WHITE PAPER

BLOCKCHAIN
# DEMYSTIFIED

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Contents

Executive Summary

Blockchain isn't something that magically appeared overnight to solve every business' problems, although recent press might make it sound that way. The concept is not very new either. People started to systematically organise transactions and keep records of goods traded and received in Mesopotamia, Egypt and Babylon in early days of human written history.

Since then, however, ledgers have moved from being recorded on clay tablets to papyrus, vellum and paper. Up until 2008 the only notable innovation has been driven by digitisation and transfer of records and information from paper to bytes. Different intermediaries and middle-men emerged to provide services vital for the smooth operation of transactions - records storing, validation, verification services. This is true for every industry where the transactional element is vital and poses some operational inefficiencies and frictions between ecosystem players as well as brings system integration issues. Marketing and advertising are not exceptions.

Democratisation of data acquisition, storage and processing, arrival of algorithms enabling the collaborative creation of digitally distributed ledgers have created opportunities to develop properties and capabilities that go far beyond traditional paper-based ledgers. Distributed Ledger Technology and Blockchain are born.

Lots of industries expect improvement of efficiencies in operating models. In advertising key areas where it may potentially bring value are:

- **Audience Planning:** identity resolution, audience data and consent management
- **Supply chain management:** secure value transfer systems from ad investment to impressions to sales
- **Reconciliation and billing:** streamlined business processes across multiple entities across the programmatic value chain
- **Smart Contracting and Transparency:** increased record transparency and ease of auditability particularly across the AdTech ecosystem
- **Content Authenticity:** reduced need for trust between stakeholders across the value chain between the advertiser and the consumer.
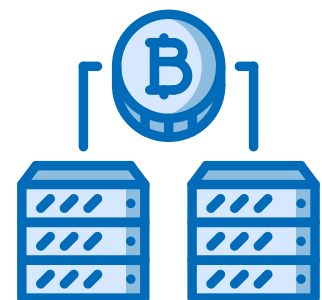
For all its merits, this is a combination of three proven technologies applied in a particular orchestration - the Internet, private key cryptography and a protocol governing incentivisation - that is making this idea get noticed today. We see many challengers who claim to disrupt traditional business models - as well as protectionists challenging in their turn effectiveness of an emerging innovation vs. current practice.

This paper will focus on explaining the basics of blockchain and its potential applications for marketing and advertising as well as existing hurdles and necessary steps and agreements to be implemented on the industry level. However, it's worth noting the span of blockchain use cases across other industries from which advertising should take insight: finance will see blockchain used for cross-currency payments and mortgages, the public sector for citizen identity verification and medical records, and retail for supply chain oversight and loyalty programs - just to name a few.

SECTION 1
Blockchain 101

In the simplest terms, blockchain is a decentralised ledger made up of discreet data records. Invested participants provide either storage or processing resources to ensure the continuation of the blockchain. Each individual copy of the ledger is kept in sync through a peer-to-peer network and all copies are updated when a new, validated record is added as a new block of data. As there is no master ledger that can be compromised, no single entity can change or destroy the records within. For the marketing and advertising industry blockchain may provide an opportunity for all participants in the media supply chain to demonstrate transparency.

A transaction on distributed ledger occurs as demonstrated below:

| 1. Buyer requests a transaction | 2. A block representing the transaction is created online | 3. The block is broadcast to a peer to peer computer network | 3. Network verifies buyer's identity and validates the transaction | 4. Block is added to the chain providing an indelible record | 5. Transaction gets executed and payment moves to the seller |
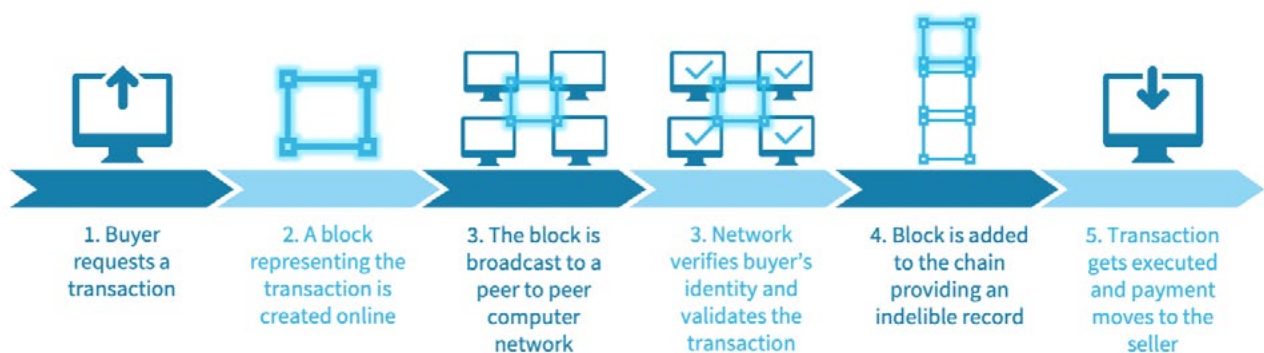
Any blockchain requires a substantial infrastructure investment and pre-agreed parameters – these will be defined by the purpose of the blockchain. If the purpose is to record business transactions then the institutes, vendors and customers involved have a vested interest in providing data storage and processing resources to the continual health of the blockchain. They will also need to define the maximum size of each recorded block and anticipate the eventual scale of the ledger as all storage sites will be retaining a full copy as it grows. Encryption methods and access rights can be agreed upon to ensure that some participants might have access to every record (for instance an underwriting financial bank) and some only have access to particular blocks (such as the buyer and seller of any one transaction they were involved in).

For the advertising and marketing industry the principal benefits of a blockchain-based record of the transactions that occurred between vendors in the media supply chain are mainly of increased transparency. At the most basic level, contract clauses and insertion order details can be recorded ahead of launch. Once live, delivery stats from multiple platforms can be aggregated and saved then accessed for optimisation. Post campaign, records can be checked for discrepancy resolution, quality assurance checks, fraud investigation and eventual invoice generation.

In recent years the agency model has come under fire for a lack of transparency, leading to some clients reducing their reliance on these hubs of collected expertise or in extreme cases investigation by national authorities. An accessible and inviolable record of the planning, purchasing and management of a client's marketing budgets would be a clear vindication of the added value that an agency provides in representing their client's interests.

However, although the core proposition of a blockchain-based infrastructure can be summarised in terms of transparency, the immutability and security it inherently possesses qualifies it as a potential solution for any use-case where alignment and trust between multiple business partners plays a crucial role. As mentioned above, a lack of transparency and thus trust has been an ongoing theme in industry-wide discussions within the media business. From viewability to brand safety, from fraud to targeting accuracy: anyone involved in the planning, buying and performance analysis of digital media knows that it can be very hard to navigate the complexity of "what can go wrong" in programmatic advertising. The discussion on legal regulations as to an open and transparent consent management (GDPR, California Privacy Act) are putting up additional requirements as to transparency on the use of data within the industry and further complicating the situation. While there are specific "natural" limitations to the use of blockchain-based reporting systems in our close-to-real time industry (lack of speed due to the decentral set-up and "backwards validation" being the most prominent one), it is not hard to think of potential applications of the blockchain as a trusted validation tool when dealing with data:

– Initiatives such as the recently announced Data Label Initiative (datalabel.org) could ensure the integrity of the entries in the audience data label
– Fraud and Malware records could be maintained and used to build up an immutable and transparent "risk profile" when running ad campaigns
– Consent Management Systems could potentially benefit from running on blockchain as the integrity of the consent signal given by the user could be structurally guaranteed
– Viewability scores, brand safety ratings or overall targeting accuracy of inventory or inventory bundles could be publicly documented and contribute to establishing a gold standard or "industry currency" regarding impression quality
– Assuming an agreed industry standard on performance measurement via a scaled attribution system, it would in theory be possible to establish a blockchain based public library helping advertisers to easily identify the most promising placements and thus also serving as a price point reference framework for publishers

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This white paper impartially examines blockchain's potential value for our industry, shedding light upon its current capabilities as well as its challenges and limitations. We believe this very detailed and in-depth resource will set the basis for future thinking on how blockchain may enable increased efficiencies and a more trustworthy supply chain for our industry.

Neslihan Olcay, Chair of the IAB Europe Education and Training Committee and CEO of Wavemaker Turkey
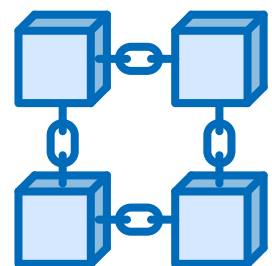
In short, Blockchain – at least on paper – is very well suited to build the backbone of an industry-wide data documentation and management tool thanks to its immutability and inherent mechanics to provide transparency where and whenever needed. The term to keep in mind here is coming from Mathematics and is called "Zero-Knowledge Proof": the opportunity to undoubtedly prove the accuracy of a statement without being forced to reveal all details of the "why". Based on industry-acknowledged quality scores distributed via blockchain business partners can almost blindly rely on the validity and (to-best-knowledge) accuracy of the data they refer to when building campaigns.

Billing and settlement is the most promising medium-term use case, and addresses most of the points made above -- it provides trust and transparency (though it's certainly not the only method for providing those things) while also automating the process of moving money from buyers to publishers. Moving towards real-time payments, or at least reducing the current cycle, will benefit buyers and sellers and eliminate a "tax" in the current system.

Following, let's take a look at what is with little doubt one of *the* most common area of confusion, out of which a plethora of questions stem: are blockchain and cryptocurrencies the same thing? How do they differ?

The Crypto Dimension

Especially with the popularisation of blockchain, terminology such as cryptocurrency (commonly referred to as crypto) or blockchain have at times been used interchangeably. Although at first sight this would not cause immediate misinterpretation within conversation, the term cryptocurrency and blockchain can in fact exist completely separate from one another.

A cryptocurrency in its most basic explanation is a digital currency formed on the basis of cryptography, the latter being the art of writing or solving codes. Cryptography brings with it the notion of security and is also applied outside the realm of currencies. Just think back to the Second World War or popular adaptations of Alan Turing's life in the movie 'The Imitation Game'. Here the use of cryptography was used to write or solve code to secure communication. Bringing it back to the idea of currencies, one can of course create a digital currency and secure it by means of cryptography.

However, the securitisation by means of cryptography does not necessarily imply the use of the blockchain technology. In fact, one can look at a variety of cryptocurrency projects and argue if blockchain technology is being used. This is not necessarily bad or good, it is merely an observation which one can also consider logically. A person could create a single digital coin on their own computer and secure it using cryptography. As was explained in the previous section, in the simplest terms, blockchain is a decentralised ledger made up of discrete data records. A person creating and owning this single coin in a centralised way is not using blockchain but in fact does have a cryptocurrency. He or she could simply have a small database.

Looking at it from the perspective of blockchain technology, one can have a blockchain and not a cryptocurrency. There can be a decentralised ledger kept in sync through a peer-to-peer network where all copies are updated when a new, validated record is added as a new block of data without the existence of a cryptocurrency and accompanying token. However, this is precisely where the underlying value add of a cryptocurrency also becomes apparent.

Maintaining a decentralised network, keeping it in sync and adding new blocks to the blockchain is not a free endeavour and even less so when it is secured by means of cryptography. A change to the network or a transaction costs processing power which costs energy which has a price. The price for an individual transaction can be low, however once a network starts to scale the overall cost to maintain it can increase drastically. This is exactly where it becomes interesting to have the combination of blockchain and a cryptocurrency. The cost to maintain the network with all its transactions can be compensated by means of cryptocurrency.

This practically means that there are people offering up their computers processing power to maintain the network and in exchange receive the cryptocurrency associated with that blockchain network. Or as one can see today as well, not a single person but entire companies that have 'mining farms' which are basically many computers offering up processing power to maintain the network in exchange for compensation. As the term mining farm gives away, the act of using processing power to maintain the network is called mining (although not every blockchain project will refer to this act as mining depending on the specifics of the project).

The incentive or compensation also to a large extent explains why the terms cryptocurrency and blockchain have been used interchangeably at times. The media hype of 2017 and 2018 around blockchain came into being due to the exponential increase of cryptocurrency value compared to dollar value. People were buying up cryptocurrencies with the expectation that the blockchain project and network tied to that currency would scale up and as such price would follow. The consequence was that most projects people came in contact with were in fact projects that used this structure of cryptocurrencies as incentive to maintain the network. However, as explained above, it is not a necessity for a blockchain network to function per se.

Blockchains that require crypto vs. blockchains that do not

Some blockchains require a native cryptocurrency as part of their core protocols and others do not. Consortium (private) blockchains do NOT require a cryptocurrency or "coin". But, public blockchains do. The reasons for this have to do with the incentives associated with how public blockchains arrive at consensus (how people come to agree on which version of the blockchain is the correct one).

As previously described, the blockchain is the ledger that records all the data. The data is made up of transactions which are subsequently bundled together in blocks. The blocks of data are cryptographically anchored to one another in a chain. This chain of cryptographically linked blocks of data is distributed to nodes. These nodes keep a copy of the blockchain and check the other nodes to make sure their copy is the same as everybody else's. This is another way in which public blockchains stay secure and tamper resistant.

The blockchain also keeps all users account balances up to date so that if Alice sends 10 Bitcoins to Bob, everybody in the Bitcoin ecosystem knows about it and both Alice and Bob's account balances accurately reflect this transaction. The state of every user and every transaction since the beginning of the blockchains history is recorded on the ledger. This guarantees that nobody can game the system by spending crypto they don't have.

But herein lies a dilemma. How are nodes in a public blockchain ecosystem properly incentivised to keep a copy of the blockchain and to check other nodes? And how are miners incentivised to bundle transactions into blocks and add them to the chain of previous blocks? The answer is *cryptocurrency*.

Cryptocurrency is the incentive mechanism that keeps public blockchains from falling apart. It is the glue that binds the system together. Without cryptocurrency, there would be no material reason for miners to bundle transactions into blocks and add them to the chain. This is because the Proof-of-Work consensus algorithm public blockchains like Bitcoin and Ethereum currently rely on is purposefully energy intensive. In other words, it is designed so that miners must use hardware devices that consume electricity to engage in the process of adding new blocks to the chain, and this means they incur costs. To offset these costs and to even make it a profitable enterprise, when miners successfully add a block to the chain newly minted cryptocurrency is awarded to them by the core protocol.

Cryptocurrencies are introduced into the market by miners and the cryptocurrency can then be acquired by everyday people to be used as a store of value, medium of exchange, and unit of account. In fact, all digital currencies can be used in this way, but some are better suited than others, depending on the use case.
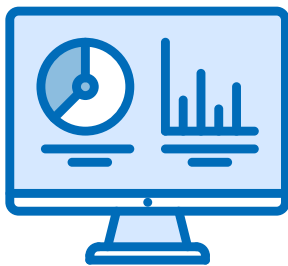
The difference between tokens and cryptocurrencies

Tokens function in the 'application layer' of the blockchain. Tokens have nothing to do with keeping consensus, minting new crypto to reward miners, tracking account balances, validating transactions, or any of the low-level maintenance required to keep a public blockchain's core functionality intact.

Developers of decentralised applications (Dapps) can write and deploy smart contracts to programmable blockchains that assign arbitrary functionality to tokens i.e. the tokens do something specific within the Dapp. Examples of these specifics include, but are not limited to: assigning reputation, granting voting rights, accruing gaming credits, storing digital collectibles, providing governance rights, paying dividends, etc.

On the contrary, cryptocurrencies as such are inherent to the low-level protocol and are only created as a means to reward miners that add new blocks to the chain. Once they are created, they enter the marketplace where ordinary people can acquire them.

The key takeaways are that a blockchain denotes the ledger that stores all transaction history while cryptocurrency is the digital money that is *being* transacted.

Tokens and cryptocurrencies are similar insofar as they are both digital currencies, but tokens operate one layer removed from the core protocol while native cryptocurrencies are intertwined with the core protocol layer.

In conclusion to this section, the extreme fluctuation of cryptocurrencies over the past two years have unleashed an interesting dynamic with regards to the public perception of the blockchain topic. While cryptocurrency related business model at the peak of the Bitcoin hype were able to crowdraise significant amounts of money and no major public attention was given to the underlying data network infrastructure the tide has turned in the past 12 months and interest is increasingly shifting towards blockchain itself and the promise of the technology. The dynamics bear an interesting similarity to what happened in digital almost 20 years ago: while the short-term win big bubble burst when the New Economy crashed it also revealed the promise of how the internet as such could become the fundament to a sustainable digital industry (which it did, looking at the following success of companies such as Google, Facebook or Amazon). Blockchain seems to be in a strikingly similar position today with a reality check after the first hype and a focus on building future-proof applications on a new and promising technology.

SECTION 3

(re)Building Digital Advertising Block by Block

The unique properties found in blockchain-based systems have the potential to drastically improve efficiency, and trust, and to a certain extent, privacy, across a complex and ever-evolving advertising supply chain. In order to fully understand blockchain's promise to our industry, it is helpful to first revisit the building blocks of blockchain-based systems. At its core, blockchain offers a technological and automated way to securely and transparently record transactions. If properly implemented, also doing this efficiently. It is this combination of security, transparency and efficiency that generates trust.

The notion of trust is crucial as this is where one sees the initial area of focus for blockchain. Many use cases inside and outside of advertising consist of the replacement of institutions, companies or jobs in a bid to build trust. However, the way trust is created more traditionally is through reputation, experience and achieving certain scale. The difference with blockchain is that instead of relying on reputation, experience or credentials, the necessities of security, transparency, immutability come as a technological promise inherent to the product i.e. the blockchain.

However, the balance between the fundamentals of security, transparency, efficiency and decentralisation can differ without necessarily causing issue. For some use cases security is such a key factor that actually efficiency can take a hit or perhaps a company does not see the value add of decentralisation and wants a more centralised approach. It is possible to then fall into almost philosophical debate about whether one is still dealing with a blockchain project or not; consequently, terminology such as 'hybrid blockchain' or 'private blockchains' came into being also indicating blockchain is not a black and white space.

What blockchain does, however, is provide an opportunity to rethink several key elements of the advertising value chain. Let's take at look at the areas of digital advertising where this technology could have the most pregnant impact.

Core Use Cases for Advertisers

The following blockchain advertising use cases have been outlined by the MRC as recommended areas to explore and experience for digital advertising technology partners;

– Ad Inventory Requisitions
– Ad Verification
– Content Collaboration
– Digital Asset Management
– Identity Management
– Media Buy Management
– Royalties Contract Management
– Volume Discount Management

Essentially, the blockchain technology, using the above mentioned building blocks, provides an opportunity to rethink several key elements of the advertising value chain:

– **Identity Management:** Understanding a consumer's identity and purchasing behaviour across a multitude of media platforms, content providers, advertisers, and devices in a privacy-compliant manner is a source of friction in today's ecosystem. Leveraging cryptographic techniques common in blockchain systems, multiple parties with the appropriate consumer consents (or other lawful basis of processing) could securely match identities against a marketer's target audience without exposing personal data to network peers beyond a unique computer-generated and pseudonymised user ID. This offers the benefits and efficiencies of audience-based planning, buying and targeting, but potentially with less risk exposure in relation to consumer privacy laws (including GDPR and other privacy frameworks).

We have already seen a potential expansion of the existing successful IAB ADS.txt initiative with ads.cert – a pre-verified identity token that can be passed along the supply chain from the originating publisher to prevent domain spoofing. A fully developed blockchain-based implementation could significantly reduce the amount of fraudulent or misrepresented traffic being passed along.

At an individual customer level in a post-GDPR world, customer preferences previously recorded on cookies located on the user's machine could instead be saved, accessed and adhered to via a blockchain, ensuring a consistent experience across the digital advertising ecosphere and reducing the need for individually tailored agreements at each step.

– **Verification, Validation & Measurement:** Rather than relying exclusively on trusted third parties to validate transaction authenticity for billing and accounting, a blockchain-based approach could be used to verify ad delivery through digital signatures, a shared ledger, and software-based rules to align behaviours and make tampering infeasible. Depending on the implementation, this type of approach to verification could reduce costs and create efficiencies for proving certain types of activities occurred without relying on a third-party validator.

– **Value Transfer:** Leveraging a combination of digital signatures, software-encoded rules and parameters, an immutable ledger of transaction records, and aligned incentives provides the building blocks necessary to leverage "smart contracts" to appropriately transfer value throughout the supply chain. Smart contracts work similarly to traditional contracts (either paper IOs or automated workflow systems) by outlining parameters of an agreement, but they could be used to automatically collect payment and enforce contract parameters. The end result is greater efficiency and automation in the ad supply chain, which allows for an increased number of deals to be made at one time.
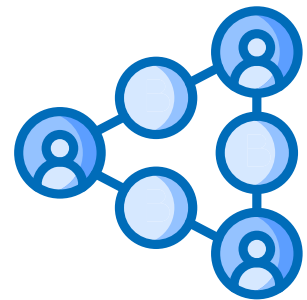
The emergence of blockchain is expected to eventually simplify and automate the ad supply chain and cut out the need for intermediaries such as traffic aggregating networks and Supply-side Platforms (SSPs). Smart contracts work similarly to traditional contracts (either paper IOs or automated workflow systems such as Mediaocean Prisma) by outlining parameters of an agreement, but they automatically collect payment and enforce contract parameters. The end result is efficiency and automation being brought into the ad supply chain which allows for an increased number of deals to be made at one time.

Depending on the scale of investment and implementation, blockchain has the potential to enhance all areas of the digital advertising industry, as it does with any industry that relies on consistent storage, measurement and validation of delivery stats.

Tempering the Optimism

While blockchain-based systems and techniques provide numerous opportunities, it is critical to ensure that the building blocks are applied consciously in ways that make sense for the underlying business context. The benefits of blockchains come with well documented costs and tradeoffs. Each of these must be carefully considered when deciding which elements of a blockchain-based systems add value and are truly necessary for the given problem, and to which degree of decentralisation is really necessary.

Blockchain, most experts believe, will absolutely become an integral part of advertising tech. It will take some time - most of the blockchain applications we are currently working with are squarely in the "experimental" category - but the very nature of ad tech means that shared services and community assets have a real place in our industry.

Let us then, in the following section, take a look at what limitation and challenges affect blockchain where its applicability in the advertising ecosystem is concerned.

SECTION 4

Challenges and Limitations in the Ad Industry

Blockchain's potential gives us all a lot to get excited about. However, it is important to keep in mind that the technology application for advertising is still in its infancy and no full blockchain solution has yet launched for general availability. In some cases, private solutions are being touted that would require buy-in to a centrally-controlled source, thereby obviating some of the advantages. A consistent and open iteration of the technology requires widespread acceptance by all parties of the ad supply chain for it to have any major impact on the media industry.

To put it briefly, the biggest technical issues with blockchain right now are time and scale. Our industry is very, very latency-sensitive (we have about 100ms to receive and ad slot, run an auction and return a creative) and we operate at an incredible scale. Then there are the issues of costs as well as education (or lack thereof) in the market as to the benefits of the technology. Let's briefly go over the main pain points for the application of blockchain in the digital advertising industry.

1. Technological Limitations:

It is safe to say that if a person is optimising for speed, blockchain might not be one's best choice. There are limitations with the speed of blockchain technology, meaning slower processing time (not real-time). It is also still unclear if the blockchain technology can solve marketplace issues and provide real added value. Whereas the current technology could be used for recording daily tallies of delivery it would not be viable for individual impression-level transaction tracking. So far, most industry players seem to be aligned on the assumption that limited speed is posing a massive challenge to an application of blockchain within real-time advertising.

At this stage it is still fair to assume that close to real time processing of data is not a natural application of DLT. That being said, there are only a few areas of true real-time applications within the digital industry. Following the assumption that the application of blockchain will be related to providing validated and acknowledged reference data (be it on brand safety, viewability, ID management, audience segments or any other "collateral" data point) used for a qualification of impressions and campaigns and as such a use in forecasting / planning and reporting the speed limitation becomes much less of an issue.

2. Infrastructure Costs:

The solutions in the market are facing scaling challenges, as the technology requires all parties in the supply chain to participate. Companies are hesitant because the solutions are not fully fleshed out. Lack of participation is also greatly due to the expensive costs associated with implementation and maintenance of a true blockchain solution. For example, the data associated with blockchain must be stored indefinitely and will continue to grow exponentially. This cost is billed back to every member of the supply chain. In an industry already motivated to remove additional fees, the introduction of a blockchain fee will likely cause additional adoption problems for advertisers.

However, while it's true that infrastructure cost is directly related to the potentially infinite data growth associated with the blockchain, specialist blockchain service providers have already today found ways how to limit the amount of data to be stored directly on the blockchain. It's worth to state clearly that the blockchain had never been designed to be used as a core data management tool, but much rather as a protocol to transparently and securely manage data access.

3. Data Management:

The market is making strides in its efforts to achieve fraud free and brand safe inventory, but there is still a significant amount of spend going to long tail and questionable publishers. By implementing blockchain technology for advertising, there must be a plan in place by the brands, agencies, vendors, and publishers to execute on the influx of data that the solution will unveil. The future goal of blockchain is to maintain a ledger of bid stream level data, which would include all transactions won and loss. It is likely that the data the solution will provide extends far beyond what is currently available in the marketplace and teams are not prepared to interpret and ingest.

4. Education & Awareness:

The benefits that blockchain provides have yet to become well known across the industry, demonstrating the need for education on the existence and benefits of the technology. Until there are industry case studies showing its true value to brands' strategy and overall business, blockchain solutions will lack scale and adoption.

Ultimately the whole point of an application of blockchain within advertising would and should be serving the goal of adding more transparency and security to critical data points used to ensure higher quality in advertising. As such, a non-compliance of e.g. longtail ad networks with an industry best-practice should hopefully lead to an exclusion of those questionable market players from the value chain. Therefore, one could say that the biggest challenge to blockchain in advertising does not lie in the technology itself, but rather in the prerequisite of an industry-wide agreement on blockchain as a tool that leaves basically no hiding holes for anyone in the market. Or to put it positively: equal conditions for everyone.

It will take time for the limitations be overcome, experimentation and investment. We are actively experimenting with blockchain technology today, but moving that into mainstream production applications is probably still a few years out at best.

Regulatory hurdles and privacy concerns are omnipresent in our industry, and the industry will need to fully evaluate each implementation of blockchain technology. I think we will be able to deploy this technology responsibly, but we certainly will have to face this head on.

Implementing blockchain at scale will require industry collaboration and needs to be supported by and facilitated by industry working groups such as the IAB. One of the biggest barriers to the solutions outlined in this paper is the sheer complexity of the ecosystem -- there are buyers, sellers, buy side platforms, sell side platforms and literally thousands of third-party systems (measurement, attribution, data, targeting, fraud prevention, etc.) that must be included in the system and which need published, agreed standards and norms to operate. Establishing these systems are critical to deploying blockchain at scale.

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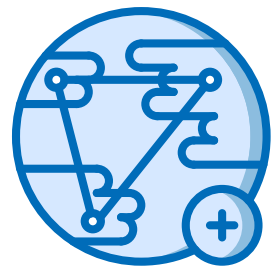
Ultimately, even if the promises of trust, transparency, and security don't fully pan out, hindered by the hurdles highlighted in this white paper, blockchain may become a trigger and the catalyst for some bigger and more complex projects to modernise clunky and still partly digitised ecosystems in marketing and advertising.

Anton Kopytov, Partner Technology Consulting, Mindshare Worldwide and Chair of the IAB Europe Research Committee

SECTION 5
Hands on: Use Cases in Advertising

BLOCKGRAPH

Blockgraph is an industry initiative led by Comcast's FreeWheel group, with participation by some of the biggest companies in TV, digital video, and advertising across the US and Europe. It is designed to become the "identity layer" for the TV industry, providing a platform on which media companies and publishers can offer marketers data activation capabilities without disclosing much identifiable user data beyond a pseudonymised user ID – adding additional protections to user privacy than traditional data transfer.

Blockgraph provides a platform that allows participating organisations to directly match insights from their data sets quickly, and most importantly, in a way that considers consumer privacy. This shared audience understanding can then be applied to enable advanced planning, targeting, measurement, and analysis. Once the identity layer has been established, Blockgraph software can be used to enforce the appropriate data rights agreements and policies when information is being exchanged. Blockchain is then used as an immutable ledger to validate usage and ensure value is fairly exchanged.

By connecting data insights across the entire TV ecosystem, while protecting data ownership and considering consumer privacy restrictions, Blockgraph will enable TV to pair its already great ability to reach and engage mass audiences efficiently, with an increased ability to offer richer and deeper data insights.

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PRIVACYCHAIN

PrivacyChain was designed to allow companies to more easily manage and control how they handle and share users' personal data, while providing users control over opt-in and opt-out. As the data ecosystem has fragmented and companies collect or update hundreds of millions of consents a year, it has become incredibly difficult to ensure that all members of a data supply chain have the most current consents.

The PrivacyChain ensures its participants have a single, consistent, up-to-date view to consumers opt-ins or opt-outs to help publishers and advertisers build more trusting relationships with their customers. It also provides companies with a standardised consent management solution which speeds and simplifies deployment for all their partners in the data supply chain. And because of this consistency and ease of deployment it simplifies companies' ability to prove that they are complying with numerous consumer privacy regulations worldwide, including(GDPR, the European Privacy Directive and the California Consumer Privacy Act, as well as a company's own privacy policies.

Use Cases

- **Consent Collection:** Data Collector captures consent when an individual's personal data and opt-in preference is being collected.
- **Data Movement Tracking:** advertiser tracks audience data movement when personal data is transferred to a third party.
- **Data Movement Tracking:** third party tracks audience data movement when data is transferred to another third party. All third parties. delete audience data post campaign
- **Consent Collection:** Data Seller captures individual's consent when individual's personal data is being collected.
- **Data Movement Tracking:** Data Seller tracks data movement when individual's data is sold and transferred to third party.
- **Individual Inquiry:** individual inquires consent status and data movement.
- **Data Propagation:** individual manages his/her consent and updated consent propagates to downstream entities.
- **Auditing:** regulator auditing Data Collector and Data Processor's privacy practice.
- **External Governance and Monitoring:** regulatory authority and consumer advocacy group monitors the integrity of the consortium.

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UNILEVER AND IBM

Unilever has started a pilot program that tracks the digital ad buying ecosystem via blockchain with a believe the technology potentially enables increased efficiencies and a more trustworthy supply chain, as well as reducing cost and fraud in two key aspects:

– financial transparency, which tracks a media buy from a media insertion order through delivery to reduce discrepancies
– supply chain transparency, which tracks an impression's delivery path from bid to fulfilment, including each vendor, charge and impact on performance.

The system that is under development promises to tackle not only the issues of buyer verification but also to create a way for all involved parties to visualise every part of the advertising process. In practice, this means that every party to a digital advertising transaction would be logged into the blockchain ledger, including identity, financial stake data, and location.

The transparency created by the system will make it far easier for advertisers and the ad platforms themselves to know how efficient their campaigns are as well as assuring that brand managers know exactly who is involved in the process at every stage.

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adChain Audits by MetaX

adChain Audits aims to detect and neutralise the impacts of fraud in digital advertising campaigns. By measuring the validity and authenticity of each supporting channel, adChain Audits ensures marketers reach intended audiences and optimise their supply chain.

adChain Audits gives clients the ability to cement a historical record of their campaign data on the blockchain. This allows them to demonstrate that their campaign data hasn't been altered or manipulated in any way since its original flight dates and to check the validity of the campaign data on the blockchain, in real time, to ensure it has not been tampered with.

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SECTION 6

What Lies in Store

The unfortunate truth is that blockchain is as exciting as double-entry bookkeeping to most, but it is worth appreciating how revolutionary the double-entry system was to banking and the merchant sector in providing an audit trail and has remained the dominant method of accounting since the 13th century. Just as double-entry engendered a fairer trading framework and facilitated levies and taxes in support of increased trade and infrastructure such as marketplaces and trade routes, blockchain has the potential to revolutionise ownership records, negotiations and dispute resolution on a global scale.

In fact, blockchain technology is making rapid advances on numerous fronts. Top researchers are working tirelessly to solve critical computer science problems that will usher in the next generation of high-transaction throughput, ultra-scalable, public blockchains.

Blockchain has officially entered the mainstream. Mass media outlets provide breaking news coverage about blockchains daily. Colleges and universities are offering blockchain curriculum.

In terms of specific technological breakthroughs that we can look forward to seeing in the near future, solving the trilemma is the most pressing concern for public blockchains. It is where the most effort is being spent on the research and development front.

What is the trilemma for public blockchains? The trilemma for public blockchains is that at any given time it can only achieve at most two-out-of-three of the following properties; **decentralisation**, **security**, and **scalability**. The trilemma accounts for why public blockchains have such pitifully low transaction times.

Overcoming the trilemma: The core developers of public blockchains realise that the only way to achieve mass adoption is by tackling and overcoming the trilemma and that is precisely what they are focused on. By altering the consensus algorithms, developing second layer scaling solutions, and making mission-critical updates to the computation layer, these blockchains aim to break out of the pretzel hold they are currently bound up in.

Sharding: To mitigate issues around scalability, and to maintain security and decentralisation some developers are working on a Sharding spec that will effectively break up the nodes that are responsible for validating transactions into "shards". By tasking only a subset of nodes with the responsibility to validate only a subset of transactions, the blockchain can achieve greater transaction throughput. Sharding public blockchains may provide a way out of the scalability part of the trilemma.

Second layer solutions: second layer solutions refer to reducing transaction wait times and fees through the use of technologies like State Channels, Lightning Network, or Plasma. These technologies allow users to transact with businesses or users repeatedly and in a closed secure environment without needing to pay costly transaction fees to miners for each individual transaction. Users only make use of the core blockchain
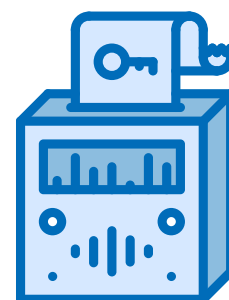
layer or the first layer when it comes time for settlement which can be done in batches. An analogy often used to describe second layer payment channels is the bar tab. You open your tab at the beginning of the night and order as many drinks as you like. Only when it's time to close out and go home do you officially get rung up for all of the transactions. There are clever ways to guarantee that nobody can skip out on the bill. If they do, then the counterparty can bring the proof of the previous transaction history to the blockchain for automated arbitration and dispute resolution.

As we can see, there are known <u>problems</u> with public blockchains but researchers are doing their best to come up with sophisticated ways to route around them. Solving the trilemma will be paramount for the future success and widespread adoption of public blockchains. First layer updates like Etransition from Proof-of-Work to Proof-of-Stake and Sharding will play a critical role. But second layer solutions like State Channels and Lightning Network will reduce friction for users when they engage in applications that require consecutive transactions in fast order, which are especially useful for digital advertising where huge numbers of impressions must be processed in a secure environment.

From a slightly different perspective, it will be interesting to see if ongoing and upcoming disruptive changes to the industry such as GDPR, the rise of ID Management Consortiums or the growing stake of one-to-many digital channels such as DooH within the industry will trigger a shift across market participants to trying out a new and promising technology rather than building upon what is already there in the market. One of the biggest advantages of blockchain lies in its flexibility. Once the infrastructure is in place, it can record and document any kind of data. Individualised keys tailored to a variety of use cases can then regulate elegantly which parts of the data is used by whom and how. As such, we may soon see an application of blockchain not limited to one use case, but rather the deployment of a blockchain "backbone" to all use cases outlined already today by the IAB from ad verification through inventory qualification to identity management.

Ultimately, providing that blockchain can distance itself as a concept from the narrow implementation of cryptocurrency that has become most people's introduction to the technology, along with the associated negative connotations of currency speculation, untraceable dark web payments and destructive ecological impact it will gain acceptance as an efficiency boost and trust-builder in our industry.

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Blockchain holds for many the promise of a more transparent and secure ecosystem, one conducive to exchanges based on trust. For that to happen, however, players need to be informed and educated on the opportunities blockchain presents, as well as its shortcomings. Blockchain Demystified is the first piece in what we hope will become – with the support of our members – an instrumental library of resources on the topic at IAB Europe.

Alex Macarescu, Programme Manager, IAB Europe

Conclusion

Blockchain may become a trigger and the catalyst for some bigger and more complex projects to modernise clunky and still partly digitised ecosystems in marketing and advertising. There are 5 essential components which should be addressed systematically to ensure we are well prepared to release value from DLT and Blockchain when scalability and other hurdles will be overcome:

1. It is essential to get data strategy be prepared for Web 3.0 where more than 70% of the information will be scattered all around the web. It is important to understand and manage the distributed nature of the information – how it is generated, stored and processed – where, when, how and by whom – and moreover nature of ownership as well as consent and permission. Importantly it applies not only for the organisation but across all its partners, including data providers, publishers, intermediaries and everybody else in the ecosystem.

2. Start thinking about how to organise and synchronise all the data sets for shared access unifying naming conventions and taxonomies behind them to create distributed database as the basis for distributed ledger. Distributed Ledger is expected to de-duplicate CAPEX investment and unlock potential efficiencies in deploying them.

3. Understand the world of cryptography that guards and protects our information when any transaction on internet happens. We need to find the right one for our industry, one that is common to all, protected and constantly upgraded by all as an industry.

4. We need to align on what should be the consensus protocol that is best suited for our industry. Is it Proof of Work? Is it Proof of Stake? How are the nodes managed? Who all are forming part of the consensus? What is the alliance between all of them? Building consensus is indirectly proportionate to speed of response. With million+ impressions being bought every second what is the compromise we are making to the protocol? What are the additional optional layers to this?

5. Blockchain technology is seen as a manna from heaven to solve fraud, fake and frenemies. How can a permissioned blockchain address this? Should it be the industry standard or competitive advantage? Is this not-for-profit or a business with growth ambitions?
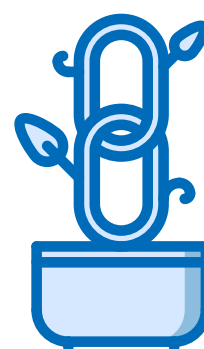
It is born. And looks very promising. We wish it good luck. Still a lot of effort and resource should be invested to nurture and bring it up, difficult agreements to be made by all ecosystem players before we will see how it may help us to cope with existing industry challenges and step-change the industry to a new level.

With Thanks

IAB Europe would like to thank the white paper leader that helped to edit and compile this white paper:

Anton Kopytov
Partner Technology Consulting, Mindshare Worldwide and Chair of the IAB Europe Research Committee

And the white paper contributors that provided content for this white paper:

Thomas Park
Senior Director Product Management, Adform and Co-Founder Advanced Blockchain Solutions

Samuel Zwaan
EU Product Lead Programmatic Advertising, eBay

Emmanuel Josserand
Brand, Agency and Industry Relations, FreeWheel

Jason Manningham
General Manager, Blockgraph

Giordano Buttazzo
Ad Tech Manager, IAB Italy

Sebastiano Cappa
Board Member, IAB Italy, ExCo Board Member, IAB Europe, and Managing Director, Ligatus Italia

Michele Marzan
Board Member, IAB Italy and Chief Strategy Officer, MainAd

Hunter Gebron
Director of Strategic Initiatives, MetaX

Dee Frew
Associate Director of Technology and Activation, Publicis Media

Tej Rekhi
VP Group Development Precision EMEA, Publicis Media

Tom Kershaw
Chief Technology Officer, Rubicon Project

Contact Details

Alex Macarescu
Programme Manager
IAB Europe
macarescu@iabeurope.eu

About Us

IAB Europe is the leading European-level industry association for the digital advertising ecosystem. Its mission is to promote the development of this innovative sector and ensure its sustainability by shaping the regulatory environment, demonstrating the value digital advertising brings to Europe's economy, to consumers and to the market, and developing and facilitating the uptake of harmonised business practices that take account of changing user expectations and enable digital brand advertising to scale in Europe.

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