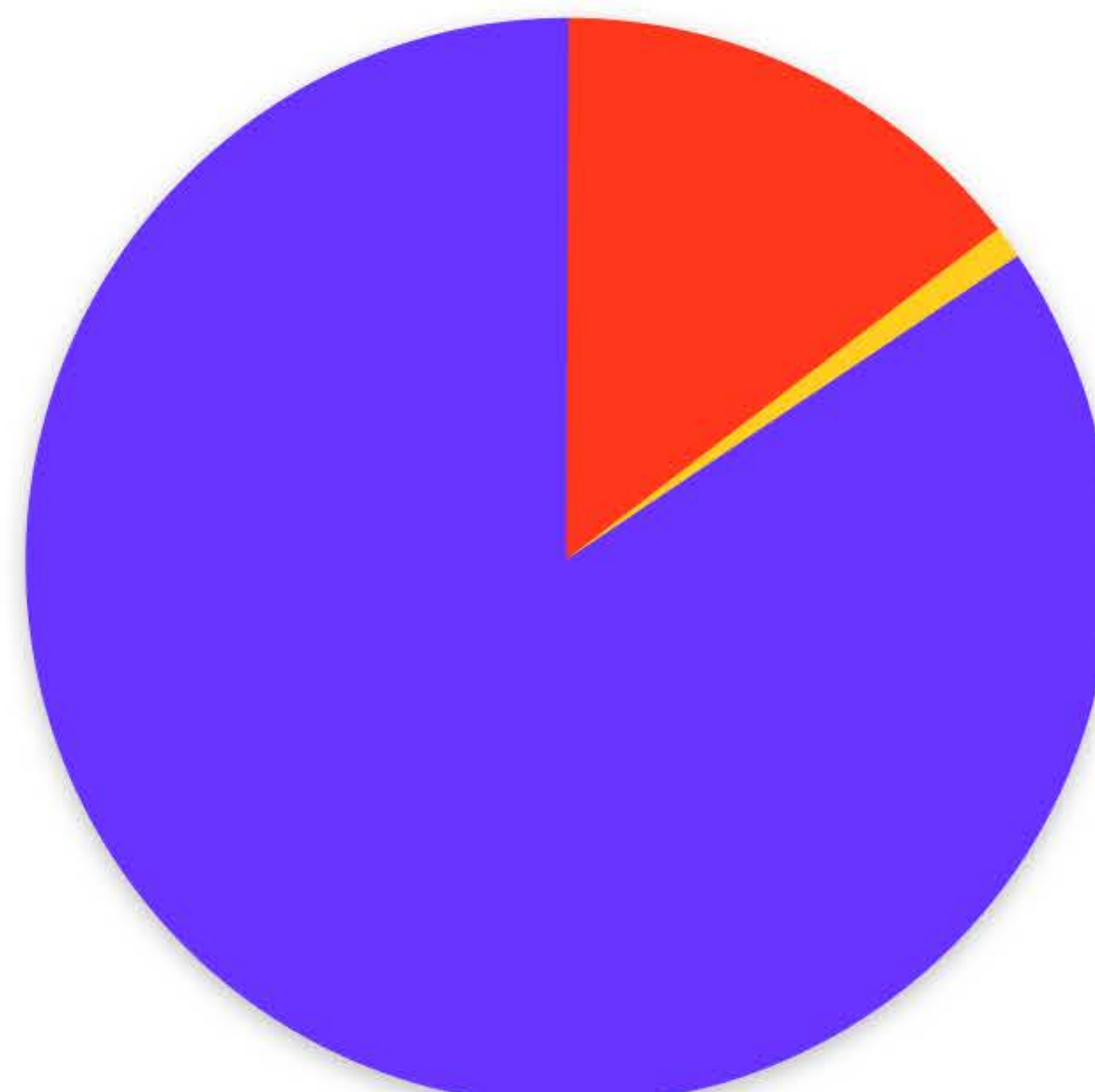
9.2.2 Payouts

Affiliate payout total pie: 48.98 VIDY
Miner payout (fixed): 0.3141 VIDY
Affiliate payout after miner: 48.6659
Publisher payout (85%): 41.366 VIDY
Vidy payout (15%): 7.2998 VIDY

As demonstrated from this example, the publisher's payout is 41.366 VIDY from a total purchase price of 489.804 VIDY, representing almost double what a typical affiliate commission would look like. All OTP payout sizes and ratios are subject to change, particularly as Vidy's product progresses out of beta. Below is an illustration detailing the VidyCoin payout pie that Vidy currently operates with for OTP payouts:

ONE-TAP PURCHASE PAYOUT ALLOCATION

- 85% Publishers
- 15% Vidy
- Fixed Fee For Miners



9.4 The Non-Profit Pool (NPP)

Vidy wants our offline future to be as bright as what it believes our online future will become thanks to decentralization. The best way that it can help do that is by supporting the brilliant charitable organizations around the world whose sole purpose it is to help push humanity forward with their selflessness.

In Vidy's ancillary pursuit to drive social good on its platform, it will be allowing 10 charities to participate in its Non-Profit Pool (NPP). The NPP will be a group of charitable entities chosen by Vidy, and each of these non-profit participants will have access the shared pool of VidyCoin in the NPP, which grows with each video ad hold that takes place on the Vidy platform.

Among a number of criteria, these organizations will be chosen on the basis of their impact and their mission, and must exist to solve some of life's biggest problems, such as low-cost education in developing nations, cures for disease and human impairment, and aid for populations suffering from disaster and famine. A number of these 10 chosen non-profit organizations will potentially be voted in by the Vidy community over social media, over the course of a voting period post-ICO.

How it will work is simple. Vidy will apportion a piece of its payout on each hold to go to the NPP. It will be from this Vidy payout slice that the NPP will receive its own steady stream of VidyCoin each time any user on the platform watches a video. NPP VidyCoin payouts will be on some to-be-determined timeline of lock-up.

This means that every time that you hold down on an embedded vidy, not only are you earning VidyCoin for yourself, but you are earning it for some of the most noble and most just causes that exist. With each second that you hold, you are a part of the solution. You are giving back to humanity. Users who complete certain tasks and reach certain performance and activity milestones on the Vidy platform will be able to access 'boost modes' for generating VIDY that both they and the NPP earn when they hold down on embedded vidys, thereby helping them donate multiples more money for the causes they care about.

Vidy will also be initiating a Heroes Leaderboard which will be opt-in for platform users who want to turn their profiles public and participate in the contest live on the vidy.com website. The Heroes Leaderboard will reward the users who have given the most to the NPP indirectly via their aggregate hold times being the longest in the ecosystem. Top ranked users on the global charts and regional charts will earn exciting prizes including trips, meet-ups with celebrities, and access to VIP events for their part in helping NPP's rewards grow.

9.5 User Payout Via Arithmetic Progression

Users are paid based on an in-house Velocity Payout Progression algorithm (VPP). As a user holds down, the velocity of their VidyCoin earnings rate increases by each passing second. The rate that they receive VidyCoin is directly proportional to how long they hold for. Early in their



hold, users earn less VidyCoin per second than later in their hold as the rate of the earnings payout to the user increases. Vidy employs this user payout embodiment as a strategy to incentivize users to hold through full video ads, given that their compensation will increase exponentially as they do. Longer holds mean more VIDY earnings. Here are the notations for the Velocity Payout Progression (VPP) algorithm:

Notations:

a_1 : the pay rate for the first second of hold

a_n : the pay rate for the n second of hold

d : every other second is d more than the previous second,
which means $a_{n+1} - a_n = d$

For incentive reasons, we set $d \geq 0$

S_n : the total payout earned for n seconds of hold time

q : the final second of the pay rate is q fraction of the total amount of the pay rate which means $a_n = qS_n$

For economical reasons we set $q \leq 1$

Here are the compound input values used:

$$\begin{cases} S_n = na_1 + nd(n-1)/2 \\ a_n = a_1 + (n-1)d \\ a_n = qS_n \\ q \leq 1 \\ d > 0 \end{cases}$$

Here is the full equation solved:

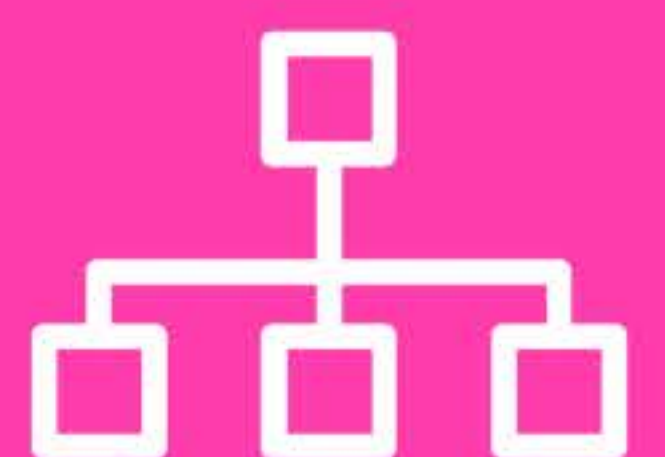
$$\frac{a_n}{S_n} = \frac{a_1 + (n-1)d}{na_1 + nd(n-1)/2} = q \leq 1 \leq \frac{a_1 + (n-1)d}{na_1 + nd(n-1)/2} \leq 1 \leq (1 - \frac{n}{2})(n-1)d \leq 0 \leq na_1 - a_1$$

Therefore with an appropriate set of initial values for q , d , a_1 , we can use arithmetic progression to model the VPP relationship between hold time on a video ad and pay rate. The iteratively increasing pay rate can incentivize the viewer to watch more ads for longer, and with a constraint of q , we can always ensure that the highest VPP pay rate is always less than the total acceptable payout amount earned.



10

Vidy's User Payout Structure Explained

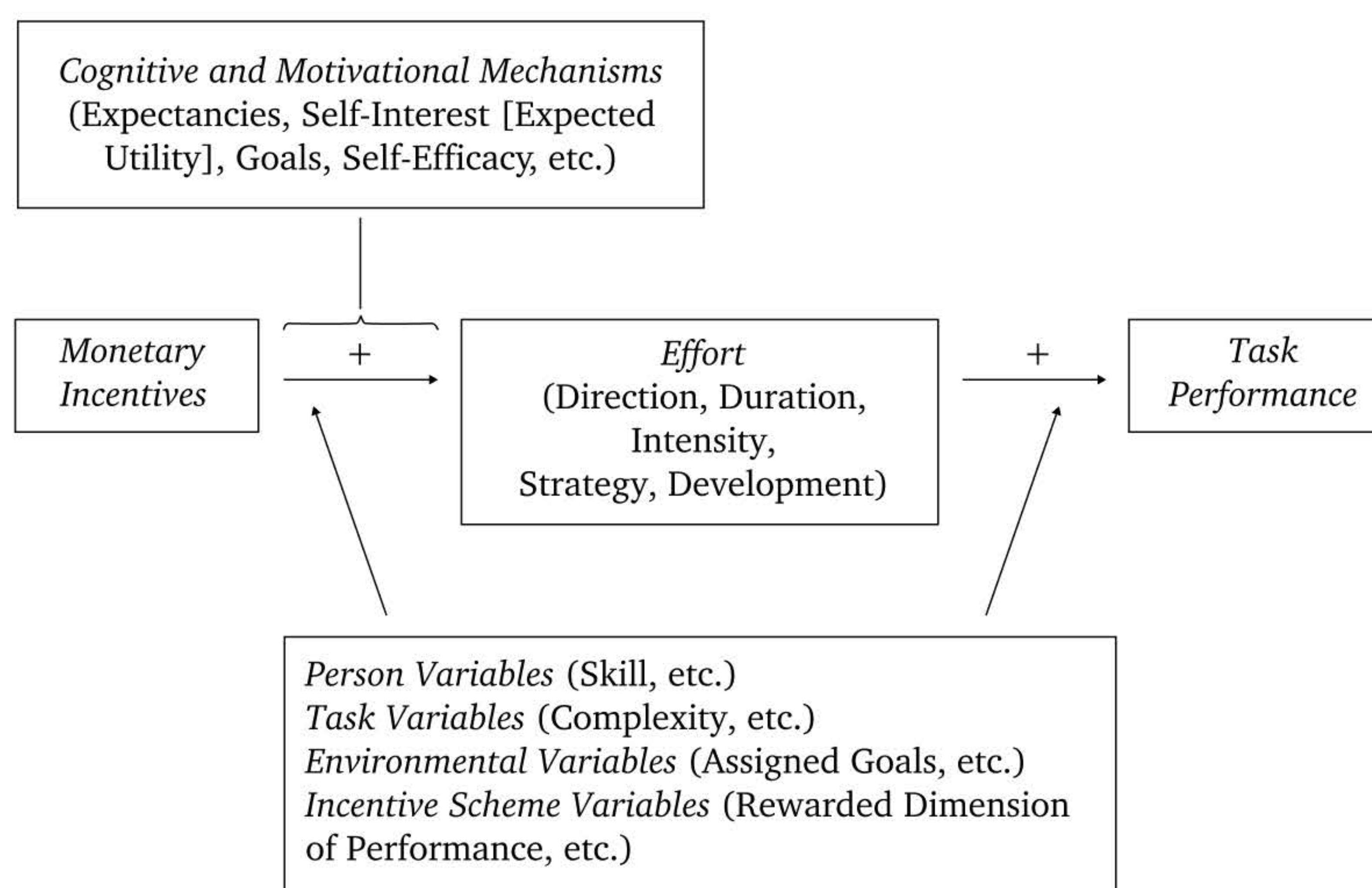


10.1 The Effects of Payout Incentives on Effort and Performance

Vidy's user payouts practice is not just wholeheartedly deserved - its backed by economic theory. Compensatory incentives exist in the market to increase the level of effort, and therefore the level of ensuing performance, from the agents receiving them. When examining the input values of this payout incentives equation, three principal elements emerge - effort, the mechanism for altering effort, and the environment within which the alteration occurs.

Effort can be quantified in a variety of manners, from duration and intensity, to direction and development. The mechanisms that facilitate payout incentives which machinate the level of effort are numerous as well, spanning expectancy and pre-conception to self-efficacy and self-interest. And an environment's variables of task nature, interpersonal impact, and incentive scheme can all shape the outcome of effort via payout incentive as well.

The following visual from Bonner and Sprinkle's 2002 literature emphasizes this conceptual framework well.



While arousal theory is one explanation for why payouts increase effort, with a vast amount of social sciences literature throughout the years speaking to its proclivity to increase motivation up to an optimal threshold (Broadbent 1971; Easterbrook 1959; Eysenck 1982; Humphreys & Revelle 1984; Yerkes & Dodson 1908), there are other reasons for the boost as well.

In fact, there are four central cognitive mechanisms that impact the duration and intensity of effort - expectancy theory, agency theory, goal-setting theory, and social-cognitive theory. Vroom in 1964 published his expectancy theory, which stipulates that an individual's motivation is a function of two variables: a) the attractiveness of the outcome, and b) the relationship between the effort and the outcome. This is the foundational premise behind



risk-reward theory which most people and firms are governed by today when making decisions on business direction. In essence, money has a clear valence not just as an instrument for value exchange, but also as a symbolic means of status conference as well.

Agency theory is constructed on the premise that individuals are fully rational utility maximizers, conforming to a set of axioms. People under this theory are presumed to be foremost motivated by self-interest, stemming from a utility function of wealth and leisure. Goal-setting theory contrasts this conjecture by stating that personal goals are actually the main engine spurring an individual's actions and efforts. And social cognitive theory claims the impetus is founded in self-efficacy, which translates into a positive emotional state via value-signaling that then leads to better effort and performance.

Regardless of which theory reigns true however, environmental variables can always contortively aggrandize or neutralize the outcomes from monetary stimulus. Notwithstanding distortions in market equilibrium such as for example a deficiency in skill (where a person does not have the skill or knowledge to perform at a higher level), monetary incentive theory can result in more optimal market symmetry.

When it comes to execution, under this theory of skill distortion, a piece rate contract that pays a user on the basis of their actions and gestures is more likely to attract individuals with higher skills for the task, unless that task is architected to be simple enough for all participants. This is the bar that Vidy has taken on in designing and building out its embed layer's UX so that the product is inclusive to all. This reduces adverse selection problems which are discussed in Section 17 of this whitepaper under the economic theory of information asymmetry.

Likewise, task variables that are debilitating or overly arduous for users can derail the potency of a monetary incentive that is shaping effort. This is why Hogarth in 1993 aptly contends, "To understand decision making, understanding the task is more important than understanding the people." If you pay a user based on an action they perform on a video ad, and that action results in deep cognitive or physical fatigue due to its complexity, sensitivity, or poor presentation and responsiveness, then you introduce distortion into the equation. A hold is so brutally easy and intuitive for mobile users to perform today that Vidy deftly evades this potential equation limitation. And by pairing it with the dynamism of an autoplaying video, Vidy combines just enough intricacy to have a direct impact on arousal via arousal theory.

There is theoretical and empirical evidence that suggests that subjects allocate more attention to a task when the monetary benefits are the highest. Focusing on attention, which is a classic resource allocation problem at the intersection of time scarcity and processing speed, Gabaix, Laibson, Moloch, and Weinberg in 2002 conducted an illuminating study.

In this lab test, the cognitive operation that subjects engaged in was unmasking boxes in a matrix where clicks into boxes rewarded users variably based on the sum of the row of boxes. The action of unmasking an additional box in the context of this time constraint was in essence the action of increasing their attention as time went on. If "a" represents the subject's expectations of the values in row A of the matrix of boxes, and "b" represents the expected values in row B, if the agent does not execute the cognitive operator than the expected payoff



is whatever he believes the higher value to be, in other words: $\max(a,b)$. If however the subject does decide to execute the cognitive operator, then the expected payoff is:

$E[\max(a',b)]$ Where a' is the updated expected payoff from row A. This allows us to state the value of increased attention, or the value of the cognitive operator, as the difference between the two: $E[\max(a',b)] - \max(a,b)$ if σ represents the standard deviation of the updated a' , then: $\sigma^2 = E(a',b)^2$. So now we can rewrite the value of increased attention as a function of two variables: the difference between the payoffs ($a - b$) and the variation, or standard deviation (σ):

$$E[\max(a',b)] - \max(a,b) = w(a - b, \sigma)$$

Finally, this equation uses the information about the distribution of the payoffs, where ϕ represents the standard normal density function and Φ represents the standard normal cumulative density function. Then rewriting $a - b$ as x , where x now represents the difference between any active row and its next best alternative, we can again reformulate the value of sustained and increased uattention (or an additional click on another box) as the identity:

$$w(x, \sigma) \equiv \sigma \phi\left(\frac{x}{\sigma}\right) - |x| \Phi\left(-\frac{|x|}{\sigma}\right)$$

It is with this formula that we can gain two critical insights, specifically by examining how the independent variables affect the value of the cognitive operator. First, the value of the cognitive operator is a decreasing function of $|x|$, meaning that subjects will continue to click on more boxes if the values between their two options are close. If the values between their two options are very different, then their optimal choice is probably not to waste any additional time or additional attention. The other variable of interest is σ , which tells us that the function increases when the variation increases. This implies that the value of an extra Vidy hold example increases with the variability of the information received.

Gabaix, Laibson, Moloch, and Weinberg found that the correlation between the number of boxes opened programmatically versus the number opened by the study's participants was quite high registering at a score of 0.66. This proved that subjects allocated their attention based on the variability of information obtained by the differences between the values of their options.

Thus, our takeaway here is if there is a lot of variability in the embedded content on a page presented to a user in the form of Vidylinks, and if it is still hidden, then the participant should continue to hold. This premise is best attributed to today's pop culture reference of FOMO, or fear of missing out, which has become a marketing and product phenomenon that is deeply rooted in human psychology.



We can use the quantitative attention allocation model of Gabaix and Laibson to craft an embed layer experience that intuitively understands and operates on the two economic principles upon which all sessions are governed by:

- a. If a choice (an opened vidy) gains a large edge over alternatives, the value of continued attention declines (since that vidy is consumed with enjoyment due to it being of a desirable topic, and moving to a different vidy will likely result in less value)
- b. If analysis yields little new information (when variability of embedded vidys dissipates meaning that the surprise of the unknown no longer exists), then the value of continued attention declines (users get bored and stop holding).

10.2 Piece Rate Payouts for VidyCoin

In moving now from theory to empirical evidence regarding piece rate payout benefits to Vidy users, we can turn to Lazear. Lazear put forward a unique dataset in 2000 for his work examining a key question in personnel economics - do monetary incentives truly boost productivity. He utilized wage data and corresponding performance statistics from a large firm called Safelite Glass Corporation to determine if average productivity in a firm changes when the hourly wages become piece rate wages.

During 1994 and 1995, Safelite changed their compensation method and tracked the results. Examining 3,000 different workers at the firm, workers were paid either \$20 per windshield under a piece rate model, or \$11 per hour under a fixed rate model, whichever was the higher amount. The units-per-worker-per-day figure was one of the primary measures used to gauge productivity. The table below displays the mean units-per-worker-per-day, and note that it increases from 2.70 to 3.24 after switching to piece rates.

Mean and Standard Deviations of Key Variables in Pay Structure

	Hourly Wages		Piece Rates	
Number of observations	13,106		15,246	
Variable	Mean	Standard Deviation	Mean	Hourly Wages
Units-per-worker-per-day	2.70	1.42	3.24	1.59
Actual pay	\$2,228	\$794	\$2,283	\$950
PPP pay	\$1,587	\$823	\$1,852	\$997
Cost-per-unit	\$44.43	\$75.55	\$35.24	\$49.00



Lazear found this evidence a compelling attestation of piece rate compensation structure being a key factor in determining productivity. But he continued further and analyzed the study from a point of reconciliation as well, seeking out other potential sources that may have influenced the dramatic increase in productivity. The considered specifications included variability in timing, variability in worker-specifics, and variability in human capital. Even under these changed circumstances, Lazear ultimately concluded that the gain in productivity was due to changing its payout structure to piece rate wages. When the firm changed over, the average output per worker increased by a whopping 44%.

Lazear's results demonstrate not only that Vidy's multi-party payout system serves as an adequate means for payout incentive to further engage with advertisers, but also that it is the most effective way possible for users to interact on the platform by virtue of its performance based reward framework.

As Lazear's data shows, by compensating Vidy users via a piece rate payout system based on per-second hold times on video ads, we could expect under similar circumstances for users to watch 40%+ more advertisements than if they were compensated under simpler terms such as a fixed measure of attention structure or a flat session-time compensation schedule.



11

The Need For VidyCoin



11. The Need For VidyCoin

The decentralized currency that will run this ecosystem will be VidyCoin (VIDY). VIDY will be used as the sole means of value exchange for the following: a) all ad placements on the platform with payouts from advertiser to publisher, b) all one-tap purchases on the platform with payouts from user to advertiser, c) all hold time earnings on the platform with payouts from advertiser to user, and d) all miner rewards on the platform with payouts from Vidy to miner.

VIDY serves three core purposes:

- a. A store of value
- b. A medium of exchange
- c. A membership key

11.1 A Store Of Value

A store of value is the function of an asset that can be saved, retrieved, and exchanged at any time in the future. VIDY embodies these properties as a utility token that possesses an unlockable and reusable value on the platform for parties who own it.

VIDY is earned for services rendered such as a publisher offering its video ad inventory to an advertiser, for actions taken such as a user holding down on an embedded vidy, and for successful operations conducted such as a miner adding a block to the ledger.

As a coin, VIDY serves as transparent tokenization for service exchange, retaining its purchase power into the future based on its respective utility value in the future. In essence, VIDY changes hands on the platform based on the underlying utility that it provides the parties transferring it. We can contrast this decentralized tokenization to that of the current centralized system. With the status quo, one intermediary entity determines payouts through internal policies and calculations, and complicated remuneration for service exchange ensues where a fragmented network of buyers and sellers suffer through no transparency for their respective bids, asks, spreads, payouts, and placements.

Therefore, the existence of VIDY, and the protocols around its transfer and underlying utility, serve foremost as an anti-fraud measure, so that complete transparency and recourse exists for all parties on the platform. All value is marked in an immutable ledger for everyone to see, to agree with, and to abide by.

11.2 A Medium Of Exchange

A medium of exchange is an intermediary instrument used to facilitate the sale, purchase, or trade of goods between parties. By design, it must represent a standard of value accepted by all parties in order to function, so fiat currency is a good example.



The ad industry desperately needs a decentralized medium of exchange to alleviate the issues that plague both sides of every placement transaction, and to render obsolete the many leeching middlemen that charge buyers and sellers to do everything from “verification of the other side”, to “transaction due diligence”, to “smart fraud offset”, to “priced inventory re-sale”. All of this is much too complicated and unnecessary, and one token maintained in an immutable ledger and accepted by all parties as the only means of exchange can solve it. The answer is VIDY. VIDY is a trustless token that no central body or owning entity controls or calculates payouts using. All distribution is effected via open source protocols for complete transparency across the full ad buying spectrum.

When publishers receive VIDY from advertisers for displaying their video ads, they can rest assured they received the full amount they were owed for the respective seconds the video ad was held down on their site for. They know the transaction, hold time, payout amount, and funds will be marked, sent, and saved for the future.

11.3 A Membership Key

The membership key system is the necessary hierarchy on the Vidy platform to ensure top advertisers with the best advertising campaigns are integrated with as many publishers as possible, so that end-users have the best shot at consistently enjoyable experiences when interacting with the Vidy embed layer. This automated quality filtration system is based around the premise of staking VIDY.

Advertisers stake VIDY for greater access to the platform’s suite of advertising controls, which are unavailable to companies operating on the free tier. The stakeholder tier structure for coinholders who want to advertise with Vidy goes from Titanium, to Gold, to Platinum. Each additional tier unlocks greater freedoms and stronger tools to execute successful video advertising campaigns on the platform. Advertising features tied to each tier are described in the next section under the stakeholder tier structures.

All of the VIDY that an advertiser stakes can be used toward their ad budget for payouts to publishers, so effectively the staking serves as a guaranteed ad spend to use the Vidy platform.

In this way, VIDY retains its value whether it is an up market or down market since its underlying utility as a staking mechanism is always relevant and necessary for platform operations. Without VIDY, advertisers cannot conduct full fledged embed layer campaigns.

11.4 Stakeholder Tiers

Access to Vidy’s advertising utility comes from possessing enough VIDY to unlock its stakeholder tiers of advertisement products. In total there are 4 tiers of membership on the Vidy platform:



- a. Free tier
- b. Titanium tier
- c. Gold tier
- d. Platinum tier

11.4.1 Free Tier

Cost: No VIDY staking required

- Ability to upload one video ad at a time to queue for distribution on the embed layer
- Access to the Vidy control dashboard with basic features and reporting
- Caps on campaign size, spend, duration
- No guaranteed demographic targeting, only NLP matching
- No guaranteed campaign placement timeline
- Concurrent ads in live campaigns capped at one video

Anyone can advertise with Vidy's embed layer platform with no VIDY staked. When they go to **vidy.com/advertise** they just sign-up for a free account, fill in the necessary company details, and can start creating their campaign with videos. In order to start a campaign, they will need to purchase VIDY either through the control dashboard or through an exchange, and they will need to stake that VIDY against the ad spend they designate for the campaign. One of the main limitations of the free tier is that advertisers will not be able to guarantee that their campaign will be filled immediately or on the schedule they request since preference in video ad placement will go to advertisers at tier Titanium and above. By offering a free tier to companies, Vidy ensures that its platform is open, accessible and beneficial to anyone who wants to use it to grow their business.

11.4.2 Titanium Tier

Cost: Stake 300k VIDY

- Ability to upload unlimited video ads to queue for distribution on the embed layer
- Access to the Vidy control dashboard with mid-tier features
- Unlimited campaign size, spend, duration
- Guaranteed demographic targeting
- Guaranteed campaign placement timeline
- Concurrent ads in live campaigns capped at two videos

Advertisers who stake at least 300k VIDY will unlock guaranteed demographic targeting in their video ad campaigns, which will give them the power of both consensus driven NLP matching along with demographic filtering from smart contracts. They also unlock guaranteed campaign placement timelines so that their video ads aren't waiting in the queue for placement. A Titanium tier advertiser's main limitation is in how many concurrent video ads that they can go live with at the same time.



11.4.3 Gold Tier

Cost: Stake 700k VIDY

- Access to all the features from Titanium tier
- Access to the Vidy control dashboard with full features
- Unlimited concurrent ads in live campaigns
- Ability to designate preferred publishers to embed with, and publishers to avoid

Advertisers who stake at least 700k VidyCoins will unlock the full feature suite in the control dashboard, including full analytics, reporting, creatives resources, vidy masks and effects, vidlylink customizations, and ab testing modules. Gold tier advertisers will also be able to run as many video ads concurrently as they want, giving them the power to glean insights into on-the-fly ab tests to get to the highest converting video ad campaigns faster than lower tier advertisers with caps. They also unlock preference designations for publishers they want to be embedded with and publishers they want to avoid, which is property placement information that the consensus layer receives when determining distribution of video ads to specific publishers. All preference designations are not guaranteed, but give the advertiser priority over other advertising companies.

11.4.4 Platinum Tier

Cost: Stake 1 Million VIDY

- Access to all the features from Gold and Titanium tiers
- Unlock the one tap purchase modal

Advertisers who possess at least 1 million VidyCoins will get access to everything available in the Vidy advertising ecosystem. In addition to receiving all tools that lower tier advertisers have, they will unlock the one-tap purchase modal along with all of its linked features that come with customizing OTP for the best conversions.

There are 115 million companies worldwide that need to advertise to grow their businesses. Vidy is allowing only a max of 10,000 companies worldwide at any one time to have access to its Platinum tier, a ceiling that exists from the basis of its total available pool of VidyCoin. As such, Vidy's one-tap purchase modal is a valuable commodity for early adopting advertisers looking for a conversion edge, and with a growing scarcity in the supply of VIDY via this staking system, will become a feature that appreciates in value for its advertising holders.



Stakeholder Tiers

FREE

- Upload one video ad at a time
- Basic Vidy control dashboard
- Caps on campaign size, spend, duration
- No guaranteed demographic targeting, only NLP matching
- No guaranteed campaign placement timeline
- Concurrent ads in live campaigns capped at one video

0

VIDY

TITANIUM

- Ability to upload unlimited video ads
- Access to the Vidy control dashboard with mid-tier features
- Unlimited campaign size, spend, duration
- Choice of publishers to embed and avoid

300K

VIDY

GOLD

- Access to ALL FEATURES from Titanium tier
- Access to the Vidy control dashboard with full features
- Unlimited concurrent ads in live campaigns

700K

VIDY

PLATINUM

- Access to ALL FEATURES from Titanium to Gold tiers
- Access to the One-Tap Purchase Modal
- Only 10, 000 spots available at any time

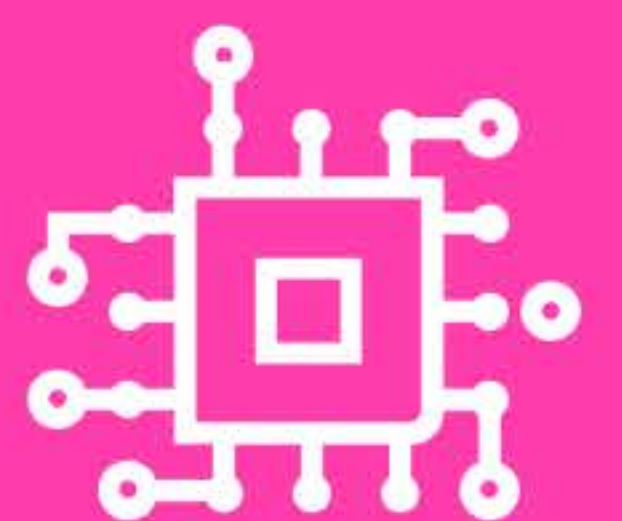
1M

VIDY



12

Vidy's Technology



12.1 The Vidy Technology

Backed by its AI-engine and crowdsourced curation pipeline working in conjunction with one another, Vidy aggregates and amalgamates the best video content across the web, and serves its highlights in bite-sized form called vidys, all in a matter of seconds. The result of this system has been that Vidy has grown a database of video content that spans tens of millions of clips, now all accessible for free to publishers during their page creation process.

Dozens of micro-services and 100s of thousands of servers in the Vidy stack come together in symbiosis to facilitate a flow of speedy content retrieval right through to thoughtful content consumption. Vidy sources, ingests, transcribes, timestamps, analyzes, labels, converts, crops, indexes, orders, curates and serves up video highlights across any topical domain and language.

Vidy delivers its content with a patented natural-language powered search that displays video content based on the words that are uttered in them. While former search engines have allowed users to search for videos by keyword, topic, or hashtag, with Vidy you can search inside videos by querying the actual words that are spoken in them. This offers an element of contextual relevance and granular discoverability that is remiss in the greater search engine industry.

Now we are taking the most important component of our technology, our NLP-search and assignment algorithm, and making it open-source so that it can become the crux of a decentralized distribution platform that puts users first.

Vidy's single-page embed layer is applicable to anything that has text online, including articles, web pages, listicles, social posts, comment sections, digital books, pdfs, and even images and video via OCR.

12.2 Vidy's Segmentation Neural Network

Vidy obsesses over the appearance and user interface of its embedded vidys on a daily basis, since the interaction of holding down and seeing a video emerge on an existing page has to be seamless in all contexts. With the mission to make this a weightless experience, Vidy has embarked on a project to process its video database with unique transformations so that a video's speakers can jump out of the page when they emerge on hold. To this effect, Vidy has trained a convolutional neural network that segments out the main speaker's face and body in any video frame. Using deep learning on the images in the video, Vidy pushes the consumption of its clips to their bleeding edge through the augmentation of their digital appearance, so that when someone shares a vidy with you or you come across a vidy online, **you know it's a vidy** from its identifying visual characteristics.

Vidy's convolutional neural network segmentation API that was modeled and trained in-house is run on all videos in the database, along with all newly uploaded videos that an advertiser adds to their campaign dashboard. After segmentation, Vidy then applies a 2-D holo mask to the video. This video output version is available to all advertisers for free, along with the standard version embed which keeps the uploaded video in its existing aspect ratio. Advertisers



can customize their embedded videos across different aspect ratios, segmentation types, and mask effects before going live with them.

Vidy's image segmentation harnesses recent deep learning techniques, and relies on a large amount of labeled data to train a deep neural network that achieves high accuracy for segmenting the person in the video from the background. The network is based on the recent MASK R-CNN, which is the state-of-art network for instance segmentation. The original network consists of several residual blocks and has two branches, one for the segmentation mask and the other for the category label. The segmentation branch uses de-convolution layers to concatenate with the residual blocks and output a segmentation mask, while the label branch uses a fully connected layer to output a category of the object. Since the central use case on the Vidy platform only requires segmenting out the person as the foreground and does not require the classification or categorization of the object, Vidy only keeps the segmentation branch of the network. During training, the input is an image containing a person, and the ground truth is the segmentation mask of that person. Each time, the weight of the network is updated using the following cross entropy loss:

$$loss(x, y) = \sum_p y_p \log x_p + (1 - y_p) \log(1 - x_p).$$

Here x is the predicted segmentation mask, and y is the ground truth mask. The loss is summed across the entire image over all pixels, where for y each pixel p is either foreground (1) or background (0). The prediction x is a number between 0 and 1 and indicates the probability that it is foreground. At Vidy we train the network such that the output mask x is consistent with the ground truth y , while minimizing the loss. After training is finished, we use the trained network to segment every frame of the video to segment the person from the background. The network achieves both high-accuracy results and real-time processing capabilities.⁵⁰

12.3 Prevention Of Inappropriate Content

In addition to weighing the transcription data and advertiser-designated keywords of submitted video ads, Vidy also runs image recognition on all uploads to determine their rating and appropriateness score. Vidy's in-house image recognition algorithms, built on top of SIFT, recognize familiar characters, scenes, and faces in videos to make determinations on what creatives can be placed and what creatives cannot.

Vidy has also trained image recognition models specifically around nudity and extreme violence, built on top of Facebook's great open source projects like DeepMask, SharpMask, and MultiPathNet. Vidy runs facial recognition and its own in-house face detection scripts on all videos in its database to track the primary face for its input coordinates when adjusting clip

⁵⁰ K. He, G. Gkioxari, P. Dollar, and R. Girshick. Mask r-cnn. In Computer Vision (ICCV), 2017 IEEE International Conference on, pages 2980-2988. IEEE, 2017



aspect ratios. Advertisers consequently have a host of custom controls for video ad display from their control dashboard, from zooming in on the video speaker, to changing border ratios.

When Vidy pinpoints nudity or illicit images, it flags and locks that video upload and notifies the uploading advertiser through the control dashboard. In this way, Vidy can proactively spare publishers from dealing with inappropriate content on their sites and can safeguard users from unwanted exposure.

12.4 Disrupting The Search Status Quo

The current search climate is one that has remained stagnant for almost two decades. It was erected on the framework whereby a single centralized player, such as a Google in the US or a Baidu in China, largely monopolizes the digital gateway to all information for all people of that region.

This type of central power threatens the freedom, safety, and progress of the people it serves, since all decisions as to what information is served, including when, where, and how are left to the sole discretion of the actors who control it.

It also undermines the utility of the engine itself over time since the probability of adverse change grows the more market externalities transpire that an internal team must react to and adapt to. Privatized search is not after all a public utility whereby regulations are eschewed on it from a governing body claiming to hold the public's best interests at heart. Capitalists would argue that the pressures of profit keep private companies honest in a capitalist society when there is competition, but when you look at the search industry, there is no competition.

All centralized search engines have the same characteristics - they possess one core property accessible via various wholly-owned applications, they have little to no competition, and they are propped up by the inbound traffic that they pay for. This establishes a profit-driven model where the flow of information to their users is always locked to the value that the search engine reaps in its profits. That of course is the antithesis of free knowledge and information distribution.

Enter Vidy. Vidy is different because it is flipping the search model on its head, thanks to blockchain. By decentralizing its video search services through a consensus layer where many miners make the placement decisions in realtime, Vidy is able to achieve production-level utility paired with a necessary scalable precision driven by open-source NLP models.

Vidy's embed layer SDK is run on a plethora of different platforms, and empowers the many, not the few, to control the destiny and the output for all video embeds. Vidy safeguards the veracity, identity, and security of its users by containerizing their info with smart contracts. Unlike Google and Baidu who associate real identities with data collection and expose them across a myriad of their services, and who benefit greatly from an exclusive and hidden nebulous of selling this data, Vidy provides advertisers, publishers, and users with full fledged transparency.



13

Terms Of Issue For VidyCoin



13. Terms Of Issue For VidyCoin

Vidy is directly taking on the \$300 billion dollar a year digital ad industry. Our technology promises to shake up the industry's entire intermediary market of exchanges, networks, and middlemen that control hundreds of billions of dollars in ad placement revenue, and we need the right amount of capital resources to ramp up our decentralized technology to scale, to build out a global partnerships team for acquiring a roster of thousands of advertisers, and to index 10s of millions of pages of publisher content for vidy embeds.

Our ultimate goal is to introduce the world to crypto through the bridge of embedded entertainment and ecommerce. Blockchain can be a challenging concept to first digest for many, but manifestable value that you can interact with through a touch and a hold is instantly clear. This is why we are confident we can convert millions of normal consumers to become token holders of VidyCoin through the natural gateway of Vidy's free embed layer as people organically discover and interact with vidys on millions of publisher pages.

The industry needs product bridges like the Vidy platform if it wants the utility of cryptocurrencies to be accepted by the mainstream. We are also building our own unique platform atop of the Ethereum blockchain, with infrastructure that will be tailored specifically to the high throughput, demanding scalability, and consensus service nuances that a realtime decentralized ad distribution platform like Vidy requires. We need to employ a number of ecosystem-specific strategies to our stack, from delayed reconciliation to realtime placement protocols, and as a result we need capital to build a strong, self sustaining, high performant blockchain solution for advertisers and publishers looking to handle billions of transactions.

13.1 Issuance & How to Purchase

VidyCoin will be issued on the Ethereum blockchain using the ERC20 token standard for Vidy's ICO. The ICO crowdsale period will be August 31 - December 31, and will follow the pre-ICO round and private sale round for whitelisted investors. There is no guarantee that all VidyCoin will not be sold by the start date of its ICO crowdsale. To be whitelisted, go to vidy.com/whitelist to sign-up.

Purchase method accepted: ETH

The token sale's starting ETH price equivalent of 1 VIDY will be set at 0.00001782 ETH. This figure represents the ICO price, and the token sale's Pre-ICO price and private sale price will differ. No fiat currency will be accepted in the crowdsale.

In order to have the best shot at participating in the crowd sale, be sure to sign-up so that you can be added to the official whitelist. This will give you access to all Vidy notifications via email and will put you on the fastest track for contributing.



13.2 Fundraising Caps

The soft cap will be set at 15,000 ETH (roughly \$6m as of the contributions start period)

The hard cap will be set at 60,000 ETH (roughly \$24m as of the contributions start period). Fiat numbers here are for illustrative purposes, caps will be governed by these two ETH amounts.

If Vidy does not reach its 15,000 ETH soft cap in total proceeds raised through ICO and private sale by the end of the fundraising period, it will hand back all ICO funds to all contributors. This is Vidy's pledge to its early ICO backers that it is on a war path toward building a large self-sustaining platform, and is committed to a full raise. Until the public ICO begins, the team reserves the right to adjust issuance splits between private sale and public sale allocation totals.

13.3 Issuance Provisions

The VidyCoin pool will be capped at 10 billion coins to be issued. Vidy will never issue more than 10 billion coins, which will remain the full pool of available VIDY. This perpetual cap is Vidy's baseline value-oriented pledge to its long-term coin holders. It will be allocated as follows:

52% Token Sale (crowdsale and private placement)

- 26.4% Public

- 25.6% Private (public-private split subject to change slightly)

25% ad pilots, partners, marketing, & advisors (distributed to the team if any left unallocated)

0.5% bounty program

0.5% airdrop

22% team

Lock-ups:

Team: 12 months (vests monthly after 6mos)

Advisors: 6 months (released after 6mos)

Public Sale ICO: no lockup

Pre-ICO: 3 months (released after 3mos)

Private Sale all tiers: 6 months (released after 6mos)

a. Public ICO

No bonus

Expected amount of allocation is roughly 7,090 ETH

First come first served, starting October 1 2018.

b. Pre-ICO round

7.5% - 33% bonus

Capped tentatively at 10,000 whitelisted contributors (final cap TBD closer to the date)

Expected amount of allocation is roughly 32,410 ETH (any left unallocated is rolled into Public ICO)

First come first served for whitelisted contributors, starting September 1 2018



c. Private Sale round

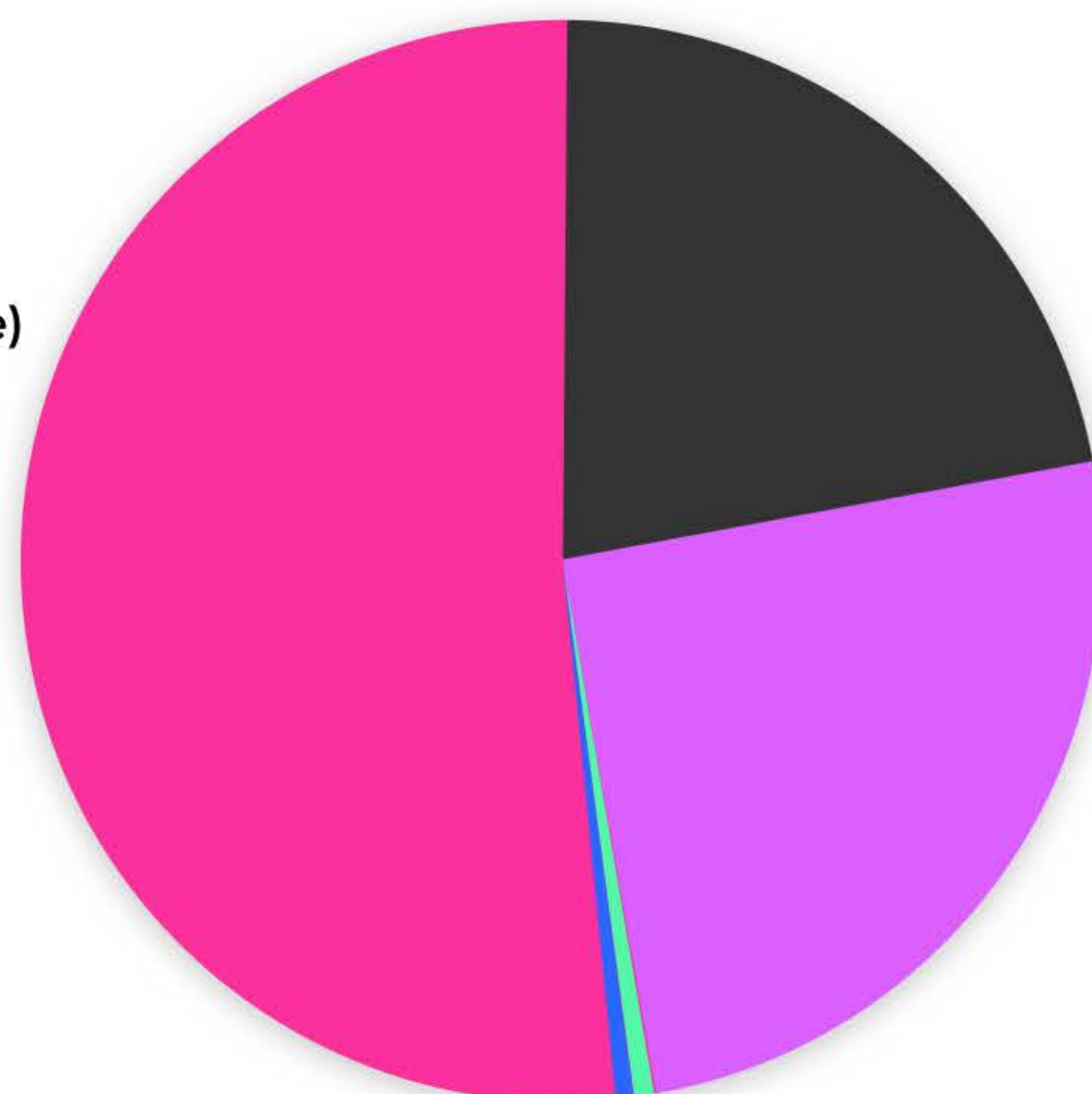
Structured in a bonus tier

Expected amount of allocation is roughly 20,500 ETH

First come first served for contributions

Private Sale begins on May 15

TOKEN ALLOCATION



13.5 Airdrop

Vidy plans to airdrop 0.5% of its total accessible pool of VIDY via a partner exchange and/or direct to a random selection of ETH addresses that have at least 1 ethereum in their wallet and are active addresses having conducted a recent transaction, with a hopeful target of about 50 million users. It roughly anticipates about 5-10% of airdrop receivers will become claimants.

13.6 Bounty Program

Vidy is allocating a further 0.5% of its total available pool of coin for the bounty program leading up to the public crowd sale. Please see Vidy's separate bounty document online for details on the program and how to earn as much VidyCoin as you can within this allocation amount. Go to vidy.com/bounty to access the document, and start bringing friends into the Vidy ecosystem.

13.7 Crowdsale Contract

The crowdsale contract uses the TBD's in-house Crowdsale Library. This library provides functions for a standard crowdsale in which users send ETH to the crowdsale contract and then withdraw the tokens purchased. This requires a two-step process for participants, which is

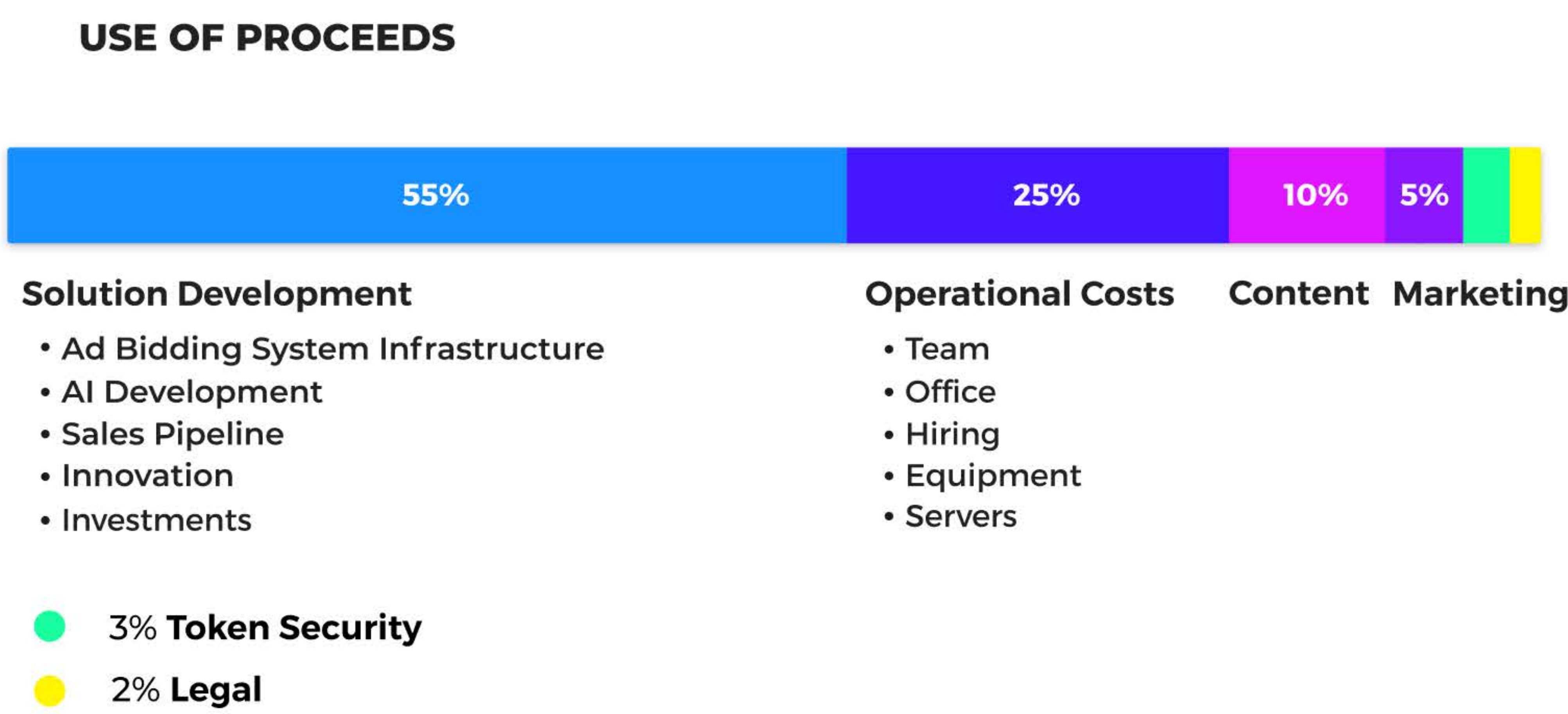


designed as a security precaution. Participants send ETH and the contract allocates their portion of tokens into a bucket. Participants then request a withdraw from the contract and it sends tokens out of their allocation. This provides a layer of security between all tokens in the contract and those allocated to each participant, and follows the security recommendations found here <http://solidity.readthedocs.io/en/develop/security-considerations.html>. The crowdsale contract uses timestamps and not block numbers. This does not present any significant vulnerability, however, it should be noted that block miners have some control over the timestamp recorded in the block they mine. This may result in the crowdsale ending a few seconds later than advertised. The minimum raise limit for the Vidy crowdsale is as stipulated in Section 13.2. All funds sent to the crowdsale will be made available to Vidy upon completion of the sale. Participants should note there is a risk of loss if they send Ether from an exchange account. Exchanges do not offer the ability to interact with crowdsales in general. A wallet should be established outside of any exchange and Ether should be sent from that wallet to the crowdsale contract.

13.8 Use Of Proceeds

The anticipated Vidy team’s use of proceeds is broken down below. This breakdown is likely to change as the business and its strategy evolves, and is meant only as a rough indicator and in no way is a set plan. It is at the sole discretion of Vidy’s board of directors to change these allocations however it sees fit:

- 55% ad bidding system infrastructure, sales pipeline, innovation, AI development, investments
- 25% team, office, hiring, equipment, servers
- 10% content
- 5% marketing
- 3% token security and operations
- 2% legal



Vidy plans to aggressively expand throughout North America and Asia after its ICO, currently preparing to onboard most multi-national brands that have major online ad-spend and introduce them to the product.

With the proceeds raised, Vidy will invest heavily into the artificial intelligence field to bring on board a team of deep learning specialists. Vidy believes that every technical challenge that it faces today can be solved over time with a properly focused AI thanks to the massive dataset that Vidy has already cultivated for which its NN's can train on. This data edge that Vidy possesses will bring an ever-growing competitive advantage to its AI program in the coming years.

In North America, Vidy has strong ties to most of the big advertising brands throughout the US and Canada. Vidy will continue to build in-roads with advertisers from all product and service verticals, and will begin to move into more non-traditional publisher platforms with massive user-bases. In Asia, Vidy is even stronger on the business development side, with contacts spanning the top social, digital, news, and commerce companies in China, Indonesia, Japan, Korea, and Singapore. It will continue to grow its reach throughout Asia and refine its localizations. These two dominant regions will be where Vidy spreads across millions of publisher pages, with the ultimate goal of becoming naturally ingrained in American and Asian internet culture.

The Middle East, South America and Europe will follow as regions that Vidy will launch in, with a target of late 2019. All of Vidy's core offerings will be translated for these regions, and the Vidy protocol's NLP script will be tweaked where needed for the local nuances of each geography. Beyond the details however, the Vidy product is largely language agnostic, and therefore able to expand quickly worldwide as it looks to grow its publisher roster and greater userbase.

13.9 Buying VIDY On Exchanges Post ICO

Vidy is committed to ensuring that VIDY can be purchased on exchanges shortly after its ICO. While we are not able to announce which exchanges will be issuing VIDY, we can say that we are already in talks with a number of exchanges and are making the accessibility and ease of transfer for VIDY coin a top priority at the company. Join our Telegram group and our bitcointalk.com thread to learn more about our plans, and to be close to the action when we announce where we are listed. You can go to the home page of our website at **vidy.com** to find links to these groups.



13.10 Vidy's own Blockchain

Vidy is strongly considering building out its own Blockchain in the future based on the scalability, performance, and high-throuput demands that a global, decentralized ad platform uniquely requires. The existing blockchain options on the market today are too nascent and architecturally vanilla to inextricably commit to for the full growth plans of the Vidy platform. The Vidy team has unique insights into the technical, consensus-based, and data needs of its network that clearly stand apart from the development priorities and feature-release cycles of the other major blockchains.

Most importantly, the Vidy team recognizes that the world's first invisible layer on the internet could be greatly benefitted from apps of its own built on top of the Vidy blockchain to augment Vidy user experiences. Vidy can imagine a day when ICOs are launched on the Vidy blockchain to offer services from payment and ecommerce, to video and social. Vidy is not 100% committed to this future just yet, but we will announce any developments regarding our own blockchain. Should we decide to ultimately make this move, the Vidy token will be converted in a 1:1 generation event to the new Vidy Blockchain owned token.

13.11 Token Specifications

Token Name	VidyCoin
Ticker Symbol	VIDY
Issuance Amount	10,000,000,000 VIDY
Token Sale Price	Token Sale: 0.00002229 ETH per 1 VIDY
Particulars	ERC-20 Ethereum-Based Token
Maximum Token Offered	5,200,000,000 VIDY
Minumum Token Required	1,000,000,000 VIDY
Use of Proceeds	Section 12.10

14

Vidy's NLP Protocol



14. Vidy's NLP Protocol

The Vidy ecosystem is run on NLP, short for natural language processing, which serves as the fuel that drives all realtime video placement decisions. The Vidy team has developed a specialized expertise in the field of natural language over the years, and this is what makes our vision for the first decentralized NLP placement protocol possible. This section will cover the foundational premises behind NLP, the historical progress in the field, and the current embodiment employed by Vidy for its distribution platform juxtaposed to what has been enacted in the past.

14.1 What is NLP

NLP is the application of computational techniques for the analysis and synthesis of natural language and speech. NLP covers a wide spectrum of fields from speech recognition and language generation to natural language understanding.

Since the statistical revolution of the 1990s, most NLP has been built on machine learning, given that supervised engineering and manual rules-based approaches have proven to be largely too time consuming, unscalable, and overall unfruitful in the field for research and production-level products alike. As a result, statistical inference has emerged as a popular method applied to learn a broad series of rules from the generalized analysis of a large corpora of both correct and incorrect examples.

The field of machine learning-powered NLP has come a long way from the early days of decision trees where systems were governed on hard if-then rules. Today, statistical model approaches are widely used, where soft probabilistic decisions are applied based on real-value weights or vectors of input features.

The key to a successful NLP strategy lies in the nuances rooted in the connections made, and specifically in the ability to express relative certainty and uncertainty across many different possible answers through vector assignment. The following section will provide an in-depth breakdown of the list of inputs that comprise Vidy's NLP algorithms, and the granular approaches that bear them for all video ad distribution.

14.2 Vidy's Algorithm Broken Down

Vidy has architected an advanced multi-faceted approach to determining natural language placements, executed through deep learning and fundamental parts-of-speech targeting. Language analysis is a complex task given the plethora of manners and styles that a thought can be conveyed in written text. As such, knowing the context of both the entire document and each line becomes of paramount importance when endeavoring to understand the overall meaning of the words and phrases themselves.



Just as Vidy uses a layered approach for the architecture of its decentralized platform built on the blockchain, it also uses layers for its NLP strategy in order to achieve systematic filtration, multidimensional analysis, and better mitigation of derailing edge cases. Each descending layer in Vidy's NLP funnel gets more and more granular as it focuses on a different defined area of the sentence. All of these layers working in symbiosis with one another come back with a decision on placement relevance in a split-second, making this strategy both deeply thorough and highly efficient for massive scalability.

On the most basic of levels, Vidy's natural language processing converts a character stream into a sequence of lexical items (keywords, keyphrases, and syntactic markers) through structure extractions and tokenizations which divide streams up into tokens which are identities that can be further processed against other tokens.

Vidy begins by looking at the broad strokes of a publisher page that has been indexed by the ingestion system. Vidy first conducts an automatic summarization of the publisher page, amalgamating all sentences and outputting keywords and keyphrases (a fragment of multiple keywords/phrases) that describe the page. This includes an extractive summarization technique via maximal marginal relevance and graph-based textrank to try to highlight the most informative subset of sentences from the publisher page. Vidy counterbalances its own automated summarization with an evaluation of the keywords manually provided by the publisher of both that specific page, and the publisher's overall website and brand (umbrella keywords). These analyses are conducted in conjunction with one other so that realtime comparisons can be made, and a more robust understanding of the greater text can be achieved via both automation and manual input.

Vidy then takes this generalized overview and analyzes a publisher page on a series of more microscopic levels to determine the meanings of sentences themselves, the commonality of their keywords, the greater sentiment of their topics discussed, and the list of discernible parameters from which to compile an understanding of each line's context.

A core component of Vidy's NLP protocol includes sentiment analysis, which entails the extraction of subjective information from a corpus of text and the emphasis of its polarity in meaning, emotion, and opinion. By identifying these polarities in thought, Vidy can cleanly filter most video ads into more targeted, albeit generalized, sentiment buckets. Sentiment analysis is a higher level approach that is conducted near the top of the funnel of Vidy's placement protocol, since it offers only a macro filtration of relevant content with matching inventory. But when an opposing sentiment is discerned, it trumps any placement decision on a page, no matter how high the matching vector may be, so that a video ad that is a polar opposite to the greater sentiment of a web page is never placed with that publisher's content.

This helps ensure that advertisers do not have their video ads placed in inappropriate or irrelevant advertising inventory locations, and that publishers are not confronted with complaints and takedown requests. The biggest offender for ad misplacement today comes from matches made with language-relevant, but contextually inappropriate, publisher pages. This is a potent problem that many companies are struggling to grapple with, as alluded to earlier with Google and Facebook's significant annual investments in the attempted manual alleviation of this challenge. Vidy tackles this issue in a scalable way through its natural



language approach and through steady performance calibration, while also giving publishers a final say to designate which advertisers they don't want on their platform, and likewise advertisers to designate which publishers they want to avoid being placed with.

One of Vidy's main information collection layers in its protocol hones in on parameters present in each line of text. Parameters can include everything from enumeration, which is a series of predefined named things, to details such as location, date, time, number, contact, distance, and duration. Parameters are helpful not just because they simplify downstream processing, but because they usually serve as anchor points in a sentence. Function, intent, and purpose for example are often gleaned by the relationships that exist between a sentence's entities and the parameters that affect them.

A top-level parameter of the Vidy algorithm considers named entity recognition as a means to denote proper nouns and company names of participating advertisers and their products, services, partners, and competitors in order to better assign videos to keywords. A blanket approach is taken here, where a company's namesake, alternate names, and other high profile nouns are identified and considered either 'relevant' or 'irrelevant' to a queued video ad placement. Splinter features to named entity recognition include acronym normalization, which Vidy concurrently runs to ensure all acronyms related to a named entity are accounted for, and regex extraction, which lets Vidy pull hashtags, emails, URLs, and other similar entities from the text.

Vidy then takes named entity recognition a step further by conducting relationship extraction after nouns are parsed out, looking specifically at relationships that it can identify among the named entities on the page. For example an article talking about Coca Cola could mention Pepsi's new flavored soft drink on a brief tangent, and Vidy would make the connection that both of these named entities are competitors and acknowledge Pepsi's product name. It would then use this information to eliminate this sentence from a possible video ad match due to irrelevance and conflict of topic to Coca Cola's video ad campaign, despite the fact that "soft drink" is a relevant keyword for Coke video ads.

As a final step, Vidy employs anaphora resolution by matching up all discerned nouns with all of their respective pronouns in the greater body of text, thereby being able to distinguish allusions across sentences to the parent noun for better contextual comprehension of the discussed named entities. This technique serves as an additional layer of support to relationship extraction since follow up statements in a paragraph are often described with pronouns rather than repeating the nouns themselves when talking about the same entity.

As Vidy moves away from the top layer of its NLP protocol deeper into granularity, it looks at lemmatization, stochastic grammar parsing, compound term processing, word sense disambiguation, and coreference resolution in order to better distill the meanings of phrases that it is scanning. These employed techniques represent the mid-section of the Vidy's NLP multi-layer protocol, and the following paragraphs cover brief descriptions of each.



Lemmatization uses a language dictionary to perform an accurate reduction of word variations to simpler root words. This is a more complete reduction and simplification of words than that of stemming which is a rules-based pattern matching technique to strip token suffixes. Decompounding is also a smaller piece of lemmatization, which is sometimes necessary to use for specific words in other languages.

Stochastic grammar parsing is the process of determining the parse tree of a given sentence. The two types of parsing in stochastic grammar parsing include dependency parsing, which focuses on the relationships between words such as a sentence's predicates and primary objects, and constituency parsing, which builds out parse trees through probabilistic context-free grammar.

Compound term processing is a statistical information retrieval technique that is comprised of matching compound terms together. Query expansion is a well known similar practice to this, but specifically built around information retrieval in a consumer-facing search engine. One example of compound term processing is the compound term "triple base hit." It is evidently a useful method for more technical passages where a priori knowledge is not available, and where combining two or more free morphemes to create compound terms with unique meanings is more common.

Word sense disambiguation is the selection of proper meaning attributed to a word or series of words that have many meanings, performed through a list of associated word senses that are generated offline for each publisher based on the nature of their website's content. While the human mind is especially proficient when it comes to this, achieving high-performant word sense results with machine learning has long been a challenge in the NLP field. Vidy's procedure here is using supervised machine learning methods where a word sense disambiguation classifier is trained for each unique word in a corpus of manually annotated example senses.

And finally, coreference resolution is the procedure of identifying which words refer to the same objects in a line of text. This means bridging relationships through referred expressions such as "He walked through Mary's house toward the living room window" with "living room window" serving as a referred expression that bridges the relationship between "Mary's house" and the "window". Vidy uses this method to better understand references within the boundaries of descriptive compound sentences.

On the lower levels of its layered protocol, Vidy conducts discourse analysis, which looks at elaboration, explanation, and contrast between sentences to identify the discourse structure of connected text. Discourse analysis also recognizes and classifies various acts of speech in a sentence such as assertions, yes-no questions, and exclamation remarks. This technique ranges from basic parts-of-speech tagging to more advanced clustering of content via phrase detection and lexical semantics to identify central topics of discourse to compare against uploaded videos. Lexical semantics, specifically, is the determination of computational meaning for individual words in the context of a phrase or greater paragraph.

These methods ultimately lead to an overall natural language understanding of indexed publisher content, which is one of the main goals of all of this systematic language analysis.

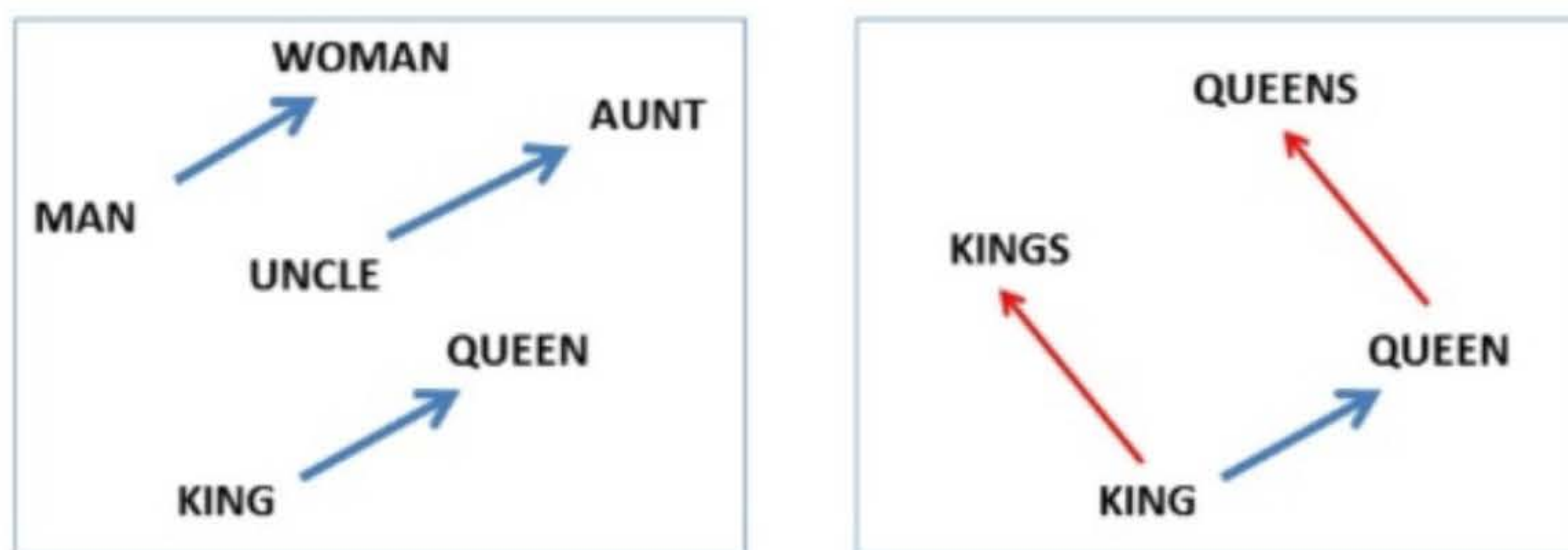


Natural language understanding is the conversion of text into formalized first-order-logic representations that are easier to manipulate, handle, and calculate. This involves understanding the intended semantics from the natural language expression of the sentence.

14.3 The Protocol's Lowest Level - Word Embedding

On the lowest level of Vidy's NLP protocol is word embedding. Word embedding is a powerful technique employed last in the execution funnel since it allows Vidy to simplify its plan of attack into one focused and final neural network on top of all previously analyzed layers. Word embedding is a mathematically embedded space of one-dimension per word mapped to a continuous vector space with lower dimensionality. Basically Vidy produces a vector space of a few hundred different dimensions and assigns a vector to each unique word in the training corpora. When words in the corpora share similar meanings or contexts, Vidy positions them close together in the vector space, as a means of mapping out contextual relevance across a bevy of words. While there are numerous generation methods for word embedding, spanning probabilistic models, explicit representation, and matrix dimensionality reduction, the Vidy protocol focuses on a deep learning approach.

$$\text{vec}(\text{"man"}) - \text{vec}(\text{"king"}) + \text{vec}(\text{"woman"}) = \text{vec}(\text{"queen"})$$



Vidy takes some of the best aspects of Word2vec and others such as FastText and GloVe, and builds upon them with its own proprietary in-house deep learning models on Tensorflow. Vidy's neural network is trained on a database of billions of data points that Vidy has amassed and regularly adds to. This data includes keywords, phrases, paragraphs and documents that have been both automatically and manually labeled by Vidy's team of dozens of data curators (as the figure below showing typical training samples gives a glimpse of). Vidy's competitive advantage against any other player in the NLP space today is the sheer amount of clean data it has to train on for which it has devoted significant capital and human resources to in the past years to cultivate. Data is the engine of AI.



Source Text	Training Samples
The quick brown fox jumps over the lazy dog. →	(the, quick) (the, brown)
The quick brown fox jumps over the lazy dog. →	(quick, the) (quick, brown) (quick, fox)
The quick brown fox jumps over the lazy dog. →	(brown, the) (brown, quick) (brown, fox) (brown, jumps)
The quick brown fox jumps over the lazy dog. →	(fox, quick) (fox, brown) (fox, jumps) (fox, over)

Before going into Vidy's neural network component, here is a brief overview of these three baseline methods:

- a. Word2vec is a group of shallow duo-layer neural network models that produce word embeddings by reconstructing the linguistic contexts of words. Word2vec is trained on a database of words. This means that when it comes across a word that was not present in the corpus that it was trained on, it has trouble matching or identifying it. Sen2vec, which is a version of the project that is used to identify matching sentences, and Doc2vec which is a version of the greater project that is trained to identify matching full documents, are two other embodiments of Word2vec that are also useful in different circumstances. Vidy does not tap them in production however.

(WATER - WET) + FIRE = FLAMES
 (PARIS - FRANCE) + ITALY = ROME
 (WINTER - COLD) + SUMMER = WARM
 (MINOTAUR - MAZE) + DRAGON = SIMCITY

- b. FastText is Facebook's answer to Word2vec. It is an unsupervised learning algorithm for determining the vector representations of words. It is identical to Word2vec, but instead of focusing on words, it trains on characters. This allows it to recognize and understand words that it never worked with or trained on, whereas Word2vec fails on any words that were not in its training set.



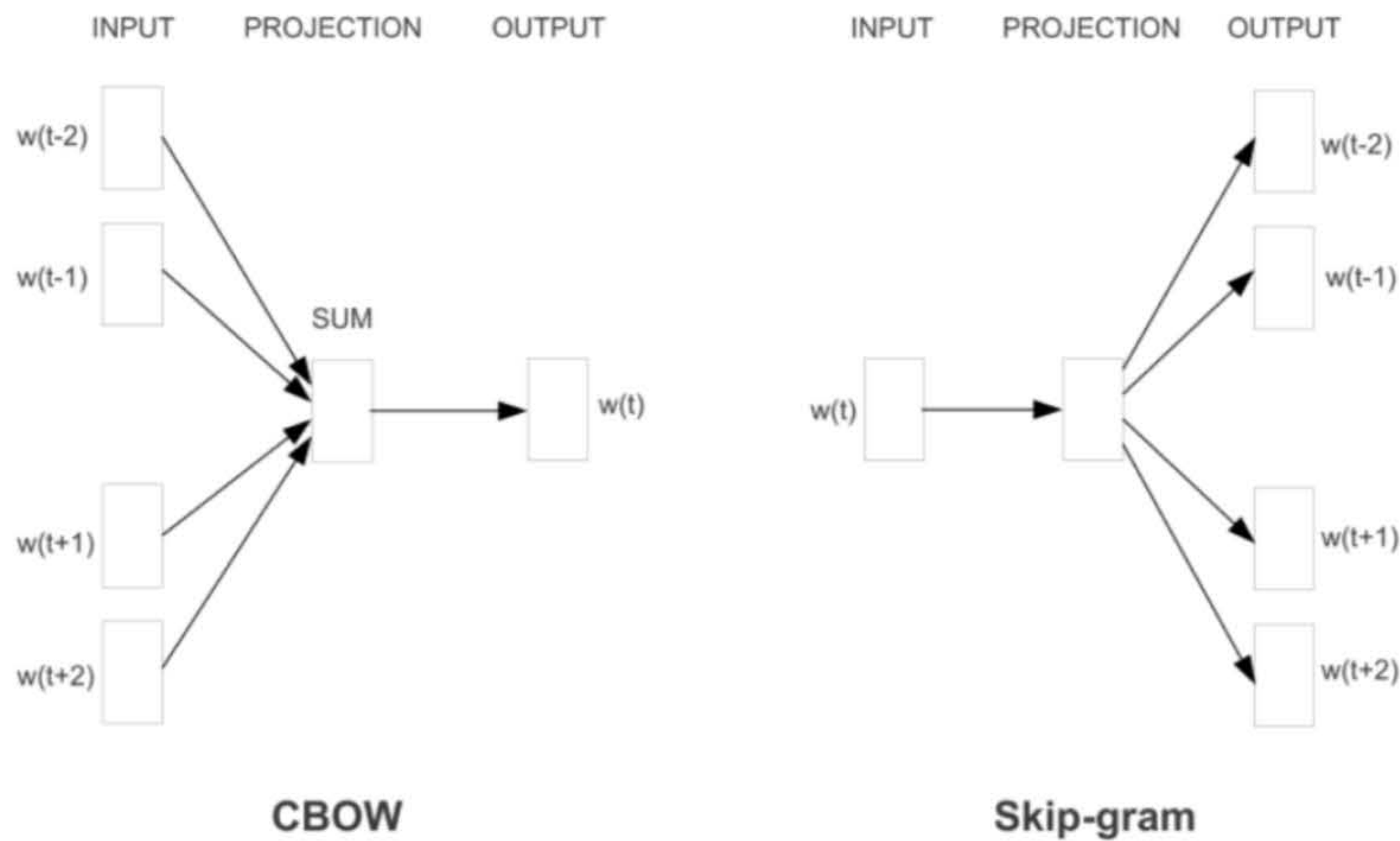
- c. GloVe, which is short for global vectors, is an open-source project out of Stanford that is also a distributed word representation model. Like the other two, GloVe is an unsupervised learning algorithm that was built to obtain the vector representations of words. It is trained on aggregated global word to word co-occurrence statistics from corpora, and the output of GloVe are linear substructures of the word vector space.

The Vidy protocol uses elements of these projects in its low-level schema, and expands on them with training on its multi billion-point dataset. Vidy's neural network approach to embeddings is not just for word to word vector representations, but also to classify a sentence into a group of categories and keywords for cross-page topic recognition. Extracting meaningful tags to match against the keywords of video ads helps to make clean matches faster through topical filtration, and more importantly helps to make the available set of queued videos much smaller. This figure below shows an example of mapping cities to countries and descriptive terms.

	Paris	Madrid	France	Spain
Other	$\begin{bmatrix} 0.2 \end{bmatrix}$	$\begin{bmatrix} 0.2 \end{bmatrix}$	$\begin{bmatrix} 0.2 \end{bmatrix}$	$\begin{bmatrix} 0.2 \end{bmatrix}$
Capital	0.5	0.5	0.1	0.1
France	0.1	0	0.1	0
Spain	0	0.1	0	0.1
Country	$\begin{bmatrix} 0.2 \end{bmatrix}$	$\begin{bmatrix} 0.2 \end{bmatrix}$	$\begin{bmatrix} 0.6 \end{bmatrix}$	$\begin{bmatrix} 0.6 \end{bmatrix}$

While the Vidy protocol's top layer combines the approaches of named entity recognition, relationship extraction, and anaphora resolution, Vidy's bottom layer goes a step further and employs rarified terminology extraction in order to gauge how rare, and therefore how important to that specific page (relative to all indexed pages), a term may be for a specific publisher and their content. Vidy achieves this vector space determination by analyzing the occurrence of that term across the millions of pages that it has indexed and then by scoring that term in a vector that is compared to all other vectors on the same plane. Vidy uses both dictionary-based and complex pattern-based extraction in tandem with rare terminology extraction to identify when token sequences occur in publisher sites from master terminology lists rendered offline.





The idea here is that similar words appear in similar contexts, which is called the distributional hypothesis. The concept of representing a word as a prediction of its context, thereby yielding a continuous representation of a word embedded in a vector space, turns out to be a very robust technique for semantic representations of that word. In lieu of the continuous bag of words approach which predicts a word given its context (as shown in the figure above), the protocol chooses a skip-gram approach which predicts which words are in the context given a target word.

Here's how the method works. We begin by constructing a vocabulary from an examination of the corpus, flagging all words that we find presented more than n times and adding them to the set. Then for each word in the compiled vocabulary set, we initialize two vectors, randomized by dimensionality and vector. These two vectors - one being a target vector representing the word's meaning, and the other being a context vector representing the word's context - are assigned to all words and combined in a matrix, giving us two $|V| \times D$ matrices, where D is the number of dimensions, and $|V|$ is the number of words in the vocabulary. These two matrices are termed the embedding matrix (which houses the main embeddings of each word in the vocabulary), and the context matrix (which houses the context embeddings of each word). Our objective here is to train the D -dimensional target vectors (which begin as randomized values) to predict their context, thereby representing the target word's meaning. For every cycle of training that we perform thereon, we sample a target word w_t from the corpus and then estimate the probabilities of the context words w_c given the target word w_t :

$$p(w_c|w_t) = \frac{\exp(u_{w_c}^\top v_{w_t})}{\sum_{w \in \mathcal{V}} \exp(u_w^\top v_{w_t})},$$



This softmax function sets the values V as the list of all words in the vocabulary, u as the vectors from the context matrix, and v as the vectors from the embedding matrix. This means that context word probability is the function of a target vector and a context vector. Only computing the full probability distribution of the vocabulary will result in generating context word probabilities. After that, we backpropagate the prediction error through the target and context vectors using gradient descent, in order to maximize the log probability over the set of context words C_{w_t}

$$\sum_{w_c \in C_{w_t}} \log p(w_c | w_t).$$

We backpropagate through $|C_{w_t}|$ words in the context matrix and one word in the embedding matrix on each subsequent cycle of training. The purpose for this is to have the target word effectively predicting its context words, with the goal of maximizing the average log-probability over the set of all target words T

$$f_{obj}(u, v) = \frac{1}{|T|} \sum_{w_t \in T} \sum_{w_c \in C_{w_t}} \log p(w_c | w_t).$$

This process becomes extremely expensive the more words you have. A vocabulary with say a million words becomes a great challenge to keep the probability generation efficient for throughout each iteration. To solve this, Word2vec creator Mikolov in 2013 put forward a negative sampling function, so that instead of computing the softmax over the whole vocabulary, you can just sample a few words that do not appear in the current context, and then modify your maximization objective to be a binary classification task that uses a sigmoid function to estimate whether a word belongs in that context or not. This results in a far more efficient maximization objective for us, which plays out as follows:

$$f_{obj}(u, v) = \sum_{w_c \in C} \left[\log \sigma(u_{w_c}^\top v_{w_t}) + \sum_{w_n \in N} \log \sigma(-u_{w_n}^\top v_{w_t}) \right],$$

This equation sets the value of N as the set of negative samples. By backpropagating the prediction error on the objective through the target, the context, and the negative sample vectors, we analogously update the model while enjoying big gains in efficiency. In the negative sampling case, we adjust one word in the embedding matrix and $|C| + |N|$ words in the context matrix. As each cycle of training runs its course, the embedding matrix progressively consists of more and more meaningful vector representations for each word in the vocabulary.

A component of Vidy's neural network implementation is also inspired by the logic and structure of image recognition models applied to word embedding. While an image is basically a matrix of pixels, a sentence can also be regarded in the same sense. Instead of pixels however, the sentence is a 2d matrix of words that you can feed to computer vision techniques for text identification.



On this matrix you have a word represented by an n -dimensional vector, just as a point in an image is also an n -dimensional vector. For each token in the sentence we use word embedding (one word embedding per row) to get vectors with fixed dimensions (dimension is d , length is fixed at n). So the input is a 2 dimensional matrix (n, d) which is analogous to an image using a CNN. When comparing images to determine similarities, you compare the matching score of all the vectors in one image against all of the vectors in the other image, and this same practice is done here with language. Even the scaling methods and the code around generating image cluster centers and efficient matching from image recognition methodology is directly applied on this protocol layer. To solve the curse of dimensionality that plagues all ambitious recognition projects that pack a high number of dimensions into each vector for more advanced matching capabilities, the protocol employs product quantization which has proven to be a strong and versatile method for nearest neighbor search.

14.4 Feeding the Protocol

Vidy conducts two principal tasks when acquiring, refining, and sending off the information that is needed to make an NLP match happen. The first is an indexing component on the publisher side (crawling text and preparing it via the protocol's uppermost layers), and the second is a content pre-processing component on the advertiser side.

When a video ad is uploaded to the Vidy platform by an advertiser, Vidy runs a signal processing audio cleanse algorithm on it to eliminate any non-stationary noise and other intefers, and then transcribes the video through a speech-to-text engine. It also timestamps each word that is uttered. After transcribing the uploaded video, Vidy then employs sentence boundary disambiguation, which is a sentence breaking technique where sentence boundaries are demarcated even though there is no punctuation present in the transcribed output to help with segmentation. This is done to further learn about the meaning of what is being said among phrases. From there the general sentiment of the video ad is denoted and listed in the meta tag keywords which Vidy stores with the file, alongside the manually entered keywords that the advertiser provides for the video ad upon upload.

Once this information is packaged and sent off, it reaches the consensus layer which is a compartmentalization of two planes of placement decision. The first plane is purely on an NLP level driven by the open-source protocol that all miners run on; and the second plane is on a user profile filtration level. A user's demographic profile which has been built by a collection of data points and locked in smart contract is then applied to all NLP-matches to filter down the correct embed for that visit; and the input factors include the following:

- The context of the greater publisher page through keywords and automated summarization
- The context of the greater publisher website through keywords and automated summarization
- The context of the video ad through transcription, summarization, and advertiser keywords
- Keyword extraction from all applicable sentences on the indexed publisher page
- NLP analysis and vector assignment of all relevant keywords
- A set of matching video ads queued to move to stage 2 profiling assignment
- User profile examination and further filtration through demographic and visitor data



- Placement of selected video ad into corresponding publisher text based on campaign demand from the advertiser
- Recalibration of performance for all placed ads based on data layer feedback

The scoring for NLP matches is iteratively adjusted as the data layer receives feedback on video ad performance and user-specific activity on embed ads, and these scores get fed into the topical vector assignments for better future representation assignments.

For the selection process when determining which phrases to embed vidys in out of all eligible phrases within a publisher page, campaign demand is a prevailing decision maker. Beyond extractive summarization recommendations, there is not a deep need to determine phrase relevance respective to page relevance, or to make environment relevance supersede pure ad campaign demand after an NLP+demographic match is made. The reason for this is that overall ad spend and campaign impression volume purchased is at the end of the day what still drives the advertising platform itself, and ultimately determines how often and where video ads are placed among hosted publisher pages.

14.5 Takeaway

In closing this section, it is important to underscore that large mainline pieces of the logic, structure, and framework behind Vidy's NLP protocol will be open-source and accessible on GitHub. It is our hope that this NLP project, which will forever be a continuing work in progress, can continue to grow and improve with the collective support of the community and the branched projects that we hope blossom from our starting point. Vidy will rely on the community's feedback, support, and ingenuity to drive the world's first open-source NLP placement protocol forward. Our initial code marks just the beginning of what is to become a big community win.

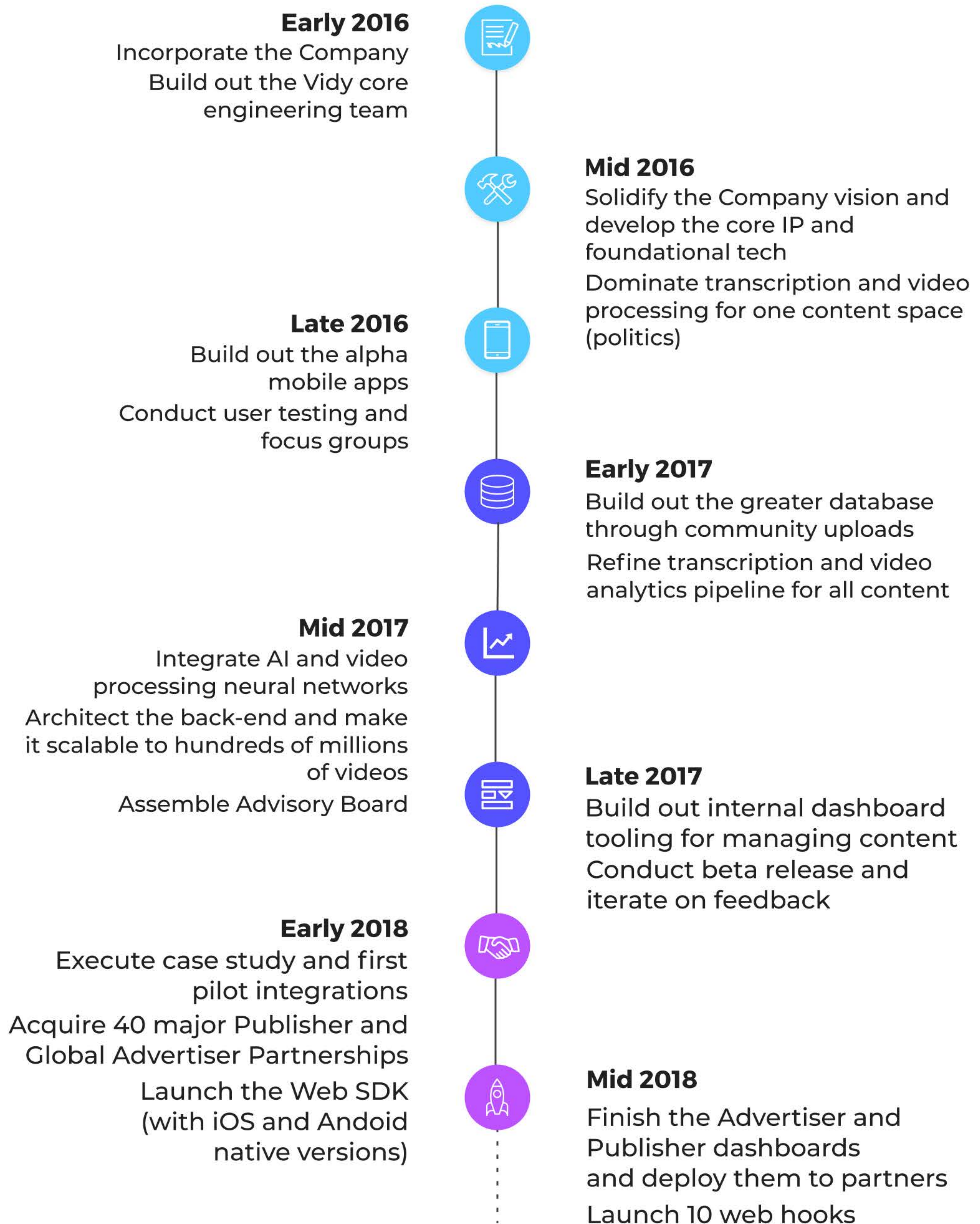


15

Where Vidy Stands



15.1 Gameplan And Milestones



Late 2018

Grow database of videos to 50 million clips
Launch iOS and Android native SDKs
Be on 100K web pages with embed layer
Issue V2 of Vidy's open-source NLP script



Early 2019

Launch V1 of the Vidy platform out of beta into production
Acquire 1000 advertisers
Grow database of videos to 300 million clips



Mid 2019

Unveil beta of blockchain platform component with miner-driven protocol
Begin developing in-house content studio for realtime embeds
Be on 10 million web pages with embed layer



Late 2019

Have 10K unique products linked to the one-tap purchase modal
Issue V3 of Vidy's open-source NLP script



Early 2020

Acquire 10K advertisers
Grow database of videos to 1 billion clips



Mid 2020

Be on 100 million web pages with embed layer
Have 100K unique products linked to the one-tap purchase modal



Late 2020

Introduce first VR-based Vidylinks with video ad embeds
Plan towards an IPO



15.2 Comparing Vidy To Other Blockchain Ad Companies

Features	VIDY	BAT	Adtoken	BitClave	Adshares
Decentralization of Ad Marketplace	✓	✓	✓	✓	✓
Deregulation of Industry's Dominant Companies	✓	✓	✗	✓	✓
Value Accessible on Any Device	✓	✓	✓	✓	✓
Securitized Through Blockchain	✓	✓	✓	✓	✓
Multiple Existing Partnerships	✓	✓	✗	✗	✗
Solves Bot Fraud	✓	✗	✓	✗	✗
Compatible in the Existing Ad Ecosystem	✓	✗	✗	✗	✗
Incentives For All 3 Parties (including Publishers)	✓	✗	✗	✓	✗
No Switching Cost to Operate	✓	✗	✗	✗	✗
No Visible Ad Delay	✓	✗	✗	✗	✗
User Choice on What Ads to View	✓	✗	✗	✗	✗
In-text Embedded Ads	✓	✗	✗	✗	✗
Direct Purchase Option on Ads	✓	✗	✗	✗	✗
NLP Relevant Placement Protocol	✓	✗	✗	✗	✗

✓ Fully Implemented

✗ Not Started



15.3 Selected Partner Traction

Some partnerships are for specific countries or with specific terms or pre-terms stage.



Mercedes-Benz



deliveroo



KALTENDIN

THE BUSINESS TIMES



16

The Vidy Team



16.1 Team

The Vidy team is uniquely positioned at the intersection of East meets West, with a fusion of Western engineering and Eastern business development. As such Vidy capitalizes on the ability to tap the best minds in Silicon Valley for its innovation, and the most connected arms in Asia for its groundbreaking global partnerships. This edge is one that Vidy sought to hone from its inception, when Patrick Colangelo, the Founder of Vidy, partnered with Matthew Lim in Asia, to cultivate a powerful cross-functional team.

Vidy boasts a world-class engineering team based in San Francisco with team members who have previously sold their own companies, amassed 10s of millions of users, patented multi-million dollar inventions, and have enjoyed decades of successes in the software development world.

The Vidy team has been together for years, bonded by mutual admiration, friendship, and ambition to build a platform that can truly change human lives for the better. As fervent believers in blockchain and personal investors in technologies that exist for the betterment of the human colossus, we have collectively devoted ourselves to the mission of letting content and video ads be found, consumed, and enjoyed in a way that finally safeguards us and truly garnishes us.

Vidy began when Patrick spent 30 minutes trying to find a clip from tv to text to a friend as an inside joke. After searching over a dozen times for it, he finally came across a 7 minute video where the scene was nested in between a 15 second portion of the video. This meant that his friend would either have to watch the entire video to see it, guess where to tap to skip though to get closer to the correct part, or worse yet that Patrick would have to crop the video himself and then download it and send it. Wow. He immediately knew there had to be a better way. Why was it so hard to find a short video highlight? And why was there no way to search inside videos to get the parts you care about faster?

With the Vidy engineering team's tenacity and ingenuity driving this vision forward, Vidy went on to architect, build, and deploy the world's first distributed NLP-powered search engine that was run on transcribed videos. Vidy then added an AI-pipeline containing dozens of video-processing microservices, and soon had a database of millions of video highlights. Since then Vidy has built a handful of core products to showcase its technology on iOS and Android, along with native mobile keyboards, and on the web. Now Vidy is taking its database, search, nlp, and sdk technologies to the next level to solve the broken video ad industry.



The Vidy Company was founded out of Harvard, and has since grown into a 15 person engineering operation in downtown San Francisco.

Here is the Vidy team:



Patrick Colangelo
Founder and CEO

Patrick founded the company from his Harvard dorm room, and has since handpicked each member of the Vidy team. Patrick graduated from Harvard College in 2014 where he oversaw hundreds of Harvard entrepreneurs as the President of the Harvard College Entrepreneurship Forum. He also served as the President of the Harvard College Private Equity Group. Patrick is the Founder and current Chairman of Black Diamond Capital Investors, the renowned equities hedge fund out of Harvard that is one of the highest performing funds in America, with over 150 partners and alumni on Wall Street. Patrick handles product and operations at Vidy. He is the author of Vidy's patents and whitepaper, and the inventor of Vidy's Embed Layer.



Matthew Lim
Cofounder & CEO of Vidy Asia

Matthew is an ex-investment banker from Credit Suisse, having spent 3 years directly impacting a number of multi-national deals in Asia. Matthew executed 8 IPOs, M&As, and Debt Issuance deals during his time there. He has successfully inked deals for Vidy with the biggest superstars in China including Jay Chou, A-MEI, Lin Jun Jie, Stephanie Sun, and Mayday, along with massive deals with Baidu and others. Matthew graduated from National University of Singapore with First Class Honors in Finance.



Jake Rosin
Engineering

Jake has over 13 years of engineering experience in machine learning, mobile development, and back-end architecture, and holds a B.Sc. and M.Sc. in Computer Science from the University of Wisconsin Madison. Jake specialized in machine learning in the early part of his career, and later cultivated an expertise in the Android operating system. He was the sole Creator of Quantro, an advanced multiplayer game on Android that amassed a large international userbase with no marketing. At Vidy Jake leads Android, and also works on back-end, iOS, web, and Vidy's search technology thanks to his deep tool chest. He has done everything from build NLP-powered autocorrect technologies for keyboards, and complex subtitling animation logic for clip UI, to design nuanced search algorithms, and help architect the internal pipeline of clip processing.





Marco Vanossi
Engineering

Marco is a veteran entrepreneur with a successful exit and over 15 years of engineering experience under his belt. Marco founded one of Latin America's first search engines, which had a deal with Yahoo! and millions of users. As a computer vision pioneer, Marco later published academic work about novel software algorithms in the image recognition space, and founded a mobile visual search engine called ClickPic, which received multinational media attention for its ability to recognize images and music, and lead to him being interviewed live on Brazil's most famous talk show, Programa do Jo. Marco also served as co-founder and chief scientist for Arqetype, which used augmented reality to create engaging experiences for big brands. He sold the company in 2014.



Garrett Wilson
Engineering

Garrett is a Y Combinator alumnus founder and entrepreneurial engineer with over 15 years of experience building innovative web products for venture backed companies. In his career, Garrett has done everything from full stack solo engineering to serving as a CEO, and has since developed an expertise in Javascript, React, and front-end web technologies. Before joining Vidy, Garrett ran his own on-demand food delivery service company called Instant, where he built out its entire full-stack product, and successfully closed deals throughout Palo Alto with dozens of restaurants and establishments. Garrett is passionate about the decentralization of applications, and specifically about data infrastructure, usability, and scalability on the blockchain.



Luke Edwards
Engineering

Luke is the creator of Polka, the fastest Node.js HTTP server that exists today, registering at 25-65% faster speeds over the closest competition. Luke is also on the core development team of Preact.js, which is the most popular React.js alternate language used by hundreds of the biggest companies in the world including Google, Tencent, QQ, Uber, Lyft, Groupon, Housing.com, The New York Times, Pepsi, Algolia, The Financial Times. He is recognized as a performance beast in the Open Source community, and regularly works closely alongside Google and Facebook's developers to push the boundaries of what JavaScript can achieve. As a full stack engineer with a primary focus on JS, Luke has also worked with a wide range of languages throughout his career and has actively contributed to the Open Source community. Before joining Vidy, Luke worked as a freelance contractor for 8 years where he led design, front-end, and back-end teams for a variety of successful and now profitable companies.





Arria Owlia
Engineering

Arria is a highly experienced client-side software engineer specializing in development on the iOS operating system, with a strong background in Objective-C, Swift, and React Native. He has extensive development experience dating back 16 years, with professional training heavily rooted in effectively utilizing the foundational principles behind OOP as it relates to large-scale, cross-platform environments. His career experience has led him to develop enterprise-level technologies and novel systems architectures that are in use by both Fortune 500 companies and international, multi-billion dollar companies. Arria has also built his own full ad-blocking DNS/VPN solution in order to let users surf the web with full privacy, decreased data usage, and increased battery life on mobile devices.



Nicholas Kubiak
Engineering

Nicholas is a software engineer with over 10 years of experience in research and development in the cryptography, automotive, and mobile industries. Before coming to Vidy, Nicholas was the Head of Android for Volkswagen's Research and Development division, and further back he made stops at Adobe, the Department of Defense, and Hewlett Packard. Along the way, he successfully submitted multiple patents and molded industry standards, while developing a keen expertise in the Android operating system. Since then, he has developed Android apps for the Pentagon, Volkswagen, Audi, Bentley, and now Vidy. Nicholas holds a B.Sc. degree in Computer Engineering from California Polytechnic State University San Luis Obispo.



Harry Yang
Deep Learning

Harry is a Ph.D student at the University of Southern California, and has published more than 10 papers in top AI conferences including CVPR, ICCV, SIGGRAPH. His work in deep learning, AI, and computer vision has garnered over 200 citations. Harry's recent work in image synthesis using deep neural network won him a US patent and is widely reported in news media. He has been the recipient of many awards, including the best paper award in ISBA, the Annenberg PhD fellowship of USC, and the sub-finalist award in the LDV vision summit entrepreneurial challenge of New York. Harry has done research at Microsoft and Adobe, and currently he serves as the reviewer for major conferences and journals, including ICASSP, TIP, CVPR, SIGGRAPH, and TOG.





Luke Goh
Design

Luke began his graphic design career as an art director for emerging businesses in the Bay Area. Prior to that he ran a freelance creative practice for several years, helping clients all over the world launch their websites and apps. Luke brings with him a wealth of fresh perspective and creativity to the design process at Vidy where he prototypes all types of product and is a main contributor to the UI and UX process. As an early bitcoin investor, he has a deep passion for what cryptocurrency can do for the world, and has the entrepreneurial fire to help make Vidy a massive success in the cryptocurrency space.



Nasim Uddin
Marketing

Nadim was the growth strategist for PChain, the first native multi chain system. He has over 10 years of experience in marketing and business development, previously serving as a business analyst and project manager. Nadim has extensive experience in analyzing current and potential business processes to identify clear opportunities in business, and has a proven background in explosive growth in the crypto industry with several successful ICOs. Nadim holds a B.Sc. and an M.Sc. in International Business Development and Marketing from the University of Ulster.



Sinjin Lee
Marketing

Sinjin was a Founding Member of Groovespark, helping it grow from an idea on a business plan to one of the largest music streaming apps in the world serving over 35 million users a month. Sinjin has over 15 years of experience in the start-up world as a marketer, growth director, and business developer. In his career, he has served as a Go-to-Market Consultant for over 20 high tech start ups including those backed by Y Combinator and Spark Capital.



16.2 Advisors



Alan Boehme
Procter and Gamble

Alan is the Global CTO and CIO at Procter & Gamble, the largest advertising company in the world, spending over \$10 billion a year on advertising. At P&G, Alan leads 95,000 employees, oversees \$83 billion in sales per year, and oversees 23 billion dollar brands and an additional 14 \$500 million to \$1b brands. Before P&G, Alan was the Global CTO and CIO of Coca Cola where he oversaw all Coke technology, innovation, engineering, and architecture, and prior to Coke he was the SVP and Head of Architecture at ING Bank. Earlier in his career, Alan was the CIO of Juniper Networks, and the CIO of General Electric. Alan has over 30 years of experience leading the most successful companies in the world as a Chief Officer, and is globally recognized as one of the best in his field of consumer goods and services, technology, and leadership.



Dawn Hudson
CMO @ The NFL

Dawn was the CEO of Pepsi, and recently served as the CMO of the NFL. At the NFL, Dawn lead all marketing for the NFL's portfolio of brands including the NFL Network. She also oversaw major NFL events including the NFL Draft, the NFL Combine, and the Super Bowl which she organized, marketed, and helped execute. Before the NFL, Dawn was the President and CEO of Pepsi-Cola, and the CEO of PepsiCo Foodservice where she managed over 250,000 employees. She was also formerly the Chairman of the LPGA where she oversaw the LPGA tour. Dawn served as the Vice Chairman of the Parthenon Group for 5 years, a consulting firm focused in Private Equity within the consumer goods space, which was recently acquired by Ernst and Young. Dawn has over 30 years of experience building the biggest and most prestigious brands in the world.



Damian Marano
Coca Cola

Damian is the Vice President of National Sales for Coca Cola, directly handling over 500 client brands and managing a team of 35 sales people at Coke. Damian has over 20 years of experience in Sales and Marketing, and maintains C-level relationships with his national client portfolio. He works closely with the CTO of Coca Cola to implement early stage technology solutions, and has developed a modular digital value proposition for go-to-market use by customer account teams at Coke. Damian has worked in the National Foodservice division for the past 9 years in leadership positions, and was in the start-up world before that with roles in national account management, strategic planning, and operations. He has joint law and business degrees with a JD from University of San Francisco and an MBA from University of California Berkeley. Damian is a member of the California state bar and is licensed to practice law in California.



Brandon Berger
Ogilvy

Brandon is the former Global Chief Digital Officer of Ogilvy & Mather, and is the current Chief Revenue Officer of The Skimm. At Ogilvy, Brandon served as a Worldwide Board Member and Partner for 4 years, and was responsible for creating and leading the entire digital agenda across the network. Prior to Ogilvy & Mather, Brandon was the VP of Digital Innovation for MDC Partners (MDCA), the international advertising and marketing holding company, where he was instrumental in growing the organization's total digital revenue from 10% to over 40%. Earlier in his career, Brandon was an entrepreneur serving as Co-founder and Director of Marketing at WideRay Corp. Brandon has over 20 years of experience in Digital, with the rare combination of experience in both advertising and publishing.



Lim Ho Kee
UBS

Ho Kee was the CEO of UBS for East Asia and the Global Vice President of UBS Group, as well as the Chairman of UBS Group for East Asia during his 15 years at UBS. Ho Kee was the Singapore Post Chairman for 10 years, and sat on the Singapore Government's Economic Planning Committee. He held Board of directorships at SingTel, Keppel Tatlee Bank, CWT Ltd, Keppel Offshore & Marine, K1 Ventures, Southern Capital Group, Vertex Venture Holdings, and Jardine Cycle & Carriage Ltd. Ho Kee is also a Managing Partner at Majuven Venture Capital.



Kimberly Wheeler
Sephora

Kimberly is the Director of Marketing at Sephora, where she manages over 350 marketing plans for Sephora Collection and Holiday. Kimberly leads Sephora's highest revenue campaign, leads all CRM strategy development at Sephora, and has developed marketing plans for all 70 of Sephora's fragrance brands including the large iconic Chanel and Dior down to the small niche Atelier and Tocca. She has driven everything from retail activation and digital marketing to influencer partnerships and product category initiatives. Kimberly has over 15 years of experience building brands, and served as Brand Director at Kraft Foods and at L Brands earlier in her career. Kimberly holds an MBA from Harvard Business School and a BA in Marketing and Business Administration from the University of Wisconsin-Madison.



Boon Swan Foo

Temasek

Swan Foo is a Senior Advisor to Temasek Holdings, and the Chairman and CEO of Allgrace Investment Management Pte Ltd. He is a Senior Advisor to Singapore Technologies Engineering Ltd, and the former Chairman of A*STAR Technology and Research. He holds Board of directorships to Singbridge Holdings Pte Ltd, Sino-Singapore Guangzhou Knowledge City Investment and Development, China National Offshore Oil Corporation, China Huadian Corporation, Dongfeng Motor Corporation, and is a member of the advisory council of Chartis Singapore Insurance.



Elizabeth Barelli

Medium

Elizabeth is the Head of Digital Marketing at Medium, where she leads all digital campaigns for the platform with over 70 million monthly users. Medium.com sees over 10 million posts published on the site each year, and is within the 300 most popular websites in the world. Before Medium, Elizabeth was the Director of Acquisition for Blurb, managing a multi-million dollar budget and leading all acquisition efforts via paid media channels of display, video, social, paid search ads, native content, media buy, affiliate programs, and influencer programs. She also served as the Marketing Manager of the Sony Play Store and Sony Entertainment Network where she lead the digital campaign for Sony's PS4 product launch. She has over 10 years directing national marketing and digital campaigns, and holds a BA from Lycée Massena and an MBA from EM Lyon.



Michael Von Schlippe

PMG

Michael is a veteran publisher in Asia, serving as the Managing Shareholder of Indochine Media Ventures whose portfolio includes Esquire, The Robb Report, Luxury Guide, My Pope, Buro 24/7, STAIL, and Barcode. Michael is also a Partner of PMG (Partners Media Group) whose portfolio includes Cosmopolitan, Men's Health, and Harper's Bazaar. PMG is the largest up-scale publisher in Kazakhstan, and Indochine is a massive publishing force across Singapore, Vietnam, Thailand, Malaysia, and the Philippines. Michael has over 25 years of experience in the publishing industry, and has built leading luxury brands in everything from digital publishing and high-end magazines, to newsstand distribution and major publishing events.



Greg Chambers

Ex Coca Cola

Greg is the Global Group Director of Digital for Coca Cola. He has delivered hundreds of millions of dollars in estimated value to Coca Cola through digital partnerships and brand equity from innovative experiences and product offerings that partner companies have adopted. At Coca Cola he has designed cooperative revenue strategies with the CMOs of major customers, architected Coca Cola's digital product suite with Google Cloud, built operational "stores of the future" for top retail and foodservice brands, and digitized Coca Cola's legendary signage program. Before joining Coca Cola, Greg was a consultant working for some of the biggest brands on their marketing growth and digital experiences. Greg has received several product design awards in his 20 year career and is a frequent keynote speaker including steady speaking collaborations with Google.



Doron Reuveni

Applause

Doron is the CEO and Co-founder of Applause, one of the largest software testing companies in the world. Doron grew the company to over 200 engineers, acquired hundreds of the biggest brands in the world as customers, and ultimately drove Applause to a successful acquisition in 2017. Since its inception, Doron lead Applause to the #8 spot on Forbes list of America's Most Promising Companies, and to the #16 spot on the INC 500. He has over 25 years of experience in the technology space with internationally recognized expertise in software development and testing, and was a finalist for the Ernst and Young New England Entrepreneur of the Year award. Prior to Applause, Doron was SVP of Technology at Enigma where he lead multi-million dollar software implementations for Fortune 100 brands and managed a global team of engineers. He is a triathlete, and has run the Boston Marathon 10 times.



Koh Boon Hwee

GIC

Koh Boon Hwee is a Board of Director at GIC (Sovereign Wealth Fund), a global long-term investor with well over US\$100 billion in assets in 40 countries worldwide. Koh is currently Chairman of Credence Partners, Sunningdale Tech Ltd, Yeo Hiap Seng, Far East Orchard, AAC Technologies Holdings, Rippledot Capital Advisers, FEO Hospitality Asset Management. Previously, he was Chairman of Singtel (\$50bn Mkt Cap), Singapore Airlines (\$11bn Mkt Cap), and DBS Bank (\$65bn Mkt Cap). Koh received his bachelors with First Class Honours from Imperial College and his MBA from Harvard Business School.

15.4 Chinese Celebrity Partnerships

Vidy has also signed exclusive partnerships with a handful of Asia's top music superstars to apply its embed technology to their musical work. All highlights from their songs and music videos are now embedded into the text of any website or app. Here are some of Vidy's partner artists:



Jay Chou



JJ Lin



A-mei



Stephanie Sun

17

Conclusion



17. Conclusion

The internet has become a jungle. We walk inside it freely, and do what we please while there, but we must endure a host of adverse elements if we choose to stay, from its unfriendly wildlife (malicious click-baiting) and troublesome terrain (UI's with no standardization), to its brutal weather (disruptive interstitials, pop-ups, slow banner page loads) and the ominous feeling of being followed (incessant user tracking). With these sorts of headwinds in our midst, it is easy to lose our sense of direction and purpose as we navigate through. In the context of nature this makes sense since all of these elements are well out of our control as humans, and we did not create the forest or any of its features. But with the internet it is clearly different. We did create it, and we did erect its ecosystems of social, data, advertising, and information transfer. We run the companies that service it, we use the services that drive it, and collectively we are part of the human colossus that inhabits it, because it is ours. Why then do we feel so powerless and lost within it?

It is always important to fall in love with the problem, rather than the solution, when embarking on a new challenge. Our team at Vidy picked the broken video ad industry because we all realized this is bigger than just a business; this is a movement to galvanize internet users all around the world to stand up for the sake of privacy and online wellbeing. If advertisements have adversely affected your life in the past, and you did nothing about it, join the club. That's exactly what we did too, for decades. But today, in 2018, thanks to the gift of blockchain, we finally have the tools in place to give people a choice. We can make things better for all parties across the ad ecosystem.

Vidy has devised a tri-layer technical solution to attack this problem because the industry needs not only decentralized distribution, or placement transparency, or data security, but arguably most importantly, it needs inventiveness at the consumer ad display level.

Universal adoption rarely happens in technology outside of jurisdictions where governments place mandates requiring the masses to adopt. As a result, when a product wants to reach that pinnacle level of usage, it needs to possess three imperative qualities: brutal consumer-facing simplicity, a strong financial or value-adding benefit to all parties who participate, and a solution to the two-sided market the plagues the majority of innovative ideas. Vidy architected its embed layer to specifically excel on these 3 planes.

First, whether you understand or believe in blockchain yet or not, as an internet user you instantly understand how to uncover an embedded vidy by holding down when you see one.

This is our simplicity.

Second, whether you are mindful of it today or not, as a user, **you deserve to be compensated.** Period. Without you, there are no ads, there are no publishers, and there are no revenues. You are tracked, you are analyzed, you are bombarded, and you get nothing in return. Vidy is flipping the model on its head and sharing ad revenues with the people who make them happen in the first place, via their hold times. When you hold, you earn, and thanks to NLP embeds, finally you get to choose what you want to hold and see and what you don't. By cutting out the middlemen who bring nothing but complexity, room for manipulation, and



capital drain, Vidy saves money and redistributes it to the users who power the internet with their participation. **This is our financial alignments plan.**

Third, whether you use browser X or Y, or whether you hold VidyCoin or no coin, or whether you subscribe to this publisher or merely browse that one, as a user you will reap immediate value from embedded vidys by virtue of them being **everywhere** and them being **free**.

Similarly, as a publisher, whether you want to monetize with Vidy ads or not, you have the luxury to embed vidys in your work for free to open your readers up to new world of entertainment and information. **This is our two-sided market killer.**

We now have the power to take back control of our lives, our privacy, and our freedom through innovation. Decentralization is the killer of all monopolies, and it is just a matter of time until the old guard falls. Just as banking is a seemingly insurmountable industry to eclipse with cryptocurrencies, but one which we believe undoubtedly will be overtaken in time, so too is that of the broken advertisement industry. The primary reason for this is that the video advertising space needs more inventory desperately, and Vidy is uniquely positioned to execute on this ever-growing problem - one invisible embed layer at a time.

First and foremost we're calling on all people who believe in fighting the good fight to stand up and refuse to be taken advantage of anymore. No more illegal data tracking, no more invasive data warehousing, no more spuriously irrelevant ads, no more profiting on our online lives without due compensation.

Second we're calling on all advertisers who are tired of being lied to, tired of having no recourse for placements purchased at the behest of fraud, tired of an industry that loses \$16 billion a year and just looks the other way. You spend billions of dollars optimizing your user acquisition funnel, optimizing your purchase funnel, optimizing your retention funnel. But why fight that war when you can bring the ease and convenience of a purchase to the 1st click instead of the 5th on Vidy's embed layer.

Third we're calling on all great publishers who want to enthrall their users, who want to retain their users, who want to delight their users, and who want to engender even more loyal users. Vidy is the tool to employ to bring smiles to your readership, to educate your users and immerse them in a dimension of information remiss in the current online world. Vidy is a place where you can augment your income with just a few clicks, where you can guarantee revenues that won't cannibalize your own UX or screen real estate, and where you can rest assured that transparency, equity, and placement precision will always prevail.

Advertisers hate the current climate. Publishers hate the current climate. Users hate the current climate. So it's time to change the current climate. Join us.



18

Definitions, Disclaimers & Sources



18.1 Definitions

Vidy is the company that builds the Vidy platform, engineers the technology behind its IP, interfaces with advertisers and publishers, and is the entity that has invented OTP, and the first decentralized embed layer. Vidy sits next to the Vidy Foundation as the main operating vehicle for the Foundation.

Vidy Foundation is the non-profit master entity that is the main vehicle for receiving the proceeds from the Vidy ICO. Proceeds are allocated out to the Vidy operating company from the Foundation.

VidyCoin is the decentralized currency that runs the whole Vidy ecosystem. VidyCoin can be purchased from an exchange that lists it after the ICO, can be earned by users by holding down on vidys, and is used as the membership key for advertisers to stake with to access one of three feature tiers on the vidy platform.

VIDY is the abbreviated term for VidyCoin, serving as the symbol that VidyCoin can be purchased under on all listed exchanges.

Vidylink is the visual demarcation on text that has a vidy embedded into it. Named after the hyperlink for its similar linking disposition, the Vidylink is different in that it keeps a user on the same page without a page load, new browser tab, or url change, upon hold event. The UI for a Vidylink can be customized by publishers from the control dashboard.

Embed layer is the embed layer is a focal consumer-facing component for the Vidy tri-layer system, and exists as a piece of the application layer, which interfaces with the other layers and users who interact with embedded vidys.

Application layer is the layer that interfaces directly with users through embedded vidys, and lives on the publisher website. The application layer lets users hold, watch, earn, authenticate, and purchase, and tracks hold times to relay to the data layer.

Consensus layer is the layer that determines placement of all Vidy ads via NLP. A network of miners that run an open-source protocol that matches the natural language of live video ads with available video ad inventory on publisher pages.

Data layer is the layer that enters all records embed placements, hold times, VidyCoin payouts, VidyCoin staked balances, and VidyCoin transactions into the ledger. The data layer also warehouses a collection of user data points and containerizes them in a secure smart contract.

Advertiser is any brand or company that signs up to Vidy and uploads a video ad for embed placement on one of Vidy's partner publisher pages. Advertisers get a control dashboard to manage their campaigns, and must stake a certain amount of VidyCoin across three membership tiers to gain access to specific platform features.



Publisher is any entity, person, or company owning and/or operating a website, webpage, or mobile app that hosts content. Publishers sign up to Vidy and index their site, thereby making all text on their pages available for NLP matched video embeds. Publishers get access to their own control dashboard where they can manage all embeds and see VidyCoin payouts for connected advertisements.

Titanium tier is the basic advertising tier on the Vidy platform. Advertisers must stake at least 300k VidyCoin to access the Titanium tier. This tier lets advertisers upload unlimited video ads for unlimited campaigns running concurrently, letting advertisers compare performance metrics in realtime across different creatives and iterate faster on their go-to campaign strategy.

Gold tier is the middle advertising tier on the Vidy platform. Advertisers must stake at least 700k VidyCoin to access the Gold tier. This tier lets advertisers dictate their preferred publishers that they are most interested in advertising with, as well as the publishers that they want to avoid. All preferred placements are based on availability and not guaranteed.

Platinum tier is the top advertising tier on the Vidy platform. Advertisers must stake at least 1 million VidyCoin to access the Platinum tier. This tier gives advertisers everything from Titanium and Gold, and also lets them display a one-tap purchase button next to their embedded video ads so that users can instantly buy an advertised product with VidyCoin.

Control dashboard is the control panel where advertisers can upload their video ads, set up their campaigns, and oversee VidyCoin payouts and performance, and where publishers can index their sites, manage all embeds across their hosted pages, and track performance analytics for hold times along with VidyCoin payouts.

User is any visitor online who interacts with a publisher page and/or an advertisement on the web. These visitors are considered non-authenticated users and therefore not part of the Vidy ecosystem yet.

Vidy User is any user who has authenticated with Vidy by signing up through the embed layer or directly through vidy.com. Vidy users collect VidyCoins as they hold, and are able to do one-tap purchases in the embed layer.

Natural language processing (NLP) is the main method that Vidy employs to place ads to their matching linked text on publisher pages. NLP is the practice of analyzing parts of speech such as ngrams, language models, synonym paraphrases, and word vectors to process language in efficient and efficiently.

One-tap purchase modal (OTP) is a Platinum tier feature available to advertisers who have staked enough VidyCoin to access it. OTP gives advertisers the ability to display a purchase button next to their embedded video ad to let users purchase their product right from the spot using VidyCoin or other checkout methods.



Miners on the Vidy platform are computers that serve as links in the network chain that makes up the consensus and data layers. Miners earn VidyCoin for solving mathematical equations using cpu/gpu power, add blocks to the Vidy ledger, place ads via Vidy's open-source protocol, and serve as the members of the decentralized governing body that makes the Vidy ad distribution platform operate.

Fraud detection protocol (FDP) is an open-source protocol that is run by the data layer to detect fraudulent bot manipulation of hold times on embedded ads. Upon flagging of a manipulation event, a "marked for review" entry is added to the ledger and the issuing publisher is alerted and given an opportunity to respond.

18.2 Disclaimers

This document is a vision document and should not be considered a specification. In the appendix we provide first iterations of specifications for our plans with advertisers and publishers who will integrate with the Vidy Platform.

A forthcoming milestone in 2018 aims to complete a final round of internal editing and peer review to arrive at a first full specification for our whitepaper. This is for general informational purposes only and may change as the Platform is developed over time. VidyCoin or VIDY is not intended to constitute a regulated product in any jurisdiction.

This explanatory note does not constitute advice to purchase any VIDY or VidyCoin nor should this note be relied upon in connection with any contract or purchasing decision. See <https://vidy.com/> for further information.

Recipients are specifically notified as follows:

No offer of securities

VidyCoin, Vidy Inc. and "VIDY" (as described in this Overview) is not intended to constitute securities in any jurisdiction. This Overview does not constitute a prospectus nor offer document of any sort and is not intended to constitute an offer or solicitation of securities or any other investment or other product in any jurisdiction.

No advice

This VidyCoin Technical White Paper does not constitute advice to purchase any VIDY nor should it be relied upon in connection with, any contract or purchasing decision.

No representations

No representations or warranties have been made to the recipient or its advisers as to the accuracy or completeness of the information, statements, opinions or matters (express or implied) arising out of, contained in or derived from this Overview or any omission from this



document or of any other written or oral information or opinions provided now or in the future to any interested party or their advisers. No representation or warranty is given as to the achievement or reasonableness of any plans, future projections or prospects and nothing in this document is or should be relied upon as a promise or representation as to the future. To the fullest extent, all liability for any loss or damage of whatsoever kind (whether foreseeable or not) which may arise from any person acting on any information and opinions contained in this Overview or any information which is made available in connection with any further enquiries, notwithstanding any negligence, default or lack of care, is disclaimed.

Risk warning

Potential purchasers should assess their own appetite for such risks independently and consult their advisors before making a decision to purchase any Coins or Tokens.

VIDY Protocol White Paper 0.0.5 August 7 2018

All concepts and technical proposals outlined in this document are working hypotheses and subject to change and correction.

Translations

This Overview and related materials are issued in English. Any translation is for reference purposes only and is not certified by any person. If there is any inconsistency between a translation and the English version of this Overview, the English version prevails. Unless otherwise stated, all references to “\$” and “dollars” in this Overview pertain to United States dollars.

18.3 Sources

Sean, B. (2017, February 1). The State of the Blocked Report. Retrieved March 4, 2018, from <https://pagefair.com/downloads/2017/01/PageFair-2017-Adblock-Report.pdf>

Study: Mobile Advertising Kills Battery Life. (2013, June 27). Retrieved March 4, 2018 from <https://www.fastcompany.com/3013584/study-mobile-advertising-kills-battery-life>

Daisy, W. (2008, April 14). Ad Networks Try to Climb From Bargain Basement to the Penthouse. Retrieved March 4, 2018, from <http://adage.com/article/special-report-ad-network-exchange-guide/ad-exchanges-a-premium-level-future/126186/>



Brandon, V (2017, March 2017). Forrester Data Report: Ad Fraud And Viewability Forecast, 2016 To 2021 (US). Retrieved March 4, 2018, from <https://www.forrester.com/report/Forrester+Data+Report+Ad+Fraud+And+Viewability+Forecast+2016+To+2021+US/-/E-RES137685>

Miko, K., Ruben, C., & Shailin D. (2016). Compendium of Ad Fraud Report. World Federation of Advertisers. Retrieved March 4, 2018, from https://www.wfanet.org/app/uploads/2017/04/WFA_Compendium_Of_Ad_Fraud_Knowledge.pdf

Lucy, H. (2017, January 31). Procter & Gamble Chief Marketer Slams ‘Crap Media Supply Chain’, urge marketers to react’. Retrieved March 4, 2018, from <https://www.cnbc.com/2017/01/31/procter-gamble-chief-marketer-slams-crappy-media-supply-chain.html>

Leslie, K., Tami, K., & Kate B. (2018). Ads That Don’t Overstep. Harvard Business Review. Retrieved March 4, 2018, from <https://hbr.org/2018/01/ads-that-dont-overstep>

Dave, C. (2018, January 31). Average Display Advertising Click Through Rates. Retrieved March 4, 2018, from <https://www.smartinsights.com/internet-advertising/internet-advertising-analytics/display-advertising-clickthrough-rates/>

Mimi, A. (2016, July 13). Why People Block Ads, And What it Means for Marketers and Advertisers. Retrieved March 4, 2018, from <https://research.hubspot.com/why-people-block-ads-and-what-it-means-for-marketers-and-advertisers>

Alex, S. (September 2016). The Need for Mobile Speed: How Mobile Latency Impacts Publisher Revenue. Doubleclick by Google. Retrieved March 4, 2018, from <https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/>
<https://arxiv.org/abs/1801.04470>

Arthur, B. (2016, July 31). The Truth About Data Mining: How Online Trackers Gather Your Info and What They See. Retrieved March 4, 2018, from <http://observer.com/2016/07/the-truth-about-data-mining-how-online-trackers-gather-your-info-and-what-they-see/>

Mike, O. (2014, August 25). Why Don’t People Click on Mobile Advertisements? Retrieved March 4, 2018, from <https://www.clickz.com/why-dont-people-click-on-mobile-advertisements/30003/>

Lary, K. (2017, December 13). Cracking The Code on Gmail Ads. Retrieved March 4, 2018, from <https://www.wordstream.com/blog/ws/2016/02/01/gmail-ads>



Retailers and the Age of Disruption (February, 2015) . PwC Annual Global Total Retail Consumer Survey. Retrieved on March 4, 2018
<https://www.pwc.com/gx/en/retail-consumer/retail-consumer-publications/global-multi-channel-consumer-survey/assets/pdf/total-retail-2015.pdf>

Tony, R., & Kurt, W. (2017, October 27). Facebook is taking a stricter stance on political advertising ahead of its testimony to the U.S. Congress next week. Retrieved March 4, 2018, from
<https://www.recode.net/2017/10/27/16555926/facebook-political-advertising-ads-2016-russia>

Alex, B., (2018, March 1). 400 Percent Growth in Decentralized Marketing Technology Projects: Report. Retrieved March 4, 2018, from
<http://www.the-blockchain.com/2018/03/01/400-percent-growth-decentralized-marketing-technology-projects-report/>

Announcing a new Blockchain-Based Digital Advertising Platform (2017, March 23). Basic Attention Token. Retrieved March 4, 2018, from
<https://basicattentiontoken.org/announcing-a-new-blockchain-based-digital-advertising-platform/>

In the News: Rebel AI talks Blockchain (n. d). Retrieved March 4, 2018, from
<https://rebelai.com/rebel-ai-talks-blockchain/>

Mimi, A. (2016, July 13). Why People Block Ads, And What it Means for Marketers and Advertisers. Retrieved March 4, 2018, from
<https://research.hubspot.com/why-people-block-ads-and-what-it-means-for-marketers-and-advertisers>

Alex, S. (September 2016). The Need for Mobile Speed: How Mobile Latency Impacts Publisher Revenue. Doubleclick by Google. Retrieved March 4, 2018, from
<https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/>
<https://arxiv.org/abs/1801.04470>

Arthur, B. (2016, July 31). The Truth About Data Mining: How Online Trackers Gather Your Info and What They See. Retrieved March 4, 2018, from
<http://observer.com/2016/07/the-truth-about-data-mining-how-online-trackers-gather-your-info-and-what-they-see/>

Mike, O. (2014, August 25). Why Don't People Click on Mobile Advertisements? Retrieved March 4, 2018, from
<https://www.clickz.com/why-dont-people-click-on-mobile-advertisements/30003/>

Lary, K. (2017, December 13). Cracking The Code on Gmail Ads. Retrieved March 4, 2018, from
<https://www.wordstream.com/blog/ws/2016/02/01/gmail-ads>



Retailers and the Age of Disruption (February, 2015) . PwC Annual Global Total Retail Consumer Survey. Retrieved on March 4, 2018
<https://www.pwc.com/gx/en/retail-consumer/retail-consumer-publications/global-multi-channel-consumer-survey/assets/pdf/total-retail-2015.pdf>

Tony, R., & Kurt, W. (2017, October 27). Facebook is taking a stricter stance on political advertising ahead of its testimony to the U.S. Congress next week. Retrieved March 4, 2018, from
<https://www.recode.net/2017/10/27/16555926/facebook-political-advertising-ads-2016-russia>

Alex, B., (2018, March 1). 400 Percent Growth in Decentralized Marketing Technology Projects: Report. Retrieved March 4, 2018, from
<http://www.the-blockchain.com/2018/03/01/400-percent-growth-decentralized-marketing-technology-projects-report/>

Announcing a new Blockchain-Based Digital Advertising Platform (2017, March 23). Basic Attention Token. Retrieved March 4, 2018, from
<https://basicattentiontoken.org/announcing-a-new-blockchain-based-digital-advertising-platform/>

Kegon, T.(2008, September 4). The First Fundamental Theorem Of Welfare Economics. University of Chicago. Accessed March 8, 2008 from
<https://www.math.uchicago.edu/~may/VIGRE/VIGRE2008/REUPapers/Tan.pdf>

Modigliani, F. & Miller, M. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. American Economic Review. 48 (3): 261–297.
<https://www.jstor.org/stable/1809766>

Rothschild, M. and J.E. Stiglitz (1976). Equilibrium in competitive insurance markets: An essay in the economics of imperfect information. The Quarterly Journal of Economics, 80: 629-49. Accessed March 18, 2018 from <https://www.uh.edu/~bsorensen/Rothschild&Stiglitz.pdf>

Spence, A.M. (1973). Job market signaling. The Quarterly Journal of Economics, 87: 355-74. 87 . Accessed March, 18, 2018 from
https://www.jstor.org/stable/1882010?seq=1#page_scan_tab_contents

De Haas, Lucas. (2017). Extractive summarization using sentence embeddings. Automatic summarization of news articles at Blendle. University of Utrecht: 5-33.

Jonathan Levin (2001). Information and the Market for Lemons. Rand Journal of Economics Vol 32. No. 4. Accessed March 18, 2018 from
<https://web.stanford.edu/~jdlevin/Papers/Lemons.pdf>

Akerlof, G. (1970). The market for lemons: Quality uncertainty and the market mechanism. The Quarterly Journal of Economics, 89: 488-500

“Performance Pay and Productivity” by Lazear (AER 2000)
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.704.3116&rep=rep1&type=pdf>



19

Solving Market Distortion With Economic Theory



19. Solving Market Distortion With Economic Theory

Vidy believes placement and transaction transparency is the answer to quelling fraud in the ad industry, and this section will apply some economic theory to help demonstrate how a marketplace's quantity and quality of trade improves when its transaction platform becomes more transparent. In economics, information asymmetry theory looks at the decisions in transactions where one party has an advantage over another party by possessing more information, or better information. All financial decisions that take place in a marketplace are made based on the level of information that both transacting parties have, and so this type of asymmetry creates an imbalance of power in these transactions, and this ends up rippling out to create an imbalance in the greater market.

A lot of the literature on information asymmetry in recent years was inspired by the first fundamental theorem of welfare economics written by Franco Modigliani and Merton Miller. This theorem states that in a competitive economy absent of any externalities, prices will adjust so that the allocation of resources are optimal in the Pareto sense. One of the primary assumptions of this theory is that all features of all products traded on the market are equally observed by all agents, which of course is unrealistic in today's opaque advertising marketplace. And according to this theory, when this assumption fails and information possession becomes asymmetrical, prices become distorted, and the market suffers through a less-than-ideal climate of resource allocation. The first theorem of welfare can be expanded to state that a market will always move naturally towards a competitive equilibrium that is Pareto optimal. But the following conditions must be met in order for it to do so:

- i. The Market is regarded as being complete, with no transaction costs because there is a perfect distribution and reception of information;
- ii. There are no monopolies and there is easy entry and exit from this market;
- iii. For any original bundle of goods, there is also another bundle of goods arbitrarily close to the original bundle.

The following is a theorem that elucidates a Pareto optimal to satisfy advertisers and publishers in the midst of both a competitive equilibrium environment and an asymmetric non-satiating environment.

Assume that the local non-satiation condition for advertisers is satisfied and $[(x_i^0), (y_j^0), (\emptyset)]$ is a competitive equilibrium, then the allocation $[(x_i^0), (y_j^0)]$ is Pareto optimal.

Let $[(x_i^0), (y_j^0), (\emptyset)]$ be a competitive equilibrium; we then show that under the condition of

non-satiation, for each $i, u_i(x) = u_i(x_i^0)$ implies $\emptyset(x) \geq \emptyset(x_i^0)$

Suppose instead that $u_i(x) = u_i(x_i^0)$ and $\emptyset(x) < \emptyset(x_i^0)$

By following the local non-satiation conditions, we can let $\{x_n\}$ be a sequence in X_i converging to x such that $u_i(x_n) > u_i(x) = u_i(x_i^0), i = 1, 2, \dots$. Since \emptyset is continuous, this implies that for all sufficiently large, $\emptyset(x_n) < \emptyset(x_i^0)$, however, in a competitive equilibrium, $u_i(x_n) > u_i(x_i^0)$ implies that $\emptyset(x_n) > \emptyset(x_i^0)$



Suppose further that the initial allocation $[(x_i^0), (y_j^0), (\emptyset)]$ is not Pareto optimal, then there is another feasible allocation $[(x_i'), (y_j')]$ such $u_i(x_i') \geq u_i(x_i^0)$ for all i , but with inequality for some i . Then for some i , $u_i(x_i') > u_i(x_i^0)$ implies that $\emptyset(x_i') > \emptyset(x_i^0)$. Since \emptyset is linear, we see that for $k \in i$ where $u_k(x_k') = u_k(x_k^0)$, $\sum_k \emptyset(x_k') \geq \sum_k \emptyset(x_k^0)$. For $l \neq k$ where $u_l(x_l') > u_l(x_l^0)$, $\sum_l \emptyset(x_l') > \sum_l \emptyset(x_l^0)$. Summarizing across all i , this gives $\emptyset\left(\sum_i x_i'\right) = \sum_i \emptyset(x_i') > \sum_i \emptyset(x_i^0) = \emptyset\left(\sum_i x_i^0\right)$. Since both allocations are feasible, we find that

$$\sum_j \emptyset(y_j') = \emptyset\left(\sum_j y_j'\right) = \emptyset\left(\sum_i x_i'\right) > \emptyset\left(\sum_i x_i^0\right) = \emptyset\left(\sum_j y_j^0\right) = \sum_j \emptyset(y_j^0).$$

This theorem implies that competitive markets will always naturally move toward an efficient allocation of resources. In the digital advertising ecosystem where centralized profit-driven ad networks exclusively control the flow of information to both sides of the transaction, fair trade naturally becomes distorted. As a result, advertisers pay more, get less, and a massive influx of fraud is induced due to too much demand and unqualified supply.

The Modigliani-Miller theorem concluded that the value of a firm is independent of its financial structure given the existence of asymmetric information within it. Just as it becomes apparently important to align the interests of managers and workers with the interests of shareholders so that information on decisions flows freely within a firm, facilitating that information permeation in an external structure such as an ad buying marketplace becomes just as imperative for extended value alignment.

When two parties agree on the trade of goods, and one has more information than the other, that is considered adverse selection. For example, when an advertiser is unable to know the true market value of low performing publisher inventory that is marketed and sold as high performing, this facilitates a value distortion. In the years that followed the baseline economic theories above, the research around information asymmetry theory and adverse selection continued to grow with work done by Akerlof in 1970, Spence in 1973, and Rothschild and Stiglitz in 1976 - all of whom received Nobel Prizes in Economic Science for in 2001.

19.1 Adverse Selection Theory

Adverse selection theory examines the environmental and fiscal forces that allow for a recalibration of the market according to unobserved quality. Rothschild and Stiglitz explain an example of this where insurance companies and banks screen their customers with the use of deductibles and collateral requirements in order to vet them and hedge their bets. Another example is where sellers often signal the quality of their products by offering product-warranties to prospective customers. And Spence offers a further example of adverse selection on the worker side, where workers regularly signal their ability to employers by getting academic degrees and displaying them prominently.

Market segmentation grows from a host of contracts offered to agents that lead to self-selection, and ultimately reveal these agents' private information. This framework induces careful buyers of an insured product for example to opt for a low premium, high deductible contract, and careful buyers to feel more comfortable paying a high premium so they can face a



low deductible in the event of an accident. Similarly, sellers of high-quality goods want to charge a higher price in exchange for a one-year warranty to customers because they are confident in the product they are offering. This is contrasted with sellers of low-quality goods who would not entertain a policy like this due to the risk-reward ratio being off for their respective product offering.

Next we expound on the principle of adverse selection by presenting a spin on George Akerlof's famous illustration of a car sale with the narrative of advertisements. In this scenario, we consider advertisers fighting for a single impression in the market. We assume that there are $N + 1$ advertisers for this impression, with N random and $N(N \geq 2) = 1$. Advertiser i has value x_i for the impression. The value x_i is the product of two term: a common value C and a match value M_i . We then interpret C as capturing attributes of the user that are valuable to all advertisers, such as the income of the user and responsiveness to online advertising. The value M_i captures idiosyncratic components that contribute to the quality of the match for advertiser i . We then assume that, given N , the M_i are drawn from a distributions F_i , and that C is drawn from a distribution G , and that $M = (M_0, \dots, M_N)$ is independent of C . We then assume that both match and common values have finite expectations. We use X_k and M_k to denote the k th highest value factor, respectively. We assume that advertisers $i \in \{1, \dots, N\}$ (the performance advertisers) observe their values X_i , but not the components C and M_i . Meanwhile, advertser 0 (whom we refer to as a brand advertiser) cannot observe X_0 . The assumption that there is a single uninformed and multiple informed advertisers is only made for expositional simplicity.

Making use of the revelation principle, we consider a mechanism to be a mapping from the privately held information by publishers $X = X_1, \dots, X_N$ to allocation probabilities z and payment p . For $i \in \{0, \dots, N\}$, we let $z_i(X)$ be the probability that advertiser i expectations are met, and $p_i(X)$ be advertiser i 's expected payments, given X . For fixed F_i and G , given an allocation rule z , we may define the total surplus from impressions awarded to the brand advertiser by $V_B(z) = E[x_0 z_0(X)]$.

We may define the surplus from the impressions awarded to the brand advertiser by

$V_p(z) = E[\sum_{i=1}^N X_i z_i(x)]$. We consider objectives that are weighted sums of these two terms. In

particular, for fixed $\gamma > 0$, we define $V_z = \gamma V_B(z) + V_p(z)$ where $\gamma = 1$, this corresponds to the total efficiency of the allocation. When γ is chosen to reflect the relative bargaining power of the publisher and the brand advertiser, then this objective is proportional to the publisher's revenue. However, when $\gamma = 0$, and the advertiser has no information of the market then the overall objective is not met.

19.2 Transparent Information Increases Trade

Jonathan Levi's Information and Market for Lemons is an illuminating piece that illustrates the merits of transparency well. First, we can examine a scenario where private information is traded.



Consider that there are three goods in the market: Lemon ($w = L$), a Melon ($w = M$) and a Peach ($w = H$), and that the seller and buyer have the following values:

$$b = \begin{cases} 14 & \text{if } w = L \\ 28 & \text{if } w = M \\ 42 & \text{if } w = H \end{cases}$$

And

$$s = \begin{cases} 0 & \text{if } w = L \\ 20 & \text{if } w = M \\ 40 & \text{if } w = H \end{cases}$$

In this first scenario, the buyer is providing and is seeking a higher value than the seller, despite them both expecting high quality.

However, if both the seller and the buyer do not have any information, then:

$$E[b] = 28 > 20 = E[s]$$

What this denotes is that trade can happen at any price point of between 28 and 20.

Now assume that the seller is partially informed. Since $E[b] = 28 < 30 = E[s | w \in \{M, H\}]$, now only the market for lemons is active between price 0 and 14. Adverse selection has reduced the amount of trade that can take place.

If the seller then becomes more perceptive and gets a grasp on the quality, then melons can be traded between price 20 and 21:

$$E[b | w \in \{L, M\}] = 21 > 20 = E[s | w = M]$$

What this means is that sometimes sellers can provide false information, and trade can increase, but only up to a certain minimum.

According to Jonathan Levin from his research in 2001, more information that is gleaned by all agents in the market can increase trade:

$$E[b | X \leq x'_k] \geq E[s | X = x'_k]$$

In this second scenario, we examine the case of trading public information to change the power dynamics. What would happen when the buyer obtains some of the seller's information, thereby lessening the information gap? The buyer and seller have the following values:

$$b = \begin{cases} 10 & \text{if } w = L \\ 28 & \text{if } w = M \\ 85 & \text{if } w = H \end{cases}$$



And

$$s = \begin{cases} 0 & \text{if } w = L \\ 20 & \text{if } w = M \\ 40 & \text{if } w = H \end{cases}$$

Assuming that the seller has perfect information about the quality of the product while the buyer has none, full trade is possible despite the information asymmetry since

$E[b] = 41 > 40 = E[s | w = H]$. However, if the good is not a peach, lemons and melons cannot be traded, since $E[b | w \in \{L, M\}] = 19 < 20 = E[s | w = M]$. Trade is therefore seen to be decreasing with this market distortion of public information. When public information is absent, and supposing trade will only occur if the seller has a signal $X \leq X^*$ then, the equilibrium conditions are:

$$E[b | X \leq x] \geq E[s | X = x] \text{ for } x = x^*$$

$$E[b | X \leq x] \leq E[s | X = x] \text{ for } x > x^*$$

Transparent and equally distributed information does therefore increase trade if $b(w) - s(w)$ is decreasing in w .





Website

vidy.com

Telegram

t.me/VidyCoin

Twitter

twitter.com/vidycoin

Facebook

facebook.com/vidycoin

Instagram

instagram.com/vidycoin

LinkedIn

linkedin.com/company/vidyinc/

Reddit

reddit.com/r/vidy

Steemit

steemit.com/@vidy

YouTube

youtube.com/vidy

Email

support@vidy.com