

BPC Platform Technology Whitepaper

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Introduction

Purpose

BPC Technology Whitepaper is aimed at advertising industry professionals, publishers, CTOs, analysts and investors, wishing to understand how BPC plans to introduce the new paradigm of programmatic landscape.

The purpose of this whitepaper is to provide a high-level technology overview of the BPC Platform and system architecture. The readers are supposed to have basic knowledge of programmatic RTB and blockchain technologies.

Please refer to *Glossary of Terms* at the end of the documents if needed.

Scope

The scope of the whitepaper is limited to brief and overall descriptions of the technologies BPC Platform already has in its inventory or plans to develop and integrate soon. The whitepaper provides readers with an overview of BPC Platform architecture, its core components and functionality. It does not contain detailed technical descriptions or source code, except for a few examples to illustrate differences compared to the corresponding solutions in the similar technical environment.

Overview

Programmatic RTB market is currently in the 'private' period of its evolution, denying access to RTB opportunities for many publishers and advertisers, who are now struggling off the game. Those who stay in also experience many complications and intricacies caused by both the private nature of most marketplaces and intransparency of the approaches which are now the industry standards.

Let us outline the major challenges of programmatic advertising:

- Lack of trust and transparency
- Single aggregate bids
- Deal attribution absence
- Traffic fraud

These drawbacks determine the current status quo in which all the participants tend to join private programmatic RTB marketplaces or even create their own ones.

This makes it almost impossible for smaller advertisers or publishers to be competitive and benefit from using programmatic as a superb way to drive traffic and make profits out of it.

In this document we describe the aforementioned challenges and BPC Platform approach to disrupt the market and make it attractive to everyone on the basis of trust, stability, transparency and mutual benefit.

BPC Platform

Architecture overview

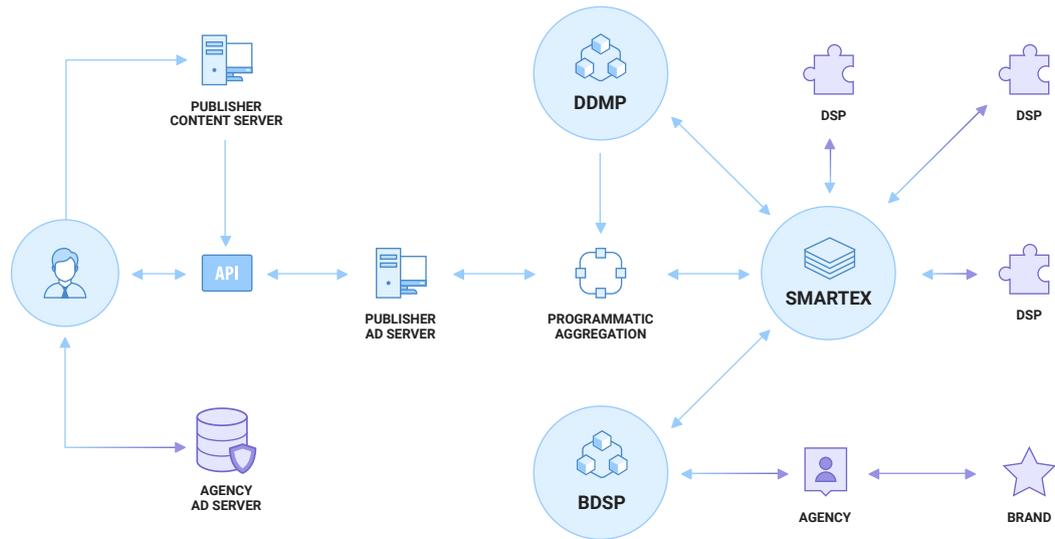
BPC Platform consists of 3 core advertising software stacks that have been fundamentally re-architected to leverage blockchain technologies for truly distributed processing: Blockchain DSP (BDSP), Decentralized DMP (DDMP), and Smart Contract Ad Exchange (SMARTEX). All modular platforms are developed using a unified architecture and shared components, designs, reports, and UI models. They will function within a specially crafted virtual machine, which will also be installed on mining facilities to integrate them into BPC data processing cluster. Core API is available using JSON-RPC over HTTP using HTTP POST and WebSockets.

The key differentiator is that BPC Platform is based on patented technology of high-speed blockchain transactions allowing real-time auctions in a distributed environment.

BPC Platform is an integrated solution for modern advertising, it is a linearly scalable, low-latency platform with the following attributes:

- secure data propagation with distributed storage, editing and maintenance;
- real-time blockchain bidding;
- transparent and secure data transactions via a unified deal ID ledger;
- smart contract-enabled attribution, audience, and content analytics.

The platform fairly distributes proceeds, offers consensus-based management and fraud protection, enables cross-border payments and provides a completely new level of advertising reach, therefore making the programmatic RTB market capable of efficiently catering to all kinds of advertisers and publishers, no matter what size they are.



BPC Platform has a unified architecture. BDSP, DDMP, and SMARTEX all share an underlying blockchain based ultrafast-transaction technology with distributed P2P architecture, semantic categorization and content analysis and verification technologies, smart contract mechanism, user interface and CPM token exchange mechanism. Below we describe each of the BPC platform core components.

BDSP - Blockchain Demand Side Platform

BDSP BRIEF OVERVIEW

BDSP is a linearly scalable, low latency blockchain-based demand side platform. It allows advertisers, trading desks, and partner DSPs to place and manage programmatic ad campaigns using BDSP console or OpenRTB API.

BDSP supports all business and technological requirements of programmatic platform, including semantic categorization, and automatic audience segmentation, integration with DMPs, cookie matching, pre-targeting and dynamic retargeting, conversion pixel optimization.

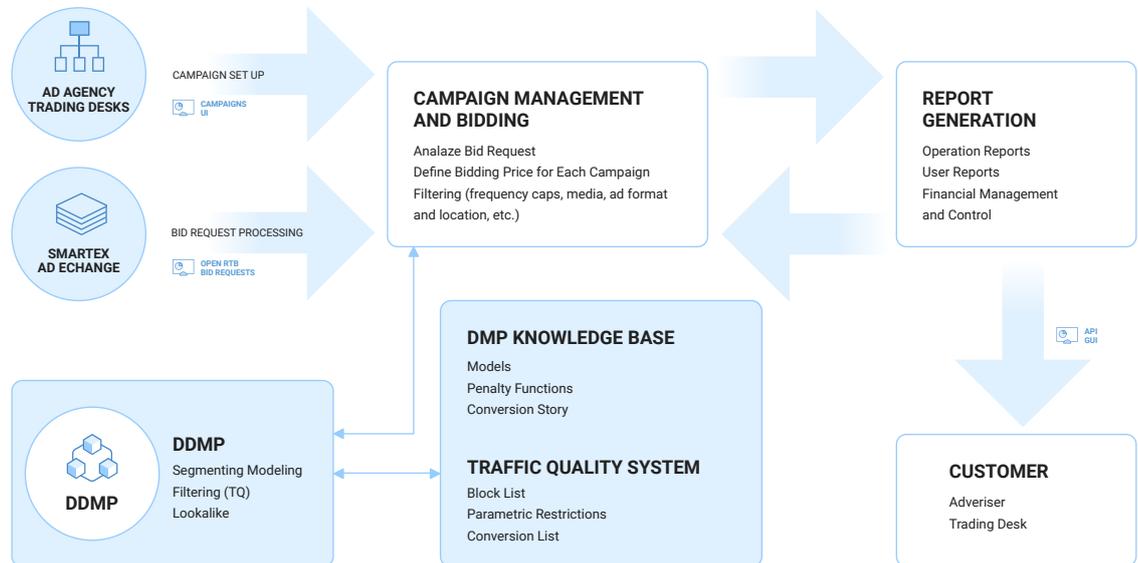
BDSP has ~1.5ms latency and throughput ~8.5B bid requests/day.

BDSP FUNCTIONALITY AND ARCHITECTURE

- Contextual Media Targeting: real-time media categorization, bid by keywords and categories, automatic blacklist of fraudulent IPS, data centers, advertisers;
- Behavior Audience Targeting: Support 20,000 global DMA regions, search by psychographics, demographics profile history.
- Bidding Strategy Management: unlimited lineups, rule-based strategy modeling, conversion pixel optimization.
- Retargeting: static, dynamic, and search retargeting

ARCHITECTURE OF BDSP

The functional architecture of BDSP:



DDMP - Decentralized Data Management Platform

DDMP BRIEF OVERVIEW

DDMP is a linearly scalable, low latency real-time decentralized data management and analytics platform. It provides state-of-the-art audience analytics to the advertisers, and allows to create target audiences based on a combination of in-depth first-party and third-party audience data.

DDMP DESIGN PRINCIPLES

DDMP is designed for Internet scale operation:

- Linearly Scalable
- Performance: latency: ~15ms, throughput ~8.5B bid requests/day
- Ingests bid request data in OpenRTB format
- Composes and interoperates through API-level integration
- Supports real-time and batch mode operation
- Blockchain-based
- Decentralized Peer-to-Peer
- Decentralized Application on BPC Platform

DDMP MAJOR FUNCTIONALITIES

Collection: collects data about customers and prospects from web traffic, advertisements, websites and mobile applications, and matches collected data with the knowledge database and first/second/third party data.

Integration: facilitates robust single customer and prospect analysis/unified audience tracking

Analytics: serves as the hub of real-time analytics-driven marketing, powering targeted marketing execution while sensing and responding to outcomes.

Segmentation: provides advanced cross-channel campaign analytics, predictive modeling and audience segmentation.

Marketing activation: activates customer and prospect data by connecting to display and video advertising, website personalization, search, email etc.

UNIQUE TECHNOLOGIES

DDMP integrates:

- **Behavioral Technology**
 - Parametric Demographics and Psychographics Analytics
 - IP/Device ID-based Audience Multi-Criteria Parameterization, Categorization, and Segmentation
 - Audience Search and Web Surfing History Analytics
 - Real-time Traffic Quality Scoring and IP quality parameterization for lookalike modeling and segmentation
 - Probabilistic cross-device mapping
- **Semantic Technology**
 - Semantic categorization of web content and web traffic
 - Semantic categorization of search terms
 - Keyword Proximity Association (Broad Match) and Keyword Categorization
 - Domain name disambiguation
 - Text analysis, categorization and summarization
 - Brand Protection (alcohol, tobacco, violence, drugs, adult, profanity etc.)
- **Data Processing System and Machine Learning Models**
- **Knowledge Database**
- **Analytics reports**
- **Blockchain open ledger**

DESIGN PRINCIPLES

Shared-Nothing Computation Model

On new hardware, the performance of standard workloads depends more on locking and coordination across cores than on performance of an individual core.

DDMP targets extreme performance on multi-core distributed hardware, and completely avoid locks for cross-CPU communications by consistently using: shared-nothing computation model, integrated high-performance blockchain data storage technology, lockless sharing of immutable and copy-on-write data by multiple processes, modular concurrency model: cooperative threads, consistent concurrency primitives (futures, promises), functional programming style, zero copy data transfer.

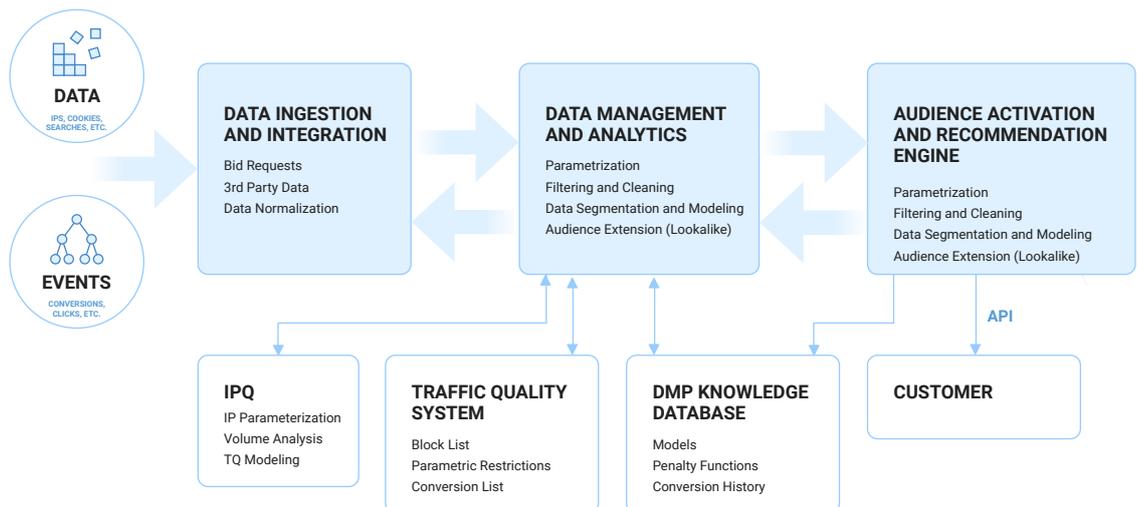
DDMP runs multiple service engines, one per core, each with its own memory and CPU and bonded NICs.

UNIFIED BLOCKCHAIN-BASED DATA MODEL FOR REAL-TIME SERVICE

Real-time DDMP service uses unified internal data graph model for all served analytics. The data model minimizes real-time service access time, and heavily relies on immutable pre-sorted data structures, and in-memory compressed indexes that use DDB.

DDMP ARCHITECTURE OVERVIEW

DDMP Architecture is provided below:



DDMP consists of two major subsystems: The Analytics Data Processing System, and the Real-Time Service System.

The Analytics Data Processing System provides full streaming data processing pipeline starting from data ingestion up to populating the Knowledge Database and training of the analytics recommendation engine.

The updated (pre-trained) recommendation engine model is periodically exported as an immutable presorted data structure and transferred to the Real-Time Service System.

The Real-Time Service System performs graceful reload of the new data, and continues serving real-time requests with updated recommendation model.

ANALYTICS DATA PROCESSING SYSTEM

The Analytics Data Processing System performs the following data processing:

- **Data is ingested, normalized, and integrated**
 - Bid requests in OpenRTB format, 2nd party data (clicks, conversions, GA), 3rd Party data
 - De-duplication, removal of outliers and corrupted data
 - IPQ engine parameterize data by a set of measured parameters
 - Browser/device/OS identification, JavaScript & Flash support, geo, referrer URL, search terms, etc.
- **Parametrized data is filtered**
 - Bots, restricted parameter combinations
- **Data is augmented with modeled parameters**
 - Demographic Profile
 - Psychographic Profile (hobbies, interests)
 - Behavioral Profile (clicks, impressions, conversions, VTR, time on site, etc.)
- **Data is segmented. DDMP supports several segmentation models:**
 - IPQ query language allows to create segments from original parameters
 - Category-based segmentation (demographic, psychographic)
 - Search-based segmentation (demographic, psychographic)
 - 3rd party predefined segmentation
 - Integrated segmentation
- **Look-alike modeling**
 - Based on demographic and psychographic proximity
 - Based on semantic analysis of matched search terms, and web sites from referrer URL

- Based on IPQ parameters
- Integrated
- **Bid request output vector is generated**
 - Customizable API: JSON over HTTP(S)
 - Batch or real-time delivery
- **Knowledge database is updated**
 - Segment models, bid request data, other

SMARTEX - Smart Contract-Based Ad Exchange

SMARTEX BRIEF OVERVIEW

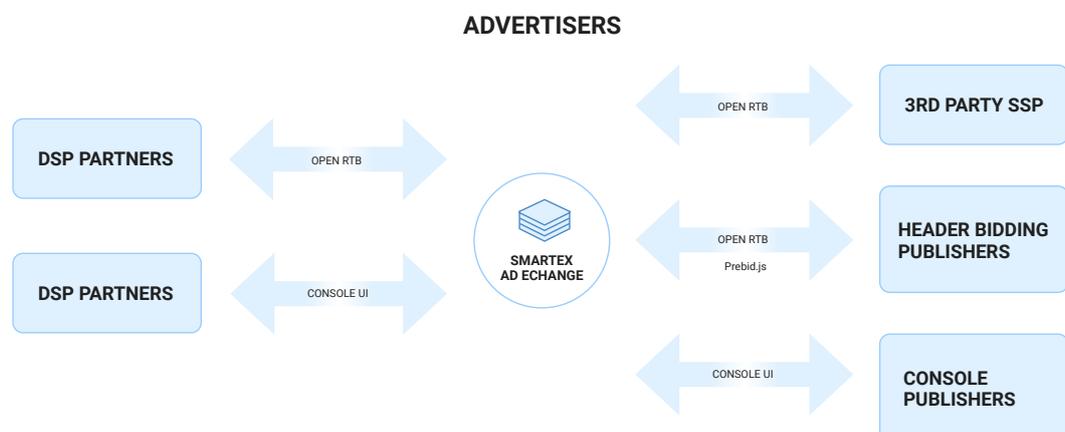
SMARTEX is a smart contract based linearly scalable, low latency ad exchange. It provides state-of-the-art audience analytics to the advertisers, and allows to create target audiences based on a combination of in-depth first-party and third-party audience data.

SMARTEX FUNCTIONALITY

- Based on smart contracts
- Dual support of direct (OpenRTB) and console level integration for both publishers and advertisers
- OpenRTB compliance
- Omni-channel support of display, video, and mobile inventory
- Integrated with BDSP and DDMP
- Integrated with content quality control ledger. Support traffic fraud protection free of charge and transparent for everyone.

SMARTEX ARCHITECTURE OVERVIEW

SMARTEX architecture is presented below:



SMARTEX UNIQUE CAPABILITIES

SMARTEX is the first Ad Exchange supporting auctions based on the ultrafast blockchain technology. It creates an extension to OpenRTB API to support smart contract auction mechanism. SMARTEX provides free open access to traffic quality distributed ledger and automatically blocks fraudulent traffic. It provides transparent access to all auction contracts and bidding history. SMARTEX supports distributed ledger on fraudulent ads and automatically blocks access to them. The quality of traffic and ads is defined by market participants in a friendly quality voting system.

ADFS - Accelerated Distributed File System

ADFS BRIEF OVERVIEW

BPC Platform needs to store and operate huge volumes of various data based on approach of distribution and decentralization. This assumes the creation of own Distributed File System using which two key components will operate: DDB (Decentralized Database) and DDS (Distributed Data Storage).

The development team conducts a research to determine the technological solution behind the ADFS. The current focus is on Merkle DAG which lies in heart of a few leading blockchain-based file systems like IPFS. This approach allows developing a nicely tuned solution to fulfill the specific requirements BPC Platform core structure demands. Merkle DAG is a directed acyclic graph using hashes as content-addressed links. The following features of a Merkle DAG file system are to be utilized for BPC:

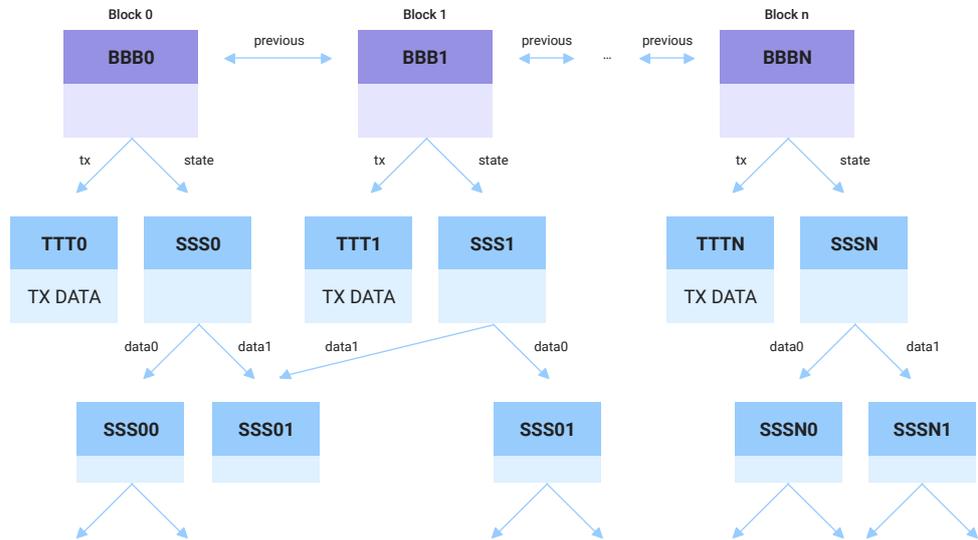
- **Authenticity.** Content hashing and verification against the particular link
- **Persistence.** Ability to permanent caching of the objects after they are fetched
- **Versatility.** Merkle DAG is suitable for almost any data structure representation
- **Decentralized nature.** No central object creators, this can be done by anyone.

This allows for content-addressed links, permanent objects caching, offline object creation and usage, network merging and partitioning, data modelling and distribution with no limitations.

ADFS is to become an authenticated and decentralized solution, enabling users to create, distribute, publish, access and download any data based on Merkle DAG.

BPC Platform also considers a potential partnership with one of the recently launched or announced distributed file system solutions like Storj or FileCoin. If there is an opportunity for a mutually beneficial cooperation, this is reviewed as

the fastest way to accomplish the task of creating a database that will meet all the necessary requirements.

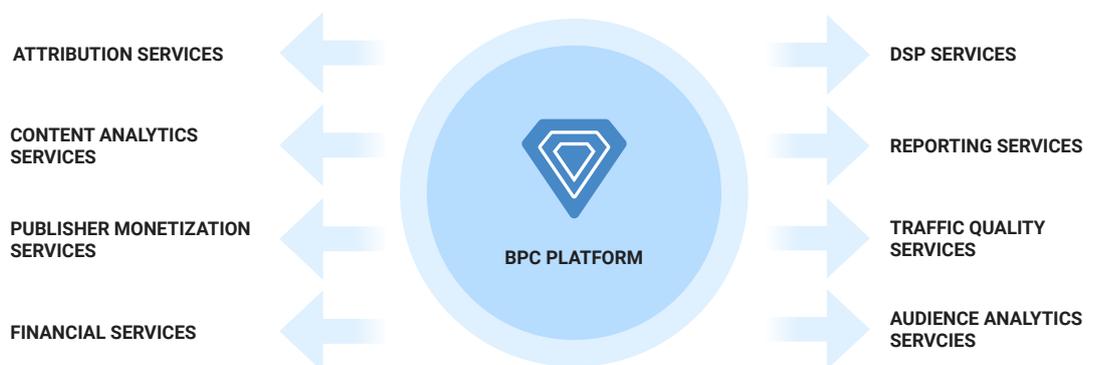


Auxiliary Services

BRIEF OVERVIEW

Besides advertisers, publishers, external DSP and ad exchanges, BPC Platform will grant access to a high variety of services capable of catering to the needs of all platform participants. Using BPC API, such services are enabled to integrate their own technologies into BPC ecosystem thus creating unique offerings that will empower BPC Platform and every player on board. Therefore, all external decentralized applications and services are to be approved by BPC Platform team to make sure they bring value to the system.

Below is a scheme of the constellation of services on the BPC platform orbit (one can imagine many more, as the architecture doesn't limit the way blockchain data can be used):



BPC Blockchain

Blockchain overview

BPC Platform needs blockchain to ensure all data received through OpenRTB protocol is securely stored and authenticity-proof. For this purpose all the available information on each event during a visit is stored in a unified ledger. Besides that, the blockchain technology allows to automatically regulate all interconnections between the programmatic RTB ecosystem participants through smart contract.

To calculate the expected amount of resources needed to effectively operate BPC Platform on blockchain, the development team used Google statistics of advertising data processing which currently approximates to 100 000 requests per second.

The blockchain is to meet the following requirements:

- Effective processing of 100 000 requests per second
- Average record size ~4 Kb
- Data is stored for 6 months and archived with no blockchain breaking

There are a few solutions currently being developed by prominent blockchain industry participants like the Lightning Network and Ethereum Foundation both working on their own solutions and uniting their potentials to create a breakthrough technology with significant speed increase compared to the solutions available today. In case there is no solution announced in the nearest future, BPC blockchain engineers has come with an alternative of how BPC blockchain can handle the necessary load.

MULTI-LAYERED BLOCKCHAIN

This is a know-how, specially designed to execute both the need to handle all smart contracts between BPC Platform participants and the capability of handling hundreds of thousands of requests per second to keep the OpenRTB log instantly available for all the parties while protecting it from unsolicited editing and fraudulent actions.

To store raw data 100 000 blockchains would be created to serve 1000 tx/sec therefore being able to utilize 100M requests per second. This approach is possible due to the nature of the data BPC needs to process - these blockchains are not required to be interconnected, therefore enabling usage of the partitioning method.

Data is stored in a particular blockchain which is determined by a smart contract put on the so-called “zero-level” or “business” blockchain. The algorithm uses smart contract address to define the number of one of 100 000 blockchains as a place to store the logs written as part of this particular smart contract execution.

Partitioning is the method of dividing database objects into separate parts with different parameters of physical storage. This is used to improve manageability, performance and reliability for large databases.

Logs will be stored for 6 months. Then they are archived in blocks with hash to keep the blockchain solid. Current calculations allow to predict BPC blockchain size in 6 months of regular workload:

100 000 tx/sec 4 kb each = 0.4 Gb/sec = 35 000 Gb/day = 5 973 000 Gb in 6 months

Every layer will equal ~59 Gb, serving approximately 0,34 Gb of data a day.

Layers will be served by distributed nodes, which will earn CPM tokens for sharing their disk space (to be described in details below), with data being pseudo-evenly distributed between the layers.

Each node is algorithmically assigned to store data from certain layers based on network requirements at the moment. The number of layers stored is defined by current layers size and the volume of available disc space allocated by the node.

Under the assumption of an average node allocating 512 Gb of disc space potentially available, to keep the blockchain running at 100 000 tx/sec capacity with at least 5 nodes proof 58 000 nodes should be enough. The new blocks are hash-sealed after each 1000 records.

The zero-layer is based on Graphene technology, while the 100 000 others are based on a proprietary solution developed in-house for the BPC Platform.

Below is the description and example of one BPC Blockchain block.

Object - A transaction object:

- **hash: DATA**, 32 Bytes - hash of the transaction.
- **ContractAddress: DATA**, 20 Bytes - The contract address created, if the transaction was a contract creation, otherwise null
- **nonce: QUANTITY** - the number of transactions made by the sender prior to this one.
- **blockHash: DATA**, 32 Bytes - hash of the block where this transaction was in. null when its pending.
- **blockNumber: QUANTITY** - block number where this transaction was in. null when its pending.
- **transactionIndex: QUANTITY** - integer of the transactions index position in the block. null when its pending.
- **from: DATA**, 20 Bytes - address of the sender.
- **to: DATA**, 20 Bytes - address of the receiver. null when its a contract creation transaction.
- **value: QUANTITY**.
- **input: DATA** - JSON-data send along with the transaction.

Example

```
// Request
curl -X POST --data '{"jsonrpc":"2.0","method":"bpc_getTransactionByHash",
"params":["0xb903239f8543d04b5dc1ba6579132b143087c68db1b2168786408fcbce568238"],"id":75}'

// Result
{
  "id":75,
  "jsonrpc":"2.0",
  "result": {
    "Hash":"0xb903239f8543d04b5dc1ba6579132b143087c68db1b2168786408fcbce568238",
    "Type": "0x1", // simple transaction between participants
    "ContractAddress":"0x103573d8013c2b85d32cf465507dd71d507400d8",
    "nonce":"0x",
    "blockHash": "0xbeab0aa2411b7ab17f30a99d3cb9c6ef2fc5426d6ad6fd9e2a26a6aed1d1055b",
    "blockNumber": "0x15df", // 5599
    "transactionIndex": "0x1", // 1
    "from":"0x407d73d8a49eeb85d32cf465507dd71d507100c1",
    "to":"0x85h43d8a49eeb85d32cf465507dd71d507100c1",
    "value":"0x7f110" // 520464
    "input":"0x603880600c6000396000f300600c6000396000f3603880600c6000396000f360"
  }
}
```

UNIFIED LEDGERS

BPC blockchain contains a few unified ledgers to guarantee equal access to OpenRTB data to all the platform participants and create a unified system or reputation to make sure no side tries to manipulate the platform and the authenticity of data whether it is user information, ad quality score or traffic attribution info. Anyone with access granted can add new entries to the ledger and everyone else would know about these additions to make their own assessments.

TRANSACTION FEES

Transactions are free within the BPC platform blockchain. The platform participants pay in CPM tokens to get access to certain blockchain layers (either write or read operations) in accordance to the previously signed smart contract with BPC blockchain - anyone accessing the blockchain layer should identify his request with smart contract ID. After the amount of transactions included into smart contract is over, the requesting side should create a new one by depositing CPM tokens, otherwise it will be denied access to the blockchain.

Mining Architecture

To create the huge blockchain structure previously described, BPC platform needs a multitude of distributed nodes. The nodes should be running independently with no connection to each other, therefore requiring the platform to attract a sustainable amount of peers willing to participate in the network. We qualify these peers as miners, but make the mining process possible to almost every personal computer or server owner, which creates the whole new opportunity for the industry.

MINING AND REWARDS

Miners receive rewards for leasing their disk storage, network bandwidth, CPU and GPU computing power. The reward system is based on Proof-Of-Work (PoW) protocol to prevent miners from misleading or compromising it. The PoW in BPC is executed in different way for different types of mining:

CPU and GPU. The PoW is the output of the DAPP (Decentralized Application) using node CPU or GPU processing power.

Network bandwidth. The PoW is the hash the miners need to submit after they execute a network request, i.e. parsing an HTML-page.

Disk storage. The PoW is the hash value of the block of data which is being sealed after reaching the volume of 1000 transactions. A miner needs to calculate the hash function of the data contained in the block and publish the result to the blockchain (followed by the data itself).

The reward is being awarded to the node that has sealed the block, but the miner receives the reward partially during 6 months of storing the data from the sealed block. This prevents nodes from deleting data soon after it receives the reward.

BPC welcomes external distributed solutions (i.e. SONM) to join the platform as huge miners and increase output for their users and contributors.

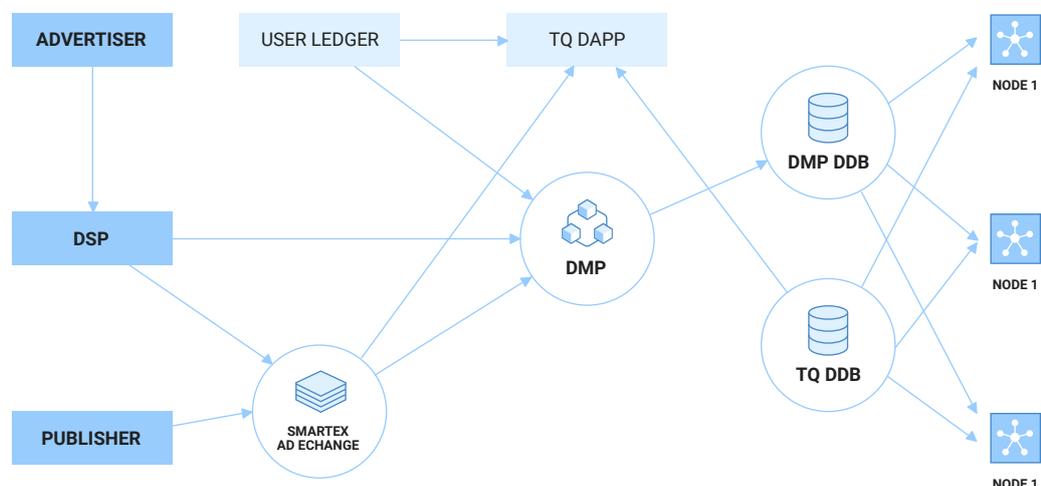
TRANSACTIONS

In BPC blockchain a transaction is a set of data up to 1Mb in size. Each transaction is a separate entity describing a function and/or containing certain parameters. The example of a simple transaction is sending a token from sender to receiver. A transaction with parameters could be an RTB-event like view or click.

The sophisticated structure of BPC Platform requires a wide variety of supported transaction types like smart contracts, mutual settlements accounting, data storage etc. Each type of transactions can be allocated to a particular BPC blockchain layer (or multiple layers). Therefore each blockchain layer can be based on a particular unique within the network principle, utilizing the technologies most suitable for the transaction it executes. Still every layer should have API that allows it to interact with any other layer including the “zero” layer. Moreover, different protocols of miners reward proof can be used, therefore BPC blockchain is not limited to PoW only - if other protocols enhance the certain layer in terms of speed, reliability etc., the development team is ready to implement it as the BPC blockchain structure makes such versatility possible.

Use Case

This paragraph would briefly describe BPC Platform functioning when executing an ordinary use case.



Use case name: Single ad serving

Actors:

- Publisher
- SMARTEX (BPC ad exchange service)
- DSP (third-party demand-side platform that connects to BPC Platform through API)
- DMP (third-party data management platform that connects to BPC Platform through API)
- Advertiser
- TQ DAPP (BPC traffic quality decentralized application)
- BPC Blockchain layers (various unified ledgers with either raw log data or particular records from BPC Platform participants)
- BPC nodes (miners, who has installed the executed file on their hardware to become part of the distributed decentralized BPC Platform structure)

Trigger: A visitor comes to a publisher's website.

Use Case Description: Publisher places SMARTEX code on his website so that SMARTEX receives a signal about a new visitor. SMARTEX requests Traffic Quality DAPP (TQ DAPP) to find out whether there any information available regarding this user. TQ DAPP checks its database updated from both the BPC unified ledgers and its private sources (including a pixel on advertiser's website to track visitor behaviour) and makes an assessment placed into BPC traffic quality unified ledger with the note of the author of the assessment. Advertiser contacts DSP with ad campaign request, DSP creates an insertion order and submits it to SMARTEX. The latter matches a visitor with this insertion order and creates a bid request including the previously received TQ information which is sent to DSP. DSP asks DMP about the visitor within the bid request, DMP checks its database, which can be updated from both the BPC unified ledgers and DMP private sources. DSP receives an answer from DMP and sends a bid response containing an ad.

DSP wins an auction and SMARTEX sends the ad to be displayed on publisher's website notifying DSP about it. The ad is shown to the visitor, the DSP pays for the view in CPM tokens on behalf of advertiser, the publisher is credited with CPM tokens from SMARTEX with the deduction of TQ DAPP service fee that SMARTEX pays to TQ DAPP, which pays the nodes and the BPC blockchain, DSP pays to DMP, which pays the nodes and the BPC blockchain.

Normal Flow:

1. A visitor comes to publisher's website or mobile application
2. SMARTEX is notified about the visitor through a previously placed code on publisher's website, the request contains some basic visitor information

3. SMARTEX stores the basic information about the visitor into the unified user ledger, using one request under the previously signed and paid (with CPM tokens) smart contract (hereinafter: PSP SC) between SMARTEX and BPC blockchain
4. SMARTEX requests TQ DAPP regarding this visitor, using one request under the previously PSP SC between SMARTEX and TQ DAPP
5. TQ DAPP makes a search in its DDB, using one request under the PSP SC between TQ DAPP and BPC blockchain
6. BPC blockchain fulfills the search using a corresponding amount of requests under the PSP SC between BPC blockchain and mining nodes
7. TQ DAPP updates its DDB by making a read request under the PSP SC to the unified traffic quality ledger
8. TQ DAPP uses the information from its DDB, unified TQ ledger and his own sources (including but not limited to placing a visitor performance tracking pixel on advertiser's website) to make an assessment of the visitor quality
9. TQ DAPP returns the information to SMARTEX, also creating a record in the unified traffic quality ledger, using one request under the PSP SC between TQ DAPP and BPC blockchain
10. DSP creates an insertion order on behalf of advertiser and submits it to SMARTEX
11. SMARTEX creates a bid request that includes TQ information in the OpenRTB format and sends it to all DSPs that has created the insertion orders with the requirements this bid request meets
12. DSP requests DMP regarding the visitor, using a request under the PSP SC.
13. DMP makes a search in its DDB, using one request under the PSP SC between DMP and BPC blockchain
14. BPC blockchain fulfills the search using a corresponding amount of requests under the PSP SC between BPC blockchain and mining nodes
15. DMP updates its DDB by making a read request under the PSP SC to the unified traffic user ledger and any other ledgers it might need information from
16. DMP returns the information to DSP
17. DSP uses the information from DMP and TQ information in the bid request to decide its bid and submits it as a bid response to SMARTEX with the ad attached and containing the number of smart contract under which the insertion order has been submitted.
18. SMARTEX decides the winner of the auction and places the winner's ad on publisher's website, confirming this to DSP
19. The ad is displayed to the visitor
20. SMARTEX puts the record of the ad placement to the raw data blockchain using one request under the PSP SC between SMARTEX and BPC blockchain
21. Publisher is credited with the corresponding amount of CPM tokens after the smart contract between the publisher and SMARTEX calculates it through analyzing the log of ad placements

Use case name: Mining node setup and start of work

Actors:

- Mining node (server installed in a colocation facility)
- BPC Blockchain
- DMP Analytics DAPP

Trigger: User decides to join BPC to participate as a mining node.

Use Case Description: A user signs up and downloads the installation file that is to be put and executed on the server to create a virtual machine. The virtual machine carries the security settings that deny connections from any source but BPC Platform. The configuration file is created during the installation. This file allows the miner to choose what kind of mining he wishes to participate with and limit the volume of allocated capacity and power as well as set the prices he wishes to charge. Default settings will be applied if the VM is started with no changes in the config file. After the virtual machine is manually started the node becomes visible to the BPC network therefore making it available for DAPPs and blockchain to use its computing power and disk storage within the limits set in the config file.

Normal Flow:

1. The user downloads the executable file to the server and executes it
2. Virtual machine is created on the server
3. The user opens and edits the config file to choose the volume of the resources allocated and also set the prices in CPM tokens (the recommended price are already set up)
4. The user runs the virtual machine
5. The VM broadcasts (creates a smart contract and makes a record into the blockchain) its availability to the network which is event-driven
6. DMP Analytics DAPP creates a task which triggers the auction and the node becomes one of the nodes chosen to execute the task
7. The aforementioned event is written into one of BPC Blockchain layers citing the number of the previously signed and paid smart contract between BPC Blockchain and DMP Analytics DAPP.
8. Node participates in executing the DAPP
9. The hash of the execution results is published to the network and stored in the blockchain
10. The node is eligible for receiving the particular amount of CPM tokens based on the prices set in the config file and the resources used to execute the DAPP task
11. When the DAPP task is completed, this serves as a PoW event
12. CPM tokens are sent to the node wallet.

Conclusion

Programmatic market expects and foresees changes that will make it advantageous for everyone again, like it was at the very beginning of this advanced technology adoption. Chances are blockchain is the solution to all the problems piled up on this industry creating a burden hard to cope with.

We reckon this whitepaper answers most of the questions regarding the technology basis of the BPC Platform and how it will serve the benefit of all the participating sides of online advertising industry. The document is to be further updated along with the development progress. We would also gladly answer your questions, if you've got any, through the livechat, in Telegram and Slack.

Glossary of Terms

RTB

The RTB or Real Time Bidding is a system to bid for an ad-impression on a real time. RTB is similar to a financial market. It enables advertising inventory to be bought and sold on a per-impression basis via programmatic instantaneous auction. A buyer or advertiser can use the RTB technologies to bid higher or lower value for a specific ad impression depending upon how attractive the impression or the audience is for its business. The RTB ecosystems put significant emphasis on user information (geographic, demographic, behavioural data, for example), and the publisher data (the publisher domain, context etc.)

PROGRAMMATIC

Programmatic advertising typically refers to automated buying and selling of digital media using technology platforms. It uses software and computer algorithms to sell and purchase digital media.

PRIVATE EXCHANGE

A virtual marketplace operated by sellers to represent their high value/premium inventory, providing programmatic access to select buyers (via a DSP) who agree to transact based on pre-negotiated terms (e.g. flight dates, floor prices, auction types, budgets, etc.). True private exchanges offer access to inventory that is not otherwise available within the open market.

DSP

A DSP is a technology platform through which buyers (Advertisers or Agencies) can plan, target, execute, optimize, and analyze digital media buying programs across 100% of the media plan. Through a DSP, the buyer can set targeting criteria, pricing, frequency, and other criteria governing the purchase of digital ad units. Advanced DSPs will provide additional capabilities to the buyer, including integration of various online and offline data sources, the ability to provision direct media buys (as opposed to just RTB), advanced optimization and decisioning capabilities, and creative tools.

DMP

Data Management Platform. A centralized system for gathering first-party data, integrating with third-party data, and applying this data to one's advertising strategy. Advanced DMPs offer users the ability to create custom segments, forecast segment volumes, sync segments with other sources, overlay advanced analytics, and are often integrated with or part of DSP platforms.

AD EXCHANGE

A virtual marketplace where participating suppliers auction their impressions to eligible buyers. The ad exchange announces each impressions, in real time, and asks buyers if they are interested to buy said impression and at which price.

DEAL ATTRIBUTION

A single piece of information known about a user and stored in a behavioral profile which may be used to match ad content to users. Attributes consist of demographic information (age, gender, geographical location), segment or cluster information (auto enthusiast), and retargeting information (visited Site X two days ago).

DYNAMIC AD INSERTION

The process by which an ad is inserted into a page in response to a user's request. Dynamic ad placement allows alteration of specific ads placed on a page based on any data available about the user and from that campaign. At its simplest, dynamic ad placement allows for multiple ads to be rotated through one or more spaces, served by a template creative. For example, Best Buy may show a DVD player to one user, and an iPod to another user, using the same ad creative and ad tag. RTB benefits are strengthened when the ad speaks closely to what the user shows interest in.

API

Set of rules and specifications that software programs can follow to communicate with each other.

JSON-RPC

JSON-RPC is a stateless, light-weight remote procedure call (RPC) protocol. Primarily this specification defines several data structures and the rules around their processing. It is transport agnostic in that the concepts can be used within the same process, over sockets, over http, or in many various message passing environments.

WEBSOCKET

WebSocket is a computer communications protocol, providing full-duplex communication channels over a single TCP connection.

LEDGER

In blockchain, a distributed ledger is a database held and updated independently by each participant (or node) in a large network.

AUDIENCE MODELLING

Potential customers modeled after an Advertiser's 1st party data (usually data from their customers who visit and make purchases from their websites). Attributes of the Advertiser's customers are matched against a larger audience, creating a pool of highly targetable and 'pre-qualified' users. Some companies refer to this also as 'pre-targeting'.

SEMANTIC CATEGORIZATION

When you place a semantic tag like <photo> on a piece of content, you put that content in a semantic category. You make it "semantically categorized." That is the why to properly organise content for future seamless usage.

COOKIE MATCHING

Or cookie synching - refers to the process of mapping user Ids from one system to another.
The systems across which the user Ids are mapped could be Ad Networks, DSPs, Ad Exchanges or Data Providers.

DYNAMIC RETARGETING

Re-messaging various messages to a collective pool of participants based on the pools the buyer/client creates; usually involves collecting data by pixelating the Advertiser's website.

CPM token

CPM token is a digital equivalent used within the BPC network to execute the payments between all participating parties.

DDB

A distributed database is a database in which portions of the database are stored in multiple physical locations and processing is distributed among multiple database nodes.

AD QUALITY SCORE

An ad quality score, often just called a quality score, is a number assigned to advertisements in a hybrid auction that determines each advertisement's rank on a search engine results page.

MINING

Mining, in the context of blockchain technology, is the process of adding transactions to the large distributed public ledger of existing transactions, known as the blockchain.

NODE

A network node is a connection point that can receive, create, store or send data along distributed network routes.

PROOF-OF-WORK

A proof-of-work (POW) system (or protocol, or function) is an economic measure to deter denial of service attacks and other service abuses such as spam on a network by requiring some work from the service requester, usually meaning processing time by a computer.

DAPP

A DAPP is a decentralized app, which is like the name suggests, not hosted on such central servers. It uses for example Swarm and IPFS, so it interfaces with the blockchain to run and to get its data.